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TECHNOLOGY, PLURALISM AND
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AGRICULTURE, FOOD, AND
ENVIRONMENT

Extent of Adoption of Organic Farming Operations by Crop Farmers for Sustainable Environment and Food Security in Abia State, Nigeria

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Abstract

Introduction

It is evident that organic farming is eco-friendly and a sure means to achieving a sustainable environment and food security, but the common organic farming practices, the extent of their adoption by crop farmers, and the challenges they face in the adoption are elusive in Abia State, Nigeria. It was, therefore, necessary to bridge this gap empirically to enhance the adoption among experienced and inexperienced farmers for the achievement of the Millennium Development Goal 7 with a uniform continuous supply of healthy food in Abia State, Nigeria.

Purpose and Objectives

The purpose of this study was to describe the extent of the adoption of organic farming operations adopted by crop farmers for a sustainable environment and food security in Abia State, Nigeria. Specific objectives were to determine the socioeconomic characteristics of the beneficiary farmers; identify organic farming operations common among crop farmers; describe the extent of adoption of organic farming operations by crop farmers; and identify constraints to crop farmers' adoption of organic farming operations in Abia State, Nigeria.

Method and Materials

The study employed a positivist approach and quantitative research method with a descriptive survey research design. It was carried out in Abia State, Nigeria with a sample of 240 farmers. A non-proportionate-stratified simple random-purposive sampling procedure and a 37-item researchers' structured questionnaire titled: Organic Farming Operations Adoption Questionnaire (OFPAQ) were used for data collection. Face validity of the instrument was carried out by three experts. With a trial testing of OFPAQ on 21 crop farmers in Anambra State, the reliability of the instrument was done using the Cronbach Alpha method with an estimated index of 0.85. Three hired and trained research assistants were involved in the study for data collection. Out of 240 copies of the questionnaire administered through face-to-face contact, 232 (96.4%) copies were retrieved and analyzed with a high degree of ethical considerations.

Results

The findings showed that 12 organic farming operations including crop rotation [\bar{x} =3.78], cover cropping [\bar{x} =3.78], mulching [\bar{x} =3.89], intercropping [\bar{x} =3.74], mowing, uprooting, and cutting of weeds mechanically [\bar{x} =3.73], cover cropping [\bar{x} =3.548], application of green manure [\bar{x} =3.40], minimal or zero tillage [\bar{x} =3.36], are common among crop farmers. While farmers to a moderate extent [\bar{x} =2.36] adopt organic farming operations in the study locale, inadequately trained extension specialists on organic farming [\bar{x} =3.71], inadequate storage facilities for organic crop products [\bar{x} =3.57], high incidence of pests and disease pathogens in organic farming [\bar{x} =3.44], inadequate processing facilities for organic crop products [\bar{x} =3.34], lack of access to credit facilities for organic farming [\bar{x} =3.21], poor transportation of organically produced crops [\bar{x} =3.00], fluctuation in the price of organic farming products [\bar{x} =2.99], and low output of organic farming operations [\bar{x} =2.98] in that order and others are the constraints to crop farmers in adopting organic farming operations in Abia State, Nigeria.

Recommendations

It was recommended that there should be the provision of requisite training of farmers on the adoption of organic farming operations by extension officers to ensure a sustainable environment and food security; Agricultural Educator and Extension workers should identify skills involved in the organic farming operations common in Abia State for respective training of students in schools, farmers and other individuals interested in farming in the State; crop farmers should add more organic farming operations to the ones they are already practicing for sustainable environment and food security; the Ministry of Education should initiate consumer education programme on the health benefit and side effect of consuming organic and inorganic farming products, and further research should be carried out by future researchers to identify possible solutions to the 11 constraints to crop farmers in adopting organic farming operations in Abia State.

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How can the organizational capacity of Extension and Advisory Services be developed to help the farming sector adapt to flash flooding?

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Abstract

Introduction and theoretical framework

Extension and Advisory Services (EAS) need to grow their capacity and enhance innovation for adapting agriculture to climate change (Sulaiman & Davis, 2012). Capacity development (CD) of public EAS is critical as they are the key player to ensure national agricultural development (Murray-Prior, 2013). CD is a systems approach that involves developing capacity across individual, organizational and enabling environment dimensions (Hall et al., 2009). Although various CD initiatives have been focused on the individual capacity of public EAS, significant barriers to enhancing innovation are associated with other capacity dimensions (Aerni et al., 2015). Particularly, CD in the organizational dimension of public EAS is essential because it facilitates the process of bringing together opportunities and challenges at the individual level and in the enabling environment (United Nations Development Programme, 2009). Thus, the organizational dimension integrates all other capacity dimensions and enhances the overall system's capacity to innovate and support the adaptation of the farming sector to various challenges (United Nations Development Programme, 2009). There has been little study to date on the ways to enhance the organizational capacity of public EAS to help the agricultural sector adapt to climate change. Additionally, the current literature falls short of comparing the capacity of EAS among various dimensions, such as individual vs organizational, and organizational vs enabling environment for the same context.

This study utilized CD of the agricultural innovation system (CAIS) as a theoretical lens to conceptualize the capacity of public EAS to innovate. EAS should have the capacity to navigate complexity, collaborate, reflect and learn, and engage in strategic and political processes in each dimension (Tropical Agriculture Platform, 2016). CD intervention through the organizational level needs sufficient emphasis on improving organizational processes and management systems (Grovermann, 2017). These may include the influential position of EAS in various committees, support for collaboration, support for field activities, support for ICT use, vehicle supports, training supports, a culture of appreciation and rewards for good work, freedom of work for EAS staff, and manageable work-load for EAS staff.

Purpose and objectives

The study aims to contribute to CD through the organizational dimension of public EAS, by examining the Department of Agricultural Extension (DAE), the largest public-sector extension organization in Bangladesh (Coote & Rahman, 2016). The specific objectives of this study are – 1) to investigate the aspects that influence the organizational capacity of DAE to help rice farming adapt to flash flooding and 2) to compare the organizational and individual capacity dimensions of DAE associated with adapting rice farming to flash flooding.

Methods and data sources

The research was conducted in the north-eastern part of Bangladesh that is prone to flash floods, which occurs in a small catchment with heavy rainfall within a short period of time and cause overflow of rivers and inundate crop fields (Archer & Fowler, 2018). A total of nine aspects mentioned as CD interventions in the introduction and theoretical framework sections were considered independent variables, and four capacity aspects of the organizational dimension of DAE were considered dependent variables. Individual capacity dimensions of DAE were also investigated. Data were collected using a survey with 99 randomly selected DAE staff, key informant interviews with six DAE staff, and focus group discussions with 16 DAE staff from March to June 2019. The statistical package for social science software was used to conduct regression analysis and t-test, and NVIVO software was used to analyse qualitative data.

Results, products, and conclusions

All the selected independent variables significantly influenced the various capacity of DAE except training supports. The capacity to navigate complexity was influenced by support for field activities, the influential position of DAE in various committees, freedom of work, and vehicle supports. The capacity to collaborate was influenced by support for field activities, a culture of recognition and rewards for good work, support for collaboration, the influential position of DAE in various committees, and support for ICT use. The capacity to reflect and learn was influenced by support for collaboration, manageable work-loads, and a culture of recognition and rewards for good work. The capacity to engage in strategic and political processes was influenced by support for collaboration, freedom of work, manageable work-loads, and the influential position of DAE in various committees.

The individual capacity dimension of DAE to navigate complexity was significantly higher than organizational one with t-value -3.624. To overcome the shortage of rice seeds, one DAE staff reported, "When we offer demonstration plots to farmers, we tell that after demonstration you need to store the seeds with fungicide, we will help you to sell seeds with good price." This task is entirely personal, self-driven and beyond the DAE's organizational strategies and approaches. The capacity of DAE to reflect and learn was significantly higher for the individual dimension than for the organizational dimension with t-value -5.714. There were no significant differences between organizational and individual dimensions of DAE for capacity to collaborate and capacity to engage in strategic and political processes.

Recommendations, educational importance, implications

Capacity development is a complex and long-term process (Sulaiman & Davis, 2012). It involves a change in the existing organizational culture (Raymond, 2010) and rearranging current roles, practices and ways of performing various services (Hall et al., 2009). There is no silver bullet that develops capacity for the organizational dimension of EAS (Claussen, 2011). A supportive organizational structure for the collaboration of public EAS with other relevant organizations might be helpful. Policy-makers should emphasize public EAS and position EAS as an influential and significant member in various committees associated with agricultural development. Government and policy-makers need to reorganize the roles and regulations of public EAS organizations to develop a culture of appreciation and support for good work and practice of freedom of work for EAS staff. Donors, funders and policy-makers should provide adequate funds and other instrumental support to EAS for conducting field activities and enhancing responsive services to the farming community to support adaptation to flash flooding.

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Job Satisfaction of Agricultural Extension Professionals in Nigeria's National Agricultural Extension and Research Liaison Services (NAERLS)

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Abstract

Introduction

To foster the development of agriculture in Nigeria, agricultural extension education is being used to change the practices of farmers, who are still largely subsistence producers (Shehu, 2016). The National Agricultural Extension and Research Liaison Services (NAERLS) in Nigeria has the mandate to develop, collate, evaluate, and disseminate agricultural technologies and conduct research in agricultural extension methodologies and policy. Given the important role agricultural extension and advisory services play in agricultural development in the country, Extension professionals (EPs) need to be satisfied with their job in order to perform their duties effectively. In addition, to retain professionals in the Nigerian Extension system, they must also feel satisfied with their job. According to Lee-Kelly, L., Blackman, D.A., & Hurst, J.P. (2007), job satisfaction can be used as a broad assessment of an employee's attitude or overall acceptance, contentment, and enjoyment in their work.

Purpose and objectives

The purpose of this study was to evaluate the degree of job satisfaction of EPs in Nigeria and to determine whether their personal characteristics influenced their level of job satisfaction. The specific objectives were to:

- Describe the level of job satisfaction of the EPs in the head office of NAERLS.
- Describe selected demographics (gender, age range, level of education, and years of experience) of the EPs, and determine whether the demographics has any influence on the degree of their job satisfaction.

Methods and Data Sources

Participants in this study were EPs stationed at the head office of NAERLS in Zaria, Kaduna State. The questionnaire for this study was developed by the researcher to address purpose and objectives of the study. The demographic section of the questionnaire was used to collect data on gender, age range, level of education, and years of experience as an EP. The other section asked the EPs to rate their level of job satisfaction/dissatisfaction using a five-point Likert-type scale (1 = Very Satisfied, 2 = Somewhat Satisfied, 3 = Neither Satisfied nor Dissatisfied, 4 = Somewhat Dissatisfied, 5 = Very Dissatisfied).

A cover letter and the research instrument were sent to the 61 EPs in the NAERLS head office. The participants were requested to return questionnaires within two weeks. A total of 43 completed questionnaires were returned, resulting in a response rate of 70%.

Descriptive statistics were used to determine frequencies, means, percentages, and standard deviations. Analysis of Variance (ANOVA) was used to explore the relationship between independent variables (demographic data) and dependent variable (job satisfaction).

Results and Conclusions

Results from the study revealed that a total of 14 (32.5%) respondents reported that they were satisfied (very satisfied: $f = 5$; somewhat satisfied: $f = 9$) with their Extension career. On the other hand, job dissatisfaction was recorded for 15 (34.9%) respondents (very dissatisfied: $f = 3$; somewhat dissatisfied: $f = 12$). The remaining 32.6% neither agreed nor disagreed that they experience some degree of satisfaction/dissatisfaction within their career.

There were more male respondents ($n = 34$, 79.1%) versus female respondents ($n = 9$, 20.9%). The majority of the respondents ($n = 32$, 74.4%) were less than 50 years old. Most respondents ($n = 30$, 69.8%) reported to have acquired postgraduate level degrees. Similarly, a majority ($n = 27$, 62.8%) of the respondent had more than five years of experience.

The degree of EPs' job satisfaction did not vary with their gender, age range, level of education, and years of experience.

Educational Importance and Implications

The findings from this study indicates that only about one third of EPs in NAERLS were satisfied with their careers in Extension. There is the need for the management of NAERLS to implement an intervention or/and a process that will be aimed at enhancing the motivation of its staff in order for them to better serve their clientele. Further research that seeks to identify positive motivating factors will be very useful.

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Importance of women's empowerment in child nutrition: Guatemala case study

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Abstract

Introduction

Malnutrition is one of the greatest challenges for human development, being classified as one of the main factors responsible for the intergenerational transmission of poverty and inequality (United Nations International Children's Emergency Fund [UNICEF], 2013). Among the countries most affected by malnutrition is the Republic of Guatemala, which has one of the highest rates of child stunting in the world, being particularly high among the indigenous population (Food and Agriculture Organization of the United Nations [FAO], 2021b). The cause of this situation has been attributed mainly to poverty, which is why various programs have been implemented to reduce the rate of stunting. Despite this investment, there has been no significant progress in Guatemala's reduction in malnutrition (FAO, 2021a). This indicates that there may be other factors, besides poverty, that have not been considered when formulating these programs. Among the determining factors in child nutrition, one of the most prominent is the status of the mother, since the quality of childcare depends on them, and directly affects their nutritional status. Therefore, the status of women is a key element in combating malnutrition at the national level (UNICEF, 2019).

According to published literature, several authors report that women's empowerment is associated with the improvement of the nutritional status of children (Njuki et al., 2016). This research considers the influence of belonging to an ethnic minority group on the relationship between both children nutritional status and mother's empowerment variables in Guatemala. The assumption of this study is that ethnicity could be negatively associated with other factors. In other words, the fact of belonging to an ethnic minority group is associated with less empowerment of women and child nutrition problems. Under this assumption and to study the possibility of such an association, we have carried out a statistical analysis of the relationship between the empowerment of women and ethnicity, and how this relationship influences the results of stunting reported during the most recent data in 2014-2015.

Purpose

Our purpose is to generate information that is useful to guide decision-making, policy formulation and the planning of development programs focused on child nutrition.

The main objective is to generate regression models that help represent the relationship between women's empowerment, ethnicity, and the nutritional status of children under 5 years in Guatemala, as well as the level of association between them.

Methods

To understand the relationship between women's empowerment, ethnicity, and child nutritional status in Guatemala, we used data generated by USAID through the Guatemala Demographic and Health Surveys [DHS] (2015). To conduct the survey, the DHS program used a multistage, random, and stratified cluster sampling procedure to select a nationally representative sample. The total sample size of the survey is 25,914 women aged 15-49 years and 11,962 children under 5 years. From the total number of observations, we eliminated those that did not have the necessary information to carry out the study, such as the cases in which information on the nutritional status of the children was not reported, and/or information on the participation of women in the decision-making. Therefore, the analytical sample of this study consists of a total of 9,297 observations that correspond to children under 5 years with mothers living with their partners.

Outcome variables:

Our outcome variables refer to child nutritional status, based on the child's height and age. Outcome variables were examined as continuous and binary variables. The first variable corresponds to the height-for-age Z-score (HAZ), which is measured as a continuous variable. The second variable refers to child stunting, which is defined as two standard deviations (SD) below the mean height-for-age of the World Health Organization [WHO] (2006) child growth standards. The last variable corresponds to severe stunting, which is defined as more than 3 SD below the median of the WHO child growth standards (WHO, 2006).

Empirical analysis:

To analyze each of the variables, we developed different models of ordinary least squares (OLS) and binary logistic regression, using Stata version 17.0[®]. The models were calculated under the assumption that, the greater the empowerment of women, the better the nutritional status of children under 5 years; and, that this effect could vary with minority ethnic populations.

To control any external effects to the empowerment and ethnicity variables, we included variables that characterize each household, child, and mother.

Results

The developed HAZ and severe stunting regression models show statistically significant associations with women's empowerment and ethnicity. We found that, the increase in the decision-making score is associated with a 0.05 SD increase in HAZ and a 13% decrease in the probability of severe stunting. On the other hand, ethnicity is associated with a 0.22 SD decrease in the HAZ model and a 50% increased probability of severe stunting.

These findings suggest that, in non-indigenous households, female empowerment is associated with better HAZ outcomes and lower rates of severe stunting. However, in indigenous households, the individual effect of women's empowerment is reduced, increasing the chances that her children will suffer severe stunting. This reflects that, in Guatemala, there is a high probability that children suffering from severe stunting belong to an ethnic minority and that, in the indigenous population, the women's empowerment has not been able to help improve the nutritional status of children significantly.

Therefore, in Guatemala, it is necessary to focus efforts to reduce child malnutrition in the indigenous population, promoting programs for the women's empowerment, but differentiating action strategies according to the cultural context and the specific needs of each population.

Recommendations

According to the study's findings, the status of women is a key element to combat malnutrition in Guatemala, however, in the indigenous population it is not possible to observe an impact on children with empowered mothers. One of the limiting factors in this study is that the DHS survey does not provide enough information to measure women's empowerment, since it does not have such an approach. Therefore, it is suggested to carry out a study that provides more detailed information on empowerment and delve into the reasons why the indigenous population is the most affected.

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The Case of Contradictions: How Prolonged Engagement, Reflexive Journaling, and Observations can Contradict Qualitative Methods

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Abstract

Introduction

Conversations surrounding validity in qualitative research remain a central concept within methodological literature (Kvale, 1995; Lub, 2015). One of the most well-known works in qualitative validity includes Lincoln and Guba's (1985) development of trustworthiness in qualitative research (Lub, 2015). Their quality criteria include methods to address credibility, dependability, confirmability, transferability, and authenticity. These concepts occur at various phases of the research process (Lincoln & Guba, 1985). To evaluate qualitative research rigor, or the act of being extremely thorough (Johnson & Rasulova, 2017), strengthening credibility, and gaining authentic data, Lincoln (1995) suggests focusing on prolonged engagement, persistent observation, peer debriefing, triangulation, and member checking.

Other researchers, including Kvale (1995), suggest further qualitative research validity steps and outline three approaches in the postmodern context including validation as investigation, communication, and action. By combining these three approaches, validity in qualitative research involves the researcher maintaining a questioning and critical attitude (Kvale, 1995).

Morse et al. (2002) suggested reconsidering the verification strategies from Lincoln and Guba (1985) to ensure rigor. Their strategies include investigator responsiveness, methodological coherence, appropriate sampling, an active analytic stance, and saturation (Morse et al., 2002). These strategies move the responsibility of rigor from the external judges to the investigator and require the investigator to attend to rigor throughout the entire research process (Morse et al., 2002). Morse et al. (2002) claim if the question of validity is only taken into account at the end of the study, the researcher may miss serious threats to validity and reliability that are too late to change.

Researchers suggest it goes further than just academic reflection and there may not be a single set of assessment criteria for qualitative research (Hammersley, 2007; Lincoln & Guba, 1985; Lub, 2015). Although the debate on qualitative validity standards continues, the use of certain methods remains prevalent in qualitative research. In this study, we found particular validity procedures to be useful as they contradicted findings from results produced via common qualitative methods in an international context.

Purpose and Objectives

The purpose of this study was to explore why contradictions occurred between the interview themes and observations due to prolonged engagement in a qualitative study of an international development fellowship program in Ghana. The specific objectives include:

- 1) Determine the relevance of validity measures including prolonged engagement, reflexive journaling, and observations.
- 2) Describe recommendations for future qualitative research.

Methods

This paper draws from a larger research study using mixed methods to examine the impact of long-term international experiences in agricultural education. The overall study used a convergence parallel mixed methods design (Creswell & Plano Clark, 2011). The population included a census of eight fellows from the International Agricultural Education Fellowship Program (IAEFP). The fieldwork took place for three months in Ghana, and one month in the United States, where the qualitative components included interviews, focus groups, and monthly open-ended survey questions. The researcher used a reflexive journal including all events that occurred throughout the study and allowed the researcher to reflect on their observations (Wallendorf & Belk, 1989). The reflexive journal and observations assisted in cross-checking the data collected (Wallendorf & Belk, 1989).

Results

Using the constant comparative method by Glaser and Strass (1967), through analyzing and debriefing the qualitative data, six themes were identified, including one theme describing “contradictions.” This theme came directly from the reflexive journaling and observational data the researcher kept through the prolonged engagement. This theme included three subthemes, contradicting monthly meetings, contradicting desire for feedback, and contradicting expectations.

Participants participated in monthly meetings with their cohort and during interviews and focus groups, described how they would like to have more structured monthly meetings. However, when a more structured schedule was implemented, participants retaliated and requested multiple changes to the schedule. This directly contradicted what was described by participants in qualitative data collection.

Participants also mentioned they desired more feedback on their teaching and 4-H advising. Because of this, the program coordinator provided an opportunity for participants to receive feedback from an expert. Then, however, multiple participants who had specifically described how they wanted feedback, contradicted themselves, asking if it was required because they did not want to complete the feedback opportunity. Further, participants wanted to know the quantitative expectations of the program. However, when numbers were given to them, for example, how many students they should bring to a camp, they expressed wanting to change the number and contradicted the previous responses.

Conclusions

The findings for the theme, contradictions, would not have been revealed without the three-month in-country prolonged engagement, reflexive journaling, and observations. The contradictions theme contributed to the overall study by providing more context to the mixed methods research and future

program adjustments. The use of prolonged engagement, reflexive journaling, and observations was useful to address validity and credibility, but it also deeply contributed to the research findings.

Swain and King (2022) suggest informal conversations can be just as valid, and have the same epistemological status, as formal conversations in interviews and focus groups, the findings in this study validated this conclusion. There is an advantage to increasing validity through observations and informal conversations. The threat of memory can lead to the possibility of contamination and degradation (Swain & King, 2022), however, this can be mitigated via reflexive journaling and reflecting on the researcher's own bias' (Swain & King, 2022; Symon & Cassell 2012). In this study, if the informal conversations produced from prolonged engagement, observations, and reflexive journaling did not occur, the qualitative findings would not have been as rich and descriptive.

Recommendations

In future mixed methods research and phenomenological qualitative methods, especially international research, we recommend placing prolonged engagement, reflexive journaling, and participant observation as a top priority. In order to reveal the richest findings in phenomenological research, the researcher should be completely immersed in the research process. Further, we recommend member checking vital and encourage the use of member checking in qualitative research. When the participants were able to partake in a second focus group post-fellowship, they could add to or edit what they have previously explained which contributed to the findings and either confirmed or disconfirmed what they had previously stated.

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Farmers' Stress During the COVID-19 Pandemic

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Abstract

Introduction

The COVID-19 pandemic has widely affected the U.S. economy, including the agricultural sector and farm households (Dong & Zeballos, 2021). Farmers were forced to shift to direct-to-consumer sales, seek alternate avenues for their products (e.g., on-farm public events), and use online sales platforms (Broadaway & Wolnik, 2020; Gunther, 2020; Raison & Jones, 2020; White, 2021). There are limited studies that reported farmers' stress during times of uncertainty. Farmers who experience stressful workplace events tend to report psychological stress. This may trigger spillover effects into other aspects of farmers' life (Ang, 2010), such as family, friends, and work. Previous studies reported that farmers' occupational stress was influenced by their financial situation, farming hassles, weather condition, work overload, plant and animal diseases, governmental regulation, and other stressors (Belokar, 2022; Walker et al., 1986). McElrone et al. (2022) found that farmers experienced higher stress following needs such as housing, food insecurity, utilities, child care, and finances during the pandemic. Previous research found significant relationships between farmers' stress and the farm operation type (Deary et al., 1997; Johansson, 2020), age (Firth et al., 2007; Rudolphi et al., 2020), farm size (Parry et al., 2005), employment status, civil status, and gender (Firth et al., 2007). During COVID -19, agricultural producers experienced high challenges in production (Johansson, 2020). In terms of age, the results of previous studies report a negative association between age and stress among farmers (Firth et al., 2007; Rudolphi et al., 2020). Limited research reported a relationship between farmers' stress and tenure (years of experience in farming). Firth et al. (2007) wrote that older farmers with more years of experience in agriculture have less occupational stress. Stier-Jarmer et al. (2020) suggested that a stress-prevention program is a feasible, effective, and practical strategy to reduce occupational stress and improve participants' resources to cope with tough times.

Purpose and research objectives

The aim of this research was to investigate farmers' occupational and personal stress amidst the COVID-19 pandemic and how perceived stress relates to demographic factors such as farmers' age, tenure, work hours during the busy season, and farm size. Two research objectives guided this study. (1) Describe farmers' occupational and personal stress levels during the COVID-19 pandemic. (2) Determine the relationships between overall farmers' stress and demographic variables such as age, tenure, work hours during a busy season, and farm size.

Method

An online survey was utilized to collect data from the [State] farmers, administered via Qualtrics, in Spring 2021. The target population for our study was 3000 [State] farm operators registered on the

[University] Extension database, who were mainly goat and sheep producers. Our study used a census approach followed by Dillman et al. (2014) online data collection technique. The response rate was 10% (n= 332). The final data set comprised 186 responses after cleaning the data. This study used a two-scale instrument to measure farmers' stress. The first scale is Farmers' Occupational Stress, and the second is Farmers' Personal Stress. The occupational stress scale was measured by using two sub-scales developed by researchers: on-farm stress factors (9 items) (item example: machinery breakdown) and off-farm stress factors (5 items) (item examples: unpredictable weather). Our study adopted Sinclair and Wellstone's (2004) personal stress scale. We used a 5-point Likert scale (from never to always) to measure occupational and personal stress among farmers. The Cronbach Alpha coefficient for the occupational stress scale was .84 and 0.81 for the personal stress scale. We compared early and late responses to evaluate non-response errors in this study (Miller & Smith, 1983).

Results

The overall mean score for occupational stress was 3.11 (SD = .65, n =186), on-farm stress was 3.07 (SD = .67) off-farm stress was 3.18 (SD = .81). The higher score was among the following factors of on-farm stress levels: unbalanced workload, worrying about the farm business in the future, and financial issues on the farm. The higher score was among the following off-farm stress factors: governmental regulation, the market price for agricultural commodities, and unpredictable weather conditions. The mean score of the overall personal stress was 2.80 (SD = .82). The higher score was among the following factors: limited leisure time and getting enough sleep time. A multiple linear analysis indicated that a significant proportion of the total variation of 11.3% in overall farmers' stress was predicted by all four demographic variables in the regression model, $F(4, 194) = 6.152, p < .001$. Within the final model, two of the predictors were statistically significant. The strongest predictors of overall farmers' stress were work hours during the busy season ($\beta = .160$; p-value $< .001$) and farm size ($\beta = .246$; p-value = .002). Farmers' age and tenure in farming were not significant factors in the overall farmers' stress.

Implication

Farmers' work hours during the busy season and farm size were significant predictors of farmers' stress during the COVID-19 pandemic. Prior studies suggested supporting farmers by offering opportunities for educational interventions (Rudolphi et al., 2020). Extension educators should design farmers' stress-prevention programs that teach farmers to implement practical strategies that help to reduce occupational stress and cope with tough times. It is vital to rethink how we can support farmers today while not losing sight of our long-term goal to build sustainable agriculture. Additional research should further explore the burden of financial factors' among the farmers' population. It would be beneficial to study farmers who produce different agricultural commodities and include farmers' spouses to help us better understand the phenomenon of farmers' stress.

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Climate Change Adaptation and National Extension Approaches in Malawi: A Stakeholder Assessment

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Abstract

Introduction and Conceptual Framework

Climate change poses significant challenges to Malawi's ability to grow maize, its staple food crop, due to its heavy reliance on rain-fed agriculture and traditional farming practices that largely do not utilize agricultural inputs. According to the Food and Agriculture Organization of the United Nations (2021), addressing climate change and transforming agricultural and food systems will help meet the Sustainable Development Goals. Climate-Smart Agriculture (CSA) practices can help to support sustainable food production given changing climate conditions (FAO, 2013).

The Government of Malawi's (GoM) new pluralistic extension policy calls for the delivery of specialized services to farmers by governmental extension providers, nongovernmental organizations (NGOs), and private industry. These extension services are intended to support farmers to overcome barriers to increasing production and adapting to changing climatic conditions, yet these multiple actors often provide conflicting messages to farmers. The GoM has emphasized the need to improve coordination among extension providers to reduce inefficiency, redundancy, and confusion.

The Diffusion of Innovations Theory can be used to analyze the diffusion and adoption of agricultural innovations among farmers. This theory asserts that the adoption of an agricultural technology communicated through specific channels occurs over time among members of a social network (Rogers, 2003). Under this theory, individuals within the network are categorized according to their willingness to adopt the technology. This theory follows the top-down "transfer of technology" model where innovations are developed by researchers, disseminated by extension personnel, and then adopted by farmers. In the context of Malawi, agricultural innovations are developed both by researchers within the hierarchical structure of the public extension system (Knorr et al., 2007) and are co-developed at the grassroots level with input and field testing from farmers (Bezner-Kerr, 2012). Therefore, it is useful to understand the basic elements of the Diffusion of Innovations Theory to evaluate Malawi's public extension system, but also analyze the extension system as a network of actors that all develop, share, and improve agricultural innovations and information.

Purpose and Objectives

The purpose of this research study was to evaluate the challenges and successes in communicating climate change adaptation information to maize farmers in Malawi to inform the development of content and delivery of information by extension providers. The study included the following objectives:

- Identify the development of content and methods used by extension providers to educate maize farmers about climate adaptation practices in Malawi.
- Evaluate institutional constraints of Malawi's extension system in providing effective information for maize farmers to adapt to climate change.

To address the research objectives, this research study posed the following questions:

1. How is information generated in Malawi's extension system to address climate change?
2. How do extension providers engage and share information with other organizations to address climate change?
3. What advisory methods do extension providers use to educate maize farmers about climate smart agricultural practices?
4. How are extension providers addressing climate change in their recommendations to maize farmers?
5. What challenges exist in providing effective information for maize farmers to adapt to climate change?

Methods

The data for this research were collected through in-depth interviews with 19 participants who provide extension services to farmers in Malawi. Social network analysis was used as the analytical method for understanding and evaluating Malawi's extension network. The use of social network analysis allowed us to evaluate the structure of organizations providing extension services, engagement amongst stakeholders operating within the network, and transfer of knowledge within Malawi's extension system.

Results and Conclusions

We found that there are select organizations that develop messages and are considered experts on climate change adaptation. Government departments were referenced as content developers by the greatest number of participants. In terms of knowledge transfer, 85 organizations were mentioned in the dissemination of information throughout Malawi's extension network. Several high-level government departments, Malawi NGOs, international NGOs, and farmer groups were identified as crucial to the transfer of information within the extension network.

Findings also suggest that Information Communication Technologies (ICTs), trainings, and written materials are the main advisory methods used to educate farmers about CSA practices. ICT platforms often complement one another by providing increased access to information for farmers who cannot afford technology, are illiterate, or require additional information to address agricultural issues. Findings revealed that organizations address climate change by recommending a variety of strategies to farmers including being climate informed, good agriculture practices, water conservation, soil management, improved seeds, crop diversification, agroforestry, and reducing diseases and pests.

Educational Importance, Recommendations, and Implications

This study revealed a need for improved integration of organizations from lower governance levels in the development of climate change adaptation content in Malawi. The increased diversification of

organizations within Malawi's core network will enhance collaborative decision-making and improve the transfer of knowledge among extension providers in Malawi. This study also reaffirmed the importance of communicating clear and consistent messages to farmers to address climate change impacts in Malawi. The findings and recommendations have relevance for CSA and agricultural extension education practices and policy making in the other southeast African countries.

Keywords: Climate-Smart Agriculture, Extension, Agricultural Education, Malawi, Africa

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The Fourth Industrial Revolution: Reflecting on the Opportunities and Challenges for Smallholder Farmers in South Africa

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Abstract

The study was carried out in Msukaligwa Local Municipality, South Africa. The aim of the study was to examine the prospects and challenges of the fourth industrial revolution (4IR) for agricultural production among smallholder farmers. The specific objectives of the study were to examine the opportunities and constraints of the 4IR for agricultural productivity, and to analyze the decision of smallholder farmers to accept available technologies for the 4IR. Sampling was randomized with sample size of 235. The unit of analysis were smallholder farmers practicing farming in the area. The study used quantitative techniques involving structured and semi-structured questionnaires and focus group discussions. Results revealed that opportunities for 4IR were reduced farm labour, improved production, and improved quality of produce while the constraints as indicated by the smallholder farmers were cost-related, infrastructures, stereotype, and training. Logistic regression model was adopted, and eight variables were found to be significant concerning the acceptance in the use of technology for the 4IR. The study recommended the promotion of technology acceptance amongst smallholder farmers. The government should capacitate farmers and extension agents with adequate skills to disseminate technological innovations underpinned by the 4IR.

Keywords: Smallholder farmers, fourth industrial revolution, innovation, technology, acceptance, preferences

Introduction

The 4IR is driven by numerous technological innovations that comprises of unmanned vehicles, the internet of things, robotics, artificial intelligence, nanotechnology, and three-dimensional printing (Schwab 2016; FAO 2017). In assisting farmers, the 4IR will use agricultural digital technologies such as in-field sensors, phone applications, satellites, and drones to monitor crops and livestock, manage water use efficiency and keep the balance of required soil micro-nutrients and pH levels (EIP-Agri 2017). This will allow farmers to prepare an effective programme that will enhance production performance, reduce labour and environmental degradation, optimize processes for farm input supply while at the same time allow for profit maximization.

In time past, about 90% of the world population were engaged in agriculture but presently the number of active farming population has narrowed down to about 60% (Lee 2017). There is a need to improve on technology that is driven by smart agricultural practices (Sikwela 2013).

The threat and the scourge of climate change has caused substantial losses in agricultural production in South Africa. The introduction and acceptance of 4IR will go a long way towards ameliorating the

unintended consequences of unfavorable weather events. The study, therefore, navigates the prospects and challenges, and presents the opportunities and constraints of 4IR in South Africa.

Purpose and objectives of the study

Agricultural intensification has been a daunting challenge especially in Sub-Saharan Africa where the demand for food to meet the teeming population remains a mirage in the face of unprecedented weather uncertainty. The need to explore new ways of increasing food production is one of the priorities of South African government. Against this backdrop, the study, therefore, examined the prospects and challenges of 4IR for agricultural production among smallholder farmers in Msukaligwa Local Municipality, South Africa.

Consequently, the study was steered by the following specific objectives: (i) to examine the opportunities and constraints of the 4IR for agricultural productivity; (ii) to analyze the predilections of smallholder farmers in accepting available technologies for the 4IR.

Method

This study was carried out in Msukaligwa Local Municipality, South Africa, located within the latitudes - 26° 32' 59.99" South and longitudes 29° 09' 60.00" East. Random sampling was used with sample size of 235. Primary data was collected using structured and semi-structured questionnaires while secondary data was also collected using grey literatures relevant to 4IR. Focus group meetings was also used to validate responses that resonated from the questionnaires. The primary data collected was cleaned and captured into the statistical package for social science (SPSS) version 27. The smallholder farming household was used as the unit of analysis. Descriptive statistics were used to determine the socio-economic characteristics, opportunities, and constraints of smallholder farmers in the use of technologies associated with 4IR. The logistic regression model was also used to determine the relationship between smallholder farmers characteristics and preferences in accepting available technologies for the 4IR.

Results and conclusion

Result reveals that the opportunities presented by the 4IR are reduced farm labour, improved production, and new trends to increased economic growth and improved quality of produce. Result further indicated that the major constraints as indicated by the smallholder farmers are cost-related, uncertainty, stereotype, and inadequate training. In the regression analysis, eight variables out of the fourteen variables were found to be significant in relation to the acceptance and preference for 4IR.

Recommendation

The overall practical readiness level of South African farmers lies within the foundation stage of 4IR. The study recommended the development of a workable 4IR model specifically for an emerging country like South Africa. Moreover, since the 4IR landscape is massive, framework for acceptance by farmers must be established and validated periodically.

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Gender Roles in the Groundnut Value Chain in Uganda

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Abstract

Introduction

In least developed countries (LDC's), such as Uganda, agriculture employs 80 percent of women (Huyer, 2016). Despite their high participation rate, women in Sub-Saharan Africa manage land plots that are 20-30% less productive than plots managed by men (Ali et al., 2016). Cash crops are a target industry for improving food security in these areas (Kuma et al., 2019). In developing communities, men dominate the cash crop industry while women work largely with food crops (Zakaria, 2017). Studies show that female farm managers focus on food crops to ensure food security for their households (Mugisha et al., 2019).

In Uganda, groundnut is a popular crop because it serves as both a food and cash crop in small-scale farming communities (Balakrishnan et al., 1999). In 2020, cultivation of this legume represented 24.6% of total arable land in Uganda (Akpo et al., 2020). In terms of production, both men and women produce groundnuts despite any issues that gender roles present.

Scholars have documented challenges for female plot managers. Wanjala (2014) suggests control of land is one of the main assets to increase bargaining power and securing a space in African economics. For young farmers, acquiring land and capital is difficult without adequate access to extension services (Ahaibwe., 2013). Additional challenges based on gender include the use of agricultural inputs and access to technology (Kilic et al., 2015).

Objectives

The objective of this study is to assess gender roles that exist between young male and female farm managers within the groundnut value chain in two rural districts of Uganda.

Methods

For this research, we used a two-group study design of 30 participants residing in rural Uganda. Half of the participatory group are male, and half are female. Fifteen of these participants live in the district of Nwoya, in northern Uganda. The other fifteen participants live in the eastern district of Tororo. These districts were selected based on their different agroecology and socio-demographic characteristics, while also being two of the highest producing districts for groundnuts in Uganda.

In July 2022, a team of U.S. and Ugandan researchers visited participants and conducted one-on-one interviews about feelings of empowerment and gender roles within the groundnut value chain. The individual interviews lasted between 15 and 20 minutes for each participant. In addition to interviews, researchers led two gender-disaggregated focus groups in each district. Focus groups lasted between 20 and 30 minutes. Interviews were recorded and transcribed for further analysis. Interview transcriptions were inter-coded and divided into emergent themes.

Results

Interview results show that women are not represented equally throughout the groundnut value chain in Uganda. These differences between men and women include gender roles in the value chain, challenges for women entering the groundnut market and perceptions about women who work in agriculture.

Gender Roles in the Value Chain

Both male and female participants stated women are the ones who weed and plant groundnuts in the value chain. During the interviews, a female participant stated, “They’re too much involved in planting season stages because the male like they’re not supposed to do that.” In response to asking what men do during this stage of the value chain, another participant stated, “A few do help, but mostly they don’t. Mostly men don’t help.” Male participants in the Nwoya district collectively stated that “Women do all the weeding.” Moreover, men were more likely to take part in the land preparation and clearing stages of the value chain. “Almost all men, they do land preparation,” stated a male participant. In further discussion, it was explained that women are not expected to use ox plows in agricultural production.

Challenges in the Value Chain

In both districts, women face the issue of gaining access to land and retaining capital to grow a successful groundnut operation. One participant stated, “Men have at least different options of getting money that can help them with the farm. Well, but for women, it is limited.” Land ownership is passed down through male lineage, in fear that women may sell the land and move away once married. A male participant from Tororo stated

Okay, the mindset in the community that women are not supposed to inherit the land, [it] weakens even their ownership potential. You find even if the woman is given land, they assume they should sell it and maybe go and get married somewhere. So that thing, you see, making people to [question] to trust the women with the land.

Female participants in Tororo expressed their concerns with the challenge of obtaining land in their district. “So I feel that is not fair for the women because they’re left with most [work] but they’re not given access and ownership to the land.”

Perceptions of Women in Farming

Male participants stated that women are seen as reluctant to trust men during the storage stage of the value chain. A male participant from Tororo stated, “They think if they give us the freedom to store the

gnuts, maybe to have the keys for the store, we then easily sneak out some groundnuts because they know most men, they like booze.” A female participant included that her community doubts the skill of women in the groundnut value chain. “They look at women as if they cannot do it, yeah? But when they really engross themselves to do it, it surprises the community somehow, yeah?” she stated.

Recommendations

Groundnut is a popular crop for young farmers in Uganda because it serves as both a cash and food crop. Further research is needed on governmental policies related to gender roles in agricultural value chains to reduce food insecurity and increase production. Governments should also consider land tenure systems and policies related to access and ownership of land.

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Designing Food Safety Training Programs for Refugee Farmers Based On Needs Assessment Data

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Abstract

Introduction and/or Theoretical Framework and/or Review of Literature

Although food safety is a critical component of agriculture, growers face a confluence of guidelines and regulations in California on how to effectively implement food safety (Parker et al., 2012). Furthermore, in the absence of an outbreak directly related to the product being sold by farmers, growers can logically interpret that their current practices are sufficient (Parker et al., 2012). In contrast to California's comprehensive guidelines, many developing countries have a dearth of food safety guidelines (Akhtar et al., 2014). In these circumstances, refugees who have resettled and are farming in the United States may face a detrimental combination of a lack of foundational knowledge in food safety and a complicated regulatory or guideline structure – creating a knowledge gap. To close this knowledge gap, United States Department of Agriculture (USDA) provided funding to a non-profit to conduct a food safety extension program with Lu Mien, Nepali-Bhutanese, and Iraqi farmers in the Sacramento Valley of California.

Culture and learning are linked, and how a culture learns is part of an individual's identity (Morrice, 2012). When agricultural extensionists engage farmers from another culture – resettled refugees for example – there is ideally a recognition that Western approaches to learning may not, even more likely will not, align with learning philosophies held by the foreign-born farmers (Elias & Merriam, 2005; Merriam & Bierema, 2013). The intent for any extension effort should be to meet the needs of stakeholders and provide curricula in a format that encourages engagement and adoption. Without establishing the preferred teaching methods for the stakeholders, barriers to adoption, or clearly defining the needs, the impact of an extension program could be lessened.

Social Cognitive Theory (SCT) was used in this research as the theoretical framework for analyzing learning preferences among refugee growers from the groups targeted for the food safety training. SCT argues that adult learning is driven through social linkages and that an individual's interaction with their environment influences learning and behavior (Bandura, 1986; Schunk 1996). Additionally, modeling of an instructor's behavior or practice within a training is a component of SCT (Bandura, 1986). Furthermore, the theory does broaden to capture collective efficacy - individuals operating within the context of a collective pool of knowledge in order to achieve goals (Bandura, 2002). Finally, among these dynamics is the theory's concept of self-efficacy characterized as both the self-perception of the capacity to achieve and the determination of a personal goal of achievement (Bandura, 1977).

Purpose and Objectives

This research was conducted to identify the needs, barriers to adoption, learning preferences, and social impact of the food safety training or adoption of new food safety practices for the participating refugee groups.

Methods

Data was collected through semi-structured interviews from 15 growers from the three refugee groups slated for the planned food safety training. Along with demographic and agriculture background questions, open-ended questions were designed to elicit responses that address four key areas: the food safety needs of the farmers; the learning preferences of farmers; the barriers to adoption of improved food safety practices; and the social impact of adopting new food safety practices. Using NVivo software to analyze transcribed responses, code selection generally adhered to the themes used to develop interview questions. From this baseline, coding became inductive in order to capture response topics that strayed from the thematic areas.

Results and Conclusions

1. Growers strongly associated topics of pesticide use, chemical use as important components of food safety or determining whether a product is food safe. Furthermore, the term “organic” was commonly equated with being food safe. However other topic areas planned for the training were referenced considerably less.
2. Although farmers described food safety practices essential to controlling pathogen spread, there was little elaboration in responses regarding the purposes of those practices, with only one grower mentioning the term “bacteria.”
3. Consistent reference of social (peers, family, mentors) and physical (crop health and physical health) factors in learning-related responses validated SCT's use as a framework for analyzing learning preferences in agricultural extension.
4. No predominant factors regarding barriers to adoption emerged, which could signify that farmers do not face significant impediments to changing behavior and adopting new food safety practices.
5. A majority of the growers interviewed considered themselves the lead growers which is significant both in terms of ensuring their participation in the planned trainings and respecting their capacity in terms of available time to enact improved food safety practices.
6. The vast majority of the farmers expressed interest in learning more about food safety – even among those who consider themselves already food safe - and consider a primary benefit of being food safe to be a better well-being and health for themselves, their family and their customers.

The findings from these interviews were synthesized into a report for the training providers and researchers collaborated with the lead training designer to strategize on the content of the training. Additionally, a training addendum, using Glo Germ as a tool, was developed by the researchers to highlight for growers - through hands-on demonstrations and collaborative discussions - vectors for pathogen contamination.

Recommendations, Educational importance, and Implications

The nonprofit conducted the first set of food safety training programs to the immigrant farmers, the population that the sample of our study participants represents. The initial training evaluations indicated that the produce handling and consumption related food safety needs of the training participants are being met. This indicates that designing the trainings based on the needs assessment data was impactful. Therefore, it is recommended that extension educators and researchers should consider conducting needs assessments more routinely. It is also recommended that funding agencies like USDA or others should fund a needs assessment phase and require reporting of its role in program development and evaluation. This phase of program planning, development and evaluation is equally applicable to all the extension programs globally.

Keywords: Needs assessment, extension program development, refugee farmers, food safety training

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How does Facebook support agricultural advisory needs? The Case of Rooftop Gardening in Bangladesh

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Abstract

Introduction

Living without any space for recreation and life satisfaction is now common for urban people. Urban farming, such as rooftop gardening, can provide a breathing space in urban life, fresh produce, and food security. Rooftop gardening is becoming more prevalent in several developing nations like Bangladesh but without the assistance of an agricultural extension and advisory service (AEAS). Existing AEAS are frequently criticized for not being able to help rural farmers due to a lack of human resources. With such constraints, it is unlikely that AEAS can support expanding urban people who practice rooftop gardening. These urban rooftop gardeners, however, do not have the same level of farming expertise as the rural farming community. As a result, they encounter difficulties with several aspects of their rooftop gardening.

Urban residents rely on social media sites like Facebook, YouTube, and Twitter for daily information and recreation. Around 90.05 million people in Bangladesh are connected to the internet, while about 45 million people use social media (Dhaka Tribune, 2021). Bangladesh's government is also supporting the use of digital devices to promote its national goal to become a digital Bangladesh, increasing the number of internets and social media users. Social media connects people with shared interests and enables two-way conversation. Research in various contexts, such as health and social media, has shown how social media can provide information support to people who require health care services and have limited access to traditional health care (Plaisime et al., 2020; Zhou et al., 2018; Antheunis et al., 2013). Given the emerging digitalization of AEAS, it is expected that providing solutions to rooftop gardeners in urban areas through social media might be a game-changer and could also serve as an alternative to conventional advising services.

Purpose and Objectives

Social media is a key solution to provide a range of information for assisting rooftop farming for urban residents with limited access to traditional extension services. But in the context of Bangladesh and beyond, there is a lack of research on the evaluation of the role played by social media. Since traditional extension services are scarce, this research sought to explore whether or if Facebook could pour in the informational gaps for rooftop farmers. Specifically, the objectives were:

- i. To determine the interaction level of members of selected Facebook groups
- ii. To understand how urban rooftop gardeners use Facebook to satisfy their advisory needs.

Methods

The data for our study were gathered with the help of CrowdTangle, a free and open-source content analysis and discovery platform owned by Meta. We purposefully chose two Facebook groups in Bangladesh and collected 20,000 postings over six months using CrowdTangle. There were 73,805 members of the “Rooftop farming” group and 8,750 members of the “Easy gardening” group at the time the data was collected. Rooftop gardeners in urban areas of Bangladesh are involved in these two Facebook groups as a source of their information. Following data extraction, we randomly selected 1056 posts for qualitative thematic analysis to evaluate the role of Facebook’s virtual communities in supporting rooftop farmers’ information needs. Each Facebook post was coded using the Atlas-ti to create categories, and then the categories were combined to create the theme. After coding 1056 postings, 115 codes appeared, which were grouped into 28 sub-categories. Finally, the six core categories for the research were constructed from the sub-categories based on their common conceptual foundation. Furthermore, the interaction rate for each post was computed by multiplying the level of interaction (total reaction + total comment + total share) by 100 and dividing it by the total number of group members.

Results and discussions

Applying the qualitative thematic analysis, we clustered the role of the Facebook group into 6 categories: i) supporting the outreach, ii) crowdsourcing, iii) knowledge sharing and learning, iv) engaging groups or community, v) cooperating, and vi) popularity and promotion. Facebook groups on rooftop farming have taken a prime role in outreaching the virtual community’s members with information that benefits them socially and economically. Members of two Facebook groups asked more experienced group members for help to get the services, ideas, or content they needed (crowdsourcing). These two virtual communities of practices assist rooftop farmers in sharing and learning about agro-climatic conditions, innovative ideas, shorter and longer sessional crops, the proper use of inputs, solving problems, intercultural operations, sowing time, and crop failure risk, which supports their decision-making. Selected Facebook groups also offered a space for other actors to engage with rooftop farmers to capture opportunities, build trust, and network to strengthen their overall rooftop farming capability. Again, there were only a few experts working voluntarily, and it was difficult for them to respond to many posts. Result regarding the interaction rates were relatively low across all six categories, averaging just 0.28, 0.21, 0.27, 0.16, 0.24, and 0.15 respectively. As a result, many posts/questions stay unanswered, yet other users help based on their experiences. Finally, rooftop gardeners and others utilized Facebook to advertise for selling inputs like seeds, crops, fertilizers, and pesticides and to promote their success stories by uploading photos and videos of harvest. All these scenarios show how Facebook groups assist rooftop farming.

Conclusions and Recommendations

According to the results, the chosen Facebook groups, despite having low interaction rates, offer rooftop farmers interactive platforms that help them meet their informational needs while offering a variety of activities that meet their requirements. Since traditional extension services in Bangladesh are

typically geared toward rural farming communities, AEAS and other development organizations could consider Facebook's role in catering to the needs of urban rooftop farmers' extension services. Professional advisors can be assigned in the official Facebook group to provide timely support to rooftop gardeners to increase the level of interaction. Our research could help future studies plan for how rooftop gardeners and expert advisors interact virtually.

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A framework for researching and understanding (agri-food) misinformation in social media and online communities of practice

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Abstract

Introduction

Recently, there has been a lot of talk about how social media has become a breeding ground for misinformation (Pennycook et al., 2021). Although social and online media platforms and the massive data they generate give unique opportunities for societies to exchange and react to information, there is a risk of misinformation—the deliberate or accidental transmission of incorrect or misleading information. The field of social and online media misinformation is increasingly becoming interdisciplinary for academics, culminating in a diversity of conceptualizations across disciplines. Misinformation research is mainly unexplored in the context of agri-food communities, which have been experiencing an uptick in social and online media engagement in recent years (Chowdhury and Odame 2013; Kaushik et al. 2018; Bastos et al. 2018; Klerkx 2021) due to historical and contemporary polarized and contested issues around food safety, environmental sustainability, animal welfare, genetically modified organisms, and organic versus conventional practices (Eenennaam 2022; Zerbe 2004; Blancke et al. 2015; Ji et al. 2019). A recent protest that supported Dutch farmers' concerns about emission reductions and the case of organic farming policies in Sri Lanka shows how controversial agri-food and climate change issues can spread misinformation online. Moreover, the recent spike in online misinformation about the COVID-19 pandemic underscores this issue. Misinformation in social media and online communities of practice (CoPs) remains underexplored, especially in agri-food communities. There is also a limited theoretical and conceptual foundation for understanding emerging topics related to agri-food sectors, such as food safety, environmental sustainability, genetically modified organisms, animal welfare and the recent COVID-19 pandemic.

Purpose and Objectives

This paper asks how to leverage conceptual understandings developed in other areas to understand and engage with misinformation in agriculture CoPs on social and online media. Our research aimed to provide thematic areas and questions for researching and understanding (agri-food) misinformation on social and online media derived from a systematic review of existing literature. The thematic areas set some guiding questions for scholars and practitioners, such as what are the different forms of misinformation, how they spread, the actors involved, their impacts on knowledge communities, and processes for dealing with them at the individual and collective scales.

Methods

This paper performs a systematic review following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Our searches used the keywords “social media OR online media AND misinformation OR disinformation”, “social media OR online media AND misinformation”, “social media OR online media AND disinformation” to search on the Web of Science in early 2020 and a second in late August 2020, yielded 598 and 173 articles, respectively. Additionally, we used Google scholar and Google search to extract 303 articles from grey literature and conference proceedings. The downloaded papers were then screened on four criteria for inclusion and exclusion into further review: i) “Does the paper address misinformation?” ii) “Does the paper specifically address online (social) misinformation, iii) “Does the paper have a conceptual framework?” and “Does the paper conceptualize any aspect of online misinformation? Finally, sixty-nine papers were considered to meet the inclusion criteria for detailed reading and analysis. The data analysis took traditional content and thematic-based qualitative approaches (Creswell and Creswell 2017) using NVivo 12.

Results and discussions

The review shows that many disciplines, particularly communication, social media studies, computer science, health studies, political science and journalism, are increasingly engaging with misinformation research. However, each discipline is fixated on the topic on their terms, without a unified field of misinformation research. This systematic research generates a framework based on six thematic categories for holistically understanding and assessing agri-food misinformation in the social and online media community. The framework includes misinformation characterization, source identification, diffusion mechanisms, stakeholder impacts, detection tactics, and misinformation curtailment and countermeasures. Our result further set guiding questions for each thematic area to allow researchers to interact and expand on a specific element of misinformation by asking relevant questions, probing cross-cutting relationships, or holistically adapting it to the entire misinformation study.

Conclusion and recommendation

With the advancement digitalization of agriculture, the unconnected agri-food communities will be connected to online and digital media. Therefore, there are rising concerns about how the ongoing crises of misinformation impact the agri-food information ecosystem. This is the first attempt to systematically analyze and incorporate experience from diverse fields of misinformation research that will guide researchers and practitioners in facilitating conversations and knowledge mobilization efforts in the agri-food sector. Moreover, advisory agents and practitioners could also draw on the proposed framework to facilitate discussion around contested topics (Leal et al. 2020) and deal with misinformation when communicating with their clients.

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Homework that Pays: Using Home Entrepreneurship Projects to Create a Value-Added Learning Experience for Ghanaian Students

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Abstract

Introduction

Africa's population currently stands at 1.2 billion, and according to the Food and Agriculture Organization (FAO) (2018), over half of its population is under the age of thirty. The term "youth" is defined by the African Youth Report (ECA, 2009), as people between 15 and 39 years of age. This signifies youth constituting the majority of the population. In addition to this "youth bulge," Africa faces the issue of the population growing faster than jobs are being created (World Bank, 2017). By 2035, the continent will require over 350 million jobs to meet the needs of its growing, youthful population (World Bank, 2017). This means jobs need to be created. Unfortunately, careers within agriculture are not traditionally perceived as profitable (Spence et al., 2020).

Solving this complex problem is not an easy task, however, agricultural careers are becoming more viable to youth around the globe. This growing agriculture sector offers a solution to feed our food-insecure, fast-growing population, whilst making a living. A tangible start to tackling this issue lies within Ghana's agriculture sector and its enormous potential to become a leader in agriculture (USAID, 2018). Ghana's agricultural sector proves successful in its drive to inclusive economic growth, lifting the vulnerable youth from poverty, and pushing Ghana to remain a leader amongst other West African countries (USAID, 2018).

The [American Organization] was funded by the [US Government Agency], implemented Home Entrepreneurship Projects (HEPs) as a means of introducing youth to profitable agricultural businesses. [American Organization] fellows lived and worked in Ghana for 10 months, working with 10–20-year-old students as agriscience teachers. Fellows worked with students to create school-based agriculture projects within schools to serve as demonstrations. Fellows then supervised students who replicated the school-based agriculture projects to start HEP.

Purpose and Objectives

The purpose of this paper is to explore how implementing HEPs proved successful within Ghanaian youth and can be replicated across various countries to increase interest in agricultural careers and provide an initial business start-up for youth. The objectives include:

1. Implement the student HEPs to promote agricultural-based entrepreneurship.
2. To gain feedback on the success and failures of HEPs in Ghana via [American Organization] and [Ghanaian Organization].

Methods

[American Organization], in conjunction with [Ghanaian Organization], placed American fellows at various junior and high schools around the Eastern and Central Regions of Ghana. These fellows worked as agriscience teachers and [Ghanaian Organization] club advisors, cooperatively with Ghanaian teachers. Fellows worked with their teachers and students to determine agricultural and home entrepreneurship interests. Based on those interests, students collectively decided what home entrepreneurship ventures to explore for sustainable HEPs. As a result of this process, students selected various HEPs including home gardens, small-animal production, and bead-making.

For school garden HEPs, fellows designed lessons to teach students about conservation agriculture, crop selection, soil testing, container gardening, composting, and proper garden maintenance. In addition, fellows taught the principles of proper marketing and record keeping. The principles taught in class were implemented into the school demonstration garden, and this process was used as a model for students who chose to create a HEP. Fellows aided students in beginning their own HEPs. For some, this took the form of completely modeling the school garden at their home. For others, practices were modified to fit their at-home needs, such as practicing container gardening in their compounds to avoid theft.

Multiple school's students were interested in small-animal production. This took the form of rabbitries, where fellows worked with students to create a system of using the school rabbitry to sponsor a HEP rabbitry. Fellows and students created the rabbitry facilities and cared for rabbits together. Then, the students repeated the rabbitry facility creation at home, and "borrowed" rabbits from the school rabbitry, with the promise of re-paying the school rabbitry with future offspring. This both provided sustainability for the school's rabbitry, and a little-to-no cost start-up for the HEPs.

Results and Conclusions

The results of this project were two-fold. HEPs proved successful in engaging students in agricultural ventures, proven by dozens of students at various locations creating and managing their own projects. Secondly, through this we were able to gain feedback from fellows who served as witnesses to the process to make recommendations for future implementation.

Over 35 students across the Eastern and Central regions of Ghana engaged and participated in the creation and maintenance of HEPs. Students started rabbit businesses and vegetable gardens, growing peppers, tomatoes, cucumbers, cassava, and more. Although the program concluded before the majority of fellows could witness harvests, students are expected to have many successful harvests and continue to be guided by the leadership of their [Ghanaian Organization] advisor and teachers. This opportunity provided a chance for students to engage in business management and profit generation, all within an agricultural context.

Recommendations and Educational Importance

This project displays major evidence of the educational importance of both hands-on learning, and the success of HEPs within the Ghanaian school system, via the help of agricultural clubs and supportive teachers. Students will thrive if given opportunities. In this case, that opportunity aims to tackle wicked problems such as: the African population vs. job availability dilemma created by the "youth bulge," and lack of interest in agricultural production for livelihood.

HEPs were implemented toward the latter half of the 10-month fellows' stay. This resulted in fellows leaving prior to the harvest season. Although not vital to student success, we recommend HEP implementation plans for supervision over the entire process. This provides support for both students and resident teachers who would oversee future projects.

Based on the success in engaging students and their commitment, we recommend continuing to engage students at every decision-making process. Students should feel ownership over their HEP, and not simply complete an assigned project, or complete the same project their peers are engaging in. Rather, HEPs should continue to be individual, and therefore increase buy-in through ownership of the entire project.

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Adopting Agroforestry technologies for sustainable development among farmers in Nasarawa State, Nigeria

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Abstract

Introduction

Amidst the problems of farmland conversion, soil degradation, and climate change bedeviling farmers, agroforestry has been touted as one means of promoting sustainability in the food production systems. Being a technology that has been in practice amongst farmers, especially in developed countries, agroforestry is being advocated for widespread adoption as means to achieving sustainable development. Unfortunately, data remains scarce in developing countries including Nigeria. There was need to bridge the gap by focusing on farmers' adoption with emphasis on their perception on benefits; level of adoption; barriers and strategies for promoting adoption of agroforestry technologies in the context of Nasarawa state. Result of the study could have implication on availability of both food and other forest-bound products like fruits, herbs, forages, and timber among others. The researchers are envisaging that global access to the outcome of this study through various media would benefit farmers both in the study area and beyond.

Purpose and Objectives

The study focused on adoption of agroforestry technology for self-sufficiency among farmers in Nasarawa State, Nigeria. Specifically, the study sought to determine the perceived benefits (social, economic, and environmental) of agroforestry technology; the level of adoption of some agroforestry technology components; barriers to adoption of agroforestry; and strategies for promoting adoption of agroforestry technology among farmers in Nasarawa State, Nigeria.

Method and Materials

The researchers adopted quantitative method and descriptive research design since the population of farmers in the area is large and widely distributed. The study area was Nasarawa State, Nigeria. A sample of 300 farmers participated in the study. Multi-stage sampling procedure including purposive and simple random sampling techniques was adopted to select respondents. The instrument for data collection was a 51-item structured questionnaire titled: Agroforestry Technology Adoption Questionnaire (AgrofTAQ) which was face validity by three experts. The instrument was trial tested 25 respondents to establish its reliability and an index of 0.87 was obtained using Cronbach Alpha method.

Three persons were recruited as research assistants. Three hundred copies of the questionnaire were distributed through face-to-face contact but 298 were retrieved indicating 99.3% return rate. Data was analyzed using descriptive statistics (Mean and Standard Deviation) with a benchmark mean of 2.50 from the average of the 4-point scale.

Result

The findings on farmers' perception on the benefits of agroforestry (tree planting) technology, showed thus: social benefits had means as [recreational opportunities ($\bar{x}=3.37, \sigma=.99$), providing a serene living environment ($\bar{x}=3.57, \sigma=.80$), enhancing quality of life ($\bar{x}=3.30, \sigma=.81$), employment diversification ($\bar{x}=3.50, \sigma=.81$), risk sharing ($\bar{x}=3.44, \sigma=.72$), increased food availability ($\bar{x}=3.50, \sigma=.81$), making of household furniture and utensil ($\bar{x}=3.06, \sigma=.95$), medicinal herbs/plants ($\bar{x}=3.09, \sigma=.88$), and reduce conflict between rural and urban ($\bar{x}=3.30, \sigma=.72$), and use of some tree species as source of fuel ($\bar{x}=3.03, \sigma=.72$)] among other uses. Economic benefits had means thus [transition to bioenergy economy ($\bar{x}=3.43, \sigma=.86$), reduces migration ($\bar{x}=3.59, \sigma=.79$), raw materials to cottage industries (timber, gum, resin etc) ($\bar{x}=3.17, \sigma=.76$), providing diverse food sources/ food security ($\bar{x}=3.37, \sigma=.67$), Source of forages to livestock ($\bar{x}=3.57, \sigma=.99$), and diversified sources of income ($\bar{x}=3.50, \sigma=.80$)]; while Environmental benefits had their means as [mitigation of CO₂ effect ($\bar{x}=3.44, \sigma=.81$), Carbon sequestration ($\bar{x}=3.23, \sigma=.72$), prevents soil erosion ($\bar{x}=3.50, \sigma=.85$), prevention of heavy raindrops ($\bar{x}=3.06, \sigma=.81$), enhance improvement of soil fertility ($\bar{x}=3.09, \sigma=.95$), protection of soil physical properties ($\bar{x}=3.36, \sigma=.88$), prevent leaching of soil nutrients ($\bar{x}=3.17, \sigma=.72$), and shading of crop seedlings ($\bar{x}=3.27, \sigma=.75$)]. On adoption of agroforestry technologies, findings showed low adoption in 11 out 13 agroforestry technology/systems including inter alia: Multipurpose agroforestry technology [$\bar{x}=2.45, \sigma=0.24$]; Trees on pasture land [$\bar{x}=1.46, \sigma=0.17$]; Hedgerows/shelterbelts/windbreaks [$\bar{x}=1.18, \sigma=0.52$]; Rotational Fallow [$\bar{x}=1.25, \sigma=0.95$]; Meadow orchards [$\bar{x}=1.45, \sigma=0.43$]; Livestock-Crop-Wood [$\bar{x}=1.70, \sigma=0.22$]; Riparian buffer strips [$\bar{x}=1.29, \sigma=0.28$]; Forage trees [$\bar{x}=1.23, \sigma=0.19$]; Integrated Home gardens (Tree vegetables) [$\bar{x}=1.30, \sigma=0.82$]; Entomoforestry [$\bar{x}=0.50, \sigma=.32$]; and Aqua-Silvo-Fishery [$\bar{x}=0.63, \sigma=0.26$]. The result however showed that the farmers were aware of two items including alley cropping [$\bar{x}=3.03, \sigma=0.53$]; and tree/forest-crop [$\bar{x}=2.58, \sigma=0.53$]. Findings on the barriers to the adoption of agroforestry revealed land tenure challenges [$\bar{x}=3.15, \sigma=.24$], insufficient skilled agroforestry professionals [$\bar{x}=3.74, \sigma=.35$]; absence of incentives [$\bar{x}=3.10, \sigma=1.10$]; absence of effective markets for forest produce/products [$\bar{x}=3.29, \sigma=.55$]; low level of farmer education [$\bar{x}=3.32, \sigma=.20$]; and absence of processing industries [$\bar{x}=3.84, \sigma=.42$]; among others. Lastly, skills capacity building [$\bar{x}=3.46, \sigma=.45$]; provision of material resources like seedlings [$\bar{x}=3.11, \sigma=.88$]; provision of monetary incentives [$\bar{x}=3.32, \sigma=.82$]; community-level advocacy [$\bar{x}=3.23, \sigma=.54$]; facilitation of market linkage/advertisement [$\bar{x}=3.60, \sigma=.32$]; and review of forestry laws and regulations [$\bar{x}=3.71, \sigma=.61$] among others were the strategies to promote adoption of agroforestry among the farmers in Nasarawa State Nigeria.

Conclusion

The findings of the study showed low adoption of agroforestry by the respondents despite perceiving the numerous benefits of the technology. The study also revealed several barriers such as land ownership challenge, and insufficient skilled agroforestry experts, among others. Therefore, if appropriate measures are taken by relevant stakeholders as recommended, farmers could widely adopt agroforestry technologies considering the numerous benefits which have link with sustainable development. For instance, agroforestry technologies like integrating livestock, aquaculture, and tree crops, the practice would enhance sustainability among farmers both in Nasarawa state and the Nigeria at large.

Recommendations

Government, through the Ministries of Environment, and Agriculture and Natural resources should advocate policies that would encourage integration of trees with crops farming among farmers; Both government and non-governmental organizations, should provide inputs and financial incentives to boost farmers desire for integrating tree planting into land utilization plans; Legislative and executive arms of government should review land tenure systems to enable extended tenancy and encourage farm tenants to adopt agroforestry technology.

Keywords: Adopting, agroforestry, farmers, sustainable development, Nasarawa State

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TRAINING NEEDS ASSESSMENT OF RICE GROWERS IN RICE ZONE OF THE PUNJAB, PAKISTAN

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Abstract

Introduction

A needs assessment is the process of collecting information about an expressed or implied organizational need that could be met by, in this case conducting training (Pandey, 2015). Training is a skill empowerment process in which an individual's abilities towards work or tasks assigned to complete are improved by the acquisition of new skills or the collection of knowledge (Sahu et al., 2011). After cotton, rice is the 2nd major commodity which is exported and largest employment generating crop of Pakistan. Production of rice in Pakistan is less than the potential (Rehman et al., 2018). Current average yield of rice is 2.88 tons per hectare instead of potential average yield of 5.20 tons per hectare. This indicates a yield gap of almost 45% between obtained and potential yield (Khan & Akram, 2012). Main reasons of yield gap of rice are the lack of application of new technologies and poor communication relationships between extension agents and farmers (Sharma et al., 2013). This space can be restored by making the extension services better for the capacity building of rice growers (Smil, 2005). The current yield of rice crop is also 61% lower than the yield being obtained around the world (Shahzadi et al., 2018). Awareness about the advanced agricultural technology is helpful for understanding the innovations. Proper training of farmers regarding modern agriculture is useful for overcoming the doubtful behavior of farmers towards the innovative tools (Swanson & Rajalahti, 2010). For better agricultural production, factors like knowledge and skills of farmers are very affective (Sharma et al., 2013). Training needs of the rice growers regarding the production technology of the rice were assessed in the rice zone of the Punjab, Pakistan. Punjab province comprises thirty-six districts and in each district, agriculture is regarded as a prominent source of income for the farm families. This study was conducted in district Gujranwala which is considered as the rice-growing area where rice of great quality is not only produced but also exported.

Objectives

The objectives of the study were to identify the socio-economic characteristics of the respondents, to assess the knowledge level of rice growers regarding recommended production technology of rice, to assess the areas in which rice growers need training regarding recommended production technology of rice, to determine the training facilities provided by the public sector extension in the rice zone, to find out the constraining factors affecting the training of rice growers and to develop a strategy for an effective training of rice growers.

Methods

The district is subdivided into 5 tehsils (subdistricts) named as Gujranwala Saddar, Gujranwala City, Kamoke, Nowshera Virkan and Wazirabad. A random sampling technique was used and through balloting, one tehsil was selected as a study area. The names of each tehsil were written on a piece of papers and one piece bearing the name of tehsil was chosen blindfolded. Tehsil Nowshera Virkan appeared as the study tehsil. Through random sampling technique, 332 rice growers were selected as respondents at 95% confidence level and 5% confidence interval from tehsil Nowshera Virkan and interviewed accordingly through face to face interview technique. Statistical Package for Social Sciences (SPSS) was used for data analysis. Frequency, weighted score, mean, percentage and chi-square techniques were used to analyze the data.

Results

More than half (53%) of the respondents were aged from 36 to 50 years. Regarding education, 47.9% of the respondents had no formal education. More than half of the respondents (53.6%) were small landholders. Fine varieties were cultivated by simple majority (53.9%) of farmers. 55.7% growers were owners, majority (65.7%) of respondents were sowing rice crop for commercial purpose. Insect pest management was unknown to 65.1% of rice growers. Knowledge about fertilizer application appeared to be the leading deficiency in the region, with a mean value of 3.20. The most successful extension method was demonstration used by the extension agents with mean value of 3.01. Only 8.7% respondents were very highly satisfied regarding trainings conducted by public sector. A vast majority (86.1%) of the respondents reported commodity prices as, a high level constraint. Relationship between independent and dependent variables clarified that old aged rice growers needed more training regarding recommended production technology of rice as compared to young age rice growers. Highly qualified (above matriculation) rice growers' need of training is less as compared to illiterate and up to primary passed rice growers. Size of land holdings of the respondents had no impact on their training needs and every group of land holdings had almost the same level of training needs. Experienced rice growers needed low level training as compared to those rice growers who had up to ten years' of experience, while overall result was non-significant and almost same level of training needs. High income rice growers' need of training is less as compared to lower income rice growers. This study summarizes that capacity building of farmers is the need of the hour about the recommended practices of the rice crop cultivation. Recommendations: Department of Agricultural Extension, Government of the Punjab should plan training programs and organize training sessions for the farmers. There is an urgent need for the effective liaison between the Department of Agriculture (extension), academia and the Rice Research Institutes to train farmers. Awareness campaigns, use of print media and social media can help farmers to stay updated about the recommended technologies of rice crops.

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Promoting Napier Grass Cultivation for Social and Environmental Security in Nigeria: The Pastoralists' Perspective

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Abstract

Introduction and review of literature

Pastoralism means herding ruminants animals for livelihood (Ducrotoy et al., 2016). It contributes about 10 percent of global meat production and supports around 200 million households in Africa (FAO, 2017). It is a phenomenon that has experienced many inequalities in history and is usually omitted from most policy documents on regional economic integration (Catley et al., 2013). Nigeria has the 6th largest cattle herd in Africa (Maina, 2016) with about 20.7 million cattle (FAO, 2018). The pastoralists are accountable for about 90 per cent of domestic milk production and about 13 per cent of global dairy output (FAO, 2017).

Pastoralism, as practiced in sub-Saharan Africa, poses a great demand on land and this leads to unsustainable land management practices such as overgrazing and soil erosion; while these further translate into shortage of land for human endeavors and get the ozone layer depleted (IPCC, 2022; Aderinoye-Abdulwahab & Abdulbaki, 2020). Moreover, the negative impacts of climate change include temperature rises, shifting agro-ecosystem boundaries, scarcity of pasture and more frequent declines in grassland (Hidosa & Guyo, 2017). Consequently, climate change poses threats to the sustainability of agriculture; while feed security for livestock may not be attainable without an all-inclusive integrated approach like climate smart agricultural practices (CSAP) (Ifeanyi-Obi et al., 2022).

Purpose and Objectives

There had been reports of social unrest involving mobile pastoralists and farming communities in Nigeria (Ajala, 2020; Nwozor et al. 2021) while pastoralists cannot guarantee sufficient feed for their livestock. The study anticipates that Napier grass, a fast growing and high yielding fodder (Ntege et al., 2021; Muktar et al., 2022) can be introduced to pastoralists to ensure feed security for cattle and reduce climate change.

The study investigates the following questions:

1. What is the knowledge level of pastoralists on the benefits of Napier grass cultivation?
2. Are pastoralists willing to cultivate Napier grass?
3. Can Napier grass guarantee feed security all year round?
4. Can Napier grass cultivation promote social and environmental security?

Methods

The study relied on the process of knowledge (Nonaka and Takeuchi, 1995) where knowledge data advances from information through wisdom. The innovation-decision process (Rogers, 2003) also starts with the knowledge stage. Individual learns about the existence of innovation and seeks information about 'how to use the innovation'. Rogers highlighted three types of knowledge: (1) awareness-knowledge, (2) how-to-knowledge, and (3) principles-knowledge.

The study adopted a mixed methods research design and was carried out in north central Nigeria with 200 pastoralists and 8 extension practitioners. Key Informant Interviews (KII) and Focus group discussions (FGDs) were conducted with extension practitioners and pastoralists. Descriptive statistics and content analysis, as adopted by (Fernandez-Gimenez et al., 2021), were employed to explore the data using four themes.

Results

Theme 1: Knowledge of the Benefits of Napier Grass Cultivation

Most (76.5%) of the pastoralists had no knowledge or information that can encourage them to cultivate Napier grass. Pastoralists hinted that Napier cultivation will reduce long distance trekking for pasture and their children will be able to attend school given that their sons currently herd the cattle. They also believe that their cattle will be better-fed with Napier grass; consequently, meat and milk production and, by extension, incomes will increase. Extension practitioners described Napier cultivation as an addition to the existing natural grassland and that such deliberate effort is required to abate the rising impacts of climate change. Practitioners also noted that Napier grass, like other plants, inhales carbon-dioxide and releases oxygen which detoxifies the air in the environment.

Theme 2: Willingness of Pastoralists to Cultivate Napier grass

Pastoralists were willing to cultivate the grass provided the resources (land, seedlings, water, and political-will in form of appropriate implementable policies) are available. Extension agents noted that cultivation of Napier is an excellent initiative hoping government can provide relevant policies suitable for its cultivation.

Theme 3: Can Napier Cultivation guarantee Feed Security?

Extension practitioners opined that the ability of Napier grass to serve pastoralists all year-round depends on their knowledge level, as well as the availability and the amount of access pastoralists have to necessary resources. If the pastoralists are well informed and empowered to cultivate the grass in large quantity, it can adequately serve them because the grass can be kept in form of hay and silage. However, pastoralists will need support from government to be able to afford cultivation at a level that will ensure all year-round feed security.

Theme 4: Can Napier Grass Cultivation ensure Social and Environmental Security?

Extension practitioners inferred that the search for pasture to feed livestock is a main reason for the rising clashes between the pastoralists and farmers. So, if the pastoralists are adequately imparted with

the practical knowledge (know-how) of Napier cultivation while presenting the grass as a better alternative to itinerant herding, it is expected that mobile pastoralists will settle in locations where the grass is readily available. Napier cultivation will equally lessen atmospheric Carbon-dioxide and improve soil aeration.

Conclusion

Pastoralists' awareness of the benefits and their knowledge of Napier grass cultivation are crucial for enhanced adoption. Additionally, massive cultivation of Napier offers cleaner, greener, and healthier environment that is devoid of excessive carbon-dioxide. Again, Napier cultivation offers potential benefits to curb incessant crises involving pastoralists in areas of sub-Saharan Africa where there are high spikes of clashes between farmers and herders.

Recommendations and Implications for Theory, Policy and Practice

Napier cultivation is capable of minimizing the lingering social unrest involving pastoralists through a more sedentary pastoral system. It can promote environmental security by reducing the alarming rate of global release of carbon. Hence, there has to be supportive extension programs and policies from government and these should be enforced amongst pastoralists in sub-Saharan Africa. Rogers (2003) noted that - how-to-knowledge is an important factor in increasing the rate of adoption, thus knowing how to cultivate Napier is a function of knowledge of the learner (pastoralists). If pastoralists adopt Napier grass cultivation, they might be able to practice sedentary pastoralism. Further studies can explore effective extension teaching methods to motivate pastoralists to fully adopt Napier grass cultivation as an alternative to itinerant herding.

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Relating Social Norms and Definitions of the Self to Understand the Culture of Water Conservation

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Abstract

Introduction and Theoretical Framework

Concerning global water crises are expected to worsen through social and climatic changes (Greve et al., 2018; World Economic Forum, 2019). As a result, water conservation among all sectors is a critical international priority and a focus for many agricultural education and extension professionals working around the world. Water conservation is a social issue because society is generally affected by water crises more than individuals (Landon et al., 2016; Lapinski et al., 2007). Thus, people's willingness to sacrifice for the greater good (i.e., conserve) is interesting to consider in a social context. This phenomenon can be viewed through people's definition of the self. Individuals may define themselves using independent or interdependent concepts captured by individualism and collectivism (Otterbring et al., 2022; Triandis & Gelfand, 1998).

People in individualistic societies (e.g., the United States; Hofstede Insights, 2022) may generally prioritize the self while those in collectivist societies may prioritize greater society's needs (Komatsu et al., 2019; Singelis et al., 1995). Globalization is changing how individuals identify, with self-identification no longer consistently tied to traditional cultural expectations (Otterbring et al., 2022), presenting important opportunities for agricultural and extension educators and researchers to examine relationships between self-identity and conservation behaviors. Individualism and collectivism can both be further distinguished as vertical (valuing hierarchy) or horizontal (valuing equality) (Singelis et al., 1995; Triandis & Gelfand, 1998), leading to measures of horizontal individualism (HI), vertical individualism (VI), horizontal collectivism (HC), or vertical collectivism (VC; Triandis & Gelfand, 1998). This study examined the indirect behavior of encouraging others to conserve water by integrating these four measures along with the Theory of Planned Behavior (TPB) which explains a person's actions are guided by their behavioral intentions which are influenced by attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991).

Purpose and Objectives

The study purpose was to determine how people's identification with individualism and collectivism related to their engagement in *encouraging others to conserve water*. The specific objectives were to: 1) segment the audience using definitions of the self (i.e., horizontal individualism, vertical individualism, horizontal collectivism, vertical collectivism) and behavioral intent; 2) characterize and compare the resulting segments' demographic characteristics; and 3) characterize and compare the resulting segments' TPB variables (subjective norms, attitudes, perceived behavioral control).

Methods

A non-probability opt-in panel design was used for sampling adult residents from Florida in the United States, and quotas were used to ensure the sample reflected the actual population. TPB variables were measured using a series of semantic differential and Likert-type scales according to Ajzen's (2002) recommendations. According to calculated Cronbach's alpha values, all measures were suitable ($\alpha < .70$; Cortina, 1993).

Cluster analysis was used to partition data into meaningful subgroups by maximizing similarity within each group and maximizing differences between groups (Burns & Burns, 2008) using the four individualism-collectivism indexes (Triandis & Gelfand, 1998) and behavioral intent. After cluster analysis, the resulting subgroups were compared on demographics and TPB variables by using chi-square and ANOVA analyses as appropriate.

Results and Conclusions

Examination of the agglomeration table from hierarchical cluster analysis output revealed a solution of two clusters. This number was specified in a subsequent *k*-means cluster analysis which was conducted to assign respondents to individual subgroups. Cluster 1 ($n = 127$; 48.1%), hereafter referred to as the *Interdependent Conservation Advocates* was characterized by significantly stronger identification with HC and VC and greater behavioral intent. Cluster 2 ($n = 137$; 51.9%), hereafter referred to as the *Unconnected Bystanders* was characterized by weaker identification with HC and VC and lower behavioral intent. HI and VI were not significantly different between the groups. The difference in behavioral intent was associated with the largest effect size among the significant differences.

Between the groups, there was no difference in gender or living in a more urban area. The Interdependent Conservation Advocates were more likely to have come to the United States as a resident of another country and less likely to identify as white. In alignment with the TPB, the Interdependent Conservation Advocates reported stronger attitudes, perceived behavioral control, and subjective norms. These characteristics were significantly different than those of the Unconnected Bystanders.

Recommendations and Implications

The integration of cultural values into TPB-based research may support the design of tailored interventions that promote behavior change (Ajzen, 2005; Lapinski et al., 2007; Pradhanaga et al., 2017). Our study demonstrates how individuals tend to identify with facets of both individualism and collectivism, signifying a gradient, and not dichotomous nature of the construct. Interestingly, although behavioral intent marked the greatest practical difference between the two subgroups, the two collectivism indexes were also different, with those in group prone to encouraging other to conserve water having stronger identification with both horizontal and vertical collectivism. This finding aligns with previous research demonstrating individuals from collectivist cultures were more likely to adopt practices such as domestic water conservation (Lapinski et al., 2007) or recycling (McCarty & Shrum, 2001) and both home landscape (Pradhanaga et al., 2017) and agricultural (Yazdanpanah et al., 2014) water conservation. One might have expected those less prone to encouraging others to conserve water would align more strongly with the individualism constructs but there was no difference in either horizontal or vertical individualism.

Among the demographic characteristics, we found those individuals that have lived outside of the United States were in the cluster with significantly higher intent. The Interdependent Conservation Advocates spent time outside of the United States, which may have resulted in a higher degree of collectivism and intent to advocate for water conservation that benefits society at large. Those that had not lived outside of the country were less aligned with collectivism and less likely to encourage others to conserve water. These differences may be a result of the opportunity the Interdependent Conservation Advocates have had to develop a global perspective by living outside of the United States and being exposed to different cultures. These findings bolster the rationale for providing opportunities to value collectivism and creating cultural immersion opportunities for program participants, to expose them to different perspectives and schools of thought that may influence their desire to encourage other to conserve water.

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The Impact of Governance and Socioeconomic Development on Sustainability

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Abstract

Introduction and Theoretical Framework

Poverty reduction and food security are the crux of reforms within agricultural extension education and international development programs (Rivera & Alex, 2004). However, low- and middle-income regions are seriously lacking in institutional and physical infrastructure to support agricultural growth. The vulnerable small holder farmers require more than knowledge and information to attain sustainable development amid 21st century challenges (Birner et al., 2009; Rivera & Alex 2004). The case for strong institutions, particularly good governance, and socioeconomic development for improved quality of life in developing communities is well documented (Bonudei et al., 2019; Sarpong & Bein, 2021). Governance directs policies on agriculture, food, and environment (Mangnus et al., 2019) with a goal of robust national development and sustainability (Kaufmann et al., 1999; Meso et al., 2005). Sustainability encapsulates the well-being of the people, economy, and environment (Adger et al., 2003; Safdar et al., 2022). Strengthening governance, reducing inequalities, and sustaining environments and economies are key drivers of the United Nations' Sustainable Development Goals (SDGs) (United Nations [UN], 2015). The SDGs 9, 11, 12, 14, 15, and 16 all underscore the importance of sustainability. This study is guided by the social, economic, and environmental pillars of the sustainable development framework within vulnerable regions.

Purpose and Objectives

The purpose was to understand the current state of sustainability, governance, and socioeconomic development in developing countries and countries in transition. To this end, this study aims to (1) investigate the relationship between level of governance, level of socioeconomic development, socioeconomic barriers, and sustainability and (2) to explain if a significant amount of variance in sustainability policy was explained by level of governance and socioeconomic development.

Methods

Data was sourced from the 2022 Bertelsmann Stiftung Transformation Index (BTI). This index aggregates quantitative and qualitative data to identify 137 countries' political and economic transformation and the quality of their political management. The BTI defines governance as the quality of political management (Bertelsmann Stiftung, 2022b). They calculate a score between 1 (the lowest governance) and 10 (the highest governance) based on the country's performance on the individual level of difficulty, steering capability, resource efficiency, consensus building, and international cooperation (Bertelsmann Stiftung, 2022b). Sustainability is defined as balanced economic growth that is environmentally sustainable and future-oriented based on the country's environmental policy and education policy with respect to research and development (Bertelsmann Stiftung, 2022a). This is also measured on a scale

from 1 (no environmental concerns or regulations and basic institutions for education and research and development) to 10 (Environmental concerns are effectively considered and regulations are enforced with high quality nationwide education and high research investment) (Bertelsmann Stiftung, 2022a). A country's level of socioeconomic development asks to what extent are significant parts of the population fundamentally excluded from society due to poverty and inequality (Bertelsmann Stiftung, 2022a). A score of 1 implies that poverty and inequality are extensive and systemic; a score of 10 implies that poverty and inequality are minor and not systemic (Bertelsmann Stiftung, 2022a).

To analyze objective one, we used Pearson's r to assess the correlation between the variables. To analyze objective two, we conducted a multiple regression analysis. A priori significance was set at $p \leq .05$. Davis (1971) conventions were used to interpret the results of the correlation coefficients.

Results and Conclusions

All data analysis was conducted on SPSS Version 26. All 137 developing countries and countries in transition were included in the analysis ($n = 137$). For objective one, sustainability ($M = 4.61$, $SD = 1.80$) had a very strong association with governance ($M = 4.69$, $SD = 1.43$, $r = .75$, $p < .001$), socioeconomic barriers ($M = 4.06$, $SD = 2.34$, $r = .881$, $p < .001$), and level of socioeconomic development ($M = 4.06$, $SD = 2.34$, $r = .881$, $p < .001$). Socioeconomic barriers and level of socioeconomic development also had a very strong association ($r = 1$, $p < .001$). Governance had a strong association with socioeconomic barriers ($r = .58$, $p < .001$) and level of socioeconomic development ($r = .58$, $p < .001$). The very strong and strong correlations suggest that as countries move toward higher levels of governance and socioeconomic development their policies that promote environmental and economic sustainability increase.

For objective two, a multiple linear regression with semipartial correlation was conducted with sustainability as the dependent variable and governance and socioeconomic development as the independent variables. Due to the high potential of multicollinearity, the decision to not include socioeconomic barriers in the multiple linear regression and conduct semipartial correlations to better understand the regression equation was made by the researchers. The regression equation demonstrated that governance and level of socioeconomic development explain a significant amount of the variance for sustainability ($R^2 = .93$, $F(2, 134) = 426.19$, $p < .001$). Governance has a significant impact on sustainability ($b = .46$, $p < .001$, $t(134) = 9.28$). Level of socioeconomic development also has a significant impact on sustainability ($b = .52$, $p < .001$, $t(134) = 17.28$). The regression equation is as follows:

$$\text{Sustainability} = .37 + .46 \text{ Governance} + .52 \text{ Level of Socioeconomic Development}$$

Semipartial correlations were conducted to calculate the proportion of the variance in sustainability accounted for by governance over and above socioeconomic development and vice-versa because of the multicollinearity of the independent variables. Governance explains 27% of the variance in sustainability ($r_{\text{partial}} = .27$) holding socioeconomic development constant. Level of socioeconomic development explains 55% of the variance ($r_{\text{partial}} = .55$) in sustainability holding governance constant. The large amount of variance explained suggests that governance and level of socioeconomic development have value in explaining proclivity for sustainable development. The semipartial correlations suggest that

level of socioeconomic development has more weight than governance in explaining sustainability policies.

Recommendations

Smallholder farmers need sustainable approaches to governance and socioeconomic development to achieve agricultural productivity, alleviate poverty and improve well-being. International agricultural education and development programs should target barriers and address the cohesion of multi-actors to foster good governance across public-private institutions, producers, communities, and markets for sustainable development.

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My Cultural Heritage

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Abstract

Introduction

Pluralism and inclusiveness in agriculture are important elements when learning about country-specific contributions of global food and fiber systems. Pluralism can be described as an energetic engagement with diversity; it constructs a society by acknowledging and accepting, rather than hiding, our fundamental differences (Eck, 2022). Taylor (2000) noted, “regardless of their background and experiences, all students need to recognize the diversity that defines and strengthens our society” (p. 25). Inclusiveness refers to the quality of including other peoples, cultures, or practices, and regarding all fairly and equally. How can we foster learners’ understanding of pluralism and inclusiveness in agriculture-related courses?

Cultural heritage is an expression of the ways (through food, art, music, religion, etc.) of life within a community that are passed from generation to generation. Culture and heritage are important concepts to explore before students interact with cultures not their own. Understanding one’s own culture and heritage should preclude the study of others’ cultures and/or heritage. Educational assignments such as essays and family interviews that encourage students to evaluate and understand their unique cultural heritage may encourage deeper appreciation of pluralism and inclusiveness at home and abroad. Understanding one’s past can have a major impact on the construction of individual identity (Woodham et al., 2017). A sense of family history can provide stability, a sense of security, and distinctiveness to an individual (Basu, 2004). Understanding oneself can be accredited as the first step in forming a greater appreciation for other cultures. Suiogan (2018) states that “in the modern world, understanding oneself means relating to the other, the border does not separate but unite” (p. 124). How well do students understand their cultural heritage? What impact does understanding cultural heritage have on students participating in education abroad programs?

Purpose and Objectives

The purpose was to assess a pre-departure education abroad exercise designed to help learners develop awareness of cultural heritage before travel. The objectives were to evaluate students’ perceptions of their cultural heritage and determine if common themes were evident before travel on a study abroad experience.

Methods

A qualitative research design with content analysis (Fraenkel et al., 2019) was used in this study. Content analysis is a reduction and sense-making process used to examine and identify core consistencies and meaning from a large amount of qualitative material (Patton, 2002). Data were searched for patterns of

recurring words or subjects. Themes were derived from the patterns. The research design allowed us to measure the quality of descriptions from students' essays about cultural heritage. We sought students' perspectives through analyses of their communications. "A person's or group's conscious and unconscious beliefs, attitudes, values, and ideas often are revealed in their communications" (Fraenkel et al., 2019, p. 476). Among these revelations, cultural themes emerged, which were used for subsequent comparisons to examine the phenomenon under study.

A random sample of 20 student cultural heritage essays were collected from four study abroad programs (Costa Rica, 2019-2022; Mexico, 2019), which contained a pool of 72 essays. Five assignments were evaluated from each study abroad program. Essays were uploaded into an online word cloud generator to quantify common word trends. After common words were identified and extracted, they were evaluated for relationships and meaning. Essays were analyzed to determine students' perceptions of their cultural heritage to determine if common themes existed before study abroad travel.

Students were asked to complete an investigation of their family's cultural heritage through interviews with family members before studying abroad. This assignment required students to investigate (i.e., choose paternal or maternal lineage) cultural heritage focusing on family origin (e.g., surname, ethnicity, and historical roots), identity (e.g., language, religion, socioeconomic status, education, careers), U.S. transition (i.e., how your family came to the U.S.), significant norms (e.g., favorite foods, traditions, family values), and, cultural unknowns (i.e., three interview outcomes that were unknown to you before the interview). Essay outcomes were discussed, in general thematic terms, throughout the education abroad experience.

Results

Content analysis revealed the pre-departure interview and essay process created increased student awareness about their family's cultural heritage. The word cloud generator produced prominent themes such as geographic location, professions, and major events across selected essays. Geographic location themes centered on Texas, United States, and Mexico, while professions were dominated by agriculture and military. Families' histories included significant mention of involvement in military campaigns (i.e., war) throughout the world. These findings suggest many students' families had strong values for their country or state of origin. Likewise, their familial professions and involvement with events such as war efforts indicated a willingness to defend their family and/or homeland. A common trend in all essays were descriptions of increased connectedness and appreciation for family history, culture, and uniqueness. According to those who completed the cultural heritage assignment, the activity was "eye-opening," a "positive self-awareness" experience that promoted desires to "do more research" on their family's history, heritage, and culture.

Recommendations

Students often have limited knowledge of those things that constitute one's cultural heritage before traveling on an education abroad experience. One goal of education abroad programs is to help students improve their understanding and appreciation of other cultures. It can be difficult to discuss others' cultural values and/or heritage if we lack sufficient understanding of our cultural values and heritage. How can others' cultures, values, and heritage expand our appreciation of global food and agricultural systems? A sound starting point is achieved through open discussions about our views of pluralism and inclusiveness in agriculture, food, and the environment.

My cultural heritage assignment encourages learners to investigate and perhaps appreciate their family's unique story before engaging with other cultures. Encouraging self-reflection about cultural heritage serves as a precursor to effective study of pluralistic and inclusive education abroad experiences in agriculture, food, and environment. Educators should not overlook the importance of helping students understand their cultural heritage before studying other cultures. Self-reflective assignments about culture and heritage have potential to broaden perspectives of culture, thereby aiding in development of inclusiveness and pluralism.

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Uptake of Climate-Smart Agricultural Practices (CSAPs): Influence of Religious Institutions in Tharaka South Sub-County, Kenya

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Abstract

Introduction

Research on climate change and associated impacts is ongoing. To mitigate the impacts of climate change, uptake of climate-smart agricultural practices (CSAPs) by farmers in sub-Saharan countries is inevitable (Kabubo-Mariara & Kabara, 2015). CSAPs are agriculture practices that sustainably increase productivity, enhance resilience, reduce emission of greenhouse gases, and enhance achievement of national food security and development goals (FAO, 2013). Religious institutions, in their service to the community, go beyond spiritual service (Gruber & Hungerman, 2007; Belcher & Tice, 2011). This is evident in many parts of Kenya where religious institutions are involved in raising awareness about CSAPs and hence uptake of agricultural technologies. Agricultural production among smallholder farmers in Tharaka South Sub-County has been on decline in recent years. This is associated with effects of climate change.

Purpose and Objectives

The purpose of the study was to investigate and establish the influence of religious institutions on uptake of climate-smart agricultural practices (CSAPs) among smallholder farmers Tharaka South Sub-County, Kenya. The findings of this study are aimed to provide insight on the contribution of religious institutions and assist in enhancement of extension outreach programs in rural Kenya.

The research addressed the following objectives.

1. To determine the contribution of religious institutions in creating climate-smart agricultural-related awareness among smallholder farmers.
2. To determine the influence of membership to religious institution on uptake of CSAPs among smallholder farmers.

Methods and Data Collection

The study was conducted in Tharaka South sub-county in Kenya. The sample size of 375 respondents in a population of 16,437 was used and was based on the recommendations by Krejcie and Morgan (1970) sample size determination. The target population was organized in wards (strata) and thus, random proportionate stratification was conducted to compute the study participants.

Data were collected using a semi-structured questionnaire. Experts in Agricultural Extension were involved in validating the research instruments. The validity elements including content, construct, and

face aspects were checked. Pilot study questionnaires were administered to 10 % (n = 38) of the sample size (Hazzi & Maldon 2015). Data from Pilot study was used to compute Cronbach alpha values which helped in estimating instrument reliability. Reliability coefficients that were realized from pilot data were religious contribution ($\alpha = 0.99$), membership ($\alpha = 0.98$), and uptake of CSAPs ($\alpha = 0.76$). The reliability coefficients of all the study variables ranged from 0.76 to 0.99 which was greater than the minimum 0.60 required for social sciences (Moorthy et al., 2012).

Results and Data Analysis

Uptake of CSAPs was the dependent variable, while religious institutions were independent variable. The variables were measured using summated scores of 5-points Likert-types scaled items. IBM SPSS Statistics version 25 was used for data analysis. Assumption of homogeneity of variances and normality was checked and met. In normality test, skewness coefficient ranged from -0.07 to 0.39 indicating that the data was normally distributed since skewness values were within the ranges of -3 to +3 (Razali & Wah, 2011). In homogeneity of variance test, Levene's statistic was: $F(1,363) = 0.87$, $p = 0.35$ implying that the study adhered to assumption of homogeneity of variance. Males comprised 81.1% (296) of the respondents while females comprised 18.9% (69). A previous study by Kanyi and Lawver (2016) indicated that gender has a significant influence on awareness and uptake of technologies among small-holder farmers in Tharaka-Nithi, Kenya.

Most of the farmers indicated that the church has impact on awareness on CSAPs ($M = 3.14$, $SD = 1.60$). This is because the church has been organizing field days on CSAPs ($M = 3.14$, $SD = 1.60$), demonstrations ($M = 3.15$, $SD = 1.59$), as well as facilitating access to resources outside the communities ($M = 3.14$, $SD = 1.13$) to enhance uptake of CSAPs. A few farmers felt that the church is not doing enough especially in organizing seminars on CSAPs ($M = 2.56$, $SD = 0.67$), facilitating networks with CSAPs promoters ($M = 2.81$, $SD = 0.77$), structuring access to and control over resources ($M = 2.85$, $SD = 0.81$), and facilitating affiliation with donors ($M = 2.97$, $SD = 0.89$).

Most respondents indicated that religious institutions worked together with other CSAPs promoters ($M = 2.17$, $SD = 0.98$), moderately effective in structuring access to and control over resources ($M = 3.08$, $SD = 1.02$), enhancing affiliation with donors ($M = 2.71$, $SD = 1.44$), and facilitating access to resources outside the community ($M = 2.71$, $SD = 1.45$) to aid in promoting uptake of CSAPs. However, some farmers felt that church was not doing enough in delivery of sermons related to environmental conservation ($M = 1.13$, $SD = 0.49$), organizing field days ($M = 1.22$, $SD = 0.78$), planning and implementing farm demonstrations ($M = 1.23$, $SD = 0.80$), and organizing of workshops ($M = 1.52$, $SD = 0.54$) and this could be a predator towards uptake of CSAPs by farmers.

An independent samples t-test was conducted to find out whether difference existed between members of religious institutions and non-members on uptake of CSAPs. The t-test results indicated that farmers who were members to religious institution (n = 318, $M = 63.86$, $SD = 8.46$) compared to non-members (n = 47, $M = 63.83$, $SD = 8.11$) showed no significance difference in uptake of CSAPs, $t(363) = 0.02$, $p = 0.98$, $p > 0.05$. This implied that membership to religious institution had no significance influence in uptake of CSAPs.

Conclusions and Implication

Religious institutions were associated with creating awareness by organizing field days, demonstrations, facilitating access to resources outside the communities. Membership to religious institutions had no influence on uptake of CSAPs. However, members may have benefited more especially by CSAPs that are championed by various religious institutions than non-members.

Recommendations

CSAPs practitioners should work with religious institutions in order to increase uptake of CSAPs. Further studies should be conducted on how best to intensify uptake of more CSAPs that enhances crop management, soil management, water management, and livestock management since smallholder farmers have more potential to utilize and benefit from uptake of CSAPs.

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To What Extent Can Extension Agents Provide Nutrition-Sensitive Extension Service to Rural Dwellers in Nigeria?

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Abstract

Introduction and review of literature

Hunger has been identified as major problem affecting developing countries, hence the need for a holistic appraisal that can alleviate the nutrition anomaly (Suresh et al. 2016). The WHO (2021) and the FAO, IFAD and WHO (2019) issued a global statistics of about 820 million people who are plagued by hunger, and the situation poses a threat to achieving the SDG 2030 target of zero hunger (UN, 2016); while stunting in children under the ages of 5 still persists. Globally, more than 2 billion people faces severe food insecurity; while the inability of these populations to attain the required access to sufficient nutritious food exposes them to a risk of malnutrition. While the level of hunger and malnutrition is of little significance (8%) across Europe and Northern America, the scourge is concentrated primarily in low and middle income countries (Grosso et al. 2020). Moreover, one out of every three persons in sub-Saharan Africa is undernourished (Akerle et al. 2013). Consequently, Matemilola and Elegbede (2017) argued for a need to reduce nutrition inadequacy while ensuring a healthy and sustainable development in Africa.

Elsewhere, the World Bank (2021) posited that agriculture has the capacity of improving food and nutrition for about 75% of the people in the world who reside in rural areas and whose main activity is farming. Nutrition-sensitive agriculture, which is based on the production of nutritious, affordable, safe and culturally appropriate foods in the required quantity and quality, can be used to bridge the nutrient deficiency gap (Thompson and Amoroso 2011). This will ensure adequate dietary requirements, guarantee food nutrition sustainability and alleviate micronutrient and malnutrition deficiencies (FAO 2019).

Nandi et al. (2018) sees agricultural extension and advisory workers as the best remedy source to ensure the attainment of nutritional education by farmers and rural people through convergence of actors, farm schools, and participatory methodologies. Dia (2018) also advocated for the integration of nutrition education into agricultural training institutes with the belief that extension and advisory workers are important agents in transmitting agricultural knowledge to farmers and rural people.

Statement of the Problem

It has been reported that food insecurity, under-nutrition and essential services are not easily accessible to rural dwellers (FAO, 2015) while it is a known fact that extension agents (EAs) can play significant roles in enhancing livelihoods of farmers and rural communities. However, the extent to which they can provide nutrition-sensitive extension services is unknown. The competencies of EAs and their knowledge

level in the dissemination of nutrition-sensitive extension services remain largely undefined in certain parts of sub-Saharan Africa. Despite the prevalence of agricultural production in rural areas, the sources of information on nutrition-sensitive extension by the extension agents are quite vague. It is against this background, that this research sought to investigate the knowledge level and capability of the extension agents in delivering nutrition-sensitive extension service.

Purpose and Objectives

The study aims to investigate the capability of extension agents in disseminating valuable information that can improve the nutrition adequacy of rural dwellers in order to enrich their diets and livelihoods. The specific objectives were to:

1. Determine the knowledge level of extension agents on nutrition-sensitive extension services.
2. Identify the extension agents' sources of information on nutrition-sensitive extension.
3. Investigate the constraints faced by extension agents in delivering nutrition-sensitive extension.

Hypothesis

The study explored the relationship between extension agents' socio-economic characteristics and their knowledge level in nutrition-sensitive extension delivery.

Methods

The study was carried out in Kwara State, Nigeria with a population of 3,192,893 (NBS, 2017). The State is located between latitude 7° 45' N to the south, latitude 2° 45' E to the west, and longitude 6° 40' E to its south-eastern part. About 80% of the State's population lives in rural areas, the majority of whom are farmers (Yusuf et al., 2016). Crops largely grown in the state include yam, rice, cassava, maize, beans, sugarcane, vegetables, and fruits. The study population comprised all extension agents (EAs) currently serving under Kwara State Agricultural Development Programme (KWADP). All the 120 EAs in the four zones of KWADP were selected for the study. A structured questionnaire, using face and content validity to determine the appropriateness of the instrument, was used to elicit information. Test re-test method was used to verify the reliability of the instrument while descriptive statistics (frequencies, percentages and means) was used to analyze the socio-economic characteristics of the extension agents. Regression analysis was used to analyze the determinants of the extension agents' knowledge on nutrition-sensitive extension.

Results

Findings showed that 66.7% of the extension agents were males, 92.5% were married, and 48.3% have 6-10 years working experience as extension agent; while each agent covers an average of 6,096 farming families. These results suggest inadequacies in terms of the capability of the extension agents. Their sources of information on nutrition were: personal experiences, agricultural extension institutes, friends and colleagues, professional fortnight training, and workshops. It was also found that the EAs have adequate knowledge about cassava processing, protein foods, calcium foods and vitamin supplements; but their knowledge about preparation of nutritious diets, sources of iodine, and cheap protein and vitamin D sources are limited. Constraints to adequate nutrition-sensitive information are: insufficient number of EAs, inadequate staff mobility, poor EA-Nutrition expert linkage, poor access to information

on nutrition, and lack of training incentives. The regression analysis showed that age was a basic determinant of their knowledge on nutrition ($b= 0.027$, $R^2 = 0.495$, $P<0.05$).

Conclusions, Recommendations and Implications

The study concluded that extension agents have a high knowledge level of cassava processing and foods rich in protein, calcium and vitamin; but there is a requirement to update their knowledge on iodine, vitamin D, and cheap protein sources. Hence, the study recommended that agricultural research institutes need to introduce short courses and workshops on nutrition education so that EAs can be adequately trained in order to boost their capacities. Such measures will translate into effective nutrition-sensitive extension service delivery and by implication result in food security and nutrition adequacy.

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Pluralistic Extension Model for Fostering the Production of Extra Long Staple (ELS) Cotton in India

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Abstract

Introduction

In terms of botanical status, range of fiber quality and biological variability, Indian cotton crop is the most diverse one in the world. India cultivate all the four cultivated species of cotton. Three of the species of cotton contributing to trade and industrial consumption viz., *Gossypium hirsutum*, *G. arboreum* and *G. herbaceum* are commercially grown in the country. The fourth, *G. barbadense* which includes better fibre quality with Extra Long Staple (ELS) class and figures as parental line for many hybrids is also cultivated in very small scale. This group of ELS cotton (staple length of >34.9 mm and above) is highly demanded by domestic industries and mostly imported from USA, Egypt and Sudan. Import of this special cotton averaged around 411.83 USD Million from 1996 until 2016, which concerns the Indian textile industry. As India accounts for 40 per cent of global share in the fine and super fine cotton yarn trade, it is the responsibility of country's Research & Development institutes to develop perfect diffusion mechanism to promote ELS cotton production. Literature reveal that the United States of America promotes ELS cotton through social groups which provide professional services in all aspects of farm operations required for cotton field (Tian et al, 2019). Egyptian Government is carrying out its duties and commitments together with private sector, towards development of GIZA cotton cultivation (ICAC, 2018). The International Cotton Board is a farmer-owned producer organization that coordinates relations between farmers, other supply chain actors and R&D institutions in Israel. In China, the cotton subsidy policy in Xinjiang, not only protects the interests of cotton farmers but considers the need of the cotton industry, also improves the market competitiveness of the entire cotton industry in China (Tian et al, 2015). The Gezria scheme of Sudan attempted to increase the area and yield of cotton crop, reduce the cost of production, downstream cotton processing for added value, up stream of cotton inputs processing for import substitutions and improving of cotton productivity through R&D and extension (Bushara et al., 2004). The five-year Economic reform program 2015-2019 put more emphasis on cotton production improvement in Sudan (Mohamed et al., 2018). Contract farming projects of Karnataka Textile Mills Association and Appachi cotton co., India have shown encouraging results for promotion of ELS cotton varieties / hybrids viz., DCH 32 and Suvin (Basu & Chellamai, 2007). The Government of India sponsored Front Line Demonstrations on ELS cotton had reinforced the production in traditional ELS cotton belts (Usharani & Prakash, 2021). However, it is predominantly highlighted that there are many researchable and non-researchable constraints faced by growers and other stakeholders which indeed turn as bottlenecks for revival of ELS cotton in India. All these facts demand for an

analysis on constraints faced by ELS cotton stakeholders and creation of a common platform for all stakeholders to jointly revive and promote the heritage ELS cotton (Aparna, 2015).

Purpose and Objective

Hence, an extension research study is conducted to document various constraints and develop an appropriate extension model for fostering production of ELS cotton in India.

Methods

To document constraints, the universal Participatory Rural Appraisal (PRA) method “Problem Tree Technique” was used in participatory mode. It helped in identifying the focal problem and mapping out causes and effects of the target problem. ELS cotton is cultivated in larger scale at Tamil Nadu and Karnataka states of South India and hence the districts like Coimbatore, Salem & Tirupathur in Tamil Nadu state and Chamarajnagar in Karnataka state were selected purposively as study area. In the selected districts, the ELS cotton growing blocks were selected purposively and Focus Group Discussions (FGDs) were conducted among ELS cotton growers. Totally 238 farmers participated in five FGDs and they were carried out in small groups using flip chart papers. Through brain storming, the perspectives of ELS cotton growers on constraints faced in cultivating ELS cotton were discussed and carefully noted in charts. From documented details, meaningful and workable charts of problem, objective and strategy analyses were brought out. Primary data were also collected using semi structured interview schedules through personal interviews among 450 ELS cotton growers to develop an extension model for diffusing ELS cotton technologies by knowing their profile characteristics, attitude, knowledge level, technology adoption gap, marketing & information availing behaviour and SWOC analysis was done using secondary data as well as data collected through FGDs. Primary data on value chain of ELS cotton and prospects of Farmer Producer Organizations (FPO) to foster ELS production were also documented. The data were analysed with appropriate statistical methods using latest SPSS software.

Results and Discussions

The Problem Tree Analysis facilitated to map out causes and effects of the focal problem i.e., “Low Adoption of ELS Cotton” and further the objective and strategy analyses. The analysis on primary data on cultivation behaviour revealed that majority of ELS cotton growers had positive attitude towards ELS cotton cultivation and medium level of knowledge about cotton production practices. Their adoption behaviour also fell under medium level category. Top concerns about crops’ long duration, low price, low yield, more labour requirement, high susceptibility to P&D, high cost of cultivation and competition from hirsutum hybrids were documented and ranked using Rank Based Quotient (RBQ). Majority of the respondents perceived that a contract buy back system involving public and private institutes with technology and extension backstopping can revive and sustain the ELS cotton cultivation in traditional and potential cotton growing tracts. Based on above said observations, stakeholders’ perceptions and analysed empirical data, a Pluralistic Extension Model for fostering the production of ELS cotton in India was developed.

Conclusion and Recommendations

The Pluralistic model includes ELS cotton grower’s aggregation, collective bargaining power, convergence of multiple actors both public and private, diverse funding systems and multiple extension

approaches for technology and extension backstopping. Mapping the potential area, conducting base line survey, implementing an action project to foster the production of ELS cotton using this pluralistic model, assessing its impact and replicating the model in other potential areas would pave way for increasing the area and production of ELS cotton in India.

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Developing the Next Generation of Extension Workers in Sub-Saharan Africa

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Abstract

Introduction

The agricultural sector plays a dominant role in the economy of Africa. African agriculture is dominated by smallholder systems except for a few large farms and plantation crops. Ayim et al. (2022) reported that about two-thirds of the total African workforce is engaged in agriculture. The performance of the agricultural sector in Africa is inhibited by problems in governance, poor soil fertility, low use of fertilizer, poor access to inputs, insufficient postharvest storage, poor transportation and marketing infrastructure, limited technical knowledge, and weak information dissemination (Livingston et al., 2011). Further, spread of commercial farming, trade liberalization, feminization in agricultural labor, and technological advancements have created both opportunities and threats to the farmers. Increasingly, agricultural extension is regarded as one key component in the development agenda of Africa (African Union, 2022). However, agricultural extension workers do not possess skills and competencies required for effective extension work. To strengthen the human resources for extension service, meaningful efforts should be made to incorporate job skills and competencies in the undergraduate extension curricula (Suvedi and Sasidhar, 2020). There is an urgent need to develop a competency-based curriculum to prepare the next generation of extension agents to serve farmers and agribusiness operators to modernize agricultural extension and advisory services.

Purpose

Institutions of higher education in agriculture in Africa are in dire need of improvements to support agricultural extension services with well-trained and competent extension workers. Specifically, the undergraduate agricultural extension curriculum has been followed without major changes for three to four decades. As a result, extension professionals tend not to possess required core competencies to perform roles and functions required by participatory, demand-driven, and pluralistic agricultural extension and advisory services. To address this gap, a multi-country research study was launched to enhance the undergraduate-level agricultural extension curricula in African educational institutions. The goal is to explore challenges facing effective delivery of agricultural extension services. Specifically, this study was planned to identify critical job skills and competencies needed by extension professionals in a changing context and recommend improvements in the undergraduate extension curricula. This would help provide policy recommendations aimed at improving extension services systems in Africa. This study will address the following research objectives:

1. Identify the challenges of agricultural extension service delivery in sub-Saharan countries.
2. Assess critical skills and competencies of agricultural extension professionals.
3. Suggest strategies for improving the undergraduate curricula to prepare the next generation of development professionals to competently handle extension service delivery.

Method

A qualitative study using focus group discussions was carried out in Kenya, Malawi, Nigeria, South Africa, and Uganda. The data were collected through 12 focus group discussions (FGDs) inviting 104 senior and mid-career extension professionals across the five countries. The FGDs were guided with a semi-structured interview guide. All FGDs were recorded and transcribed. We adopted a five-step procedure to analyze the focus group data. The first step involved carefully reading all the transcripts of all 12 FGDs conducted in the five countries. This provided an understanding of the overall extension services and training context in sub-Saharan Africa. The second step was to re-read the transcript and highlight key words and themes. The third step involved grouping key words and themes, which resulted in six themes:

1. Challenges of extension service delivery systems of each country.
2. Recommendations to improve the agricultural extension systems.
3. Critical job skills/core competencies required for agricultural extension workers.
4. Skills competency gaps in the undergraduate extension curriculum.
5. Barriers to training undergraduate extension students with required job skills and competencies.
6. Suggestions for improving the undergraduate extension curriculum.

The fourth step was reviewing statements that resonated with each of the themes, categorizing them under each theme, and selecting statements for verbatim quotes. The final step was counting the frequency of respondents who supported a particular statement identified across the five countries. Instead of numbers, modifiers such as “no one”, “few”, “many”, “most” or “all” were used to describe how many people talked about an issue (Krueger and Casey, 2000).

Results and Discussion

The results revealed that the agricultural extension systems in the study countries and possibly others in the region are constrained by capacity gaps among the extension officers (EOs), lack of support to EOs, issues related to information delivery by EOs, and issues related to farmers and their lack of trust in the EOs. Practical know how, technical knowledge, communication skills, and managerial skills were identified as the critical competencies that EOs should possess. Further, the study revealed skills gaps in the curriculum pertaining to practical and technical skills, knowledge of ICTs, use of soft skills, marketing, entrepreneurial skills, knowledge about resource mobilization, project management skills, monitoring and evaluation, problem-solving skills, analytical skills, and self-confidence. Perceived barriers to effectively teach undergraduate extension students across sub-Saharan Africa included lack of student motivation, lack of trainings for the students and staff, lack of qualified and adequate teaching staff, bureaucracy in the decision-making process and inadequate facilities within universities, and lack of practical learning opportunities. Suggested strategies to improve the undergraduate extension curricula were to involve public and private sector stakeholders in reviewing and revising extension curricula and developing competency-based curricula, use digital methods in teaching extension courses, involve students in working collaboratively with farmers and rural communities,

establish more robust internship programs, recruit adequate and competent faculty and staff, and improve teaching facilities in the universities.

Conclusion and Recommendations

The study revealed that there are gaps in the human development dimension of extension services across the five countries studied. The following recommendations are made to strengthen the human development dimension of agricultural extension services: current undergraduate agricultural extension curricula should be overhauled to emphasize practical skill acquisition; a curriculum which is standardized, competency-based, and updated with modern farming techniques and management principles through technologically integrated agricultural courses should be developed for each country; functional working relationships and linkages between the private and public sectors should be promoted; and fellowship programs should be arranged for agricultural extension professionals to get training from resourceful and developed countries.

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Towards a Competency Model Approach to Agricultural Development: Evidence and Insights from Central America and Malawi

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Abstract

Introduction and Theoretical Framework

As drivers of rural development, competency models have become more prevalent in extension (Davis et al., 2017; Michigan State University Extension, 2008; Stone & Coppernoll, 2004). Competency models tailored for extension organizations now include capacities pertaining to technical issues and subject matter, evaluation, management, international markets and issues, gender and social equity, as well as skills and knowledge around adult education, facilitation, and mobilization (Adesiji, 2006; Davis et al., 2017; Harder et al., 2010; Suvedi & Kaplowitz, 2016; Umar et al. 2017).

Crucial to addressing competencies within rural development and extension is cascading the competencies down to smallholder farmers. A training cascade as a diffusion or multiplier model can help information, ideas, or competencies flow downwards and spread over time, to individuals or groups operating at multiple levels of a system (Karalis, 2016).

This study focuses on the competency model developed in 2018 by Catholic Relief Services (CRS) to inform the design, implementation, and evaluation of CRS' agriculture and livelihoods (A&L) programming. CRS established evaluation standards and techniques to assess performance across its agriculture and livelihoods projects (1 = Basic to 5 = Advanced).

Purpose

The purpose of this study was to assess the effectiveness of the CRS model for building competencies among extension professionals as well as end-users.

Methods

This study used a mixed methods approach that combined the Situation, Task, Actions and Results (STAR) model (Heinsman et al., 2007) to assess the level of competencies, with the SenseMaker method, to evaluate the internalization of the behavior changes for each competency. Four development projects were included in this study: (1) the Water Smart Agriculture (WSA) project in Central America; (2) the United in Building Life Expectations (URBALE) project in Malawi; and (3) the Development Food Security Activity in Ethiopia (ETHIOPIA). Semi-structured interview guides were developed to determine behavioral baselines and follow-up situations, tasks, actions, and results. Data analysis was a multi-stage process, with iteration between visualizing patterns and open-ended and structured analysis.

Results and Conclusions

WSA participants achieved a functional level in four foundational competencies and developing in the other remaining competency. UBALE project participants achieved similar but a slightly lower average level, reaching a functional level in two of the foundational competencies and developing for the other three. ETHIOPIA participants achieved a developing level in three of these competencies and stayed at a basic level in the other two.

Results for Natural Resources Management (NRM) and innovation competencies show that farmers who participated in the WSA project reached a functional level for two core NRM competencies: conservation and regenerative agriculture, and integrated soil fertility management. They achieved a developing level on the continuous learning and innovation competency. Those farmers who participated in the ETHIOPIA project only reached a developing level for two of these five competencies and stayed at a basic level for the other three.

The UBALE project started agricultural marketing development in its second year with participants interested and ready to collectively engage with markets, and who joined market clubs. Market club members only reached a developing level for two of the four agricultural marketing competencies and stayed at basic level for the other two.

For UBALE, the evaluation of the cascade included the field supervisor/officer, the extension worker, the lead farmer (LF), and ultimately the follower farmers (FF). End users achieved a developing competency level for holistic plant health showing that the training cascade worked. With respect to the efficient management of water resources across projects, while field supervisors reached the developing level of the competency, LFs and FF stayed at the basic level, showing that the cascade did not work as expected. Field supervisors stayed at the basic level of the integrated soil fertility management, while LFs and FFs reached the developing level, which may signal that the latter already had some level of the competency at baseline.

For the continuous learning and innovation, field supervisors reached the developing level, while LFs and FFs stayed at the basic level. Given that the activities to develop this competency started in the third year, it may require more time to see changes among lower levels of the cascade.

For the technical NRM competencies of the WSA project, extension workers achieved differing levels, as did the LFs and FFs they supported. For the conservation and regenerative agriculture competency, extensionists were showing 87% of the indicative behavioral evidence and achieved an advanced level of the competency, with farmers progressively lower in the competency down the training cascade. The competency levels between extensionists and farmers were very closely clustered, indicating that information may have in fact been cascaded to its participants.

Recommendations and Implications

Using a competency model approach helped CRS assess its current capacity building efforts and to determine key design considerations for more effective programming. The assessment emphasized the importance of contextual differences and a baseline assessment to tailor the program for specific

learners and contexts. For example, by comparing baselines competencies, levels found in Malawi were lower than in Central America. Even within countries, the diversity of farmers' pre-existing capacities was more advanced than expected. Additionally, gains in competencies varied by context, with the biggest gains occurring when farmers were at a lower starting point.

Evidence of a training cascade did appear for some competencies, most notably where more skilled field agents were followed by slightly less-skilled lead farmers and even less skilled follower farmers. This was most common when initial competency level was already high, as in NRM. There were also instances where concepts were new enough (e.g. innovation, marketing) that all levels were still learning and the cascades were less obvious. Further investigation is needed to determine the specific competencies that cascaded best.

Finally, evidence suggests that extension workers were better prepared in technical areas, especially in Central America. As the literature indicated, extension workers remain challenged in areas like promoting innovation or softer skills, and this in turn affected their ability to teach others. A baseline competency model assessment would identify these gaps, which would allow more targeted training for their engagement in development projects.

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Determinants affecting to Adoption of Climate Smart Agriculture (CSA) in the Northern Bangladesh

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Abstract

Introduction

Bangladesh is known as one of the most climate vulnerable countries in the world (Ali et. al., 2021; Mamun et al., 2021). Among different development sectors agriculture faces the most profound challenges due to climate change. Climate impact on agriculture threatens the overall economic development of developing countries like Bangladesh (FAO, 2014). Innovative technologies are always the key responses to the management of climate impacts. The Climate Smart Agriculture (CSA) connotes three objectives such as sustainable increases of agricultural productivity, adaptation to climate change and mitigating the GHG emission (Sain et al., 2017; FAO, 2010). Despite of triple benefits of CSA, the adoption rate is still varied and relatively limited because of the influence of different factors (Aryal et al. 2018; Mango et al., 2017; Mulwa et al., 2017; Khatri-Chhetri et al., 2017; Tey and Brindal, 2012). Although there are policy and scholarly interests in accelerating the adoption of CSA, the literature related to factors influencing adoption of CSA is limited, especially in Bangladesh. The study aims to fulfill the research and knowledge gap.

Purpose

This research study aims to cover the socio-economic characteristics, innovation's attributes and institutional factors that might be minimized the research gap and accelerated the knowledge for further implications. Therefore, the specific objectives of this study are:

- to determine the farmers perception of climate variability,
- to compare farmers' perceptions with metrological data, and
- to explore the determinants that affect the likelihood and intensity of adoption for five CSA technologies and to identify the reasons for non-adoption.

Research Method

Primary data regarding climate change perception, determinants and adoption were collected based on the household survey from stratified and randomly selected 365 farmers of Biral subdistrict under the Dinajpur district in drought-prone northern Bangladesh. Metrological data are collected from Bangladesh Wheat and Maize Research Institute. The likelihood and marginal effect of adoption were

analyzed following multivariate probit and ordered probit models, respectively. Data analysis was performed using Stata software.

Results

The findings show that about 82.5% of the farmers perceived increasing temperature and 75.1 % of farmers perceived decreasing dry season rainfall over the years, which is similarly relevant to metrological data. About 76.4.7% and 80.85% of farmers were aware of the drought tolerance crops and vermicompost, respectively; more than half of the farmers adopted these practices. Around 70.7% of farmers were aware of perching for insect control, but 46.3% farmers adopted this practice. Although two-thirds of farmers were aware of crop diversification and pheromone trap, adoption was lower compared to the other three CSAs. Results also indicate that the likelihood and intensity of adoption of five CSAs are significantly influenced by different factors such as socio-economic characteristics, institutional factors and perceived technological or innovation attributes. The likelihood and intensity of adopting drought tolerance crops are affected by 11, while both crop diversification and perching method by 7, pheromone trap by 9 and vermicompost by 8 determining factors. Lack of information and unavailability of input appear to be major obstacles to the non-adoption of drought-tolerance crops. Non-suitability in the existing farming, complexity and lack of labour hinders crop diversification adoption. Lacking of experience and information are the major constraints for non-adopting perching practices. Using pheromone trap for controlling insects does not appear suitable for most non-adopters. Non-adopters do not use vermicompost because of lacking of cash and unavailability of input or vermicompost.

Educational importance, implications and further recommendations

This research study contributes to the literatures by covering perceived technological attributes, institutional factors, and socioeconomic characteristics of the individual household farmers. Secondly, it acknowledges the interdependence among CSAs technologies and the likelihood and intensity of adoption decisions were jointly analyzed by applying multivariate probit and ordered probit model, respectively. Therefore, it provides some insights into the long-standing discussions on whether farm households adopt CSAs in a single or composite way. This study suggests that policy implications are necessary to promote the extension and information services, and overcoming the obstacles for the non-adoption of individual CSA technologies. It further recommends that research study should be conducted in diverse context of nationally or globally.

Keywords- Determinants, Adoption, Climate Smart Agriculture, Northern, Bangladesh

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A tool to understand localized extension impact toward farmers' adaptive capacity and gender inclusion: Applied to a Liberian case study

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Abstract

Introduction

This paper presents the findings from a Liberian smallholder farmer case study that identified farmer gender and place-based gaps in agricultural extension and advisory service (EAS) access and household agency. Additionally, a new tool was developed and applied as a measure for farmer adaptive capacity. Three bodies of literature including local gender contracts, intersectionality, and adaptive capacity are used to build a case for understanding and rebuilding EAS in post-conflict settings, including the application of a multidimensional index tool to target localized climate change adaptive capacity.

Purpose and objectives

The research was developed through a collaboration among the Liberian Ministry of Agriculture, Cuttington University (CU), USAID, and a doctoral student. The primary objectives were to develop a more holistic picture of farmer needs and challenges in Bong, Lofa, and Nimba counties and to identify gender gaps in Liberia's national extension program. Here we present findings relevant to understanding how farmer's resource and information access and household agency vary by gender and spatially across the study area. Specifically, we use an inductive approach to thematically determine and test key components of a new index that includes questions about farmers' resource access, leadership opportunities, household power, and time allocation as a measure for access, agency, and overall adaptive capacity. The main goal is to identify gender gaps in farmer access to and agency over extension resources across the study area. Additionally, to provide the Ministry with recommendations to improve gender inclusion and farmer adaptive capacity through spatially targeted EAS. Toward this end we ask the following questions:

1. How does gender impact local smallholder farmer access to and agency over EAS?
2. How does access to and agency over EAS vary spatially?
3. To what extent are Liberian EAS aligned with farmer needs?

Methods

Project co-development was facilitated through partner meetings, iterative protocol development, and work with CU students and staff between November 2017-April 2018. Methods included focus groups, mixed methods surveys, and participatory mapping with Ministry field staff to select study communities. Qualitative coding, statistics, and exploratory spatial analysis were used to investigate the responses from 352 surveys (176 women, 176 men) and 46 focus groups from 22 communities. Further, a multidimensional index that incorporates survey questions related to resources/information access, household agency, leadership, and time allocation was created and used to build a more comprehensive understanding of farmer's needs and challenges by gender and across space. This process included thematic coding, testing internal consistency with Cronbach's Alpha and external validity with a principal component analysis. We used an analysis of variance to test gender-based and spatial differences and the global Moran's I and local spatial autocorrelation (LISA) tests to determine spatial autocorrelation globally and locally.

Results

Results indicate that men farmers are more likely to have agricultural access and agency when compared to women, however, the extent varies spatially. Specifically, that rurality has a diminishing impact on access and points to the possibility of adaptive efforts happening at the local level. However, while the research found that the many rural farmers experience challenges, the results show that women farmers face additional time constraints due to domestic labor burdens, difficulties with land tenure and cultural marginalization, and less access to technology and networks outside of their local communities. Findings provide evidence that the Liberian national extension system can more effectively build community adaptive capacity and improve women's inclusion in resource/information access when services are appropriately targeted and consistently supported, specifically toward women's intersectional needs.

Recommendations, importance, and implications

This research provides evidence that a more holistic approach is required to close the gender-based extension provisioning and household power gaps for women farmers in Liberia. For example, while increasing women's opportunities in leadership and hiring more female extension officers may help address gender gaps, alone, they do not equalize women's overall access, agency, or opportunities when compared to men. We also present, a new locally relevant multidimensional index, and extension service recommendations to help researchers, academics, and policy makers uncover vulnerabilities in farmer resources/information access and household agency toward greater extension efficacy and gender equality; connections between extension services and improved adaptive capacity are also explored. While study findings have local and regional implications, they also have the potential to enhance agricultural extension services in post-conflict settings more broadly. In the face of climate change and political tension, building gender equity and adaptive capacity into extension service practices is more pertinent than ever.

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Utilizing Social Media Groups for Purposive Sampling in International Populations

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Abstract

Introduction

The participation response rate in academic surveys for quantitative research is and has been declining for several decades for both individuals and organizations (Burgard et al., 2020; Brauch & Holtom, 2008). This decrease in participation has led to a concern about the quality of the resulting responses (Murphy et al., 2013). One approach to maintain the rigor of survey research is the use of targeted sampling of hard-to-reach populations specifically through the use of social media. Many social media sites group people together where participants enter networks of informants in order to access or disseminate information (Dusek et al, 2015). Social media allows for three main solutions (1) it identifies the principal actor in local power relations, (2) it offers an alternative channel of access to people by bypassing gatekeepers and diversifying the same, and (3) it allows for more efficient respondent access (Doesk, 2021).

People who are traditionally harder to reach due to a variety of different personal or sociodemographic characteristics, within most countries this is often due to language and educational barriers (Smith, 2012). Low literacy rates within developing countries as well as differences in cultures who are reluctant to volunteer personal information due to the risk of social, political, or discriminatory repercussions (Tung et al., 2008). Hard-to-reach populations are thus being left out of critical scientific research thus creating a gap in the diversity of participants who are opting into research studies thus receiving benefits from the research being conducted (Smith, 2012). Sampling bias is a key issue that occurs in research towards participants with larger networks and stronger ties among individuals. As a consequence participants with smaller networks and weaker ties tend to be ignored (Baltar & Brunet, 2012). Social media also allows researchers to enter multiple networks of informants, and access diverse information thus leading to the minimization of sampling bias to occur (Dusek et al., 2015). While the literature describes purposive sampling with social media in general, there is limited research on specifically using social media groups that have members who meet the criteria and are members of specific social media groups for purposive sampling.

Purpose and Objectives

The purpose of this study was to explore possible options for sampling international populations. The specific objectives include:

1. Determine if and how social media can be used as a sampling tool for international populations
2. Describe the possibilities and limitations of using social media as a tool for sampling.

Methods

This paper draws from a larger study using survey methodology to examine the impact of food loss on smallholder crop farmers in Nigeria. The population includes Nigerian smallholder crop farmers and the sample was collected from a combination of nine Facebook groups and WhatsApp groups. A Qualtrics survey link with the 31-question instrument was administered for two months from December - January of 2022/2023. Purposive sampling was used because the social media groups had the ideal characteristics to take the survey since they were smallholder crop farmer groups that were actively farming (Fraenkal et al., 2019). A researcher on the research team was a member of these groups and was able to post within the groups. The social media post followed Institutional Review Board protocol and included information regarding why the survey was being conducted and their participation was voluntary.

Results

Through the use of social media groups, a total of 54 respondents participated in the survey and had usable results. At the end of the survey, participants could select which social media group(s) they belonged to. The nine options participants could select were based on the groups we targeted and an option to select "other" and enter other social media groups. The results included: 23% of respondents belonged to the Maize Association of Nigeria, 16% said Other (Anambra State Farmers Association, National Ginger Farmers Association, The African Farmers Stories, and RIFAN), 14% said Farmers Forum Nigeria, 13% indicated Commercial Farmers Association of Nigeria, 9% said Cassava Growers and Processors Markets, 7% belonged to OGUN Maize Association of Nigeria, 5% to Cassava Wealth Initiative, 5% belonged to Agriculture in Africa, 5% were members of the Plantain Farming Group, and finally 2% of participants represented the Nigeria Pepper Association.

Conclusions & Recommendations

We found social media to be a viable tool to reach hard-to-reach populations, specifically Nigerian crop farmers. However, there were limitations to the study that lead to future recommendations. By using social media, it did limit our population sample to those who could read English and had access to the internet and social media. Additionally, while we had 54 usable responses, there were 120 total responses. At the time of the study, there were a total of 240,800 members in all nine of the social media groups. This limitation includes the threats to validity of survey fatigue and mortality. We recommend future research projects that utilize social media groups use short, easy-to-understand surveys to mitigate these threats. Although we executed content validity, we recognize there was a limitation because of survey fatigue and mortality that could have impacted the results. Further, we found complications with the post being lost within the contents of the Facebook and WhatsApp groups. Therefore, we recommend contacting the page administrator to pin the survey to the top of the discussion page or thread. Finally, if possible, future researchers should consider potential compensation for participants to incentivize taking the survey. We also recommend having a researcher on the team be a member of the group to assist in posting and/or contacting the group admin.

Social media is an innovative avenue to contact hard-to-reach populations, such as international populations (Dusek et al., 2015; Smith, 2012). Particularly social media groups that involve members of a particular demographic have great potential for purposive sampling. This paper found that social media was an option, but future research should address the limitations found including survey fatigue, mortality, and the survey post being lost in the social media feed.

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The Mounds and Ridges of Innovative Technologies in School Gardens in Liberia

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Abstract

Introduction

In the middle of the 20th century, many rural schools across the United States developed agricultural education programs to train students on modern agricultural practices to increase efficiency on the farm and industry (Swanson, 1954). School-based agricultural education (SBAE) was then established and implemented across the United States as a way for students to develop career-readiness skills for agricultural employment through classroom instruction, laboratory-based experiences, and leadership involvement (Talbert et al., 2014). School gardens have become increasingly popular in low-income countries where these programs aim to build an understanding of food security and nutrition decisions (Hutchinson et al., 2015; Nury et al., 2017; Christian et al., 2014). Programs involving school gardens provide students hands-on experiences in growing vegetables in combination with educational opportunities of how food fuels youth's bodies (Christian et al., 2014). Moreover, in rural areas, education is considered a fundamental component of increased agricultural productivity with the adoption of new technologies, inputs, and methods (O'Donoghue & Heanue, 2016).

Outside of the US context, In Liberia, approximately 48% of the population lives within a rural area and 80% of the country is involved within the agricultural industry in some way (Liberia Institute of Statistics and Geo-Information Services, 2017). Additionally, the Sub-Saharan Africa region has six of the top ten fastest growth countries in the world. Therefore, the current policy dialogue has now revolved around youth employment which has gained the attention from the highest level of African policy makers including the African Union, African Development Bank and national governments. However, there seems to be a gap in knowledge of how exactly youth within Africa will be engaged and gain hands-on learning techniques to enter the workforce (Fox et al., 2016).

Purpose and Objectives

This study gained a practical understanding of the effectiveness of SBAE and 4-H Liberia by examining the use of contextually appropriate agricultural technologies and school gardens. The objective was to determine the 3-year trend in agricultural innovation adoption, specifically in soil health.

Methods

The SBAE program focuses on four main, transformative efforts through which teachers deliver classroom instruction, school demonstration farms, home entrepreneurship projects, and leadership skills using hands-on, innovative approaches (Rogers, 2004). Liberian teachers were trained in the four SBAE categories listed above. After the workshops teachers and volunteers return to their villages to enhance the existing local 4-H clubs (approximately 25 members per school) to strengthen student's

capacity to expand food security, nutrition knowledge, leadership skills, and workplace attributes to expand student's career opportunities. SBAE focused on seven counties within Liberia including Bong, Bomi, Gparpolu, Lofa, Montserrado, Margibi and Nimba. Each school had the opportunity to participate in a school garden in which the instructor could choose how to incorporate different soil health technology in order to increase yield of the garden. Educators selected technologies such as: a) composting piles, b) composting pits, c) mulching, d) level beds, e) raised beds, f) use of a-frame tools, g) mounds constructed and, h) ridges constructed. Educators could pick any combination of these technologies to increase yield within the garden.

Results

Over the course of three years, 2019-2020 (year 1), 2020-2021 (year 2), and 2021-2022 (year 3), seven counties in Liberia were analyzed that fall within USAID's zone of influence. One hundred and fifty-seven schools were evaluated on their implementation of the eight agricultural technologies that would improve soil health within their school garden. The results show that the use of mounds and ridges were the most frequent innovation within the schools for agricultural technology adoption. The trend during the three years for mound adoption in the 157 schools was 62, 54, and 90 within year one, year two and year three. The ridge adoption trend was 54, 44, and 106. A-frame adoption was 9, 6, and 41. Level bed adoption was 11, 15, and 38. Raised bed adoption was 1, 4, and 33. Compost (pit), mulching, and compost (pile) adoption rates were less than 2.5%.

Conclusions & Recommendations

We found that the use of school-based agricultural education and school gardens increased the use of mounds and ridges from 2019-2020 to 2021-2022. However, there was a slight decrease in use from 2019-2020 and 2020-2021. The COVID-19 pandemic may have influenced the decrease in implementation. We recommend that further research projects should be conducted to explain this decrease in implementation. We recommend further research to evaluate why the adoption rate is so low in the other six innovations. Finally, future research should be conducted to evaluate the effectiveness of the SBAE model through the lens of adoption of innovation of school garden techniques in other counties across Liberia.

School gardens serve as an educational opportunity in developing countries to teach children the importance of nutritious food (Christian et al., 2014). This paper found that the innovative technologies most widely adopted are the use of mounds and ridges, but further research should be conducted as to why this technology was more successful than other techniques and why there was a decrease in adoption throughout the 2020-2021 year.

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Proposing an Identity-in-Context Framework for Culturally Responsive Evaluation: Implications for Cooperative Extension in Rural Areas

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Abstract

Introduction and Literature Review

Extension programming and evaluation frequently center effective strategies to assist in achieving collective social impact (Borron et al., 2019). However, little literature within Extension evaluation practice highlights sociocultural identity as a program impact. Culturally responsive evaluation (CRE) oriented around identity may help illuminate the epistemological and cultural influences behind evaluation that impact priority populations and thus the subsequent social impacts of an Extension program (Borron et al., 2019). CRE centers culture, emphasizing that meanings are continually negotiated among group members to provide a group's symbolic identification based on shared commonalities (Bocock, 1992). Taking a sociocultural and identity-oriented approach to evaluation may highlight how evaluation practice relates to broader issues of equity and social justice (Acree & Chouinard, 2020). CRE considers culture a crucial component of understanding, analyzing, and judging social programs, emphasizing that evaluation itself is influenced by culture (Acree & Chouinard, 2020). Recognizing cultural influences on evaluation is important for practitioners involved with all aspects of program design, development, and delivery across community-based Extension programming.

Purpose and Research Questions

The purpose of this theoretical work is to showcase how CRE evaluation practice centering identity in context may create more effective Extension evaluation strategies to holistically capture the social impacts of programs. The research questions guiding framework development were: 1) What aspects of sociocultural identity are important to consider when evaluating rural, community-based Extension programs?; and 2) How does culturally responsive evaluation influence the interpretation of the sociocultural identity components within rural, community-based Extension programs?

Philosophical Themes

Evaluation work can unintentionally contribute to the maintenance of a harmful status quo if cultural and epistemological assumptions remain unexamined (Mathison, 2018). Evaluators are often in a position of power, communicating a specific cultural worldview using metrics of compliance rather than measures of equity when assessing program value (Dhaliwal et al., 2020). Since evaluation emerged from a Western worldview, the practice tends to support "the colonizing Western intervention to uplift the poor and downtrodden, to take up agency on their behalf, and to enlighten them to practices of the modern world" (Dutta, 2008, p. 27). CRE offers a practice positioned away from centralized Western ideals of evaluation and toward developing evaluation with the values, needs, and participation of the community in mind (Hood et al., 2015). CRE was developed from a transformative paradigm (Mertens,

2003), which asserts that knowledge is situated within infrastructures of injustice, power, and privilege (Alkin & Christie, 2004). CRE practitioners maintain specific ethical commitments, including “respect for culture, the advancement of human rights, the importance of addressing inequities, and the promotion of social justice” (Hall et al., 2020, p. 385).

Products and Conclusions

The components of the proposed Identity-in-Context Framework (ICF) include: individual; community history; collective identity; community structure (place); structure; agency; power; and discourse. An individual’s self-identity is a prerequisite for entering into social relationships (Baumeister, 1995). Expressed identity (as a mediation between self-constructed and externally perceived identity) includes the “attitudes, beliefs, knowledge, preferences, and aptitude that one chooses to express” (Anderson et al., 2018, p. 33). Expressed identities are influenced by one’s education, lived experiences, gender, religion, cultural setting, nationality, socioeconomic status, and power structures of the environment in which an individual exists. External responses to individual’s behavior may either confirm or counter one’s identity as it interacts with their perception of their self and the intention to continue expressing an identity (Anderson et al., 2018).

Community history is the shared historical memory of a group within a geographic space. Histories within a community are both personal (one’s personal attachment to place as well as family connections; Nowell et al., 2006) and collective (the history of individuals and groups in the community and their related experiences). A related concept, collective identity, refers to large-scale, collective processes situated within a community context that are continually reproduced through discourse around sociocultural identity construction (Colombo & Senatore, 2005). Additionally, place as a spatial and physical component of identity facilitates one’s feelings of attachment to the community at large (Anton & Lawrence, 2014), making it an influential component of the ICF.

Structures, imposed on communities from external and internal power sources, can make particular identities more vulnerable than others (Reid et al., 2020) especially when working in international contexts. Race and gender are not mutually exclusive categories of experience; rather, they are components of a complex identity compounded based on one’s position in the existing power structure (Crenshaw, 1991). Structures are closely related to agency. According to Bhattacharyya (2004), agency involves participants defining problems on their own terms and then “taking active measures to solve” those issues (p. 13), however, structures impact groups’ abilities to undergo the definition process.

Language plays an important role in the social construction of reality, as social practices are constructed discourse and symbolic meaning-making (Yin, 2018). Power can also produce various identity categories within society (Weir, 2009). Because power and discourse are co-constitutive (Hall, 1996), discourses can legitimize various power structures that uphold the power of the dominant cultural group to continue cycles of marginalization and oppression that influence individuals, histories, and structures (Dutta, 2008).

Recommendations and Implications

Cultural differences not only exist when there are racial differences in priority communities - other characteristics such as rural/urban and high socioeconomic status/lower socioeconomic status can contribute to sociocultural identity differences between Extension program participants (Moore, 2005).

In rural areas, local communities are often constructed around concepts of space and place, which have been used as instruments to emphasize identity, values, and social networks (Kumpulainen, 2017). The ICF can help practitioners remain cognizant of cultural implications for practice but also how identity intersects with cultural, social, economic, geographic, and structural forces impacting rural communities around the world. The ICF integrates personal identity, structure, history, and discourse to understand identity formation processes that can enhance the social sustainability of international Extension programming. Recognizing the role of sociocultural identity, and how it is supported or negated, can illuminate important social impacts of Extension programming (Borron et al., 2019).

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Exploring How Cultural Dimensions Influence Communicating with Prospective Agricultural and Environmental Science Graduate Students

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Abstract

Introduction and Review of the Literature

International agricultural and environmental science graduate students build universities' research capacity by establishing academic networks with scholars in their countries of origin (Pandit, 2007). However, recruitment and retention of graduate students with diverse cultural backgrounds is difficult (Amirali & Bakken, 2015). Some universities have effectively implemented social media to recruit international students (Amirali & Bakken, 2015), highlighting the importance of inclusive, usable university websites (Diwanji, 2022). However, distinctions between international and domestic graduate students' communication preferences have not been thoroughly explored (Ammigan & Laws, 2018).

Hofstede et al.'s (2010) cultural dimensions theory framed this study. Dimensions are cultural aspects measured relative to other cultures. One dimension is collectivist versus individualist cultures. Collectivist societies prioritize the interests of the group over the individual; individualist societies prioritize the interests of the individual over the group (Hofstede et al., 2010). Differences in societal priorities present challenges for international students in countries with divergent cultures from their own because values can influence digital and information-seeking behaviors (Binsahl et al., 2020). Additionally, students from collectivist countries exhibit different communication and thinking styles in the classroom, possibly due to cultural differences experienced in the predominately individualist U.S. culture (Lu et al., 2021).

Purpose and Research Question

The purpose of this study was to explore the communication preferences of agricultural and environmental science graduate students from individualist and collectivist cultures when selecting a graduate institution. The question guiding the study was: When searching for graduate research programs, what communication channels do prospective graduate students from collectivist and individualist cultures use?

Methods

Ten departments in the University of Georgia College of Agricultural and Environmental Science each submitted the name of one international and one domestic exemplary graduate student for recruitment into this qualitative study. Nine international and 10 domestic students participated. The semi-structured interviews explored participants' experiences; follow-up questions were asked for a deeper understanding of responses (Seidman, 2006). Interviews occurred over Zoom or in-person, lasted ~60 minutes, were audio-recorded, transcribed verbatim, uploaded to MAXQDA for content analysis, and

pseudonyms assigned. A single coder used inductive coding to allow the “research findings to emerge from frequent, dominant or significant themes inherent in raw data” (Thomas, 2006, p. 238). An audit trail and codebook were maintained to guarantee data credibility and integrity (Lincoln & Guba, 1985) and peer debriefing established reliability (Barber & Walczak, 2009). Using Hofstede et al.’s (2010) cultural dimensions, 10 participants, all from the U.S., were categorized as individualist and nine participants from Benin, China, India, Jamaica, Nepal, South Korea, The Philippines, and Turkey were categorized as collectivist.

Results

Four themes emerged from the collectivist participants: *emails*, *departmental and lab websites*, *journal articles*, and *social media*. *Emails* with prospective faculty advisors helped participants narrow their program searches. Lorelai used email to learn more about her advisor and his research: “we had email exchanges and he actually sent me a draft of his research proposal.” *Departmental and lab websites* provided research and social information. Matt preferred lab websites with project pages, publication pages, and lab news “where they post for their social activity thing... [to] give you an overall picture of the lab and how big, how fun, how together, how close [it] is.” *Journal articles* helped collectivist participants find faculty members with strong reputations and similar research interests, as well as dynamics of team science. Oliver stated, “when I read the article, I look at names. If we have names from different departments or schools, that means that part of the study was done by others.” Collectivist participants used *social media* to find funding opportunities, explore institutions, or contact current students. Yvette said *social media* was beneficial because “[you] can directly tell the new student what kind of lab environment [...] it is ...”

Four themes emerged from the individualist participants: *emails*, *in-person visits*, *departmental websites*, and *direct and interpersonal communication*. *Emails* with prospective faculty advisors established initial connections used for continued communication, typically after visiting campus. *In-person visits* were influential in providing participants with departmental culture insights. Comparing [University] to another institution, Natasha said, “I liked my visit here ... because I felt like I had better interactions with the faculty...The real seller was way better interactions with actual students in the program.” The *departmental websites* theme involved “a lot of looking at their department web pages to see who was listed on the faculty and what kind of research they did” (Victoria). Finally, *direct and interpersonal communication* was beneficial for participants who had pre-established relationships with prospective faculty. Karter said, “I had already had such a strong interpersonal relationship that I didn't feel the need to complement that or supplement that with media.”

Conclusions and Recommendations

Participants from collectivist and individualist cultures shared communication preferences of *emails* and *departmental websites*, indicating these information-seeking channels are useful for all prospective graduate students. Therefore, institutions should prioritize communication strategies in these areas to meet diverse students’ needs. Additionally, *journal articles* were used by collectivist participants to determine research ethics, methods used, and the collective research values in a department or lab, emphasizing a group-dynamics focus aligning with Hofstede et al.’s (2010) cultural dimensions theory. Thus, recruitment of graduate students from collectivist origins should prioritize sharing *journal articles* with strong team science and methodological foundations. *Social media* aided collectivist participants in identifying student experiences, helping them understand the departmental culture. It

may be beneficial to share social media content featuring graduate students from collectivist cultures to encourage prospective student engagement.

In-person visits solidified relationships with faculty members and bolstered individualist participants' confidence; however, this theme may be due to opportunities afforded to domestic students who do not face the same cost-prohibitive barriers to *in-person visits* as international students. Additionally, the *direct and interpersonal communication* preferences of individualist participants were likely related to pre-existing relationships, providing participants with self-assurance to communicate because relationships had already been established. Domestic students are more likely to have an advantage in this area over international students. This should be considered in departments' diverse, equitable, and inclusive communication strategies.

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The ICT Stewardship Project: Introducing a community of practice approach for inclusive digital innovation training with EAS practitioners

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Abstract

Introduction

Digital transformation of the agriculture sector promises to contribute to sustainable development and improve the livelihoods of farmers and their families in the Global South (Florey, Hellin, & Balié, 2020). There are, however, concerns that the voices of smallholders and other marginalized groups may be excluded from important decision-making processes, thereby perpetuating systemic inequalities and creating new power asymmetries between farmers and large-scale agribusiness (Lajoie-O'Malley, Bronson, van der Burg, & Klerkx, 2020). In recognizing these concerns, several leading voices in the field have identified an emerging and essential role for agricultural extension and advisory services (EAS) in supporting inclusive digital development in ways that will serve the interests of all stakeholders, including smallholders (Klerkx & Rose, 2020).

To that end, we have established an international research partnership to develop and test an introductory ICT stewardship training program for extension practitioners in the Global South. We draw on the communities of practice (CoP) literature and its emphasis on situated learning as integral to professional development (Wenger, McDermott & Snyder, 2002). EAS practitioners are typically members of one or more communities of practice as crucial intermediaries in the agricultural value chain and with a pivotal role in digital transformation efforts.

“Technology steward” was introduced into the CoP literature as term referring to someone who guides and supports inclusive digitization efforts within a community of practice (Wenger et al., 2009). Technology stewardship is a type of intermediary role that shares features with, for example, “ICT champions” (Renken, 2019). Research points to the intermediary as an influential role in promoting innovative technology practices, particularly with women and other marginalized groups (Oreglia & Srinivasan, 2016), but it is sometimes problematically enacted as a top-down and supply-side driven role (Wahyunengseh et al., 2020). Unlike other intermediary-based training that focuses on implementation (FAO, 2018; Raj & Bhattacharjee, 2017), our training program takes a “whole community” approach (O'Donnell & Beaton, 2018) that attempts to foster “effective use” with ICTs (Gurstein, 2003) in alignment with local capabilities and community-led choice (Kleine, 2013).

Purpose and Objectives

The initial purpose of this initiative was to adapt the technology stewardship approach to agricultural contexts in the Global South. The project has been designed around three main objectives: (1) create and test a curriculum that could form the basis for training in “ICT stewardship” that can be offered to

EAS practitioners in Sri Lanka and the Caribbean; (2) incorporate the training into a participatory action research design that involves practitioners as they carry out stewardship activities; (3) build local capacity to deliver and improve the training program beyond the life of the research project.

Methods

We have incorporated a multiple, embedded case study design (Yin, 2003), gathering participants into mixed cohorts of EAS practitioners that represent a cross-section of gender, age, experience and sectoral background. Training provides each cohort member with an integrated set of core competencies in community engagement, ICT selection using on a low-cost a low-cost (“frugal”) technology strategy (Vossenbergh, 2018) suitable for resource-constrained settings. Participants are then introduced to action research techniques for evaluating ICT-related efforts. Data are collected using pre/post-course surveys, classroom observation, and in-depth interviews. Cohort members are encouraged to attempt an individual or small group capping project, which will vary in complexity and duration on a case-by-case basis. The capping project concludes with a self-evaluation and a “quasi-ethnographic” report (Murtagh, 2007). We assess process outcomes with multiple methods, including participants’ capping project reports, periodic consultations and check-in interviews with the participants during the capping project, and a post-project focus group.

Results

The major results of this project can be summarized in three categories. (1) participant interest and engagement; (2) curriculum testing and validation; (3) impact on professional practice. The pilot phase of the project indicated strong participant interest and engagement in the training program. EAS organizations invited to participate responded enthusiastically and the four training courses offered during the pilot stage were fully subscribed, involving a total of 80 EAS practitioners from across Sri Lanka and the Caribbean. We also noted high completion rates upwards of 90 percent per cohort. Post-course evaluations completed anonymously by participants indicated that they felt the training to be relevant and contributed positively to their ICT skills and capabilities in leading digital initiatives (Gow et al., 2018). While the pilot phase provided limited data about impact on practice, we observed that a number of cohort members completed post-course capping projects (Gow et al., 2020a). Their capping project reports indicate that the participants were able to apply the training to guide inclusive engagement efforts when introducing new digital practices.

Implications and educational importance

The ICT stewardship program has proven to be a promising approach to support inclusive digital innovation with EAS practitioners. Our partners in Sri Lanka and Trinidad are interested in continuing it as a professional development offering through their respective universities. The curriculum has been made available online as an open educational resource and we hope that other educators will adopt it and improve on it (Gow et al., 2020b). During the next phase of the project (2022-2024), we expect to be able to provide more support for the capping project activity as we conduct in-depth research on the lived experience of EAS practitioners in taking up the stewardship role.

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new model for utilizing online education platforms to improve students' academic achievements and to enhance their desire to learn

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Abstract

Introduction

Over the past decade, educational institutions have been constantly striving to provide education to students following the dynamic changes observed in higher education (Lal, 2020). Hence, the number of colleges and universities looking for ways to deliver course content online has also increased rapidly (Dumford & Miller, 2018). Not only are higher education institutions increasingly offering online courses, but the number of students enrolling in online courses is also increasing rapidly (Wei & Chou, 2020). Meanwhile, the COVID-19 pandemic has further caused the natural functioning of various activities around the world, including learning and teaching, to shift to online education (Baber, 2020).

Online education is a learner-centered approach that increases students' responsibility and motivation to learn by encouraging learners (Sabah, 2020). Students' satisfaction with online learning is largely related to the rate of leaving or continuing education and the motivation to continue training courses, success, students' commitment to educational programs (Kuo et al., 2014), perceived quality of online learning, and student performance (Harsasi & Sutawijaya, 2018). Research on students' satisfaction and the quality of online courses improves the quality of universities and enables the multidimensional development of higher education (Hou, 2017). Some people believe that achieving high-quality learning in online education is more difficult and to be able to maximize the quality of learning in online education, many factors affect it (Putra et al., 2019). Online education providers face challenges in measuring the quality of online education (Shava & Ndebele, 2014). Therefore, the need to create an appropriate and comprehensive evaluation framework to measure the quality and impact of online education programs has been raised by many researchers (Mariasingam & Hanna, 2006).

Purpose and objective

The present study examines factors affecting students' perceived quality and satisfaction with online education.

Methods

a cross-sectional online survey was designed to achieve the research goal. The sample study included students of Iranian agricultural universities who used online education in the second semester of the academic year 2020-2021 during Covid-19 (n=480). Internal consistency of the constructs was confirmed using Cronbach's alpha (0.84-0.96). The composite reliability of all constructs is more than 0.7 and the Average Variance Extracted for all constructs was greater than 0.5.

Results, Products, and Conclusion

Data analysis showed that the research model is very strong in terms of predicting students' perceived learning quality and satisfaction. The model was able to predict 83% of the variance of perceived quality and 86% of the variance of satisfaction.

Findings have shown that course structure has a positive effect on satisfaction ($\beta = 0.34$, $P < 0.001$) and perceived learning quality ($\beta = 0.36$, $P < 0.001$). Students' motivation and flexibility have directly affected students satisfaction. In addition, among interactions, learner-content interaction has positive effect on satisfaction ($\beta = 0.33$, $P < 0.01$). Furthermore, learner-content interaction, learner-learner interaction, and learner-instructor interaction have a significant effect on perceived quality. Students can get a deep and correct understanding of the educational subject when they have a proper interaction with the content of the course and become familiar with the educational content. Students' interaction with peers, leads them to deeper ideas and increases their achievements, and their interaction with instructors is vital for knowledge transfer and feedback and can take various forms such as guidance, support, evaluation, and encouragement. and they can have deeper and bigger achievements.

Student satisfaction has been identified as one of the elements in evaluating the quality of online education ($\beta = 0.29$). The importance of students' satisfaction with online learning in research is well documented (Ali & Ahmad, 2011; Yukselturk & Yildirim, 2008). Therefore, this element can be used as a framework for evaluating and developing online programs and courses in various educational institutions. On the other hand, due to the prevalence of pandemic diseases, this study helps education officials and academics to identify factors that increase the quality of online training courses (Baber, 2020) and improve the quality of online courses by educators and trainers.

This study confirmed the importance of three formal interactions in online learning and reinforced the belief that institutions should pay more attention to course design and improve the quality of online learning by creating a conducive environment to expand engaging learning experiences. Therefore, it is important to pay attention to the use of strategies that aim to interact with educational materials and other learners. In addition, facilitator training is very important. Hence, educators need to have strategies for managing time and fascinating discourse.

Recommendation, Implication, and application

In general, the results of this research are more practical for the three groups. The first is online educators, who are looking for different interactive strategies to implement in their online courses and intention to teach online or improve the effectiveness of their online teaching. The second is educational designers who work in the design and development of online courses and want to make attractive online courses. Finally, the third group is managers who are looking for ways to increase participation in online courses and support staff and faculty who work in successful online programs.

As long as students are at a high level of interaction, deep and meaningful learning can occur. Therefore, to achieve a more desirable output quality, sufficient attention should be paid to the interactions in online courses. Efforts should be made to produce appropriate content with online teaching methods and to provide numerous opportunities to increase learner communication when presenting curriculum and out-of-class times. In addition, the findings show that course structure is an important predictor of perceived quality. Therefore, educational designers should pay attention to the appropriateness of the structure of the courses according to the characteristics of the students, and the content of the course should be designed in such a way as to increase the interaction of the learner with the educational content. In addition, instructors and trainers should use various attractive and conversation-oriented teaching methods to increase communication with students when presenting educational materials to increase the interaction of students with their peers, and design course activities in the form of the team working.

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Assessing stakeholders' perception of underreported pluralistic advisory service system in Ontario, Canada using the Q-methodology

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Abstract

Introduction

Agricultural advisory services (AAS) are essential to facilitate joint learning, co-production of knowledge (Faure et al., 2016), and accelerate the adoption of sustainable agricultural technologies by farmers (Long et al., 2016; Cerf et al., 2011). Effective service provision can increase the resiliency, efficiency and productivity of agricultural sectors with targeted information that is delivered in an appropriate manner. In the last decade, agricultural extension and advisory services in Ontario have gone through tremendous transformations, including declining public funding, the emergence of new stakeholders in the delivery and funding, increasing use of group methods, and introduction of new terms, such as Knowledge Translation and Transfer (KTT). This shift has resulted in organizational pluralism, which means that more private entities are creating and disseminating information in Ontario Extension services. In many instances, it is anticipated that organizational pluralism will lead to the development of new extension systems with improved client-service capabilities, better content (technology options), or better funding sources. However, organizational pluralism within AAS poses several issues, including disparity in service provision (Labarthe and Laurent, 2013), coordination constraints (Kabir et al., 2020, Nettle et al., 2017), diminished value of a personal farm visit (Knuth & Knierim, 2013) and an increase in production costs (Faure et al., 2017). Despite the fact that numerous studies have been carried out to evaluate pluralistic advising systems across the globe, Ontario's existing pluralistic agricultural advisory service system has not yet undergone a thorough evaluation. Assessment of pluralistic advisory systems can help to guide policy design to reorganize the Ontario Agri-food Alliance's Knowledge Translation and Transfer (KTT) system for timely and effective knowledge dissemination to stakeholders.

Purpose and Objectives

Our study investigates the subjective perceptions of the different crop, soil and livestock advisory stakeholders (e.g. advisors, and farmers) about the characteristics and quality of Ontario's pluralistic advisory system using the best-fit model.

Methods

We used Q-methodology, which is a mix of qualitative and quantitative methodology since it combines mathematical techniques like factor analysis with a genuine constructivist and interpretative approach

to "reality" (Duenckmann, 2010). We analyzed the existing literature to produce statements that consider the components (characteristics and quality) from the best-fit framework proposed by Birner et al. (2009). First, we generated 44 statements related to the governance structure (16), organizational capacity (5), organizational management (9), advisory methods (5), and service quality (9). Following the expert's (practitioners and researchers) critical assessment of the identified statements, 23 statements were induced for Q-sorting. In a virtual Q-sorting, 49 people from Ontario, Canada, including crop, soil, and livestock producers and advisors, participated, followed by a request for additional clarification of their decision to rank particular statements. PQMethod software was used to carry out the statistical analysis (Bacher et al., 2014). Using Principal Component Analysis (PCA), the participants were sorted into groups according to how similar their perceptions were, and these groups were then combined to generate a factor. The number of factors was chosen by using eigenvalues greater than two, which means that each factor is characterized by at least two considerably loaded sorts. The distinguishing and consensus statements were also used to highlight the differences and similarities between the factors (Zobeidi et al., 2016).

Results and discussions

Findings suggested that performance and service quality of pluralistic advisory system could be interpreted through three typologies: i) quality oriented advisory system, ii) governance and quality-oriented system, and iii) method and quality-oriented system. In particular, respondents within the first group stated that information bias and inconsistency are crucial factors to consider for AAS since they felt that they could directly affect farming and undermine trust between farmers and advisors. Meanwhile, second group respondents stated that there are considerable coordination and collaboration challenges in the present AAS system compared to the 1990s publicly sponsored system. They said these challenges persist because both sides are competing for the same market share. Finally, third group respondents reported their perception that one-on-one advice is more commonly used than group-based AAS methods like workshops and tours because current AAS organisations focus on large farmers. Moreover, private AAS providers were more likely to offer feedback opportunities to farmers than their public sector providers. They felt that private sector service providers lacked any specific method for collecting feedback from small farmers because they did not intend to satisfy the advisory needs of farmers.

Conclusions, and Recommendations

Different actor groups, such as farmers and advisors, represented the three perspectives, and not all respondents from the same sector shared the same viewpoint. Our study contributes to the scarce scientific information about extension and advisory services in the Canadian context, revealing the performance and service quality of current pluralistic advisory system. Q-methodology provided not only insight into the coordination challenges, but also into the new fact that information integrity has emerged as a major issue for farmers within the present complex pluralistic advisory service system. These Q-methodology perspectives are essential for designing a future pluralistic advisory service system.

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Extension Agent Competencies and Training Needs on Public Issues Education: A Case of Genetically Engineered Crops in Uganda

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Abstract

Introduction

Extension agents have a major role to play in helping farmers make informed decisions on public issues (PIs) in agriculture (Gay et al., 2017; Patton & Blaine, 2001; Smutsko et al., 2002). However, traditional top-down knowledge deficit models commonly used by extension agents have been widely criticized for being ineffective on controversial technologies such as genetically engineered crops (Ahteensu, 2012; Calo, 2018; Hansen et al., 2003; Klerkx, 2020). Approaches that are more system-oriented, participatory, deliberative, and not knowledge deficit have been found to be effective at addressing controversial scientific technologies (Abelson et al., 2003; Barnhill-Dilling et al., 2020; Gay et al., 2017; Kokotovich et al., 2020; Singletary et al., 2007). However, the important competencies for extension agents to conduct extension programs on controversial PIs in agriculture remain under-investigated in agricultural extension literature. Using genetically engineered crops (GECs) as a case study of controversial PIs, this study explored extension agent competencies and training needs for conducting PIs education programs in Uganda.

Purpose and Objectives

The purpose of this study was to determine which competencies are important for extension agents to lead successful PIs education programs on GECs, assess the self-reported proficiency levels on these competencies among extension agents involved in education activities on genetically engineered crops, and determine the training needs of these agents.

Methods

This was a descriptive online survey research study. The survey instrument was designed to determine extension agents' perceptions of the importance of 60 competencies organized within eight competency constructs needed to lead a successful PIs education program on GECs, as well as their self-reported proficiency level in each construct and competency. The survey instrument contained two major sections: 1) scales for recording agents' perceptions on 60 items related to competency, importance, and proficiency, and 2) questions relating to demographics, and extension programming on genetically engineered crops. Researchers developed the instrument and established its validity and reliability. The instrument used a Likert-type scale ranging from 1 (very low) to 5, (very high). The Cronbach's Alpha values ranged between 0.69 and 0.92 for various scales in the instrument, indicating a quality instrument (Tavakol & Dennick, 2011).

This was a census study and the population frame was based on the official public records of extension agents that had actively participated in biotechnology education activities in the Ugandan study districts. At the time of the research, 70 extension agents in the study districts had participated in a biotechnology education activity with farmers. We used the Tailored Design Method (Dillman, 2011) to collect data during July and August of 2021. Fifty-eight agents responded to the online survey, out of a possible 70, yielding an 83% response rate. To address the non-response error, early and late respondents were compared to determine if statistical differences existed (Lindner et al., 2001). Since no statistical differences between the two groups were found, the findings of this study could be generalizable to the study population.

Results

The extension agents providing services on GECs were mostly male (69.0%) compared to females (31.0%). The majority of the agents (67.2%) were 31 to 40 years old and six in 10 (60.3%) had acquired at least a bachelor's degree in agriculture. The advisory services were mostly provided using top-down approaches in the form of workshops and farmer groups (75.9%). A limited group of extension agents used deliberative methods (13.8%), while one-third (31%) reported that farmers preferred to learn about GECs through fellow farmers.

Extension agents' perceptions of the 60 PIs education competencies represented eight competency constructs: 1) creating partnerships; 2) collecting and interpreting data about GECs, audiences, and educational settings; 3) designing education programs on GECs; 4) communicating effectively; 5) facilitating group discussion and decision-making; 6) managing and transforming conflict; 7) working with scientific and technical information; and 8) creating an environment of professionalism. All eight competency constructs were rated important with little differences in overall importance mean scores. The highest-rated construct was communicating effectively (mean=4.36) and the lowest was creating partnerships (mean=4.07). Self-reported proficiency levels for all eight competency constructs were average. Generally, extension agents rated themselves to be more proficient in constructs they also rated as most important.

Training needs were identified by calculating mean weighted discrepancy scores or MWDS (Borich, 1980). The construct with the highest MWDS and therefore the greatest training need was creating partnerships, with a score of 3.07, while the construct with the lowest training need was managing and transforming conflict, with a score of 1.94. Overall, surveyed extension agents had favorable attitudes toward GECs.

Conclusions, Recommendations, and Educational Importance

The advisory services were mostly provided by male extension agents using top-down approaches in form of workshops, which is inconsistent with the scholarly literature on the effective implementation of extension programs on complex and controversial technologies (Smutsko et al., 2002, Ahtensuu, 2012). However, this approach is not effective in educating farmers on GECs. Therefore, the current extension programming on genetically engineered crops needs to be re-oriented to include farmer-to-farmer extension approaches.

All eight PIs education competency constructs were perceived to be important. The highest and lowest-rated constructs were separated by a small range, indicating proximity in the perceived importance of

constructs. The self-reported proficiency levels of extension agents for all the eight competency constructs of PIs education were average, on a five-point Likert scale. The greatest training need on PIs education competencies for surveyed extension agents was creating partnerships. The extension agents rated themselves to be more proficient in PIs education constructs, also rated as most important. This finding highlighted the need for future research to explore the relationship between the perceived proficiency and the perceived importance of PIs education competencies. While the extension agents studied were limited to Uganda, this study makes important contributions to extension work throughout East Africa and other countries where extension efforts on GECs have been unsuccessful. The major educational significance of this study is its contribution to identify the training needs of extension agents related to educating farmers on PIs such as GECs.

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International Audiences Close to Home: A Needs Assessment of Extension Professionals' Preparedness to Serve Spanish-Speaking Clientele in the Agricultural Workforce

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Abstract

Introduction/Theoretical Framework/Review of Literature

The U.S. farm labor force comprises an estimated 2-3 million persons (National Center for Farmworker Health (NCFH), 2018), ~73% of whom are immigrants. Nearly 68% of these individuals were born in Mexico; another 4% are from Central American nations (NCFH, 2018). [State] has seen a 50% or higher increase in Hispanic populations in 20 counties, including some of its most productive agricultural communities (Court et al., 2019; Passel et al., 2022). In 2016, 77% of hired farmworkers reported Spanish as their preferred language, 30% could not speak English, and 41% could not read English (Hernandez & Gabbard, 2018). The language preferences of hired farmworkers are important for service providers engaged in the agricultural sector, such as [University] Extension. A 2009 survey of extension educators in 12 southern U.S. states found most did not feel prepared to serve Latino audiences and reported language was the most significant barrier (Herndon et al., 2013). A contemporary investigation is needed to determine if [University] Extension agents have the competencies to effectively serve Spanish-speaking clientele in the agricultural workforce.

McClelland's (1973) perspective on competencies framed our study. McClelland argued competency-based tests derived from the actual skills needed for job performance were superior to intelligence and aptitude testing. Competencies and competency-based assessments are widely accepted within Extension for use in professional development (e.g., Diaz et al., 2020; Davis & Sulaiman, 2014; Koundinya et al., 2018). Teaching and communication competencies are needed by extension professionals in multiple contexts (e.g., Bengue et al., 2011; Tarekegne et al., 2017). Similarly, the importance of using information communication technologies (ICTs) to advance the goals of extension has been well articulated (e.g., Schneider et al., 2011; Tata & McNamara, 2018)

Purpose and Objectives

Our study's purpose was to assess the preparedness of University of Florida Extension professionals to serve Spanish-speaking clientele in the agricultural workforce. The first study objective was to describe the agents' training needs in the competency areas of teaching and ICTs, as applied to Spanish-speaking clientele. The second objective was to describe agents' perceptions of the importance of language classes.

Methods

We used a descriptive, non-experimental survey design to collect data from the target audience of 175 agents with agricultural programming responsibilities. The entire population was recruited via e-mail with the permission of the University of Florida Associate Dean for Agriculture and Natural Resource's office. Communication with the target audience was conducted via listserv.

The survey instrument had four sections, two of which focused on competency assessment, one assessing perceptions of learning Spanish through classwork, and one for demographic items. The competencies that were adapted and subsequently used to inform the survey were derived from [University's] framework of extension competencies ([Author], 2019). Items for the instrument were taken from the Extension Teaching, Tools, and Methods (TTM) area and the ICT area. The 14 competencies used for the needs assessment were revised to include phrasing such as "with/for/to Spanish-speaking clientele." Participants were asked to rate their ability and the importance of each competency using a five-point scale ranging from *none* to *essential* for importance and *none* to *exceptional* for ability; the former scale was also used to assess language class perceptions. Competency data were analyzed using the ranked discrepancy model (Narine & Harder, 2021) to determine ranked discrepancy scores (RDS). RDS scores can range from -100 (critical training need) to 100 (no training need). Frequencies and percentages were used to describe language class perceptions.

Participants were contacted three times per the recommendations established by Dillman et al. (2014) over a period of two weeks in the spring of 2022. Thirty-three individuals responded to the survey. Four partially completed responses were removed from consideration. There was a usable response rate of 16.5% ($n = 29$; 65.52% female, 34.48% male) for the needs assessment.

Results/Conclusions

Negative RDS scores were found for the 14 competencies assessed. Scores ranged from -31.03 to -75.86. As a group, participants were most in need of training for: (a) selecting appropriate teaching methods to ensure Spanish-speaking clientele's understanding of subject (RDS = -75.86), (b) explaining technical terms to Spanish-speaking clientele (-72.41), and (c) conducting workshops for Spanish-speaking clientele (-72.41). Less critical training needs were found for competencies such as using online conferencing to communicate with Spanish-speaking clientele (RDS = -41.38) and using e-mail to provide information to Spanish-speaking clientele (RDS = -31.03).

Learning Spanish by taking a formal class was perceived as being *above average* or of *essential* importance by 58.28% ($n = 14$) participants. Slightly more respondents 62.06% ($n = 18$) believed taking an informal class was of *above average* or *essential* importance. Our findings show growth in agents' willingness to learn a language; Herndon et al. (2013) found only 28% of extension educators felt a need to learn Spanish.

Results suggest that University of Florida Extension agents are not adequately prepared to apply TTM or ICT competencies with Spanish-speaking clientele, consistent with what Herndon et al. (2013) reported a decade ago. In line with the literature (Benge et al., 2011; Tarekegne et al., 2017), we found the competencies most critical for agents to develop primarily fell within the TTM area. Training is needed to improve the capacity of agricultural agents to serve Spanish-speaking clientele.

Implications/Recommendations

Competencies are skills that can be taught and intentionally developed (McClelland, 1973), so University of Florida Extension should intentionally plan to improve agents' ability to serve Spanish-speaking clientele. Due to the low response rate, we recommend triangulating our results with qualitative feedback from agricultural agents and administration before using them as a guide for improvement. Professional development could include an Extension workshop series dedicated to basic Spanish language education for agents. These recommendations should provide agents with a greater degree of confidence and linguistic accuracy when consulting with Spanish-speaking clientele. Likewise, agents could subsequently determine which teaching methods their Spanish-speaking clients most prefer, benefitting knowledge growth and future program participation. Although many U.S.-based extension professionals may never conduct work beyond domestic borders, they too are part of the global agricultural network and should be prepared to reach international audiences close to home.

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How do clients perceive digital resources of UF/IFAS Extension?

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Abstract

Introduction

About 92% of households in the United States have at least one type of computer (desktop, laptop, tablet, or smartphone), and 85% have a broadband internet subscription (Martin, 2021). With the increasing use of the internet, Extension has been prioritizing information technology as an important means to enhance project outreach (Meszaros & Lockee, 2011). Digital services are well accepted by clients as they are time- and cost-convenient (Fawcett et al., 2021). Clients reported the need for better organized, navigable, and optimized resources on the Extension organization's website during COVID-19 (Khun et al., 2021). To effectively engage a greater number of audiences in digital media, different thoughtful Extension approaches are necessary (Garcia et al., 2018). Identifying the perceptions of audiences towards digital media is critical during this process.

Purpose

This study aims to assess the clients' perceptions of UF/IFAS Extension's digital media.

Methods

A large set of data, 2,138 cases, from an open-ended question asking clients how Extension could be improved was analyzed. This question was part of a larger customer satisfaction survey that was distributed to Extension clients of UF/IFAS Extension over a five-year span (2016-2020). Thematic analysis was utilized to identify emerging themes (Harding, 2013). The whole dataset was initially coded by the second author using open coding (Silverman, 2005). The first author then coded a subset of responses (38% of the data), and intercoder reliability was calculated. Discrepancies between the two coders were discussed, and codes were refined until the intercoder reliability reached 83.8%. A total of 14 main codes were identified for the whole dataset, this study focused only on four of those codes: online communication, computer access, online programming, and time of programming. Codes were further categorized to look for themes and findings within each category.

Findings

Two primary themes emerged from the analytical process: perceived need for digital media and perceived need for improvement in digital media. The former included sub-themes for service location and timing, implying that participants find it difficult to participate in Extension programs due to time and location constraints. The latter had two different sub-themes related to updates required in digital media and making it user-friendly.

Perceived needs for digital media

The first theme addressed the perceived need of participants for digital media. Our findings suggest that the location and the timing of the Extension programs are frequently inconvenient for clients to attend. Clients described that some Extension programs are only delivered in their neighboring counties, or they are only provided on weekdays making it difficult to attend. A client, Matt, said: "have more extension classes in multiple counties. I live in [county] and work five days a week... there are few classes on weekends that I can take. I don't want to travel to [county] to take classes." Clients also reported being unable to attend the desired program because some are only delivered in a particular season. Andrew explained that: "The program I'm interested in doesn't begin until later in the year. Would be great if it were offered more than one time yearly. Because I had to wait so long to start the program, I moved on to other 'packet list' activities. I hope to get back to the Master Gardening."

Clients in this study described the need for recorded materials, Zoom classes, webinars, and a user-friendly website with several online resources as useful for them to get the desired information based on their convenience. The easy accessibility of such resources helps people in many ways. Ben said, "Create an app where users can go and search or ask questions about different subjects. Sometimes I [don't] want to bother your team with questions that I might find online. But [it's] important to know that that information comes from a trusted source."

Perceived needs for improvement in digital media

The second theme addressed the clients' perceived need for improvement in digital media. Our findings reported that clients want to use digital media because of its convenience. However, they are facing several problems pertaining to the accessibility and complexity of getting information digitally. Some of the participants reported being unaware of the resources. Amanda said, "I don't know where to find videos of these courses if I miss one, and hope there is a central repository for them, but I'm unaware of it."

Clients further reported that digital media is difficult to access and is not user-friendly. Pink said, "it is not always easy to find what is needed on the website". Similarly, Cathy said, "Continue to update and revise website information to make it easier to find information. Usually if I dig enough in the searches I find what I'm looking for, but some of the pages have a lot of information and technical info lumped together that requires a fine eye for reading through the mountains of information."

Conclusion and Recommendations

The findings of this study report that the clients feel the need for quality digital media and web services from Extension. To meet this demand, Extension should invest more in improving digital spaces, such as updating its website to make it more user-friendly and accessible. It is recommended for Extension to plan more inclusive programs for different types of audiences. To cater to the needs of a growing digital audience, digitalization of programs is recommended. For best outcomes, integration of different digital and non-digital approaches is recommended. Chowa et al. (2013) reported that promoting Extension services in a pluralistic way increases the opportunity for the audience to reach and engage with information and services from diverse sources.

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What Does it Take to Incorporate Farmers' Innovations in Agricultural Extension Service Delivery? A Case Study of Malawi

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Abstract

Introduction

Agricultural extension services play a crucial role in improving agricultural productivity, hence contributing to agricultural development of most Sub Sahara-African countries, including Malawi (Msuya et al., 2017). In Malawi, agricultural extension is considered a priority area for improving agricultural productivity (MoAIWD, 2016). The Malawi agricultural extension service is mandated to deliver information on scientifically proven technologies (Msuya et al., 2017; NAP, 2016). Achieving sustainable agricultural development requires applying both indigenous and scientific knowledge (Kanu et al., 2014). For agricultural extension services to make an impact, it requires a shift in approach from delivery of information on improved technologies to building the capacity of farmers to innovate (Faure et al., 2016; Masambuka-Kanchewa et al., 2020). What does it take for extension to shift its approach? What changes need to be made?

Literature Review

Inclusive, sustainable agricultural development in Africa hinges on the ability of practitioners, researchers, and policymakers to incorporate farmers' knowledge and experiences when developing and disseminating innovations (Kanu et al., 2014). Knowledge gives people power when deciding to accept or reject a change (Lennie, 2005). Agricultural extension service provision in most developing countries follows a linear diffusion of innovations model where farmers are perceived as passive recipients of information and not knowledge creators (Koutsouris, 2018). This approach denies farmers the opportunity and power to share their knowledge.

Innovation development consists of six steps, one of which is research (Rogers, 1983). However, Rogers did not specify the characteristics of the individuals expected to be innovative or involved in research to develop innovations. Despite a lack of clarity in defining who should develop innovations or conduct research, agricultural development agencies often look to "experts" to use scientific research to develop the innovations. This lack of integration of the end user and their traditional/local knowledge is an opportunity lost to develop farmers' agencies to develop and disseminate innovative ideas.

Purpose and Objectives

This study aimed to explore Malawian farmers' involvement in agricultural extension services, specifically, their role in innovation development and knowledge sharing. This study sought to answer the following questions:

- How do agricultural development organizations view Malawian farmers' capacity to innovate?
- How are their innovations shared with other farmers?

Methods

In this exploratory case study, key informant interviews and a content analysis of various documents, such as the agricultural extension policy and communication materials were conducted. A convenience sample was used to recruit three representatives from three major agricultural extension organizations in Malawi. The organizations included a public organization and two non-governmental organizations. The three representatives were involved in online key informant interviews, which were held on ZOOM. We conducted a content analysis of the Malawi agricultural extension policy and samples of video and radio programs to ensure data triangulation (Denzin, 1970).

MaxQDA, a computer-assisted qualitative data analysis software, was used when analyzing data. Researchers allowed for open, emergent codes to arise during data analysis (Saldaña, 2021); themes and subthemes were generated based on the research questions. To ensure rigor and trustworthiness of our qualitative study, we conducted member checking with research participants and peer debriefing amongst the two researchers.

Results

Innovativeness of Malawian farmers

The interviews and content analysis showed that Malawian farmers are very innovative. They use traditional knowledge to address emerging issues. For example, Participant Z said:

“When the fall armyworm outbreak hit Malawi, some farmers were using kapenta (dried fish) by dropping the soup, together with a mixture of sand at the top of the maize plant, and you could see that the fall arm worms were dying.”

Furthermore, farmers could not wait for formal research to bring them solutions. Therefore, they took charge of their challenges when the researchers and extension providers had no solution. Participant V said:

“...we were going to the ministry to say, there is his challenge. What are the scientific solutions to this challenge? So, in the case of fall armyworm, there were some trials, there were times when they had to commission research to see how it spreads, and so on and so forth. And farmers could not have waited.”

The representatives acknowledged that Malawian farmers were innovating without the aid of the development agencies or the ministry.

Sharing of farmers' innovations

The results of the key informant interviews and content analysis of the agricultural extension policy and communication materials revealed that only scientific information developed by researchers was shared through the agricultural extension service providers. Participant V described their role as an “information broker.” “We take from farmers what they're doing and how they think it is working and

push it to the ministry to say, okay, there is this problem, but this is how the farmers are dealing with the problem." Participant Y stated that they believed that there is a perception amongst some extension staff who feel any information shared should be vetted by researchers and the ministry before it is disseminated. "We had conflicts to say this shouldn't be shared on TV; this shouldn't be shared on the radio because we are waiting for the Department of Agricultural Research Service to approve, to clear the technologies..."

Conclusion/Recommendations/Implications

Malawian farmers are innovative and proactive in addressing emerging challenges. However, the current approach toward delivering agricultural extension services limits farmers' ability to share their innovations and knowledge. Denying farmers an opportunity to share their knowledge may lead to resistance to their acceptance of agricultural extension services. The resistance can be strong when new technologies or practices contradict their prior knowledge and experience (Lennie, 2005). There is a need for a change in approach toward agricultural extension service delivery. Malawi's agricultural Extension Policy does not specify farmers' responsibility and role in innovation development. Policies should be revised to clearly include the farmers' role in innovation development and dissemination. Furthermore, more research and documentation are needed on the impact of farmer-led innovations and their impact on addressing emerging issues.

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Addressing a Globally Important Issue: Assessing Residents' Engagement in Wildlife-Friendly Landscaping

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Abstract

Introduction and Theoretical Framework

Growing urbanization and infrastructure development causes disruption and fragmentation of wildlife habitat and threatens the conservation of wildlife species (McCleery et al., 2014). On the other hand, the potential for urban green space to restore habitat and enhance biodiversity is commonly overlooked (Burr et al., 2018). Scholars around the globe have highlighted how wildlife-friendly gardening not only benefits a diverse array of species and habitats (Baldock, 2020; Lowenstein et al., 2015; Van Helden et al., 2020), but also benefits human by connecting them with nature and different wildlife (e.g., birds, bees, butterfly, etc.) (Mumaw & Mata, 2022). As a component of wildlife-friendly landscaping, native plants are important in reducing air and water pollution, reducing carbon dioxide emission, and offering food and medicine to diverse animals and humans (Bormann et al., 1993; Burghardt et al., 2009; Shaw Nature Reserve, 2011).

Purpose and Objectives

This study aimed to determine gaps between the present and desired state of residents' wildlife-friendly landscaping engagement, identify causes, and decide priorities for action to inform future extension programming. Specific objectives were to: 1) Identify [State] residents' preferences for required capacity/skills building, information platforms and sources to learn about wildlife-friendly landscaping; 2) assess [State] residents' interest, knowledge, barriers and motivators pertaining to wildlife-friendly landscaping; and 3) explore residents' expectation of green industry professionals and [University] extension to address their wildlife-friendly landscaping needs.

Methods

A non-experimental, cross-sectional convergent mixed-methods research design was used for this study. The target population included [State] residents at least 18 years of age. The general public was selected for the study because they are the audience for the targeted extension and green-industry support (level one-needs assessment) and should therefore be at the heart of the needs assessment (Witkin & Altschuld, 1995). Random sampling was used to recruit participants from a database of individuals who had opted in to a research panel. Descriptive analyses (frequency, percentage, mean, and standard deviation) were used to analyze the residents' current and future priorities, knowledge, interest, motivation, barriers, and other preferences pertaining to wildlife-friendly landscape maintenance activities. Thematic analysis was conducted to understand the desired types of support from [University] extension and [State] green industry professionals.

Results and Conclusions

Though the majority of respondents were extremely interested in wildlife-friendly landscaping (57.00%), most (48.00%) were only moderately knowledgeable. Lack of knowledge (25.25%), costs (18.69%) and time requirements (14.65%) were the major barriers, whereas ecological benefits (21.53%), environmental benefits (21.05%), and aesthetic benefits (14.35%) were primary motivators. The majority of residents (28.00%) want educational support related to native and wildlife-friendly landscaping, followed by support in resource identification (27.00%), training related to wildlife landscaping (23.00%), and financial support (17.00%). In addition, the skill required to design landscapes that support wildlife (11.60%) and identification of native and [State]-Friendly plant species (11.60%) were of the highest priority to residents to enhance their capacity pertaining to native and wildlife-friendly landscaping. Findings showed that educational websites were the most preferred platform among the [State] residents to learn about landscape that supports native, [State]-Friendly plants and wildlife with a mean of 3.40, followed by workshops (3.99), webinars (4.02), and Facebook page and posts (4.25) according to respondent ranking (1 = greater preference to 12 = lowest preference). Thematic analysis of 108 and 119 perceived roles from [University] extension and green industry professionals were grouped into ten major themes. Across [University] extension's perceived role, offering classes for clients in a variety of formats at convenient times and locations was the top theme that was mentioned 48 times, followed by offering on-demand educational opportunities (30 times). Likewise, across the perceived roles of the green industry, we found offering education about plant selection, care, and design to simply use wildlife-friendly plants was the most repeated (33 times) theme, followed by ensuring adequate availability of plants that support wildlife (21 times).

Recommendations and Implications

Although the majority of residents are interested in wildlife-friendly landscaping activities, they lack the knowledge needed to adopt them. This implies a need for educational interventions, similar to the findings reported by Goddard et al. (2013). Findings also demonstrate respondents' top priorities among different technical skills and training were landscape design that supports wildlife and identification of native and [State]-Friendly plant species. In addition, qualitative responses showed high demand for education related to wildlife-friendly landscaping activities.

The results highlight educational opportunities that can be applied globally, given the importance of protecting and promoting biodiversity around the world. Our findings align with Campbell et al. (2017) and van Heezik et al. (2020), who reported a lack of knowledge and costs as the major barriers to protecting biodiversity globally. Therefore, it is important for extension programs to focus educational programming on wildlife-friendly landscape practices while emphasizing the value of plants that support wildlife to offset cost concerns. At the same time, it is clear that people are motivated to engage in wildlife-friendly landscaping because of the ecological and environmental benefits, and change agents need to emphasize such traits. Educational websites are the most preferred place to learn about wildlife-friendly landscaping, followed by workshops and webinars, which indicate the need for reliable, dedicated, practical, and intensive platforms. The following are key recommendations.

- Future studies could more deeply explore the best approaches for disseminating education to the public to encourage them to adopt wildlife-friendly landscaping
- Enormous opportunities remain to conduct research on educational interventions (like resource identification, training related to landscape design, etc.) to measure the effectiveness of such extension programming in elevating the adoption of wildlife-friendly landscaping

- Extension educators and green industry professionals should understand perceived barriers and motivators to encourage engagement in wildlife-friendly landscaping
- Educators and communicators should focus on residents' preferred platforms for receiving information
- Educators should carefully consider findings related to the preferred information source and integrate these into the programming

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Protecting, Preserving, and Procuring Resources: A *Photovoice of Nepalese Science Education*

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Abstract

Introduction

Education is one of the greatest tools an individual possesses to tackle challenges, yet education in Nepal frequently suffers due to underqualified teachers, limited educational resources, and unsafe infrastructure (Global Giving, 2022). Technical and Vocational Education and Training (TVET) transforms the lives of students by helping them develop applicable career skills through experiential learning (Rauner & Maclean, 2008). Agricultural education is one important facet of TVET that supports the production of food, fiber, and natural resources through an applied STEM contextual approach. To investigate TVET's application through agricultural education in Nepal, our research team conducted a scoping trip in May 2022 to analyze the resources available to educators and their use in the delivery of science instruction.

The Theory of Asset Based Community Development (ABCD) utilizes the assets found in communities to empower individuals and organizations to come together to address needs and challenges (Kretzmann & McKnight, 1993). While the challenges facing Nepalese educators are readily apparent, it is critical to recognize the unique resources educators can use to deliver meaningful educational experiences. Educational resources support the development of positive teacher self-efficacy, described as an educator's perception of their ability to exercise control within their classroom (Bandura, 1977). The field-based research team included two faculty having expertise in international development and teacher professional development and two undergraduate researchers collecting data in Nepal.

Purpose and Objectives

The purpose of the research study was to explore educator perceptions of availability of educational resources and challenges in their educational delivery system. The following objectives guided the research team:

1. Describe characteristics of Nepalese learning environments.
2. Identify educators' perceptions of opportunities related to utilizing Nepalese agriculture as a context for science education.

Methods

We conducted a descriptive qualitative study using the Photovoice method as outlined by Wang and Burris (1997). A phenomenological approach to photovoice was used. In this approach, photovoice is seen as a method to elicit the meanings participants give to their photographs (Plunkett, Leipert, & Ray,

2013). Through the analysis of the meanings, researchers can identify what participants have in common when they consciously experience a phenomenon and explain its patterns and/or essence (van Manen, 1997). Photovoice enables researchers to gain perspectives from participants that truly represent their context and experiences through collection of photos and accompanying descriptions. Photovoice research highlights local expertise and knowledge to address needs and goals in individual communities, aligning with the tenets of the ABCD Theory (Wang & Burris, 1997).

To collect data from a diverse group of educators, we visited government and private schools in both urban and rural areas in Central Nepal. Thirteen Nepalese science educators from ten different schools participated in the research study. We received appropriate consent from the educator before collecting qualitative data; this process aligned with our prior obtained approval by the Institutional Research Board at The Pennsylvania State University.

To begin each interaction, we engaged in a brief introductory conversation focused on the educator's prior experience, educational background, and instructional focus. The educators received mini i-pads and were instructed to capture photographs showcasing their educational resources. The following prompts guided photo collection:

1. Describe how you define educational resources.
2. Show what educational resources mean to you.
3. What is your favorite instructional tool?
4. I consider _____ a conventional educational resource.
5. I consider _____ a non-conventional educational resource.
6. Show what content you teach.
7. _____ helps me develop effective instruction.

After all photos were captured, a focused narration of each photo with the participant was facilitated. Photovoice protocol emphasizes this phase of the research as an exercise in "storytelling and active listening" (Latz, 2017). This reflective narration provided verbal context to the photos and supported our understanding of the findings. All interactions were recorded and transcribed for use in qualitative analysis with a strong focus on triangulation of findings between team members.

Results

We identified five preliminary themes from the analysis of submitted photos and the research team notes on their phenomenological engagement with the participants. First, government-provided resources make up a majority of the curriculum across all schools – both government and private. Textbooks, posters, and other educational resources frequently guide educators across varying educational contexts. In addition, teacher education and preparation are highly flexible processes with minimal regulation. Educators come from a variety of training backgrounds and have varied goals and future plans. In terms of challenges, teachers struggle to provide relevant, hands-on experiences utilizing their existing resources. The constraints of time and resources limit educators' ability to deliver relevant, hands-on learning experiences for students. Across the schools we visited, teachers expressed that successful students often leave Nepal in pursuit of international education and employment, a problem frequently referred to as "brain-drain".

Despite these challenges, educators work to deliver engaging experiences for students to improve learning outcomes and enhance the perceptions of both students and teachers. Resources aiding in practical application would present opportunities to further engage students. The Nepalese educational system benefits from a variety of unique assets, such as a robust lab-based curriculum and high expectations for students across varying school contexts.

Recommendations

The research team advocates for increased focus and investment in agricultural education throughout Nepal. It is recommended to implement agricultural education within the science classroom to obtain practical STEM and TVET applications using the agricultural resources that are present in the surrounding communities. The findings indicate that Nepalese teachers seldom stray from provided curriculum as they work to achieve desired learning outcomes in the current educational context. The qualitative data collected from the semi-structured narrations will be used to further analyze educator perspectives in the hopes of developing relevant and applicable solutions.

Further research should be conducted to better understand how agricultural techniques can be used to teach concepts that are outlined in the existing science curriculum. This implementation would require a greater availability of teacher training and preparation to boost educator confidence in supplying these high-impact learning experiences. The researchers recognize the value of effective teacher preparation and support educators seeking additional training related to science education.

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Farmers Capacity on Using Climate Resilient Technologies for Rice Production in High Barind Tract of Bangladesh

***Keywords:* Farmers, Capacity, Climate Resilient Technologies, Rice, Bangladesh.**

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Abstract

Introduction and /or theoretical framework and /or review of literature

Due to its climate sensitive agricultural system and low adaptive capacity of the farmers, Bangladesh is cited among the countries experiencing frequent drought and highly vulnerable to climate change associated impacts. According to the Global Climate Risk Index, in 2017, Bangladesh was the sixth most climate vulnerable country in the world [10] though during 2010 it was the most climate vulnerable country [8]. Climate change and climate variability are affecting the land use patterns, crop systems, productivity, and optimum agriculture output [7]. Climate effects in the agricultural sector are seen in the deterioration of water and land resources, outbreaks of crop disease, pests, and increasing crop failure [9,12,6], in turn of creating a high risk food security of large population of Bangladesh [11]. However, the effect of climatic variation is more pronounced in the drought prone High Barind Tract (HBT) of Bangladesh. Among the drought affect areas, HBT is one of largest area [5]. In Bangladesh the HBT of north-west Rajshahi division is different from other parts of the country due to its undulation topography having compact and low fertile soils. The region experienced high temperature with limited soil moisture storage alone with low and erratic rainfall (1075±325 mm) [4]. Moisture holding capacity of HBT soils is poor due to critical organic matter contents and low infiltration of water [2,3]. These situations make the area drought prone alone with poor crop productivity. T. Aman rice is the major crop which suffered regularly due to early or late drought and planting of post rainy crop. Thus, the HBT areas of rice production are low to climate change particularly to drought [2]. Large scale climate resilient technologies practices are being implemented throughout the Bangladesh to reduce the loss and damage from extreme climate events and climate variability [1] and contribute to increasing capacity of farmers for rice production.

Purpose and Objectives

The main purpose of the study was to determine the farmers' capacity on using climate resilient technologies for rice production in High Barind Tract (HBT) of Bangladesh. The overall aim of this study is, thus, to describe and analyze the trends of climate change in HBT of Bangladesh, to determine the extent of capacity of the farmers in using climate resilient technologies for rice production, to determine the crucial factors influencing farmers capacity in using climate resilient technologies in HBT areas of Bangladesh and to explore the constraints faced by the farmers in practicing climate resilient technologies for rice production.

Methods and /or data sources; or theoretical/philosophical themes

The study was conducted in a severe drought prone area of Bangladesh known as the High Braind Tract (HBT) [4]. Two upazilas under Rajshahi District, namely Tanore and Godagari, were selected for the field survey. Questionnaire survey was conducted to determine farmers' capacity on using climate resilient technologies for rice production. Data were collected from a random sample of 459 farmers, out of 459 in two selected blocks (200 from Bhusna block and 259 from Kalma block) of Godagari and Tanore upazilla. The data were collected through personal interviewing by using a pre-tested structure interview schedule during February to June 2016. Appropriate scales were developed and use to measure the concerned variables. Fifteen selected characteristics of the farmers were considered as the independent variables, while farmers' capacity was dependent variable. Sixty-eight years of climate data on temperature and rainfall (1948-2016) from the Bangladesh Metrological Department for Dhaka weather station were collected and analyzed using linear trend model. A simple regression model was used to determine the influential factors of farmers' capacities on using climate resilient technologies for rice production.

Results, Products, and /or conclusions

The result reveals that the time trend was statistically significant for all three major climate related variables. This implies that climate has changed over the whole period (1948-2016). Moreover, an increase in annual temperature from 1948 to 2016 has been recorded for the HBT of Bangladesh, whereas annual rainfall dominating hydrological driver that makes vulnerable to drought, and loss of crops. Results of farmers capacities revealed that 54 percent belonged moderate capacity group while 41 percent of them had low capacity and 5 percent of the farmers had high capacity. The overall farmers' capacity was low to medium. Among the socio-economic characteristics of the respondents, age, education, household annual income, family size, farm size, household assets value, extension media contact, farming experience, training exposure, use of weather information, knowledge of climate change, and perception on climate change of the farmers were significantly correlated with their capacity. Education, household annual income, use of weather information, knowledge of climate change and farm size had significant contribution on the farmers capacity. Path analysis revealed that education, extension media contact, use of weather information, access to irrigation facilities, knowledge of climate change, and perception on climate change had positive and direct effect of farmers capacity. Aberrant weather conditions, lack of need based training on climate change, less availability of climate resilient varieties and technologies or inputs or materials and fragile and marginal environments were identified as the major problems faced by the farmers in rice field.

Recommendations, educational importance, implications, and/or application

In Bangladesh, strengthen delivery mechanism of Department of Agricultural Extension should be strengthened to play a better role in multiplication and distribution of climate resilient rice varieties and

technologies. Farmers' climate resilient technologies practices will need to adjust to emerging climate change related constraints, adopt different water saving technologies for efficient diversification, and introduced labor-saving mechanization and improved management practices. The government should also establish a climate field school to provide support for climate resilient technologies to the farmers. However, without the needed awareness, knowledge, and training, most farmers are still unable to gain access to these technologies and use them effectively through better extension services to attain high adaptive capacity. A platform involving scientists, private sectors, and academia working together in partnership to strengthen farmers' capacity on using climate resilient technologies for rice production.

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Vulnerability Assessment of Crop Husbandry due to Drought in the North-Western Region of Bangladesh

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Abstract

Introduction

Increases in global warming can impact climate in many ways and may affect the type and severity of natural events that occur in many parts of the world (Khan et al., 2019). Among these naturally occurring events, drought is one of the most devastating and caused millions of death tolls (Hao et al., 2018). Drought is a natural phenomenon in direct association with reduced rainfall in various spatial and temporal frames. Bangladesh is considered one of the most vulnerable countries to climate change (World Bank, 2018). Especially the North-west regions are drought-prone (Hussain, 2017). Like floods, Bangladesh is vulnerable to recurrent droughts. Bangladesh experienced droughts of major magnitude many times during 1951-2000 and it negatively affected about 53% of the total population (Mardy et al., 2018). Most parts of Bangladesh depend on rain-fed agriculture (Moniruzzaman, 2015). However, the irregular pattern of rainfall and its declining trend has been experienced as drought and affects crop husbandry.

Objectives of the Study

The specific objectives of the study were-

- To measure the vulnerability situation of crop husbandry due to drought disasters in the north-western region of Bangladesh;
- To assess the extent of the impact of drought disasters on crop husbandry; and
- To explore the factors associated with the vulnerability of crop husbandry due to drought.

Methodology

The study was conducted in three Upazilas namely Chapainawabganj Sadar from Chapainawabganj district, Lalpur Upazila under Natore district, and Godagari Upazila from Rajshahi district. The population of the study was crop farmers from the selected areas. Data were collected by the researchers from 180 crop farmers through a pre-tested structured questionnaire from 6th March to 5th April, 2021. Appropriate scales were used in order to measure the concerned variables while both descriptive and inferential statistical analyses were used. In addition, a total of three FGDs were carried out. Different adaptation practices and constraints faced by the farmers in adapting farming practices due to climate change were identified through this method. The vulnerability assessment of crop husbandry was the dependent variable. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity" (McCarthy et al., 2001). Thus as per this definition, vulnerability has four components: hazard, exposure, sensitivity, and adaptive

capacity. The first three components together represent the potential impact and adaptive capacity is the extent to which these impacts can be averted. Vulnerability is the potential impact minus adaptive capacity AC. This leads to the following mathematical equation for vulnerability: $V = f(I - AC)$.

For the vulnerability assessment, the three components of vulnerability such as exposure, sensitivity, and adaptive capacity consist of a total of 43 indicators. Thus indicators are measured by the scoring methods (Hoque et al., 2019). The extent of exposure, sensitivity, and adaptive capacity of the drought was measured based on opinions provided by farmers according to the extent of drought in agriculture. The 43 indicators in this study reflect socio-economic, agroecological, and biophysical variables. After computing the scores, it transforms to a special scale. Therefore, the data is applied in the formula of the vulnerability index.

However, the integrated vulnerability index (VI) will be measured using the following formula. The following formula was used by Jha and Gundimeda (2019).

$$VI = (EI + SI) - ACI$$

Where,

VI = Vulnerability Index

EI = Exposure Index

SI = Sensitivity Index

ACI = Adaptive Capacity Index

Results

The finding reveals that the majority of the respondent had a percentage of vulnerability level ranging from slightly vulnerable to moderately vulnerable to crops in the study areas. Small numbers of people are in low vulnerability which means they practiced coping and adaptive strategy during the drought severity. The findings indicated that the vulnerability of crop increases with increasing exposure and sensitivity index and lower adaptive capacity. The findings of the research indicated that the farmers had high severity of drought in the study areas. The majority of the farmers got BMDA water supply during the dry season. Results of multiple regression analysis revealed that the effect of drought, total severity of natural disasters, access to water resources, extension media contact, and level of education have significant influences on the vulnerability of crops due to drought. Besides, majority (78.9%) of the farmers had experienced medium effects of drought. However, crop damage, higher cost of irrigation, and low income were the major impact of drought on crop husbandry. About 87.8% of farmers had faced medium problems in crop farming in response to drought and lack of rainfall, depletion of surface water sources, and scarcity of safe drinking water were the major problems that hinders their farming practices.

Conclusions

Farmers in the study areas are affected by drought with medium severity. It is clear that the vulnerability of crop husbandry increases with the increasing rate of exposure and sensitivity index and lower adaptive capacity. It is also observed that the drought had the highest number of occurrences and a higher extent of severity in the selected study areas. The study explored that the determinant influential factors of the vulnerability of crops were level of education, annual family income, extension contact, the effect of drought, access to water resources, and total severity of natural disasters.

Recommendations

The study revealed that the farmers of the study areas could not get proper adaptive care during drought. The scarcity of water is found as a major shock to crop husbandry due to drought, so drought mitigation measures should be taken by the development agencies. Government and development agencies must provide adequate technical support such as the re-excavation of ponds and canals, the establishment of storage facilities for retaining rainwater, the development of new irrigation projects, extension services in addition to education, income-generating opportunities, and water conservation measures. Necessary steps need to be taken so that farmers can get easy access to information sources and production inputs (i.e. drought-resistant crop varieties, irrigation facilities, etc.) as the adaptation of farming practices in response to drought.

Keywords: Vulnerability, Crop Husbandry, and Drought Disaster

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Utilizing the Extension System to Address the Major Consumer Contributions of Food Waste

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Abstract

Introduction

Global food loss and waste is one of the United Nations sustainable development goals (SDG) and has become a significant issue (Food and Agriculture Organization of the United Nations, 2022). Currently, one-third of the world's food and agricultural production is wasted, totaling 1.3 billion tons of food annually (Schanes et al., 2018). This issue affects our environment as waste produces greenhouse gas emissions (Feijoo & Moreira, 2020; Papargyropoulou et al., 2014). Food waste contributes to the world's most urgent challenge: Feeding 9 billion people by 2050. North America and Europe combined waste 30-50% of their food supply (Papargyropoulou et al., 2014). Food waste exists in all areas of the supply chain, but research has proven that the majority is present in the consumer sector (Aschemann-Witzel et al., 2016). Additionally, perishable foods have the highest wastage percentage due to consumers being uneducated about properly planning their meals (Feijoo & Moreira, 2020) and evaluating food for expiration (Kavanaugh & Quinlin, 2020). Consumer education is vital in all consumption areas, such as planning, shopping, storing, cooking, and label literacy. Because the Cooperative Extension System strives to educate the general public and participates in global outreach (Anderson & Feder, 2007), those Extension services could help bridge consumers' gap of food waste knowledge.

Purpose & Objectives

The purpose of this paper was to identify contributors to food waste and analyze previous research for possible solutions to educate consumers. The following objectives guided this paper:

- Investigate the causes of food waste due to consumer education.
- Propose potential resources to reduce food waste using the Cooperative Extension Service to inform consumers.

Data Sources and Theoretical Themes

Literature was analyzed from peer-reviewed publications and gray literature. When creating Extension programming and informational resources related to reducing food waste, it's important to consider the major consumer contributors. The identified themes from the publications addressed consumer food waste contributors pertaining to planning, shopping, storing, cooking, and label literacy. These themes led to examining one specific study's implementation that aims to identify contributors to consumer food waste.

Planning and Shopping

Practices conducted by the consumer consist of planning and shopping for their meals (Mattila et al., 2019). Often, consumers grocery shop on a routine basis, resulting in consumers buying more food than needed if not planned out beforehand (Stancu et al., 2015). Planning meals, checking inventory levels at home and creating shopping lists are essential components needed to eliminate the temptation of buying more food than necessary (Stefan et al., 2013; Dobernig & Schanes, 2019). Food waste occurs through overprovisioning due to grocery retailers' type, proximity, and accessibility (Dobernig & Schanes, 2019). Consumers who shop in local, smaller facilities on a routine basis limit food waste (Schanes et al., 2018).

Storing and Cooking

Cooking food properly requires time, knowledge, and skill to efficiently utilize all the products (Schanes et al., 2018). Additionally, consumer knowledge is needed when storing food in optimal condition (Graham-Rowe et al., 2014). Food is wasted due to pests, disease, contamination, and naturally drying out from storage issues (Papargyropoulou et al., 2014). The most common method to eliminate storage problems and prevent spoiling is freezing food to extend the "shelf-life" (Schanes et al., 2018).

Label Literacy

The lack of education and understanding of labeling is one of the largest contributors to food waste at the consumer level (Patra et al., 2022). Consumers often rely on date labels to assess food's quality and safety (Toma et al., 2017; Wang et al., 2021), but misunderstandings of the 'best by' and 'use by' dates are often prevalent among consumers worldwide (Mesiranta et al., 2021). Consumers becoming distant from food production has resulted in relying on date labels provided by inconsistent label policies to determine whether their food is still of good quality (Mattila et al., 2019). Socio-demographics also play a role in the knowledge and use of date labels (Toma et al., 2017).

Previous Study Results

From research conducted in the United Kingdom surveying consumers, planning accounts for one of the main reasons food is wasted in households (Parfitt et al., 2010). However, consumers admitted to having inadequate home economic skills causing poor storage, disposal conditions and misunderstanding of food expiration labels (Parfitt et al., 2010). Additionally, consumers in this study failed to check inventory, prepare shopping lists, and plan meals (Parfitt et al., 2010).

Conclusions

Food waste is a global issue (Schanes et al., 2018). The SDG sub-indicator 12.3.1.b aims to reduce food waste at the retail and consumption levels (Food and Agriculture Organization of the United Nations, 2022). To effectively communicate with consumers, a holistic approach must be taken to motivate individuals to make a change (Aschemann-Witzel et al., 2016). This paper provides the framework to begin understanding the gap in basic food knowledge and label literacy needed to address the causes of food waste and provides recommendations for educating consumers on a global scale.

Recommendations & Applications

The United States can utilize its land-grant university resources through the Cooperative Extension System to educate individuals and become a global leader in taking steps to achieve the grand challenge of feeding 9 billion people by 2050. Extension is present worldwide, serving a variety of nations to meet the goals of transferring knowledge and research to the public to enable them to make better decisions (Anderson & Feder, 2007). Thus, Extension will play a prominent role in educating consumers on how to reduce their household food waste by learning how to plan, shop, store, cook, and read date labels properly through providing workshops, research publications, social media infographics, and global partnerships with developing countries.

Future research should be conducted surveying consumer habits in other countries, similar to the Parfitt et al. (2010) study. Understanding how behavioral control plays an essential role in consumers' actions could also be beneficial (Schanes et al., 2018). Additional research should be done analyzing the successful implementation of food waste educational resources provided by the Extension System or other institutions to reduce food waste at the consumer level.

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ICT Adoption in Caribbean Extension: Comparing the Perspectives of Food Producers and Extension Professionals

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Abstract

Introduction/Review of Literature/Theoretical Framework

Food producers in Caribbean countries experienced disruptions in extension advisory services (EAS) due to the COVID-19 pandemic in 2020 (Author, 2020). Across the world, service delivery issues negatively impacted food production and markets (Food and Agriculture Organization, 2020a, 2020b). Since the pandemic, the use of Information Communication Technology (ICTs) has boosted global and local opportunities through online communication, information sharing, and learning across sectors (Caribbean Telecommunications Union, 2022).

The shift from traditional EAS to ICTs for extension delivery will enhance agricultural development (Wijekoon et al., 2013). The use of the internet and any internet-ready tools such as smartphones, together with WEB 2.0 applications such as YouTube and WhatsApp, provide alternative data exchange channels (McNamara et al., 2017; Author & De Freitas, 2010). However, strategies for effective e-learning in EAS require stakeholders' insights toward creating an enabling environment for the adoption of ICTs (Ramjattan et al., 2017).

Given the nuances of adoption and behavior change described by Rogers (2003), EAS in the Caribbean must intentionally facilitate the diffusion of ICTs among food producers with a guiding goal of food security in small islands. An understanding of the issues affecting ICTs adoption can enable strategies for ICT diffusion. There is limited literature on the issues affecting ICTs adoption in Caribbean EAS.

Purpose and Objectives

Objectives were to; (a) rank food producers' perceived issues to ICTs adoption and; (b) rank extension professionals' perceived issues to ICTs adoption. Recommendations are provided for facilitating ICT diffusion among farmers and EAS in the Caribbean.

Methods

The target populations were food producers and extension professionals in 14 English-speaking Caribbean nations: Antigua and Barbuda, the Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago. Using convenience sampling, we gathered survey data from 116 food producers (n1 = 116), and 45 extension professionals (n2 = 45).

Two questionnaires were created for each population. Each questionnaire provided respondents with a list of issues most appropriate for the target group based on a review of the literature and feedback from an expert panel. The list of issues varied between groups but was similar in themes. For example, the food producer questionnaire included 'Farmers lack training in the use of cyber extension methods and tools' as an issue, while the extension professionals' questionnaire had 'Farmers will need training in the use of cyber extension methods and tools' as an issue. Both items relate to the theme of 'farmer training'. The food producer questionnaire consisted of a list of 36 issues, while the extension professionals' questionnaire had 50 issues. Respondents were asked to select their level of agreement on each item on a 5-point Likert scale.

The Mean Rank (MR) statistic of the Friedman test was used to rank issues from highest to lowest in each sample. Friedman test is a non-parametric version of repeated measures ANOVA with no between-subjects effects. The Friedman test is commonly used as a distribution-free procedure to assess statistically significant within-subject effects. Within-subjects ranks are based on the mean of ordered rankings between items. The mean ranks provided a distribution-free ordering of the issues to ICT adoption in extension for both samples.

Results

For objective (a), mean ranks of the Friedman test indicated the top five (5) issues for food producers were; (1) unclear communication between researchers, technology innovators, extension workers, and farmers would lead to disruptions in messaging (MR = 24.26); (2) lack of reliable quality services for both internet and electrical infrastructure may limit the adoption of cyber extension (MR = 23.84); (3) depending on location, internet access may limit adoption and use of cyber extension by stakeholders (MR = 23.80); (4) farmers' attitudes towards modern communication technologies will influence the adoption and utilization of cyber extension (MR = 23.59); and (5) the high cost of infrastructure, including internet connectivity, speed of internet and electricity, may limit the adoption of cyber extension technologies (MR = 23.71).

For objective (b), mean ranks of the Friedman test indicated the top five (5) issues for extension professionals were; (1) Extension Advisory Services should be a blended program of both cyber extension and traditional extension (MR = 36.24); (2) farmers will need training in the use of cyber extension methods and tools (MR = 35.78); (3) extension staff will need training in the use of cyber extension methods and tools (MR = 35.34); (4) cyber extension training must be part of a continuous learning system for extension staff and farmers (MR = 34.43); and (5) farmers will be deterred from using cyber extension if they often get misinformation (MR = 33.99).

Recommendations, Educational Importance, and Implications

Food producers and extension professionals had different views on the issues impacting the adoption of ICTs in the Caribbean. Food producers were mainly concerned about the possible discrepancies in content (messages) between research, extension, and farmers; infrastructural issues; lack of reliable internet; access to the internet; cost of connectivity; and quality service. Meanwhile, extension professionals appeared committed to traditional methods and felt training for both extension professionals and farmers would be needed for ICTs adoption. Findings show the two main stakeholder groups were not on common ground concerning ICTs for EAS.

Efforts to diffuse ICTs in Caribbean EAS will require collaborations between farmers, extension professionals, and ICT experts. EAS professionals can facilitate ongoing dialogue with their primary clientele to understand their educational needs and the role of ICTs in meeting those needs. A shared understanding between stakeholder groups on the purpose and uses of ICTs for EAS will enable a robust ICT policy to guide implementation. This study holds implications for ICT integration in extension education for developing countries.

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Does Respect Received from Extension Agents Impact Technology Adoption? A Study among Jamaican Farmers

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Abstract

Introduction/Review of Literature

Agriculture is an integral sector contributing to Jamaica's economic growth and national development. It contributes 6.8 percent to the national Gross Domestic Product, provides employment for approximately 17 percent of the labour force (200,700 individuals), and generates much-needed foreign exchange. Smallholder farmers represent approximately 50 percent of the farming population (Agricultural Business Information System [ABIS], 2017), and as such, this cohort must be supported to enhance their adoption of appropriate agricultural technologies. This situation is of concern as food security is vital to the country's survival (Ministry of Agriculture and Fisheries [MOAF], 2012; Statistical Institute of Jamaica [STATIN], (2015; 2017a).

The factors regularly noted in the literature to be determinants of the adoption of appropriate technologies are primarily socio-economic, institutional, and psycho-cognitive in nature (Akudugu et al., 2012; Ali & Kumar, 2011; Asmelash, 2014; Egyir et al., 2011; Garforth, 2010). Continued inadequate adoption levels among Jamaican farmers make it necessary to investigate other possible impacts on adoption practices. Chi and Yamada (2002) and Author and Narine (2015) noted a gap in adopting technology related to select affective/psycho-cultural determinants. The variable, farmers' perception of received respect from the extension services, is the focus of this paper. We asked the question: 'Does the respect received from extension services impact the adoption of appropriate technologies?'

Bolland (1998), Henke (1996) and Brathwaite (2001), suggested that background contextual factors contribute to a Creole Complex society marred by post-colonial issues. Jamaica fits this context as much of the rest of the Caribbean. Indeed, Extension organizations across these countries still closely resemble the colonial organizations in form, function and management. We posit that this complex impacts how the respect relationship is formed, enacted, and ultimately maintained. The theoretical framework purported that once farmers believe they are receiving high levels of respect (contingent and categorical) from the extension services, the outcome of the intensity of adoption behaviour will be high, and the converse is true (Janoff-Bulman & Werther, 2008). The study focussed on select dimensions of respect; level of categorical respect (perceived worth, value – morality) and level of contingent respect (perceived competence, group standing, status).

Purpose and Objectives

This research aimed to investigate if farmers' perception of respect received from the extension services impacted their practice adoption. The main objectives were (a) to assess the perceptions of farmers on

the levels (of selected dimensions) of respect as they interacted with the extension services, (b) to investigate if there are any significant associations between the farmers' perception of respect received from the extension services and the adoption of sustainable technologies.

Methods

A structured questionnaire was used to collect data. A convenience sample of 267 farmers ($n^1=267$) and 41 Agricultural Extension Officers (AEOs) ($n^2=41$) were surveyed in six parishes across Jamaica (St. Elizabeth, Trelawny, Manchester, St. Catherine, Portland and St. Thomas). Parishes were selected randomly from the list of parishes. Results included both descriptive (means, standard deviations, and percentages) and inferential statistics, including Spearman's Rho correlation (ρ) to measure the strength of associations, and Cronbach Alpha [α] assessed the reliability of the received respect scales.

Respect was measured using a 5-point Likert-type (strongly agree to strongly disagree) 10-item scale to farmers. A 7-item scale gathered information from AEOs on the issue of respect from their perspectives. Scales were adapted from instruments developed by McLeary and Cruise (2015), Rawlins (2008), and Author & Narine (2015).

Results

The received respect scale administered to farmers had a Cronbach Alpha of 0.754. Descriptive results (overall mean $M = 3.85$; $S.D = 0.93$) showed that most of the farmers (82.4%) perceived high respect from the extension services. The results indicated that most of the farmers (93.2%; $M = 4.14$ [0.53]) believed that the extension officer valued them as a person (categorical respect), while 89.9% ($M = 4.21$ [0.69]) believed that Rural Agricultural Development Authority (RADA) saw them as important persons who contribute to Jamaica's economic development (contingent respect).

There were significant relationships as follows: (i) a moderate strength, positive and significant relationship between Integrated Pest Management (IPM)-Cultural Control practices and level of received respect ($r = 0.441$, $p < 0.01$), (ii) a weak, positive but significant relationship between to IPM – Mechanical Control and level of received respect ($r = 0.301$, $p < 0.01$) and (iii) for the IPM – Chemical Control technology, there was a weak, positive but significant relationship between this technology and level of received respect ($r=0.290$, $p < 0.01$).

AEOs (over 90%) indicated that they valued the farmers ($M = 4.80$; $SD = 0.40$) and believed they have the skills and ability to practice what they teach them ($M = 4.22$; $SD = 0.69$). All the extension officers stated that they have a good working relationship with the farmers ($M = 4.78$; $SD = 0.42$) and that they have the farmers' best interest at heart ($M = 4.88$; $SD = 0.33$).

Conclusion

Farmers' perception of received respect from the extension services is associated with the adoption of sustainable agricultural technologies. Ritualistic behaviour, including the frequency of farm visits and a positive respect relationship between the farmers and the extension agent, increases the likelihood of adoption of appropriate technologies (Chi & Yamada, 2002; Author & Narine, 2015; Slavova & Metiu, 2021).

Recommendations, Educational Importance, and Implications

Further knowledge has been gained on how to manage extension programmes through the engagement of positive respect from extension officers to farmers.

One implication of farmers' perception of receiving a high level of respect from the extension services is that they will be more receptive to adopting the technologies proposed by the extension services. As such, more effort must be made by the extension services to build and maintain social relationships with the farming community. A healthy relationship which engenders respect between the farmers and extension officers encourages cooperation and the adoption of technologies. We boldly recommend that perceived respect from Extension be integrated into the communication channel of Rogers' model of "Variables Determining the Rate of Adoption of Innovations."

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Social Media Use and its Impact on Social Learning Among Facebook Users in the Agricultural Sector of Trinidad and Tobago

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Abstract

Introduction and Theoretical Framework

Social networking platforms, for example, Facebook, are increasingly utilized by experts and farmers to facilitate two-way communications. According to Balkrishna and Deshmukh (2017), high levels of participation among agricultural stakeholders facilitate the rapid dissemination of innovations to large audiences in a cost-effective manner.

Global studies on agricultural social media use showed that Facebook is the most preferred platform (67%) among extension agents and farmers for agricultural extension and technical support (Barau & Afrad, 2017; Suchiradipta & Raj, 2016; Otene et al., 2018; Wongsathan & Bacongus, 2018). In Trinidad and Tobago, Facebook is the most popular social networking site, with 77% of the population using it (Statista, 2022).

Online networks are forming as agricultural communities of practice (CoPs). Wenger et al., (2011) defined CoP as a social network that facilitates learning. Due to the widespread prevalence of social media in agriculture, extension agents must comprehend how Facebook impacts farmers' decisions. However, little is known about the impact of social media on agricultural stakeholders' learning; therefore, their online learning interactions must be examined (Wangu, 2014; Suchiradipta & Raj, 2016; White et al., 2014; Lajoie-O'Malley et al., 2020; Trendov et al., 2019; and Rijswijk et al., 2021).

Purpose and Objectives

This study examined how agricultural communities use Facebook for networking interactions to facilitate learning. The main objectives were (i) to identify the social media use factors, (ii) to examine the correlations among the identified social media use factors, and (iii) to assess relationships between the social media use factors and three CoP social learning constructs.

Methods

A Facebook search was conducted to identify Facebook users in the Trinidad and Tobago agriculture sector. Using Saldana's (2016) coding guide, a Facebook account, post database, and directory were made. Google Forms was used to distribute a questionnaire to the members of the 71 Facebook profiles identified. Facebook Messenger was used to contact respondents. In total, 128 individuals were recruited by Snowball sampling. The instrument consisted of 24 social media use statements. Likert-type questions were used to assess respondents' social media use in four key areas: i) communication

techniques, ii) generating contacts, iii) relationship building, and iv) networking. Responses were coded: 1= Not used, 2=Rarely used, 3=Used, 4=Most used.

Social learning: Questions were designed to evaluate respondents' level of agreement to 18 statements regarding the use of social media in facilitating learning using the following subconstructs of the CoP social learning framework: i) change in understanding, ii) learning within a community and iii) learning through social interaction (Wenger et al., 2011). The responses to statements were coded as: 4= Strongly Agree, 3=Agree, 2.5=Neither Agree nor Disagree, 2=Disagree, 1=Strongly Disagree.

Factor analysis was undertaken to summarize the social media use statements (n=24). Principal Component Extraction and Varimax Rotation were also used in the analysis to discover underlying factors. This analysis condensed the twenty-four components into four fundamental factors. Spearman's correlation coefficient was utilized to determine the correlation between social media use factors and the CoP social learning constructs.

Results

Factor Analysis

Four Factor solutions were identified and named in accordance with their relevance and association with the item statements. The first factor, "Using social media for communication function," had a mean and standard deviation (Mean=2.83; SD=0.61). The second factor was labelled "Use of social media for community interactions" (Mean=3.40; SD=0.88). The third factor is named "Social media use frequency" (Mean=2.78; SD=0.62). The fourth factor was labelled "Use of social media for networking" (Mean=2.18; SD=0.51).

Correlation Analysis

Several statistically significant relationships existed among the four factors identified.

Social media communication function and Social media networking ($r_s = .382$, $p < 0.01$). This suggested Facebook use allowed CoP members who utilized Facebook for various communication reasons to establish networking links among different actors.

Social media communication function and Use of social media for community interactions ($r_s = 0.224$, $p < 0.05$). This showed that disseminating information via Facebook promoted community involvement.

There was a statistically significant and positively correlated relationship between the Use of social media for community interactions and Social media use frequency ($r_s = 0.335$, $p < 0.01$). This suggested that a higher frequency of Facebook use led to more social interactions within communities.

Social media networking factor was positively correlated with Social media use frequency ($r_s = 0.175$, $p < 0.05$). This showed that those who used Facebook more frequently were able to establish networking linkages with other users.

Social learning correlation

The correlation analysis results for the three Social learning sub-constructs (change in understanding, learning within a community, and learning through social interaction) showed a negative, statistically significant relationship between "learning through social interaction" and Social media communication function ($r_s = -0.217$, $p < 0.05$). This suggested that using different communication strategies was not a reliable predictor of online learning and change in understanding.

Recommendations, Educational Importance, and Implications

Given Facebook's popularity as an online learning tool, administrators are advised to incorporate client interaction and engagement into an instructional design for online learning. Additionally, research is needed to determine how Facebook use for learning might be encouraged more extensively among CoP members.

Social media use factors correlate with social interactions, networking, and different communication functions. Due to its instructional value, Facebook knowledge management, evaluation and monitoring should include collecting and evaluating performance metrics such as comments, shares, likes, followers, audience growth, and mentions.

This study has implications for the offline adoption of ideas and knowledge influenced by the online Facebook interactions. Therefore, it is essential to understand how online interactions influence offline behaviour and how concerns such as misinformation may influence decision-making.

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Non-Muslim Attitude towards Halal Foods in Trinidad and Tobago

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Abstract

Introduction/Review of Literature/Theoretical Framework

Islam, one of the world's major religions, has a following of 24.1% and is estimated to increase to 70% (nearly 3 billion) by 2060 (Ali, 2021; Pew Research Centre, 2015). Trinidad and Tobago is a multi-ethnic and multi-religious Caribbean country (Pietrobon, 2018), with 8% (100,000 persons) of the population being Muslims (Ali, 2021).

Religion and faith have significantly impacted personal and societal cognition, behaviour and consumption cultures (Ali, 2021; McDaniel & Burrett, 1990). According to Delener (1990), religious attitudes influence how people evaluate products, develop established practices, and influence choices and attitudes (Ali, 2021; Delener, 1990).

The Holy Quran mandates Muslims to eat halal foods (Said et al., 2014). However, non-Muslims are not. They may be unclear, uninformed or even misinformed about the Muslim mandate.

Trinidad and Tobago has a well-established halal foods system (Ali, 2021), ranging from imported raw materials such as meats, to ready-to-eat meals sold at restaurants and fast-food outlets. Businesses handling halal goods display a halal certificate and logos that presents both Muslims and non-Muslims with the knowledge for an informed purchase decision. We posit that because non-Muslims are not mandated to consume halal food at the point of sale, their attitude toward halal food comes to the fore of their purchase decision.

Researchers have found correlations between non-Muslim consumption behaviour and halal food. In Malaysia, it was found that non-Muslim consumers' attitude toward halal food positively influences their repurchase intention of halal food and is sufficient to predict their intention to repurchase halal foods in the future (Jalil et al., 2018). In Surabaya, Haque et al., (2015) found a positive relationship between attitudes towards the purchase intention of halal food products by non-Muslim consumers. Bashir (2019), in a study of foreigners in South Africa, found that attitudes on awareness and halal logo have a significant and positive effect on purchase intention and buying behaviour.

Although the presence of halal food in Trinidad and Tobago is well established, no study has been done to assess non-Muslim attitudes towards halal food in the marketplace. This study fills this gap. As an agriculture-related study, it is located beyond the farmgate and processing plant and in the realm of food certification and acceptance.

Purpose and Objectives

The purpose of this study is to determine the socio-demographic factors of non-Muslim consumers that influence their attitude towards halal food products in Trinidad.

Method

Data were collected using a self-administered survey questionnaire among non-Muslims. Participants (n=221) were conveniently selected from north Trinidad as they exited public venues such as supermarkets and shopping centres. A group of trained interviewers was used to conduct the survey. The survey questionnaire had two parts. The first part included socio-economic/demographic information. The second part included 20 single-sentiment statements used to assess the respondents' attitudes to halal foods using a 5-point Likert-type scale. The responses were coded as: Strongly Agree =5, Agree=4, Neutral= 3, Disagree= 2, and Strongly Disagree=1. Cronbach's alpha was used to assess the reliability of the scale. The instrument was pretested among ten (10) non-Muslims chosen at random. The data were analyzed using the Statistical Package for Social Science (SPSS) version 28. Results were presented as descriptives, and Spearman's rank correlation coefficient was used to assess the influence of factors of non-Muslim Trinidad consumers on their attitude towards halal food products.

Results and Discussion

Results showed that 53.8 % of the respondents were male, and 46.2 % were female. The most significant representation of participants belonged to the Christian faith (61.1 %), followed by the Hindu faith (25.8 %). Some 58.8 % of the respondents were single, and 41.2 % were married. Education level included; 60.6 % attained secondary level school, while 24.4 % had tertiary level education and 14.9% primary level. Employment data revealed that 62.9 % worked as employees while 19.5% was self-employed. Respondents' monthly income levels data showed 83.7% earning under TT\$10,000.00 while 15.4 % earned between TT\$10,000.00 to \$20,000.00.

The Cronbach's alpha score for the Likert scale was acceptable (0.869). The results further indicated that only one of the six demographic factors was statistically significant: income and attitude toward halal foods ($r = 0.133, p < 0.05$). This suggests that higher-income earners are positively inclined to purchase halal food. The socio-demographic factors of gender, marital status, employment status, religion and education were not associated with non-Muslims' attitudes towards purchasing halal foods. This suggests that these factors, among the non-Muslim demographic, would not hinder halal food purchases in Trinidad.

Recommendations, Educational Importance, and Implications

This study fills a gap of limited research in Trinidad and Tobago and wider Caribbean region on non-Muslims' purchasing attitudes toward halal foods. The finding that non-Muslims were not averse to purchasing halal food products has implications for halal certification. The purported hygienic aspects of halal foods could be used for the promotion among those who are very food- safety conscious. We caution that further studies are needed to examine whether the respect and allure of halal influences, in any way, non-Muslims' desire to purchase halal products.

Findings show the prospect for the further development of the halal food market in Trinidad and Tobago is favourable; there being no negative perceptions from the non-Muslim population (>90% of the population) to purchase halal food. Other Caribbean countries that have a significant mix of Muslim and non-Muslim populations, for example, Guyana and Suriname, could benefit from this investigation; both in terms of research procedures and findings.

The significant correlation with income suggests that higher-income earners are positively inclined to purchase halal food. Opportunity exists for manufacturers and retailers to target lower income earners given the positive finding.

Finally, the findings could guide and encourage policy makers to spend less time on this attitudinal issue and more time on other issues that engender mistrust between Muslims and non-Muslims.

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Analyzing the behavioral perspective of farmers on the revival of agricultural cooperatives in Uganda.

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Abstract

Introduction

Agricultural cooperatives in Uganda have undergone numerous changes in the last century evolving from state-controlled and politically oriented institutions to liberal farmer-controlled, autonomous, and democratic institutions (Nimusiima et al., 2021; Wedig, 2019; Nayak, 2014; Wanyama, 2009). Cooperatives achieved the glory phase up to the early 1990s (Kyazze, 2010; Hussi et al., 1993), and collapsed due to external factors such as policy changes and political instability. The internal behavior of members related to mismanagement and misappropriation of cooperative assets and funds, and lack of trust in the leadership led to members abandoning the cooperatives (Wedig & Wiegratz, 2017; Morrow et al., 2017; Kwapong & Korugyendo, 2010 and Msemakweli, 2008).

Uganda adopted liberal policy reforms and the Structural Adjustment Program (SAPs) initiated by recommendations from World Bank studies by Hussi et al (1993) and Porvali (1993) (Kwapong, 2010; Wanyama, 2009). Additionally, institutional restructuring of cooperatives to a tripartite system to include Rural Producer Organisations (RPO), and the Area Cooperative Enterprises at the sub-county level as an amalgamation of a number of RPOs. The RPOs and ACE may register as part of the union and trade with it and horizontally the saving and credit cooperation (SACCO) as a credit facility (Kwapong & Korugyendo, 2010; UCA, 2010).

The operation of agricultural cooperatives and the behavior of farmers have been enormously affected as an output of policy compliance (Howlett et al., 2020). We use the concept of behavioral factors suggested by Dessart et al. (2019) on farmers' adoption of sustainable farming practices. I further classify the behavioral factors influencing the participation of farmers in cooperatives as cognitive, social, dispositional, and external factors.

Purpose and objectives

This research investigates the compliance of farmers to the revival of cooperatives which includes a compilation of policy and strategy changes by the Ugandan government. It contributes to understanding the structure of cooperatives, and factors affecting participation in agricultural cooperatives by answering how members of agricultural cooperatives perceived the revival phase of cooperatives.

Methods

The research follows an interpretive ontology and epistemology with consideration that members of the cooperatives are owners and users of the cooperatives, therefore, their interaction constitutes the

institution itself (Wagenaar, 2015). Thus, I engaged farmers to understand how this policy of changes has affected them and their participation in cooperatives through semi-structured interviews. The data were analyzed according to Mayring's (2014 & 2016) qualitative content analysis with a focus on communication as a systematic, rule, and theory-guided investigation using MAXQDA 2022 version.

Results and Discussion

The research results suggest that the behavioral factors influence is in the order of (1) social factors (2) dispositional factors, (3) cognitive factors, and (4) external factors from the most proximal to the distal factor respectively.

Dispositional factors

Dispositional factors represent "an individual's propensity to behave a certain way" (Malle, 2011) thus representing a farmer's propensity to participate in a cooperative. They are most proximal to the farmer's decision to participate in cooperatives as opposed to Dessart et al. (2019) findings on the adoption of sustainable agricultural practices. These factors included the farmer's farming objectives, personality social and economic concerns, resistance to change, and risk tolerance of the farmer respectively.

Farmers engaged in commercial production, seeking new experiences and an assertive personality, and with intent to exploit economies of scale offered by the cooperatives were more likely to participate in cooperatives. On the other hand, Conscientious and neurotic farmers based on their experience or that of their predecessors with losses accrued by cooperatives were more resistant to change and tolerate risks associated with cooperatives (Nimusiima et al., 2021; Action aid, 2013).

Social factors

Social factors are relatively proximal to the farmer's decision to participate in cooperatives categorized into descriptive and injunctive norms, signaling motives, and trust respectively. According to Xu et al, (2019) and Cook, (2018), cooperatives are inherently social institutions highly influenced by the interpersonal, cultural, and political relationships within the community. Descriptive norms are highly influenced by neighboring farmers' experiences and achievements leading to trust in the institution (Sok et al., 2016) while the latter is when farmers seek social approval (Talcott, 1951).

These social norms and the adoption of cooperatives as implementation institutions by the government and development partners have influenced more farmers to participate in cooperatives (Government of Uganda, 2021; Action aid, 2013). Lastly, Signaling motives by farmers who believe cooperative membership is a source of social status that yields social, and economic benefits have attracted farmers to cooperatives.

Cognitive factors

Background knowledge about cooperatives, the perceived costs and benefits, and the risks associated with participation in cooperatives are distal in decision-making unlike the findings by Dessart et al., (2019) cognitive factors were proximal. Farmers who or their predecessors experienced the collapse phase attach a high risk to participating in cooperatives (Action aid 2013; Kwapong, 2010; Wanyama

2009). Furthermore, perceived costs like membership fees, fines, delayed sales, and access to finances equally deter members whereas benefits like access to credit, better prices, and training on better practices worked in the opposite direction (Nimusiima et al., 2021).

Lastly, other factors such as advocacy, quality improvement, and external support contributed the least to farmers' participation in cooperatives. Faced with the challenges like poor-quality inputs, exploitation by middlemen, and limited market and credit access, cooperatives are used as a platform to utilize economies of scale, advocate, and lobby for government and donor support (Aboah et al., 2022).

Recommendation

Cooperatives are fundamental institutions in agricultural and rural development with a remarkable potential of improving the livelihoods of farmers in Uganda. Their collapse, low farmer participation, and commitment are a result of policy changes that have affected the behavior of farmers (Action aid 2013). There is a need to invest in mindset training and capacity building of farmers by government and development partners to change the misconceptions and negative perceptions about cooperatives. According to Dessart et al (2019), cognitive factors are easily changed, and thus improving the knowledge base on cooperative leadership, value addition, bulking, joint marketing, savings, and investing would improve farmer participation and performance of cooperatives.

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SMALLHOLDER FARMERS' PERCEPTIONS OF THE QUALITY OF AGRICULTURAL EXTENSION SERVICES IN NKOMAZI LOCAL MUNICIPALITY, SOUTH AFRICA

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Abstract

Introduction

Background and problem statement of the study

The agricultural sector, worldwide, is viewed as the vehicle that can take the developing countries to the next level of development as it promises not only to deliver food security but also poverty alleviation, employment creation as well as economic growth (Agholor & Obi, 2013; Muzangwa, Mnkeni, & Chiduza, 2017; FAO, 2018; Zwane, 2018 and Shah, Dulal, & Awatobi, 2020). One of the most powerful strategies that the agricultural sector relies on, to achieve agricultural productivity, rural development and economic growth is the Agricultural Extension Services (AESs). According to Zwane (2018), AESs are key to ensuring that the agricultural sector maintains an increase in economic strength as well as improved productivity. Koch & Terblanche (2013) stated that the AESs driving point in ensuring enhanced agricultural productivity in South Africa is the dissemination of scientific information to farmers. It does not end there; the dissemination of information must go with assistance to the farmers in terms of information processing and application. This concerns the issue of the quality, effectiveness, and efficiency of the AESs. Moreover, Agholor, Monde, Obi & Odeyemi, (2013) argues that the implementation of policies, strategic plans and programmes in South Africa is the driving force that will ensure that South Africa never runs out of food and poverty levels are never increasing. The implementation of such, can not be done without the AESs and the assumption is that this is not only applicable in South Africa, but to all developing countries across the world.

The AESs refers to the practical application of the scientific research output, knowledge, and findings in the agricultural engagements through farmer education (Koch & Terblanche, 2013). Farmer education refers to the process of imparting knowledge, skills and information to farmers with the aim of enhancing their agricultural productivity (Abbas, Asof, Saleem, & Muhamed, 2021). Farmer education aims to enhance the livelihood of farmers in across the world, especially in South Africa. Furthermore, it seeks to improve the skills of the South African farmers to ensure food security, increase in income generation and improved export rates (DOA, 2005, and Kassa & Temesgen, 2016). Farmer education achieves all this through the deployment of the following farmer education practices: farmer field training programmes, farm and home visit programmes, field trips, farmers' day, practical demonstration, farmer workshops, farmer meetings, and the contact sessions between farmers and Extensionists (DOA 2005, Koch & Terblanche, 2013 and Abbas et al., 2021). However, the quality of AESs in Nkomazi Local Municipality has not been studied before.

Purpose and objectives of the study

The aim of the study was to examine the perceptions of smallholder farmers about the quality of agricultural extension services in Nkomazi Local Municipality, in South Africa. The objectives of the study were to (i) assess smallholder farmers access to agricultural extension services in Nkomazi Local Municipality and (ii) to examine the smallholder farmers' perceptions of the four dimensions of extensions services in Nkomazi Local Municipality.

Methodology of the study

The study was conducted in seventeen (17) rural and farming communities in the Nkomazi Local Municipality. Nkomazi Local Municipality is one of the four local municipalities within the Ehlanzeni District of Mpumalanga Province, South Africa. Nkomazi Local Municipality was selected as the area of study since a larger part of the population is effectively occupied with agricultural activities and that the smallholder farmers' perceptions of the quality of Agricultural Extension Services was not yet studied. The Nkomazi Local Municipality have dams (sources of water) known as Driekoppies dam, Ngugwane dam and the Mbambiso dam, which supply farmers with irrigation water (Nkomazi Local Municipality Report, 2017). In addition, Nkomazi Local Municipality is mainly fed by a perennial river (Komati River), which supplies water to the surroundings.

The population of registered smallholder farmers in Nkomazi Local Municipality (NLM) were 1103 (DARDLEA, 2021). Of all the registered smallholder farmers in NLM, the study used simple random sampling method to sample a total of 366. All the respondents were randomly sampled from the 17 rural farming communities of the NLM. The sample size was determined through the use of the Slovin's formula. The researchers assumed a margin of error of 0.5 with confidence level of 99% for the determination of the sample size. Therefore, a sample size of 294 respondents was determined. After which the researchers opted to increase the sample size from 294 to 366 to ensure reliability, and validity of the results and to maintain consistency, to enable researchers to generalize with the findings and as a result of the peculiarity of the study.

The adopted research design was mixed method, comprising of qualitative and quantitative research designs. Data was collected from the smallholder farmers using structured questionnaires, focus group discussions, rural resource mapping, as well as the timeline analysis. The Scientific Package for Social Sciences (SPSS) was employed to analyze the quantitative data collected form smallholder farmers. Descriptive statistics, with likert scale was used to analyze the data collected for the study.

Results and conclusion

The study also explored the quality of the AESs in Nkomazi Local Municipality, assessing the four dimensions of extension, namely: timeliness, relevance, accuracy, and ease of understanding. The findings revealed that majority of the smallholder farmers are not satisfied with the AESs rendered to them in the area. Of the 366 respondents, 56.83% asserted that the AESs are poor, while 43.17% asserted that they are satisfied, with services ranging between good to excellent. This might be as a result of the lack of access to AESs perceived in Nkomazi, with 45.63% of the 366 respondents having access, while 54.37% have not accessed AESs in about 10 years. However, there were a few smallholder farmers who were found to be satisfied with the AESs in the study area.

Recommendations

Researchers recommends that the Department of Agriculture should partner with Private Investors to ensuring quality, efficient and effective AESs in Nkomazi. AESs in South Africa should come up with programmes to encourage youth participation in the agricultural sector. Future research can focus on the determinants of youth participation in the agricultural sector, which is currently very low.

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Farmers' Capacity on Using Climate Resilient Technologies for Rice Production in High Barind Tract of Bangladesh

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Abstract

Introduction

Bangladesh is considered as one of the countries that is most vulnerable to climate change because of its location in the tropics, the dominance of floodplains, its low elevation from sea level, its high population density and its low economic and technological capacity (MOEF, 2005; DOE, 2007; Shahid and Behrawan, 2008; Pouliotte et al., 2009; Haq and Rabbani, 2011). This erratic pattern produces extreme events, such as floods and drought, which have noticeable adverse effects on rice yields (Alauddin and Hossain, 2001; UNDP, 2008; GOB and UNDP, 2009). Global warming is expected to severely reduce the yield of rice crops, directly affecting the food security of High Barind Tract (HBT) people in Bangladesh (Nagothu et al., 2014). The HBT is a distinctive physiographic unit comprising a series of uplifted blocks of terraced land covering 8,720 km² in northwestern Bangladesh between the floodplains of the Padma (known as the Ganges in India) and the Jamuna rivers (the main channel of the lower Brahmaputra (Riches et al., 2008). The highest temperature differentially affects the tremendous metabolic processes of rice plants, very low temperature may cause chilling injury in rice plants and intense rainfall during the monsoon season can also lead to soil erosion or the wash-out of surface soil and the depletion of plant nutrients in soil due to runoff (IPCC, 2001). The country needs to increase its rice yield and at the same time increase crop diversity with other food crops in order to meet the growing demand for food and nutritional security, driven by population and economic growth. Above these facts, The HBT is very important area for agricultural development.

Objectives

- To describe and analyze the trends of climate change in HBT of Bangladesh;
- To determine the extent of capacity of the farmers in using climate resilient technologies for rice production;
- To ascertain the crucial factors influencing farmers' capacity in using climate resilient technologies for rice production; and
- To explore the constraints faced by the farmers in practicing climate resilient technologies for rice production.

Methodology

The study was conducted in a severe drought-prone area of Bangladesh known as the High Barind Tract. Two upazilas under Rajshahi district, namely Tanore and Godagari, were selected for the field survey.

Questionnaire survey was conducted to determine farmers' capacities on using climate resilient technologies for rice production. Data were collected from a random sample of 459 farmers, out of 459 of Godagari and Tanore upazila. The data were collected through personal interviewing by using a pre-tested structured interview schedule during February to June 2016. Appropriate scales were developed and used to measure the concerned variables. Fifteen selected characteristics of the farmers were considered as the independent variables, while farmers' capacity was the dependent variable. In addition, climate data on temperature and rainfall (1948-2016) from the Bangladesh Metrological Department were collected and analyzed using linear trend model.

Results

The result reveals that the time trend is statistically significant for all three major climate related variables. This implies that climate has changed over the whole period (1948-2016). However, the findings revealed that an increase in annual temperature from 1948 to 2016 has been recorded for the High Barind Tract of Bangladesh, whereas annual rainfall dominating hydrological driver that makes vulnerable to drought, and loss of crops. Twenty two selected climate resilient technologies like short duration rice variety; drought tolerant rice variety; direct seeded rice for promoting water use efficiency; priming of seeds during sowing; seedling of dry bed method; planting of appropriate aged of seedling; mini ponds for rainwater harvesting; Surface water storage practices, land mechanization and conservation techniques; inter basin water transfer; alternate wetting and drying; low cost PVC pipe irrigation system etc. The capacities of the farmers were categorized into high, moderate, and low. A simple regression model was used to determine the influential factors of farmers' capacities on using climate resilient technologies for rice production. Results of farmers' capacities revealed that 54% belonged to moderate capacity group while 41% of them had low capacity and 5% of the farmers had high capacity. Path analysis revealed that education, extension media contact, use of weather information, access to irrigation facilities, knowledge on climate change and perception of climate change had positive and direct effects on farmers' capacity. Aberrant weather conditions, lack of need based training on climate change, less availability of climate resilient technologies or inputs or materials and fragile and marginal environments were identified as the major problems faced by the farmers in rice field.

Conclusions

To cope with the changing features of climate, Bangladesh needs to take up adaptive policies in rice production and strengthen institutional capacity for improving climate resilient rice varieties and facilitate access to weather forecasts through early warning systems. However, without the needed awareness, knowledge, and training, most farmers are still unable to gain access to these technologies and use them effectively through better extension services to attain high adaptive capacity. The findings emphasize the importance of adaptation of drought-tolerant rice varieties and suggest that sustainable climate resilient agricultural technologies development may play a vital role in mitigating adverse climate change effects for achieving farmers' capacity. The findings suggest to give proper attention and necessary funds should be provided by the Ministry of Agriculture and other organizations to solve the problems and increasing capacity of the farmers' on using climate resilient technologies for rice production in High Barind Tract of Bangladesh.

Recommendations

As the farmers had high capacity in using priming of seeds during sowing, drought tolerant rice variety and planting of appropriate aged of seedling, short duration rice variety and low cost PVC pipe irrigation system at deep tube well (DTW). It is recommended that the appropriate measures should be initiated by the proper authority for increasing farmers' capacity in using other CRTs for rice production. The research organizations need to develop different climate resilient technologies as well as extension organizations need to develop farmers' capacity for using climate resilient technologies for rice production.

Key words: Farmers' capacity, Use, Climate resilient technologies and Rice production

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Social Media Utilization level among South African Smallholder Farmers: Implication for technology inclusiveness and effective extension service delivery

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Abstract

Introduction

Globally, social media applications are now being regarded as the powerhouse of communication and the main channel for mass marketing and broadcasting (Suchiradipta & Saravanan, 2016). These applications are also gaining increased usage for agricultural knowledge and information brokerage. Farmers all around the world are using social media due to its convenience, instant feedback, and capability to connect them with farmers, extensionists, agricultural specialists, agribusinesses, and consumers across different geographical areas (Singh, 2019). Social media apps have thus offered new opportunities to farmers, extension organizations, policy makers and administrators. It has the prospective of creating equality in terms of information and agricultural technologies accessibility, and it continues to generate wide societal acceptance even among farmers all around the world (Chisega, Kedemi & Sam, 2014).

In South Africa, several agricultural institutions have incorporated social sites such as Instagram, LinkedIn, Facebook, Whatsapp as part of their information system, a platform to share links, news updates, and farmer/consumer inquiries and feedback (Kipkurgat, Onyiego & Chemwaina, 2016). However, despite the available potentials and myriad of benefits that the use of social media apps has to offer, coupled with the efforts of private and public organizations to connect with farmers through social media, a lot of farmers smallholder farmers in South Africa, especially in the rural areas seems not be fully leveraging on the potentials derivable from their use. Research still reports a low level of social media responsiveness and usage in rural communities of developing countries (Suchiradipta and Saravanan, 2016). As opined by Aguera et al. (2020), this lagging behind of smallholder farmers in the use of social media in developing countries (including South Africa), in a world moving towards digitalized agriculture will further reduce their relevance and competitiveness in the agricultural space.

This has brought to the fore the need for smallholder farmers in South Africa to leverage more the use of ICT tools, applications and digitalized agriculture for improved agricultural development. According to Accenture (2018), the intensification of digital agri-technologies usage among farmers for information access, information sharing, and facilitating linkages with stakeholders in the agricultural industry can facilitate great value for South Africa between now and 2026. In view of these therefore, as a research response to the dearth of empirical research on social media usage among smallholder farmers in South Africa, it is pertinent to evaluate the current social media use status of these farmers. This will provide adequate and informed insight for the government and other stakeholders in the agricultural information system on strategies to embark upon in upscaling ICT and social media use in agriculture for sustained agricultural development and food security in the country.

Purpose and Objectives

The purpose of the study was to assess the level of social media usage among smallholder farmers in South Africa, using Limpopo province, a major agricultural hub in the country where smallholder farmers are important drivers in the economy as a case study. This was achieved by assessing the extent and purpose of usage of social media platforms among smallholder farmers, determining the smallholder farmers perceived benefits of using social media, examining the perceived ease of using social media amongst smallholder farmers, identifying the challenges experienced by smallholder farmers in their use of social media, and determine the socio-economic factors influencing the usage of social media in the study area.

Methods

The study employed a quantitative approach utilizing a descriptive survey research design. A two-stage sampling procedure was used to select three hundred and eighty-three (383) farmers in the study area. Information was acquired from the respondents using structured questionnaires that was administered and filled by trained enumerators during interviews with farmers. Descriptive statistics (frequency counts, percentages, means, ranks, and charts) and inferential statistics (multiple linear regression) were used to analyse the collected data.

Results

The findings revealed that WhatsApp and Facebook were the most preferred social media platforms by the farmers, and most of the farmers had a positive perception of the benefits and ease of using social media platforms. Furthermore, although some of the farmers made use of social media platforms for personal use, the level of social media usage especially for agricultural related activities was still low. Challenges relating to cost of tools and maintenance, inadequate awareness, skills, and training were some of the highlighted severe challenges preventing their optimal usage of social media platforms. The multiple linear regression model revealed that the farmers' age ($t = -5.27$; $p \leq 0.01$), educational qualification ($t = 7.64$, $p \leq 0.01$), cosmopolitanness ($t = 2.04$, $p \leq 0.05$), Perceived benefit index ($t = 2.53$, $p \leq 0.01$), Constraint index ($t = -3.15$, $p \leq 0.01$), and Secondary occupation were significant factors influencing the usage of social media in the study area.

Conclusion and Recommendations

The study concluded that the usage of social media platforms among farmers in the study area is still low especially for agricultural purposes and majority of the farmers are still yet to leverage on the potential benefits of using social media for marketing, advertising and linkage with extension agents and other agricultural institutions. The study recommends that government should ensure policies that subsidize the cost of social media usage are put in place to assist in the promotion of inclusive technology for smallholder farmers. Also, extension organizations and other rural advisory services stakeholders should package capacity building programmes to educate farmers on maximizing the benefits of social media platforms for agricultural purposes. This will greatly improve their access to vital and timely information, resources, linkage with extension agencies and expand opportunities for marketing their farm produce to more profitable outlets beyond the farm gate.

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Factors Affecting of Management of Collaborative Agricultural Extension Projects for farmers in Prachinburi Province, Thailand

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Abstract

The coronavirus disease 2019 (COVID-19) outbreak began in late December 2019. The first patient was diagnosed in Wuhan, Hubei Province, China and spread to other countries in Asia. The first infected outside China was found in Thailand. On January 12, 2020 (Department of Disease Control, 2020). As a result, each country has established measures to control and prevent outbreaks both controlling the movement of people both within the country and between countries, closing or limiting transport systems, these measures affect the normal life and activities of people around the world. These measures affect the normal life and activities of people around the world led to the problem of slowing the movement of agricultural and food production including the amount of consumer demand declined due to public health measures both social distancing and various types of detention as a result, agricultural products are stuck in the supply chain. causing problems in household incomes to decrease. The problem of the potential of farmers and people to adapt and mitigate the impact on the new life-base situation.

Farmers in Si Maha Phot District Prachinburi Province with collaborative agricultural extension projects of rice were gathered together where farmers were gathered in various activities, making bio-based substances, making fertilizers, planting and producing knowledge transfer training from relevant agencies, organizing a forum for exchanging knowledge marketing and distribution of products, etc. Enabling large-scale farmers to gain knowledge and develop their own potential but the problems encountered from the operation of farmers in large plots of rice, on the issue of farmers' lack of participation in the operation, lack of participation in planning, lack of participation in the practice, lack of participation in decision making in solving production or marketing problems, lack of participation in receiving benefits for the promotion and development of the group.

The objectives of this research were to study 1) management of collaborative agricultural extension projects 2) factors affecting of management of collaborative agricultural extension projects for farmers 3) factors affecting participation in the operation 4) problems and recommendations of management of collaborative agricultural extension projects for farmers.

The population consisted of 1450 member of mango collaborative operations in Si Maha Phot District. Prachinburi Province who had registered with the department of agricultural extension in 2020/2021. The 314 sample size was based on Taro Yamane formula with the error value of 0.05. Structured interviews were used for data collection. Statistics used were frequency, percentage, mean, minimum, maximum, standard deviation and Chi square test was used to determine the correlation of variables at a statistical significance level of 0.05.

The results indicated that most of the farmers were male with the average age of 51.06 years. Graduated primary school. The average household income from mango sales was 531,286.56 baht/year. The average household expenditure on mango plantation was 240,988.34 baht. The average number of experience in mango cultivation was 17.84 years, total production volume 22,676.18 kg/year. The average selling price of the produce was 23.45 baht/kg and the average household labor was 3.39 person. The farmers participated in the operation at the highest level in the issue of participate in receiving benefits, and the least important issue is participation in knowledge management. Factors Affecting Participation were period of membership in the collaborative operations and the amount of production statistically significant difference ($p < 0.05$). Farmers had the most problems participating in operations, on the issue of knowledge management/knowledge training/production/marketing and suggestions: techniques/methods of communication/public relations should be developed within the group. Also learn about production/marketing, would be learn information technology to store the knowledge gained within the group.

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Evaluating Cooperative Extension Programming to Support Beginning Farmers in the Southeast United States

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Abstract

Introduction

Agriculture in the US currently faces a range of unique tensions, including an aging farming population, rising land prices, farm consolidation, rural population loss, and unequal access to resources across racial, cultural, and socioeconomic lines (Carlisle et al, 2019; Horst & Marion, 2019; USDA, 2019). Amidst these nuanced challenges, new farmers continue to enter the agriculture sector at a steadily increasing rate and make up a larger portion of the overall farming population (Key & Lyons, 2019). Many terms are used to describe these early stage farmers internationally - including “new entrant farmers” (Hopkins et al, 2020) - but in the US this group is considered “beginning farmers” (Key & Lyons, 2019). Beginning farmers are those with less than ten years of farming experience, which includes a wide range of life experiences, values, and goals (Bruce, 2019; Carolan, 2018; Inwood et al, 2013). Unprecedented barriers face beginning farmers at the present moment, including inaccessible land prices, staggering levels of student loan debt, and waves of inexperienced farmers entering into agriculture (Ackoff et al, 2022).

Cooperative Extension in the US includes approximately 32,000 professionals who design and implement research-backed programs in highly diverse communities (Association of Public and Land-Grant Universities, n.d.). Scholarship in recent years has pointed to the need for Extension to understand the particular challenges faced by beginning farmers, while also focusing Land Grant resources to meet these needs (Niewolny & Lillard, 2010). Research in Extension has identified different typologies of beginning farmers (Brislen et al, 2016) and modeled several approaches to resource delivery using collaborative networks (Mallory et al, 2019; Serrine et al, 2016). While these advances are promising, Extension efforts still lack a full understanding of the range of needs facing beginning farmers, particularly in the Southeast US. Additionally, relatively few Extension programs exist to support beginning farmers in the Southeast US. Particular states such as Georgia have one of the highest proportions of beginning farmers in the country, yet formalized education and programming through Extension that reaches the discrete needs of these farmers remains limited.

Purpose & Objectives

This presentation focuses on the first phase of a two-phased research project to understand the impacts of Extension programming in Georgia to support beginning farmers. The overall objective of this research is to understand if Georgia Extension’s Agricultural Program is meeting the perceived needs of beginning farmers. The program has been utilized since 2015 in 26 counties, yet no qualitative research has explored the efficacy and impacts this program has on the lives of beginning farmers. This first phase of the research presented here looks explicitly at the role Extension agents play in reaching beginning

farmers. The guiding research questions include: 1) How do Georgia Extension agents view beginning farmers and their needs? 2) What are the perceptions of Georgia Extension agents regarding community resources and their ability to leverage these for program support? 3) Why do Georgia Extension agents choose to provide targeted support for beginning farmers?

Methods

A qualitative study guided by grounded theory methodology was used to explore the lived experiences of [STATE] Extension agents who work with beginning farmers and have implemented the program in their county, which includes 13 Extension agents within the past three years. A total of six Georgia Extension agents engaged in beginning farmer programming were identified and recruited for individual, semi-structured interviews, which were primarily conducted at their county office. Prior to data collection, exploratory conversations with research stakeholders included Extension agents, Extension administration, peer researchers and service providers, as well as University of Georgia faculty involved in beginning farmer outreach and community development. Participating Extension agents included those who had organized and implemented the curriculum within the past three years. In the first round, three agents were selected for interviews based on their use of the program, their county's beginning farmer characteristics, and their individual leadership within the beginning farmer community. These participants then each recommended a partnering Extension agent in another county for secondary interviews, leading to a total of six study participants. The participating Extension agents then provided names of farmers who participated in the program to be recruited for the second phase of the study; the results from this second phase data set will be presented separately. All interview data was recorded, transcribed, and coded using MAXQDA 2020. Data collection and analytical methods followed best practices for grounded theory research designs (Charmaz, 2006).

Results

Interviews were coded and grouped into higher levels of identified themes throughout data analysis utilizing the constant comparative method (Glaser & Strauss, 1967). The views of Extension agents regarding beginning farmer typologies, needs, and available community resources were coded and grouped into thematic categories. Extension agents also provided data on programmatic decision making and necessary improvements to better serve beginning farmers. While thematic coding is still undergoing refinement, initial themes expressed by Extension agents include: a focus on knowledge-based interventions; upholding research-informed production methods; a connection with tangible resources; and the value of interpersonal connections with beginning farmers. Key differences between new and established Extension agents were seen in their approaches to understanding community needs and resulting program development.

Recommendations & Implications

This first phase of a two-part study focused on deep, qualitative understanding of how Georgia Extension agents deliver resources to beginning farmers. Core data was generated to understand how this group conceptualizes beginning farmers, understands their needs, develops appropriate programming, and maintains ongoing outreach. Interviews with Extension agents suggest that they view beginning farmers as unique individuals with specific needs rather than a homogenous group. At the same time, Extension agents note the ongoing nature of support that beginning farmers require, which extends beyond the life of a particular program and involves long-term engagement. Many agents find that the program is a successful building block for future program delivery, resource creation, beginning

farmer intake, and relationship development among participants and Extension agents. However, several divergent views among beginning farmer program participants suggests a need to include intended audience members in program refinement and delivery.

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Teaching What Matters: Assessing Ghanaian Science Educator Perceptions of the United Nations Sustainable Development Goals

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Abstract

Introduction

Despite the documented success in the fields of science and business education, there has not been broad scale embedding of education for sustainable development (ESD) resources like the United Nations Sustainable Development Goals (UNSDGs) in formal and non-formal teacher education (Bradly & Iskhakova, 2022; Huisman & van der Wende, 2022). Educators in the early stages of their career need assistance with the integration of resources like the UNSDGs and professional development has been shown to positively impact integration (Cochran et al., 2020; Weiss & Pasley, 2006). Studies have commented on the benefits of professional development to make “deep level” changes in instructional practices through targeted intervention points (Borko, 2004; Snow-Gerono, 2005).

Given the rapid development in Ghana through healthcare and telecommunications (Kumi et al., 2020; Sturman et al., 2020) there is a tremendous benefit in studying how Ghanaian educators are approaching ESD and what interventions have led to their use of the UNSDGs in their learning spaces. The study team conducted a survey to explore the perceptions of educators in Ghana towards the UNSDGs and identify discrepancies between their perceived importance and implementation of the various UNSDGs to focus future professional development to those issues where the discrepancy is highest (Wiggins & McTighe, 2005).

Review of Literature

In 2015 United Nations member states adopted the 2030 Agenda for Sustainable Development (2030 Agenda). Progress with implementation of the 2030 Agenda is monitored and reported by 17 interdependent thematic Sustainable Development Goals (SDGs). Studies have found that a majority of educators do not have previous knowledge about the UNSDGs and lack confidence to teach about them, but do feel a global perspective should be taught in applied STEM classrooms (Singmaster & Manise, 2016; Ayobolu, 2019; Tichnor-Wagner et al., 2019). Mohammadi and Moradi (2017) investigated professional development workshops and found sustained professional growth across the board in positive participant beliefs, which thereby impacts their confidence in influencing student learning. Conducting a needs assessment to inform the design of highly effective professional development can be done through a mean discrepancy analysis (Peake, Duncan, & Ricketts, 2007; Gregg & Irani, 2004) which compares participant behaviors, skills, and competencies, as “what is” and “what should be” (Borich, 1980).

Research Questions

The study is aimed at answering the following research questions:

Research Question (RQ) 1 – What are the baseline values for awareness, perceived importance, and implementation of lessons and activities based on the UNSDGs by Ghanaian educators?

Research Question (RQ) 2 – Are there discrepancies between the mean perceived importance and implementation of specific UNSDGs that can influence the need for tailored professional development opportunities?

Methods

A framework bringing together pieces from Global Education (Myer, 2006) and Pedagogical design capacity (PDC) guided the study (Brown, 2009; Knight-Bardsley & McNeill, 2016). The following methods guided this descriptive survey research study.

Population

The participants (n=20) in the study were recruited as a convenience sample through participation in the Global Teach Ag Network's programming. All participants are applied STEM educators in both formal and informal contexts and ranged in age from 22 to 44 years old.

Instrument

The "Perceptions of Global Issues" survey is a researcher-developed instrument grounded in existing instruments deemed reliable and valid due to use on similar populations of educators. Instruments from previous work influenced the survey instrument (RISE, 2017; Global Competence Associates, 2018; Ariel Tichnor-Wagner, 2019). Participants responded to questions on a 4-point Likert scale that ranged from a section on awareness, importance, and implementation of the UNSDGs to sections on background experience in global learning. Construct validity through a panel of experts addressed internal validity for this instrument. Reliability for the instrument was analyzed using SPSS to determine a Cronbach's alpha and was deemed to be acceptable.

Data Analysis

Prior to analysis, the data was assessed for meeting statistical assumptions and despite high kurtosis values for 7 fields, the data passed the Shapiro-Wilk test. Researchers conducted descriptive statistics, as well as a mean weighted discrepancy score (McKim & Saucier, 2011) across each of the 17 UNSDGs through SPSS.

Results

This study asked participants to identify their awareness, perceived importance, and current implementation of lessons and activities related to the UNSDGs to address RQ1. The three criterion variables across the sample set (n=20) on a scale from 1-4 were 2.96 (SD=.65) for Awareness, 3.25 (SD=.58) for Importance, and 2.68 (SD=.78) for Implementation. Variability in the means for the three

variables ranged from 1.41 to 4.00 (range=2.16). RQ2 focused on the mean discrepancy values for each of the 17 issues between importance and implementation. The smallest discrepancy was found in SDG 13 - Climate Change (Range=2.00, S.D.=.65) while the largest was found in SDG 8 - Decent Work (Range=5.00, S.D.=1.5), SDG 7 - Clean Energy (Range=5.00, S.D.=1.45), and SDG 12 - Responsible Consumption (Range=5.00, S.D.=1.44).

Implications & Recommendations

The participants serving as the sample for this study were diverse in discipline, years in education, and experiences that relate to global learning. Given the data from the survey instrument, we can suggest that professional development opportunities could benefit from a focus on SDGs 7, 8, and 12 given the perceived importance but relatively lower implementation. All but one respondent was familiar with the UNSDGs, and all but two have discussed them as part of their teacher education and professional development opportunities post-training. Klein & Riordan (2009) reported levels of teacher engagement have a positive association with how much content educators implement from professional development opportunities. Given the discrepancies in nine of the seventeen UNSDGs, the study team can suggest there is a need to provide focused professional development experiences for Ghanaian educators to ultimately aid Ghanaian students. The results of the study are limited to the participant group, and expansion into other subject areas and other countries will aid in further work on ESD. Future research should explore correlations between experiences and interest in the integration of ESD into instruction.

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Beginning Farmers in the Southeast United States: Lived Experiences, Persistent Barriers, and Interactions with Cooperative Extension

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Abstract

Introduction

For the past three decades, the landscape of agriculture internationally has shifted toward fewer, aging farmers working on larger plots of land to carve out a living (Giller et al, 2021). Set against this backdrop, new farmers continue to enter the agricultural sector globally, and these aspiring agriculturalists bring with them differing cultures and experiences, which vary widely from country to country (Chiswell, 2014; Mailfert, 2007; Zollet & Maharjan, 2021). In the US, these new producers are considered “beginning farmers,” which includes any farmer with less than ten years of experience on their farm (Key & Lyons, 2019). Beginning farmers in the US carry with them a lifetime of experiences, which include their family history in farming, cultural values, education, interpersonal connections, community resources, and personal goals (Inwood et al, 2013; Horst & Marion, 2019; Touzeau, 2019). All of this lived experience can be tied to the needs that beginning farmers face as they enter and continue in agriculture (Carlisle et al, 2019). Numerous programs exist to serve beginning farmers in the US, including small business training, apprenticeships, mentoring, and land access initiatives, such as incubator farms and succession planning (Lelekacs et al, 2014; Niewolny & Lillard, 2010; Schreiner et al, 2018).

Prior research has noted the wide array of barriers to market entry and success that beginning farmers face. Some hindrances to farming include insufficient capital, gaps in knowledge, limited interpersonal support, pre-existing debt, and land or equipment inaccessibility (Ackoff et al, 2022; Carlisle et al, 2019). While many of these barriers are shared by all beginning farmers, not all producers who fall within this broad USDA definition will feel the effects of these obstacles in the same way. In particular, scholarship in the field has noted that the lived experiences of beginning farmers may help to better understand the particular issues that someone might face in their farming journey (Bruce, 2019). Studies ranging from California to Hawaii to Iowa all suggest that beginning farmers must be studied at a micro-level to understand local issues facing farmers while simultaneously building a wider field of knowledge about this category of producer (Calo & De Master, 2016; Suryanata et al, 2021; Carolan, 2018). Within the southeast US, beginning farmers remain relatively under-examined and their needs continue to persist without many robust interventions at the institutional level.

Purpose & Objectives

This presentation explores the second phase of a two-phase study to understand the needs of beginning farmers in the southeast US state of [STATE]. While the larger study examines the impacts of [STATE] Extension programming on beginning farmers, this second phase looks specifically at the self-identified needs of these producers and how [STATE] Extension programming meets or falls short of these needs.

The experiences of beginning farmers were also gathered and examined within a framework of community capitals (Flora et al, 2016) and personal agency (Bhattacharyya, 2004). Guiding research questions for this second phase of the study included: 1) What are the perceived needs of beginning farmers in [STATE]? 2) How do beginning farmers in [STATE] perceive community resources and their ability to access these? 3) How do beginning farmers view [STATE] Extension assistance and resources, such as the [PROGRAM]?

Methods

This qualitative study utilized grounded theory methodology to examine the experiences, values, and needs of beginning farmers in [STATE]. A total of nine beginning farmers who had participated in [STATE] Extension's [PROGRAM] were drawn through purposive sampling. The beginning farmers were identified and recruited for individual, semi-structured interviews conducted on-site at each participant's home. Extension agents interviewed during the first phase of the larger study worked with the researcher to identify beginning farmer program participants from within the past three years who would be suitable candidates, based on years of experience, farm type, and individual business goals. Beginning farmer selection criteria were also informed by stakeholder conversations prior to the start of data collection; these stakeholders included [STATE] Extension agents and administration, [UNIVERSITY] faculty, and researchers studying beginning farmer issues at peer institutions. Each participant interview included field work with a walking tour of each farm and 60 - 90 minute interview with the beginning farmer. Interviews were audio recorded, transcribed, and coded using MAXQDA 2020. The overall process for data collection and analysis followed grounded theory methodology as outlined by Charmaz (2006).

Results

Throughout the data analysis and coding process, higher levels of themes were identified, refined, and condensed using the constant comparative method (Glaser & Strauss, 1967). Beginning farmer needs, views of community resources and personal agency, and experiences with [STATE] Extension programming - including the [PROGRAM] - were coded and grouped according to identified categories. While interviews are currently underway, initial results suggest that beginning farmers in [STATE] share some of the common barriers to success that are identified throughout the literature, but their needs are also highly diverse. The diverse needs of these beginning farmers can be traced to their unique approaches to farming, which further emphasizes the many typologies of beginning farmers who fall within the larger USDA-defined category. Beginning farmers also expressed awareness and importance of a wide range of community capitals (or resources) throughout the research, but most often acknowledged more tangible resources when asked directly, such as financial assistance. Finally, interviewees described their experiences with formalized training and ongoing assistance through [STATE] Extension.

Recommendations & Implications

This second part of a two-phase study magnified the felt needs of beginning farmers in [STATE] as expressed firsthand by the farmers themselves. Collected data shows how the participants view their primary needs as they start and expand their farming enterprises, which resources they see and utilize in their communities, and the ways [STATE] Extension programming has impacted their efforts. The deep, firsthand feedback from these program participants illuminates several areas of success and improvement in institutional curriculum to reach beginning farmers in the Southeast US. These results also underscore the necessity for community involvement in the Extension planning process and

throughout program implementation. This intentionality is especially needed when supporting beginning farmers, who bring with them myriad life experiences, ongoing needs, and unique barriers to success.

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Assessing the Competencies of Dominica Extension Staff to Deliver Climate Smart Training to Farmers

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Abstract

Introduction and Theoretical Framework

Agricultural development and rural livelihoods are vulnerable to climate change. Hence, climate-smart extension advisory services are necessary for building resilience and facilitating innovative practices to support vulnerable farmers and rural communities (Singh et al., 2021). Extension agents play an important role in encouraging farmers to participate in climate smart agricultural initiatives. Therefore, extension agents' competencies to deliver climate education to farmers is critical to climate mitigation and resilience (Olorunfemi et al., 2020).

The government of Dominica plans to reduce the effects of climate change on agriculture by enhancing the technical capacity of farmers and extension services. (Division of Agriculture, 2022). While Dominica's economy relies heavily on agriculture, the country is highly susceptible to extreme weather events; hurricanes, drought and floods which severely affects the agriculture sector. Agriculture has been identified as the top sector to make Dominica the first climate-resilient nation in the region (Caribbean Agricultural Research and Development Institute [CARDI], 2019).

Competency models provide a framework to identify and evaluate the knowledge and skills required for superior work performance in a given role (McClelland, 1973). A competency modelling approach was used to assess the baseline competencies of Dominica's agricultural extension agents within the context of climate extension education. Core extension competences were identified by extension experts and assessed via a pre-test prior to a climate-smart agriculture extension training program.

Purpose and Objectives

An evaluation of extension agents' core competencies and willingness to engage in climate education with farmers was done. Objectives were to: (a) describe extension agents' (i.e., program participants) attitudes towards the importance of climate change education for farmers; (b) rank major barriers to climate change extension education, (c) assess discrepancies in agents' core extension competencies, and (d) determine agents' intentions to conduct climate change extension education. Results will provide insight into the professional development needs of extension agents in climate change education.

Methods

This evaluation study followed a correlational design and was guided by a competency modeling framework (McClelland, 1973). The target population was Dominica extension agents who registered to participate in a climate change education professional development program (N = 32). All participants completed a pre-assessment before starting the program in October 2022.

The pre-test instrument assessed (a) core extension competencies – program planning, educational tools, evaluation, communication, and climate change-specific communication, (b) attitudes towards climate change education for farmers, (c) barriers towards climate change extension education, and (d) intentions to conduct climate change education.

Descriptive statistics addressed objectives (a) and (d). Mean Ranks (MR) of Friedman’s test were used to rank barriers to climate change extension education for objective (b). With five (5) barriers assessed, MR ranged from 1 (lowest) to 5 (highest). The Ranked Discrepancy Model (Author & Harder, 2021) was used to address objective (c). The Ranked Discrepancy Model (RDM) is an alternative approach to the Borich model for handling needs assessment data to identify gaps or discrepancies. Author and Harder (2021) demonstrated the utility of the RDM in assessing professional development needs.

Results

For objective (a), participants had generally positive attitudes towards climate education for farmers; 77% of extension agents agreed or strongly agreed (henceforth “agreed”) their actions can positively influence climate change adaptation in their country, 86% agreed that knowing about climate change problems is important to them, 73% agreed it is important to work on climate adaptation, and 81% agreed extension should prioritize climate change adaptation strategies. However, for objective (b), the highest-ranked barriers to climate change education were perceived as insufficient support from the government (MR = 3.50) and lack of willingness from farmers to consider adaptation strategies (MR = 3.00).

For objective (c), all competency items assessed had a negative Ranked Discrepancy Score (RDS); the RDM illustrated a discrepancy in agents’ competencies across all items in the pre-assessment. The highest-ranked professional development (PD) need (or discrepancy) in program planning was to “Conduct a comprehensive needs assessment” (RDS = -62). For educational tools, the highest ranked PD need was to “Design an extension program” (RDS = -63). For evaluation, the highest ranked PD discrepancy was to “Establish benchmarks to determine program impacts” (RDS = -50). For communication, the highest ranked PD need was to “Work with experts to find solutions to complex problems facing clientele” (RDS = -59). Lastly, the highest-ranked PD need for climate change communication was to “Talk with clientele about the main sources of greenhouse gas emissions” (RDS = -46).

While the RDM demonstrated discrepancies in all competency items, extension agents had good intentions to conduct climate change education (objective d). Participants were somewhat or extremely likely (henceforth “likely”) to collaborate with other agents to create an action plan on climate change adaptation education for farmers (78%), look for more information on solutions to address climate issues affecting farmers (89%), talk with farmers about climate adaptation (81%), and look for more PD training to learn about climate adaptation strategies (77%).

Conclusions/ Recommendations/ Implications

The positive attitudes about climate education among Dominica's extension staff are commendable, but insufficient to effect change among their clients. The findings point to serious gaps in the knowledge base of extension agents; extension officers possessed insufficient competencies in all core areas (i.e., program planning, educational methods and communication). Dominica's goal of becoming the first climate-resilient nation in the region would not be accomplished if the observed competency gaps are not addressed through professional capacity-building efforts. It is recommended that the program planners modify the curriculum to target identified competency gaps.

The main barriers identified were insufficient support from the government and farmers' buy in. An effective climate extension education requires robust government support in conjunction with farmers' demand. Agents' enhanced communication skills will be necessary to securing support from both parties to embrace adaptation strategies. In contrast, agents' strong intentions to provide climate education based on their own initiatives for developing their capacity through professional development and forming collaboration is a welcomed sign to climate extension education in Dominica.

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SDG Statements: Facilitating Discussions through Collaborative Mind Mapping

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Abstract

Introduction

There is a need to integrate Education for Sustainable Development into classroom curriculums to build sustainable societies (Lavanya & Saraswathi, 2014; SalÓte, 2015; Pipere et al., 2015; Heasly et al., 2020). Early studies like that of Sachs (2005) drew connections between Agricultural and Extension Education (AEE) curriculum and four of the UN Millennium Development Goals (MDGs): (a) eradicating extreme poverty and hunger, (b) promoting gender equality and empowering women, (c) ensuring environmental sustainability, and (d) building global partnerships for development. In 2015 United Nations member states shifted from the MDGs and adopted the 2030 Agenda for Sustainable Development (United Nations, 2021). Progress with implementation of the 2030 Agenda has been monitored and reported through 17 interdependent thematic Sustainable Development Goals (SDGs) which have 169 specific targets (Wilkinson, 2019). The SDGs are designed to be: a measuring stick, pathways for more inclusive stakeholder involvement (i.e. women, children, civil rights groups), and a push for systems thinking (Tomja, 2018). There have been gaps however in reporting successful strategies for integrating the SDGs into courses at secondary and post-secondary levels.

Those who have designed courses with ESD as a component have identified critical thinking, collaboration, and communication skills as primary goals (Galt et al., 2013; Hilimire 2016). And one study conducted by Petillion et al. (2019) with chemistry students at the post-secondary level found that the SDG framework was effective in promoting authentic learning of chemistry while presenting students with proof of relevance. The broad umbrella of global learning that convers ESD involves global issues and reflective learning to processes those issues (Deardorff, 2015). Those individuals who have a global perspective demonstrate better communication skills with their peers and those who they manage (e.g. educators and their students) because of their openness to connect (Walton, 2002). Projects that are guided by SDGs are not just important for training students, but can also become catalyzers for authentic creativity, curiosity, collaboration, and citizen participation (UNSD, 2017). Given the need for embedding ESD, the small-scale success with SDG integration into instructional design of coursework, and the observed outcomes of those who engage in global learning opportunities like sustainable development, the team at [University] used the SDG's to design a collaborative workshop for the global agriculture pathway within the [program] with the goal of fostering a global perspective and contributing to the growing body of literature that is reporting successful strategies for the integration of ESD.

Programming Objectives

The presented experience is an innovative model of educational programming that reflects an approach to engaging students at the secondary level in discussion on global issues. The following objectives were explored through the program:

Objective (Obj) 1 – Identify the current level of confidence students in the PSEAS program have in articulating opinions and perceptions of global issues based on an open dialogue during an instructional episode.

Objective (Obj) 2 – Engage students with the PEAS program in a collaborative mind mapping activity to capture perceptions and sentiments on global issues based on peer perceptions and sentiments.

Methods

Students in the [program] were part of an honors program funded through the College of Agricultural Science at [University]. The group (N=25) attended week-long courses in eight different pathways including Global Agriculture. The instructional team designed a four-day series of workshops to orient the students to ESD primarily through exposure to current research in food production and food security. The United Nations SDGs provided the framework to organize conversations and an activity was integrated into instruction on the penultimate day to provide formative feedback to the instructional team on progress towards improved articulation of opinions and perceptions on global issues that are being addressed by sustainable development. Four global issues relating to food production were selected and statements advocating “radical” solutions to those issues were printed and posted on four separate tables. Students were brought into the learning space and were given a broad prompt for working through a global issue. Students were then guided to apply their knowledge of global issues (addressed by the SDGs) through the collaborative mind mapping activity. Students were given stickie notes and were instructed to move around each table and create a mind map by placing primary nodes extending from each statement with broad reactions to the statements. Students then took turns adding to each other’s stickie notes, thus creating secondary and tertiary nodes that filled the tables with thoughts, reactions, and ideas related to global issues and anchored by SDGs.

Results

Students had trouble in both identifying issues and sharing a substantive discourse at the beginning of class. The instructional team planned for the difficulty as a result of pilot testing with previous groups and thus transitioned into mind mapping upon observation of student apprehension. At the conclusion of the activity, stickie notes that had noteworthy and provocative reactions (as deemed by the instructor) were pulled from each table and posed to the class as reflection points. The conversations among the students in the class were enhanced through increased awareness of alternative points of view. Students not only offered support for their additions to the mind maps but were also able to recall the nodes that they added on to because it sparked their interest as they utilized the freedom to choose which nodes offered opportunities to express their opinions.

Implications & Recommendations

The instructional team acknowledged the limited scope of the sample and thus will need more intervention points to comment on the activity’s success as an innovative model of educational

programming. Collaborative mind mapping has however become a part of the instructional design of the agricultural education capstone course at [PSU] as a result of the [program] and will continue to be used as a tool in professional development settings. The research team at [Network] has begun a thematic analysis of the responses to the prompts to assess positive and negative sentiments as well as the use of pictures to articulate feelings towards global issues and recommends continued work in this area to measure the efficacy of these strategies as a proven resources for effective work in ESD.

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The Green Industries Best Management Practices Program in Florida

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Abstract

Introduction and/or theoretical framework and/or review of the literature

In the summer of 2000, a group of green industry professionals, university representatives and state of Florida administrators met to discuss developing standards of environmental responsibilities for the industry to reduce the non-point source pollution coming from fertilizers, and pesticides to protect surface and ground water bodies. In 2002 the first edition of the BMPs manual was published in English and Spanish, with more editions in 2008, 2010 and 2021¹. In 2009, the Florida legislature recognized the Best Management Practices (BMPs) and made the training mandatory for commercial fertilizer applicators.

Pristine landscapes with palms, manicured trees and dark green lawns are common in Florida. In the state of Florida during 2018, the total output contribution of the green industry sector was \$29,888 million and the total employment contributions (incorporating multiplier effects) in the broader economy were 203,482 jobs². It is a huge business in the Sunshine State.

Because there is a huge pressure of insects, diseases, weeds and invasive organisms affecting the landscape, it is very difficult and not sustainable to maintain a pristine landscape look in Florida. Besides that, what is the environmental and social cost to keep everything perfect? Is it sustainable?

Purpose and objectives

The purpose of the Green Industries Best Management Practices (GI-BMP) program is to educate the green industry about commonsense research-based practices that will allow them to reduce the non-point source pollution coming from fertilizers and pesticides to protect surface and ground water bodies.

The five-module program is designed to teach:

- Use of appropriate site design and plant selection.
- Use of appropriate rates and methods of applying fertilizers and irrigation.
- Use of integrated pest management (IPM) to minimize pests and applying chemicals only when needed.

Objectives of the study:

- Determine if the number of GI-BMP programs taught since its inception has served the Hispanic and non-Hispanic landscape workforce in the State of Florida effectively.
- Assess how many GI-BMP participants are adopting the program's recommendations.
- Determine the level of satisfaction among the participants.

Methods and/or data sources; or theoretical/philosophical theme

Florida law states that all commercial fertilizer applicators must have a certificate from the Florida Department of Agriculture and Consumer Services (FDACS) by January 1, 2014 (s. 482.1562, F.S.). To get this certificate, each commercial applicator must be trained in the GI-BMPs and receive a certificate of completion from University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS) and Florida Department of Environmental Protection (FDEP). Local ordinances in different counties or cities may require that non-commercial fertilizer applicators also be trained.

The curriculum of the program is coordinated by UF/IFAS through the program Florida-Friendly Landscaping™, <https://gibmp.ifas.ufl.edu/>.

The central coordination of the program is in Gainesville, FL and has the support of almost all the county Extension offices in the State. The program has a Director, a Statewide Coordinator, a Website & Information Technology Coordinator, 2 Program Assistants and Regional Coordinators for South and North Florida.

Training classes are offered in English, Spanish and Creole and are held at Extension offices and other locations around the state. Live sessions via Zoom and self-paced on-line or DVD trainings are also available.

In order to schedule a new class, the person in charge of the activity needs to register the class using the portal, <https://gibmp.ifas.ufl.edu> at least 30 days before the event. All the class materials will be sent before the class by the main office. Materials include the training record form, surveys, pre and posttest, study guide and fertilizer worksheets. When the class is over, all the materials are returned to the main office for processing. The analyzed class materials include scores of the pre and posttests, personal information of the attendees, and surveys containing several questions about the training content and recommendations before and after the class. A score of 75% in the posttest is required to obtain the certificate that verifies that the attendee passed the training.

Results, products, and/or conclusions

Since the inception of the program, 75,174 people have participated in 2,427 Green Industries Best Management Practices (GI-BMPs) classes in English, Spanish and Creole and 63,957 people have obtained the certification. The total of participation was 45,729 in English, 7,231 in Spanish and 102 in Creole plus others who took the class either on-line or through DVD.

At the end of the program the participants completed a test and were eligible to obtain the state of Florida Limited Commercial Fertilizer Application Certification. The passing rates of the test were 91%, 73% and 70% for the English, Hispanic and Creole audience.

- Recommendations, educational importance, implications, and/or application

Recommendations and Conclusions:

- Add more training classes in Creole and Spanish.
- Survey the IFAS agents to understand what barriers they face in order to conduct more GI-BMP training opportunities in Spanish and Creole.

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Exploring the Role of Knowledge Mobilization in the Adoption of Integrated Pest Management for Grapevine Viruses in Niagara, Ontario Vineyards

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Abstract

Introduction

Knowledge mobilization (KMb) is the process of knowledge production, dissemination, and adoption with the intent to apply research findings into practice (Fazey et al., 2013; Levin, 2013; Nguyen et al., 2017). This process is made possible through the recurring interactions among three stakeholder groups: researchers, intermediaries, and knowledge users. Most KMb research relates to health studies, although over the last few decades it has branched into other disciplines including education and natural resource management, with very little research focusing on KMb in agricultural systems (Grimshaw et al., 2012; Levin, 2013; Nguyen et al., 2013; Rust et al., 2022). In recent years, Nguyen et al. (2017), developed the knowledge-action framework, which explores KMb in natural resource management, helping to inform environmental-related KMb research. We use this framework to situate and structure this agricultural-related KMb research in the KMb literature.

KMb is a requisite for the adoption of sustainable agricultural practices, such as integrated pest management (IPM), as it bridges the gap between the production and use of knowledge (Nguyen et al., 2017). IPM is a complex, research-intensive decision support system used to determine effective pest control strategies (Kogan, 1998). Adopting IPM requires understanding scientific research to integrate pest management strategies into agricultural systems (Peshin et al., 2009).

Vineyards in Niagara and across Canada are battling widespread viral outbreaks causing detrimental effects on the yield and quality of grapes produced (Xiao et al., 2018). IPM provides a tool for sustainably managing grapevine viruses and insect vectors. Although IPM is relatively well-adopted by Niagara grape growers, the research on viruses and insect vectors in Ontario is expanding, meaning advancements to IPM strategies are ongoing and require continuous KMb. Understanding the role of KMb in supporting IPM adoption, while identifying areas for improvement in current KMb processes, is valuable for ensuring growers use emerging findings to base their management decisions.

Objectives

This study explores the role of KMb in the adoption of IPM for grapevine viruses impacting Niagara vineyards by gaining a better understanding of how knowledge of grapevine viruses is produced, shared, transferred, and used. We aimed to understand the components within the complex phenomena of KMb while identifying factors that influence the KMb of grapevine virus research in Niagara.

Methods

We conducted an exploratory case study of KMb of IPM for grapevine viruses in Niagara using an ethnographic approach to explore stakeholders' (researchers, intermediaries, and growers) experiences and approaches to KMb (O'Reilly, 2005). Participant observations were conducted to observe stakeholders' production, transfer, and use of IPM by following stakeholders in their day-to-day activities, observing first-hand the flow of knowledge throughout the industry (Reeves et al., 2008). Observations took place within vineyards through scouting activities and farm tours, as well as in research laboratories and conferences. Additionally, qualitative interviews with researchers, intermediaries, and growers were used to better understand their perspectives on the KMb of IPM. Open-ended questions were used to guide a discussion of the factors influencing KMb highlighted by the knowledge-action framework (Nguyen et al., 2017).

A deductive-inductive hybrid coding approach organized relevant data, helping to identify recurring patterns and themes through deep reflection and interpretation (Fereday & Muir-Cochrane, 2006; Miles et al., 2018). Deductive codes were derived from the factors of influence on KMb identified in the knowledge-action framework (Nguyen et al., 2017). All data were thematically analyzed to identify and interpret themes within the data (Braun & Clarke, 2006). The themes are used to make sense of the data and fulfill the objective of better understanding the process of KMb of IPM.

Results

The preliminary findings of this research identify various factors that support the mobilization of IPM while highlighting areas for improvement. Firstly, the long-term relationships built on trust and support between researchers, intermediaries, and growers within Niagara vineyards have been highly beneficial for getting research and management options to grape growers. Our findings show that growers prefer to obtain knowledge from individuals they know and trust. Having reliable individuals to share emerging knowledge with growers and guide their management decisions is essential for using this knowledge.

Secondly, the knowledge network in Niagara relies on individuals and organizations in other grape-growing regions for support and knowledge production. Researchers, intermediaries, and growers identified other grape-growing regions as sources of knowledge for better understanding the impacts of grapevine viruses and determining ways to respond to these impacts. However, due to Niagara's divergent climate, the knowledge from the broader network is not always applicable to this region.

Additionally, stakeholders agreed that the continuation and expansion of local research efforts are required to determine local insect vectors and develop efficient management strategies. Growers highlighted that researchers must prioritize producing practical findings for growers to implement in their vineyards. Researchers and intermediaries emphasized the requirement for more support and funding to expand and continue research projects and local clean plant programs.

Overall, stakeholders agree that emerging knowledge on grapevine viruses is effectively shared with intermediaries and growers through trusted relationships and various research-sharing efforts. Despite the success of current KMb efforts, improvements can be made.

Implications

Canada is only in the early stage of grapevine virus research. As our knowledge and understanding of these viruses and insect vectors expand through ongoing research efforts, effective KMb strategies must

be implemented to share research with growers to make educated pest management decisions within their vineyards. This research provides insights into the current methods of KMb, identifying factors that have helped and hindered the flow of IPM knowledge for grapevine virus management in Niagara. These findings are beneficial for the continuing development of KMb methods for researchers, intermediaries, and industry organizations, helping to better support growers.

Understanding the role of KMb in the adoption of IPM also provides scholarly input on the knowledge-action gap broadly and more specifically within agriculture and the grape and wine industry. Additionally, this work enhances Nguyen's knowledge-action framework by expanding it into the field of agriculture and elaborating and building on the factors identified within the framework.

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Consumers' preferences and willingness-to-pay for catfish products across the U.S. Southern states: a consumer base survey study

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Abstract

Introduction and review of the literature

Increased understanding of the factors that influence U.S. consumers' preferences and willingness to pay (WTP) is critical as it may help restore the economic profitability of the catfish business (Gosh et al., 2022; Kumar et al., 2008). Such market research is often ignored in most U.S. catfish studies by focusing mainly on developing intensive production and genetic approaches (Abdelrahman et al., 2017; Dunham, 2011; Gosh et al., 2019; Khalil et al., 2017). This market development information is imperative to compete successfully with these lower-priced imports intruding from abroad to restore the viability of the U.S. aquaculture business.

Purpose and objectives

We have evaluated the consumer preferences and WTP for seafood products among a broader group of consumers in the Southern USA. Also, we have depicted how the consumers can solve the tradeoffs between time-money, and demand for catfish products by quantifying the variables that affect the consumers' preferences and WTP. Such understanding is critical in formulating the appropriate marketing strategies for the U.S. catfish industry in this post-pandemic scenario.

Methods

Review study showed that certain socioeconomic variables, including age, employment status, taste, price, and household income/size, can significantly influence the demand for the seafood product (Davis, 2013; Dopico et al., 2007; Okrent & Kumcu, 2016; Rydell et al., 2008). In contrast, a participant's WTP can be measured in two ways; 1) revealed preference method (R.P.; actual market data or experiments) and stated preference method (S.P.; direct or indirect consumer surveys; Breidert et al., 2006). Both approaches have certain advantages and limitations. Huffman & McCluskey, (2017) opined that while neither method is perfect, both R.P. and S.P. methods can be used to assess consumers' WTP for new food products or private goods and can provide helpful information for decision-makers. McCluskey et al., (2003) and Vossler et al., (2012) have documented the value of S.P. survey in food research. In particular, S.P. surveys offer a low-cost, timely method to obtain information on consumers' preferences for new food products on the drawing board. We have incorporated the above-noted variables in our current survey questionnaire and run it on the Qualtrics platform using the SP method. Approximately 2,000 participants were interviewed from the Southern USA, including Arkansas, Georgia, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Tennessee, Florida, and Virginia (n=2,000; 200 adults/state)

Results, products, and/or conclusions

Preliminary results indicated that most of the surveyed participants (62%) prefer to consume U.S. farm-raised catfish products. The source of catfish also matters to them when purchasing the catfish from the market. They mostly buy the catfish from the wild-caught (37%), followed by farm-raised (33%) and imported catfish (8%), while the rest were quite indifferent about this issue. Most participants prefer to purchase the family-sized catfish fillet packet (4-8 lb), followed by economy size (1-4 lb), large size (8-15 lb), and extra-large size packet (>15 lb). While asking about their seafood preferences, most participants wanted to see more shrimp items, followed by catfish, tilapia, crawfish, and saltwater fish in the market. With regards to WTP, the majority of the participants want to pay the additional premium price, ranging from 1 to 76 cents per pound, if the seafood products contain information related to USA origin labeling, followed by US-farm raised and certified organic labeling. However, the surveyed participants want to pay fewer premium prices for seafood products containing the labeling of genetically modified organisms (GMO). When asked about their knowledge of GMO seafood products, almost 67% of participants expressed concern that they are knowledgeable about it; the rest were unaware. Only 33% of participants were positive about biotechnological applications, such as GMOs, in seafood production, while the rest stayed between the neutral and negative stages.

Recommendations, educational importance, implications, and/or application

The current study suggests that seafood products are widely preferred by the primary races of the Caucasian, African American, Hispanic and Asian people residing in the Southern region as they are willing to pay a higher premium price for the products examined. Examined participants belonging to annual family income groups were willing to pay the higher price for the seafood products. These could be a potential option to target such consumer segments based on income group, with a greater likelihood of increasing the sales of the US farm-raised seafood products.

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College Students' Attitudes Towards Undocumented Migration: A Comparison of Agricultural & Non-Agricultural Majors

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Abstract

Introduction

Recurrent migration processes have reshaped the United States [US] agriculture workforce (USDA, 2022), especially in the southern states (Martin, 2017). Approximately 4,350,000 immigrants live in Texas, immigrant workers comprise about 27% of the workforce in agriculture (AIC, 2020).

This research evaluates undergraduate students' attitudes from an R1-Southwestern Hispanic Serving Institution (HSI) toward undocumented migration [UM] and compares students in agriculture and natural resources [AGNR] and students pursuing other degrees [non-AGNR].

Purpose and objectives

The study aims to evaluate and compare undergraduate students' attitudes toward UM. This study had three objectives:

1. To compare AGNR and non-AGNR undergraduate students' attitudes toward UM based on cost-benefit, free flow, human rights, and averaged UM variables.
2. To compare AGNR and non-AGNR students' predictors of attitudes toward UM human rights (Model 1), free flow (Model 2), and cost-benefit (Model 3)
3. To compare AGNR and non-AGNR students' predictors of attitudes toward UM issues (Model 4).

Methodology

For this quantitative study, a two-group model was used. A convenience sample of 520 undergraduate students completed an online survey; 452 surveys were used in data analysis (87%) and included AGNR (n= 292) and non-AGNR (n = 160).

In the US, the 3-factor model is considered the best arrangement (Ommundsen et al., 2002). Based on previous literature and by verifying with a confirmatory factor analysis [CFA] model fit, $\chi^2 (171) = 5446.28$, $p < .001$ CFI = .95, RMSEA= .06 (Kenny, 2016), we continued with the three-factor model measuring: (1) Cost/Benefit, (2) Free flow, and (3) Human Rights (Van Der Veer et al., 2004).

Since data were not normally distributed, non-parametric analyses were used. For objective one, four Mann-Whitney U tests examined differences between AGNR and non-AGNR for cost-benefit, free flow, human rights, and the averaged UM variables. For objective two, three models were run to explain and compare the level of prediction among attitudes toward migration variables. For objective three, the 20 items were averaged to create the overall attitude toward UM variable. An alpha level of .05 was established a priori.

Results

Most participants in AGNR were females (68.3%, $n = 198$), freshman (57.5%, $n = 168$), and non-Hispanic (AGNR 82.5%, $n = 241$). In non-AGNR, the majority were female (49.4%, $n = 79$), sophomores (32.5%, $n = 52$) and juniors (29.4%, $n = 47$), and non-Hispanic (74.7%, $n = 118$).

There was a significant difference for UM cost-benefit ($U = 29663.50$, $z = 5.01$, $p < .001$), UM free flow ($U = 31701.0$, $z = 6.58$, $p < .001$), and UM human Rights ($U = 28428.50$, $z = 4.18$, $p < .00$), where AGNR students were slightly more against UM than non-AGNR students. There was a statistically significant difference in the averaged UM scores ($U = 30836.50$, $z = 5.63$, $p < .001$); AGNR students were slightly against UM.

For UM cost-benefit attitude models, AGNR, $F(11, 266) = 13.87$, $p < 0.01$, $R^2 = .37$, adj. $R^2 = .34$, and non-AGNR, $F(11, 139) = 6.82$, $p < .01$, $R^2 = .35$, adj. $R^2 = .30$, were significant. Hispanic AGNR students have a .33 higher attitude than non-Hispanics; conservative AGNR students have a .63 lower attitude than other students; liberal CASNR students have a .97 higher attitude than other students. AGNR border state students have a .20 lower attitude than non-border state; AGNR students with little migration familiarity have a .23 higher attitude than students with another migration familiarity. For non-AGNR, female students have a .33 higher attitude than males; Hispanic students have a .40 higher attitude than non-Hispanics, and conservative students have a .65 lower attitude than other students.

For the predicted attitude towards UM free flow, AGNR, $F(11, 266) = 11.96$, $p < 0.01$, $R^2 = .33$, adj. $R^2 = .30$, and non-AGNR, $F(11, 139) = 6.55$, $p < 0.01$, $R^2 = .34$, adj. $R^2 = .39$, prediction models were significant. Female AGNR students have a .35 higher attitude than males. Hispanic AGNR students have a .44 higher attitude than non-Hispanic. Liberal AGNR students have a 1.20 higher attitude than other students. Moderate AGNR students have a .54 higher attitude than other students; AGNR students with little familiarity with migration have a .22 higher attitude towards free flow than other students. For non-AGNR, Hispanic students have a .35 higher attitude than non-Hispanic; and conservative students have a .57 lower attitude than other students.

For UM human rights models, AGNR, $F(11, 266) = 9.33$, $p < 0.01$, $R^2 = .28$, adj. $R^2 = .25$, and non-AGNR, $F(11, 139) = 6.06$, $p < 0.01$, $R^2 = .32$, adj. $R^2 = .27$, were significant. Female students have a .28 higher attitude than males; Hispanic students have a .26 higher attitude than non-Hispanic; conservative students have a .39 lower attitude than others; liberal students have a .61 higher attitude than other students. For the non-AGNR group, female students have a .41 higher attitude than males. Hispanic students have a .28 higher attitude than non-Hispanic.

Third, for the UM prediction models, AGNR, $F(11, 266) = 18.32$, $p < 0.01$, $R^2 = .43$, adj. $R^2 = .41$; non-AGNR, $F(11, 139) = 9.38$, $p < 0.01$, $R^2 = .43$, adj. $R^2 = .38$ were significant. Female AGNR students have a .22 higher attitude than males; Hispanic students have a .46 higher attitude than non-Hispanic;

conservative students have a .52 lower attitude than others; liberal students have a .96 higher attitude than others. For the non-AGNR students, females have a .36 higher attitude than males; Hispanic have a .38 higher attitude than non-Hispanic; conservatives have a .58 lower attitude than others; liberals have a .49 higher attitude than others.

Discussion and Implications

For this study, AGNR students were slightly against UM, and non-AGNR students were undecided. Understanding US citizens' attitudes, particularly those of young people, who will be the future decision-makers regarding immigration issues (Hooghe, 2004). Future research should replicate and compare these results and generate meaningful recommendations for agricultural education throughout the US. A qualitative study investigating what shapes undergraduate students' attitudes could guide agricultural educators in developing immigration content-related programming.

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Saving and internal lending communities: A case study of an agricultural community in Guatemala

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Abstract

Introduction

In Guatemala, nearly half of the population lives in rural areas. The unequal distribution of wealth and rapid population growth within the nation have given Guatemala one of the highest poverty rates in Latin America (FAO, 2014). More than 75 percent of the population lives below the poverty line, which is even more severe among rural and Indigenous people (World Bank, 2020). Approximately 70% of Guatemala's economy is informal, characterized by low productivity, wages, and competitiveness. Due to the lack of local economic opportunities, Guatemalans consider international migration as a solution to their financial limitations (USAID, 2022).

External microfinance institutions offer small-scale loans, saving accounts, housing loans, and other financial services to vulnerable communities (Asian Development Bank, 2020). The purpose of small-scale loans is to create small businesses. External microfinance also aims to develop personal incentives for growth by enhancing borrowers' self-confidence as they discover they can manage money and receive loans for their success (Lacalle-Calderon et al., 2015). A limitation of microfinance institutions is that they are external institutions (Muralanda et al., 2010).

Like the external microfinance institutions, the Savings and Internal Lending Communities [SILCs] provide a strategy to empower vulnerable populations with income-generating opportunities through access to self-managed financial services. SILCs aim to promote financial services that keep money in the community. SILCs also encourage and strengthen community values such as building trust (CRS, 2006; Lee et al., 2021).

The goal of SILCs is to create simple saving and lending activities in communities lacking financial services. In Guatemala, microfinance has been demonstrated to reduce gender violence in poor rural settings (CRS, 2020). However, there is a lack of information about the principal challenges during the SILCs creation and how members use the program benefits. This study aims to understand how SILCs programs are created and used in rural Guatemala. It will also extend the gender focus and include a youth perspective.

Purpose and Objectives

The purpose of this qualitative study is to understand SILCs participants' perceptions. The following objectives will be used to guide its accomplishment:

1. How do participants describe the SILCs program?

2. How do the SILCs programs impact participants' lives?

Methodology

Since the focus of the study was to explore a bounded system through detailed, in-depth data collection, a qualitative case study approach was selected (Creswell & Creswell, 2018). The study was conducted in two communities located in Guatemala's western highlands. The data were collected during three on-site visits, in which the researcher recruited three focus groups: 1) SILCs field promoters (n = 4), 2) associated female youth (n = 8), and 3) SILCs non-associated mixed-gender youth (n = 8). Pseudonyms were used to protect participant identity. Researchers used memoing and validated the findings with the participants.

All focus group discussions were transcribed and coded (Creswell & Creswell, 2018). Second, MAXQDA qualitative data management software was used to examine initial codes (Morse & Richards, 2012). Then, open coding was used to direct the focus of the data analysis (Saldaña, 2016). Pattern coding was implemented as an explanatory coding that pulls the raw material into a more meaningful and solid analysis (Saldaña, 2016).

Results

The following themes emerged from the data to answer the first research question: perspectives, mistrust, and flexibility.

Perspectives

Participants compared the SILCs program with other savings programs and mentioned that this system had created new income sources and opportunities for new investments. Youth participants mentioned the presence of other micro-savings programs that could provide better individual benefits. Finally, some participants claimed they had not heard about SILCs, and they were only focused on women.

Mistrust

Even though the SILCs have been well-recognized in the communities and more people are willing to participate in future programs, they recognize mistrust as a challenge. Females mentioned that one of the SILCs participants accessed a loan and decided not to return the money and ran away with it. These actions caused participants to lose their trust in SILCs systems.

The youth mentioned that the SILCs sound like a good program, but they do were wary of leaders they considered untrustworthy. They mentioned that the SILCs were working as a successful system where they could save money, but the majority did not know what to do with the collected money and were reluctant to reinvest in the SILCs.

Flexibility

Associated and non-associated youth asserted that adapting the SILCs to meet younger participants' schedules and location preferences is a need. In the female group, they emphasized being rigorous with

the SILCs bylaws to guarantee proper functionality. Not respecting the bylaws could affect participants' involvement with the program.

For research question two, the following themes emerged: migration promoter and reducer, and empowerment.

Migration promoter and reducer

Since migration is a well-recognized issue in Guatemalan rural and urban areas, participants believed that investment in these programs could help reduce migration. The annual investment benefits could be used in entrepreneurship activities. On the other hand, some SILCs participants had used the SILCs accumulated returned money to emigrate to the United States.

Empowerment

Women in the SILCs acquired the financial liberty to use their money on personal projects that improved their livelihoods. One of the younger participants mentioned that SILCs provided the opportunity to continue her educational journey by saving money for one year and using the savings to pay for school.

Discussion and implications

Migration is a constant problem that affects Guatemala's residents, and microeconomic alternatives, such as the SILCs, have been considered a stay-in-your-community driver. Even though SILCs have been shown as a successful tool for women's empowerment and rural families' economic growth, it has also been shown as a migration driver, which was demonstrated in this research. Developmental programs should invest in entrepreneurship training that promotes sound management alternatives for SILCs' members, such as investing in their education or opening business opportunities.

Younger participants mentioned that one of the reasons for their lack of interest in SILCs is that the schedules and meeting locations are focused on elders' availability. SILCs' promoters must consider its implementation based on participants' characteristics.

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The Challenges, Opportunities, and Future of Agricultural Extension: A Multiple Case Study of Guatemala, Honduras, Taiwan, and Kenya

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Abstract

Introduction

The Food and Agriculture Organization [FAO] refers to rural extension as an everyday activity in most countries and is an essential element in to promote changes in rural areas (FAO, 1993). Extension services play different roles depending on each country's cultural norms and facilities (Davis, 2020) but share similar features such as partnering with farmers to effect change (Landini & Brites, 2018).

This study explores and analyzes the challenges and opportunities of extension workers in Kenya, Honduras, Taiwan, and Guatemala. Agricultural extension in Guatemala focuses on integral development of the rural population, playing a central role in food security (Landini & Vargas, 2020). In Honduras, agricultural extension services provide updated information to enhance farming communities' knowledge, improving farmers' incomes and reducing undernutrition (Lotton et al., 2017). In Kenya, agricultural extension is provided by multiple actors, including the public and private sectors; these actors focus on technology transfer and improved processes in the farming sector (Ogutu et al., 2020). In Taiwan, agricultural extension focuses on massive technical inputs and socially oriented practices to disseminate knowledge among farmers (Lin, 2015). Different studies have reported the importance of extension services in a country (Landini & Beramendi, 2019; Namyanya et al., 2021) or in a region ([Author Blinded et al., 2022], but few aimed to analyze extension services in different regions such as Africa, Latin America, and Asia.

Purpose and Objectives

This study aimed to understand how extension workers from Kenya, Honduras, Taiwan, and Guatemala describe the challenges, opportunities, and future of agricultural extension. To accomplish this goal, three research questions were examined:

1. What are the extension workers' challenges?
2. What are the extension workers' opportunities?
3. How do extension workers describe the extension future?

Methods

To achieve the study's purpose, we used an instrumental-multiple case study design (Stake, 1995). We bounded the case by place, i.e., Guatemala, Kenya, Taiwan, Honduras, and participants' occupation, i.e., extension workers. We also imbued rigor into the study by embedding within it the qualitative standards of quality: (1) confirmability, (2) credibility, (3) dependability, and (4) transferability (Creswell & Creswell, 2018).

For data collection, we used snowball and convenience sampling procedures (Patton, 2002). We conducted semi-structured interviews with extension workers using video conferencing software. A total of 27 extension workers participated in the study, including 15 men and 12 women (Kenya = 7; Honduras = 6, Taiwan = 6; Guatemala = 8). The interviews were conducted in the participant's native language and translated into English.

To enhance this study's credibility, multiple data sources were used: interviews, researcher memos, and document analysis (Creswell & Creswell, 2018). Data were analyzed using open coding, selective coding, and axial coding.

Results

Challenges

In Guatemala, some of the challenges include language limitations. In some communities, the native language is not Spanish, so this can be a barrier. Another challenge is the distance of the communities from the city. Extension workers often travel long distances, with limited access to public or private transportation.

In Kenya, the main challenge is inadequate support of extension workers. Participants mentioned that they are not receiving necessary technical preparation for their positions. This causes a chain system in which upcoming generations avoid becoming extension workers, causing a reduction in staffing for a continuously growing farmer population. Extension workers often find a lack of cooperation among their peers.

In Taiwan, the challenge is to find a platform to expand extension activities and meet farmers' needs for resources. Communicating and building trust with the farmers is difficult, as well as limited funding resources to meet the rapid change in the environment. One of the biggest challenges is that extension work is a long-term process, making it difficult to measure and quantify the outcomes.

In Honduras, challenges include the farmers' low education levels, extreme poverty, and adherence to traditional farming practices. Poverty limits farmers from investing even small amounts in upgraded technologies because they fear risking their food supply if it is unsuccessful. Extensionists require intensive training because farmers need support to manage many different crops.

Opportunities

In Guatemala, the chance to visit new places, meet new people and understand different cultures are considered opportunities. Kenya participants stated that there are limited opportunities; however, some options included participation in training and partnerships. Most Taiwanese extensionists indicated

connections with people from the public and private sectors, as well as academia, in addition to attending training courses.

In Honduras, seeing the results of the farmers adopting the technologies, increasing their yields, having market linkages, and increasing their household incomes are considered opportunities for extensionists to grow.

Future

Guatemalan extensionists described extension as an activity that should be improved in the future. Kenyan extensionists indicated that farmers should be able to access the information they require through different channels, including virtual and face-to-face methods, and media apps. In Taiwan, extensionists identified the future of extension as enhanced marketing agricultural commodities, making them more accessible to the public, and retaining talented people in rural areas.

Honduran extensionists think agricultural extension should be an activity paid for by the government so that every farmer could have access, not just large-scale farmers or small-scale farmers who are part of an international development program., which is the current model.

Conclusions and Recommendations

Extensionists face some challenges in their countries, such as language barriers, limited transportation, lack of economic resources to solve basic needs, demoralization, communication issues with the farmers, and trust building.

Participants from all the countries mentioned that financial support is a challenge that reduces their ability to generate programs and assistance for farmers. Nevertheless, participants mentioned that social media platforms are an economical alternative to diffuse information with farmers. Agricultural extension programs must start investing in using social media as a training tool and promote it among workers and farmers. The governments of the four countries should also provide the necessary infrastructure.

Participants recognized that being in the extension field brings partnering opportunities, but it the overuse of partnering created a toxic competition among extension workers from different companies.

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Examining Student Experiences through Photovoice Journals During a Study Abroad Trip to the United Kingdom

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Abstract

Introduction/Review of Literature

As study abroad opportunities have increased for students across universities nationwide, so have the educational outcomes for students. Not only are students gaining an education through enrollment and taking part in study abroad, but they are gaining valuable skills that are unable to be obtained in a formal classroom setting. Enrolling in study abroad programs allow students to gain benefits such as gaining personal development through cultural awareness, enhancing academic performance through experiential learning, and developing connections with both peers and connections while abroad (Ruth et al, 2019). Studying abroad also develops cross-cultural connections and an overall better global understanding of students (Kitsantas, 2004).

Studying abroad, as a form of experiential learning, should increase student knowledge and cultural awareness. As [University] requires an experiential learning component for every undergraduate student to earn a degree, study abroad programs have become increasingly popular among students at [University] with over 2000 students studying abroad each year. Photovoice has been proven to be a useful tool to allow researchers to gain a better understanding of field experiences (Homeyer et al. 2017). Further research about using photo journal techniques within service-learning study abroad allowed students to conduct reflection practices within their study abroad (Dobbins, et al., 2019). Using photo journals and daily reflections, researchers hope that they will be able to better understand the student experiences of studying abroad in the United Kingdom.

Purpose

Researchers sought to better understand college students' experiences, perceptions, and behaviors while participating in an international service-learning project through photo-reflection journals. The guiding research objectives for this study were:

1. Discern the perceptions of culture through photographs taken by students during the study abroad trip.
2. Describe participants' visual meaning of the aspects of tourism and travel during the study abroad trip in the UK.
3. Address participant meaning of the structure of education and use of instructional strategies used when teaching agriculture in the UK.

Methods

A qualitative research design (Creswell & Poth, 2018; Patton, 2002) was utilized to guide this study, which allowed for analysis of photo narratives (Bost & Wingenbach, 2018; Homeyer et al., 2017). Researchers examined participant journals that were created and maintained during a 14-day study abroad trip to the UK.

Participants on the study abroad were undergraduate and graduate students from the College of Agricultural and Environmental Sciences at the University of Georgia, majoring in agricultural education, poultry science, agribusiness, agricultural communications, and animal science. Most of the students had limited international travel experiences, particularly to the UK.

Participants were provided with daily prompts for their reflective journal and included both, photography and written reflection, and students were asked to provide at least three photos per reflection. The prompts that were provided included topics such as photographing travel experiences throughout the UK, providing photos of how participants viewed culture in the UK, photographing the schools in Scotland, compare the similarities and differences throughout London, Glasgow, Edinburgh, Dumfries, and Portree. Students were asked to write a brief description of why they chose the photos that were utilized in their journals.

Following the collection of reflection journals, researchers used ATLAS.ti8 to analyze and code data, utilizing photographs and written reflections to determine students' thoughts, experiences, and behaviors through photographs.

Results/Conclusions

Researchers determined that the concepts within each journal and the narratives that were provided followed several themes: 1) pride, 2) rich history, 3) accessibility, and 4) lifestyle.

Students were asked during the trip to photograph and reflect on the different locales and cultures that they engaged in and were surrounded by. In examining the responses, most of the students chose photos of the UK flag, as they could be found hanging just about everywhere throughout the city. Jane stated, "while the Queen's Platinum Jubilee celebration was in full force, the immense pride of the British people for their Queen and country."

Researchers also noted that many students continually discussed the rich history throughout the UK, when writing about architecture, travel, and culture. Students shared photographs of castles, trains, the "breathtaking countryside," and the staple meal of fish and chips. During the days in Glasgow and Edinburgh, students photographed historical buildings and landmarks, writing in their reflections the amount of history in each of the two cities, and comparing these cities to their home cities back in the United States.

As mentioned, students were also asked to respond to prompts related to their travel experiences throughout the UK, to which many noted the "jolting transitions" between large cities and small cities in England and Scotland, as well as the overall accessibility to travel throughout the country. Most of the travel throughout the UK was done by train (above and below ground), and students remarked on how easy it was to purchase transportation and move around the cities.

Lastly, students photographed and discussed varied aspects of the lifestyles in the UK. During the tours throughout the Scottish Highlands, Megan shared, “The Isle of Skye is unbelievably easy-going, relaxed, and its citizens embrace the “work to live” mentality rather than “live to work”. What a dream.” Samantha wrote, “many stores still close at 6:00 or 6:30 for the staff to be able to go home and spend time with their families.”

From the photo and written reflections, researchers determined that students were able to connect their thoughts with photographs and reflect upon their experiences in the UK in greater detail. Through experiential learning and study abroad experiences, students are provided with the opportunity to engage in activities and then reflect upon these experiences to acquire new knowledge and skills (Luo et al. 2015). From this study abroad experience, it is evident that students were able to develop and acquire new knowledge related to the culture in the United Kingdom.

Recommendations

From the results of this study, researchers recommend the following for future research and educational opportunities that involve study abroad experiences.

- Utilize photo narrative prompts and reflection journals during additional study abroad experiences; and,
- Examine the differences between students who previously engaged in study abroad experiences, traveled abroad, and have never traveled abroad.

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The role of communication in supporting adaptation to climate resilience amongst indigenous communities in the Philippines

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Abstract

Introduction

The livelihoods of much of the population of the Philippines are dependent on agriculture and are highly vulnerable to extreme weather events. Flooding or dry weather hinders land productivity and results in low incomes, which affects their ability to meet their basic needs. Groups characterized by social inequalities, associated with gender and age, feel these impacts differently. Within the Philippines, the province of Aurora has several indigenous people's groups, which are mostly reliant on farming and fishing. Their vulnerability is exacerbated by the impacts of climate change, particularly those in Northern Aurora where most typhoons land. The capacity of indigenous communities in the areas of agriculture and climate change need to be addressed in order to strengthen their resilience to extreme weather events in the context of vulnerable livelihoods. Appropriate technologies in fisheries, agriculture and food systems combined with climate change adaptation strategies can mitigate the effect of these extreme weather events.

However, indigenous communities also face substantial marginalization and discrimination, in terms of their socio-cultural position, social power and access to services that can support sustainable livelihoods and climate adaptation strategies. Evidence tells us that indigenous communities are vulnerable to livelihood challenges due to a range of factors such as poor market access, food insecurity, inadequate extension services, social marginalization and access to land. Communication has the opportunity to address some of these challenges. One way to analyse and identify these opportunities is through the lens of Communication for Development and Rural Communication Services.

Communication for development is: "ComDev is a social process based on dialogue using a broad range of tools and methods. ComDev is about seeking change at different levels including listening, building trust, sharing knowledge and skills, building policies, debating, and learning for sustained and meaningful change. It is not public relations or corporate communications" (FAO, 2014: 13). Communication for Development should take a context-driven approach, assessing local actors knowledge and demands, help them define objectives and use collaborative methods and tools that align with local needs. Communication technologies should be locally appropriate and aim to be appropriated and owned by rural communities. These should build upon existing capacities – the communication tools should follow community needs, not drive the communication intervention. Equity should be at the heart of the intervention, so that the right to information and agency are central, and issues such as gender, social differentiation, cultural and linguistic diversity are core considerations. Content and approaches need to promote locally driven and relevant solutions, rather than "top down" interventions. The capacities of local actors should be enhanced through the communication activities, so that local stakeholders are able to create and control the communication process in the long term.

Finally, it should create a constructive environment, where dialogue is promoted and policy processes are enabled to create institutional arrangements that support ongoing dialogue.

Rural Communication Services aligns with this perspective, and are demand-led communication processes, activities, technologies and institutional arrangements that take an inclusive approach to responding to the communication needs of family farmers and rural populations. Rural Communication Services are “intended to enhance rural livelihoods by facilitating equitable access to knowledge and information, social inclusion in decision-making and stronger links between rural institutions and local communities” (FAO, 2017: 3). They involve “facilitated, deliberate and planned processes, characterized by a strategic use of interpersonal and mediated communication methods to facilitate stakeholder participation”. They contain dimensions of policy, service provision and institutional organization with an integrated vision to “enhance rural livelihoods by facilitating equitable access to knowledge and information, social inclusion in decision-making and stronger links between rural institutions and local communities” (FAO, 2017: 3).

Purpose and objectives

The purpose of this paper is to analyse how communication can support the resilience of indigenous farmers, mitigating the impact of extreme weather events on their livelihoods.

It will do this by:

1. Analysing the livelihood and communication context of the indigenous communities;
2. Using the RCS framework, analyse the communication and innovation context, dynamics and processes of the communities with relation to livelihoods, climate and extreme weather events, and;
3. Identify areas for communication intervention to enhance community resilience to extreme weather events.

Methods

This study has taken a mixed methods approach. Participatory research appraisal methods were used to collect qualitative data in five indigenous communities in Aurora, Philippines. Preliminary analysis of qualitative data was done to inform the development of quantitative tools. Data were gathered with groups of adults in each community in gender-separated activities. A questionnaire was administered in the same five communities to collect quantitative data. Results of the analysis informed the design of a capacity building curriculum, which was then trialled and evaluated in each of the participating communities.

Results

The results of this paper will demonstrate the importance of taking a community-driven approach to communication in addressing climate resilience. However, this needs to be done across multiple scales, within a right-driven approach that takes marginalization and socio-cultural context into consideration. This is highlighted by analysis using the RCS framework. It also highlights the importance of network building and institutional linkages, particularly in the context of weak extension and agricultural support

systems. In order to achieve sustainable, systemic change that empowers local livelihoods and climate resilience, and integrated approach to communication and rural development is essential.

Implications

The implications of this paper are three-fold. First, there is the evidence generated related specifically to how communication can (and may not) support the resilience of indigenous communities to extreme weather events. Secondly, there are implications for the Rural Communication Services framework, as its use in analysis suggests areas where the framework could be changed based on the evidence from this study. Third, there are lessons from a practice perspective for the design and implementation of communication for development and agricultural extension interventions within marginalized groups.

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A case study regarding Ecuadorian farmers' perspective on associativity in agriculture

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Abstract

Introduction

Farmers' relationships promote an inclusive agri-food system (Chambo, 2009; Mamani, 2017) that brings solutions to local economic problems (Johnson & Shaw, 2014; Panzoni, 1958). However, distrust and lack of knowledge concerning the association process limit working cooperatively over the long term (Ferrando, 2014). Interaction between farmers in associations has helped to identify two common types of associative models: the first consists of farmers who have learned how to work on a team to achieve long-term goals (Berdegue, 2001; Slingerland & Diaz, 2006); the second model consists of farmers who are part of a group to achieve a specific benefit and then return to their independent work once the immediate benefits are accomplished (Mamani, 2017).

In Ecuador, most of the associative agricultural work is based on the second model, and the leading causes for the prevalence of this model are the lack of cooperative education (Da Ros, 2007; Uset et al., 2019), the lack of teamwork, and the low level of collaboration (Gomez et al., 2021). Some challenges affecting farmers' willingness to participate in an association include lack of motivation, illiteracy, lack of negotiation and organizational teamwork skills, and no access to technological and economic resources (Rwelamira, 2015; Espinoza, 2019). Strengthening agricultural organizations through a process that involves identifying goals, evaluating strengths and weaknesses, and diagnosing the organization's needs can find potential solutions (Rudin, 2015).

Purpose and Objectives

The purpose of this research was to understand the perspective of a group of Ecuadorian farmers about associative work in agriculture. Two specific objectives shaped the study: (1) to understand farmers' perspectives on associative work and (2) to explore the agricultural association's status using a Strength, Weakness Opportunity, and Threat (SWOT) analysis.

Methods

In this qualitative case study, members of a farmers' association received training in organizational strengthening, focusing on the importance of collaborative work. One of the activities during the training included the development of a SWOT analysis of the agricultural association of which they are a part. The SWOT analysis is a methodology used to construct a strategic plan, identify problems, and look for solutions to organizational issues and other barriers to success (Kelsey, 2018).

Additionally, researchers conducted one-on-one interviews with participants, allowing them to deeply understand the participants' experiences (Stofer, 2019). To enhance this study's credibility, multiple data sources were used, such as researcher memos, field notes, and photos (Creswell & Creswell, 2018). All interviews were audio-recorded. After transcribing the interviews, researchers coded them by hand and analyzed the data. For a better understanding of the collected data, researchers used open, axial, and selective coding (Strauss & Corbin, 1990).

Results

Fifteen farmers agreed to take part in this study. Eight participants were men, seven were women, and all were 21 years of age or older.

For objective one, participants were asked to define what associations meant to them and how important being in an association was to them. Three themes emerged regarding the farmers' views of associative work: (1) importance of associativity, (2) core values, and (3) pros and cons. Members explained that it is essential to be associated to enhance their agricultural product and improve the economic income of the organization. They indicated this could be done through a commitment to work, sacrifice, love of the farm, and focusing on goals. Participating in an association is working for a common goal through effort and integration of the members. Pros of being associated included access to training, gaining insights from other members, being listened to by authorities, encouraging the non-use of agrochemicals, and fair price of the products. Cons of being associated included being unable to meet the demand for the product, absence of partners in meetings and trainings, non-compliance with the rules, and disagreement in making decisions.

For objective two, researchers found similar themes emerging from the SWOT analysis. Strengths of the association centered on product quality, with participants highlighting the uniqueness of their products due to their environmentally friendly production and processing. Opportunities for the association focused on technical assistance and training. Participants contacted different training institutions and received positive responses regarding agricultural-based support. Weaknesses included deficient infrastructure. Due to the increase in demand and the rigorous requirements of the market, the infrastructure of the association is one of the weaknesses in processing its agricultural products and meet the demand. Threats identified included scarcity of water for irrigation and soil quality degradation, with participants blaming climate change as responsible for these challenges.

Based on the field notes and observations of the researchers, the farmers were very engaged in the topics given by the trainers during the training. They expressed confusion about the importance of being associated and how to work associatively. They did not realize the importance of having a mission, vision, and objectives as an organization. At the end of the training, the farmers were able to establish their objectives, mission, and vision for the organization with some assistance from the trainers.

Conclusions and Recommendations

Farmers in Ecuador expressed an openness to working associatively but were very unclear on how to do so effectively. Despite their limited understanding of working associatively, they immediately identified clear benefits of being associated, though they also expressed some concerns linked primarily to their limited productive capacity and ineffective cooperative functioning. The participants' zeal for technical assistance and training was particularly acute, demonstrating a strong desire to become more effective

as an association. While this study is limited in scope to this particular farmers' association, additional research could be conducted using socio-economic variables and data on yields, marketing, and profits. Comparing these data with farmers who are not members of associations could provide additional insight into the impact of Ecuadorian farmers' associations on the farmers' bottom line.

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Needs assessment of non-hazardous organic and inorganic waste management in the Association of North Coast Communities, Ecuador

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Abstract

Introduction

In developing countries, there is a need for appropriate Municipal Solid Waste [MSW] management due to deficient control, which could result in unfavorable health and environmental effects (Závodská, 2009). MSW includes waste generated in houses, businesses, and other institutions, as well as from municipal services and street cleaning (United Nations-Habitat, 2020). Understanding how people reduce and classify waste associated with activities such as reusing, recovering, and recycling can help communities make informed decisions about appropriate waste management strategies (Estrada & Leonardi, 2019).

In the province of Manabí, Ecuador, four municipalities – Sucre, San Vicente, Jama, and Pedernales – have formed the Association of North Coast Communities [MANPANOR] to establish policies for appropriate waste management, including collection, treatment, and recovery of wastes (De la Torre, 2021). Most people in the MANPANOR region live in rural areas and are not receiving appropriate information concerning residues and waste management policies. Since extension serves as a connector between small farmers from rural areas and policymakers, they play an essential role in understanding local conditions and educating the people on waste management topics (Závodská, 2009).

Purpose and Objectives

This needs assessment examined the discrepancy between desirable and current conditions (Lee et al., 2007) for managing non-hazardous organic and inorganic waste. The main research objectives were to: (1) identify needs in rural and urban areas regarding current waste management, (2) compare perceptions about waste management between people in rural and urban areas, (3) understand the influence of education regarding waste management, and (4) explore solutions to improve current waste management.

Methods

For this convergent mixed-methods study, a non-probabilistic convenience sample was used (Fraenkel et al., 2019). A needs assessment was implemented, which allowed researchers to measure the gap between current and preferred waste management practices (Altschuld & Witkin, 2000) in four rural and four urban sectors of MANPANOR.

For the quantitative phase, a 20-question survey was developed, which was validated by a panel of experts and pilot-tested. Descriptive statistics and percentages were calculated. For the qualitative

phase, focus groups, research memos, and observations were implemented (Corbin & Strauss, 1990). To analyze the data, researchers utilized open, axial, and selective coding (Corbin & Strauss, 1990).

Results

For the quantitative data, 195 people participated in the study. After data cleaning, 11 surveys were removed, leaving 184 surveys for analysis. Data indicated that 57.1% (n = 105) of the participants lived in the rural sector (women = 45, 40.9%; men = 60, 54.5%) and 42.9% (n = 79) lived in urban area (men = 53.8%, n = 43; women = 46.3%, n = 37,). For the qualitative data, a total of eight focus groups were conducted, four in rural sectors and four in urban sectors; each focus group ranged from five to ten participants, and the length of each focus group was 45 to 60 minutes

For objective one, the identified needs were: lack of separation of organic and inorganic waste, poor garbage collection service, no control of stray dogs that litter the streets, and government inattention to citizen complaints. Most people mentioned that current waste management is a regular service (48.9%), which is supported by the focus group data. Participants agreed that they are facing problems in their communities regarding waste management regarding local government administration and citizen engagement. Most of the participants mentioned that they do not separate their waste at home (66.8%); focus group participants explained that lack of training for separating organic and inorganic waste, poor organization and planning for solid waste collection from the municipality, and the lack of citizen engagement and environmental awareness were the reasons for this issue.

For objective two, participants in rural and urban areas stated that the primary waste generators are households, local markets, restaurants, high schools, grocery stores, and informal vendors. People mentioned that the main causes of improper waste management include the lack of environmental and social responsibility and lack of training. People in rural areas mentioned that the causes of improper waste management included the local government not designating enough money for waste management, policy changes, and farmers unaware of using organic waste for compost for their crops. Participants in urban areas considered the causes to be the lack of responsiveness of the local government to the citizens' opinions and that the citizens were unwilling to spend money buying garbage bags to separate the waste.

For objective three, most people (73.4%) had never received any training regarding waste management. Some of them were willing to receive training (90.2%). Most indicated that they prefer to compost with organic waste (44.6%) and send all inorganic waste to the garbage collector (42.9%). During the focus groups, people highlighted the need to receive training about proper waste management and stated that the government should facilitate the learning process.

For objective four, participants mentioned that providing education is the main solution for waste management (39.1%), as well as improving government responsiveness to community issues for the benefit of the people (33.7%) and encouraging community cooperation for proper waste management (14.1%). In the focus groups, people from rural and urban areas mentioned that solutions include training adult citizens, community engagement, better organization in garbage collection, waste separation, making biofertilizers utilizing organic waste, sharing information in the community, and promoting the use of reusable bags.

Conclusions and Recommendations

The needs assessment process highlighted several issues that MANPANOR has regarding waste management. People in rural and urban areas expressed dissatisfaction with current waste management practices. Reasons are diverse, but they are centered on governmental management and responsiveness, as well as the environmental awareness and civic engagement of the citizenry. Both populations communicated similar needs, causes, and potential solutions to improve current waste management practices.

As part of the solution, it is recommended that community education on waste management be developed and deployed, as well as training for government officials on civic leadership. Another recommended solution that will particularly benefit small farmers would be training on using organic waste to produce their own organic fertilizers.

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Closing the gap between coffee producers and consumers in Latin America: How much more are consumers willing to pay?

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Abstract

Introduction

Coffee is one of the most appreciated beverages worldwide (Samoggia & Riedel, 2018). Various factors determine the aroma and flavor (e.g., origin, post-harvesting, roasting, and grinding) (Giacalone et al., 2019; Sales et al., 2020; Spinelli et al., 2017). Coffee has economic importance to low-income countries around the globe (Rhiney et al., 2021). It is one of the top agricultural sectors and exports in Central America (Fromm, 2022). Unfortunately, the coffee trade suffers from a long supply chain, resulting in farmers' lower shares (Esquivel, 2021).

Coffee production and consumption trends increased in recent years (Ramírez-Correa et al., 2020). Small-holding farmers, usually with 5 ha or less landholding, dominate coffee production across most cultivation regions (Rhiney et al., 2021). However, producers have little bargaining power in a market-driven value chain like coffee and rely on external standards to increase their leverage toward buyers (Bager & Lambin, 2020). In Latin America, coffee landscapes undergo rapid transformations (Valbuena et al., 2021). Even though many rural communities rely on this product and its commercialization, its production is under pressure due to decreased profitability, high price volatility, lack of technical support, and climate change, among others (Valbuena et al., 2021).

Although the price of a cup of coffee has increased, it has not translated into higher prices paid to farmers (Fromm, 2022). However, it may be possible to target specific consumer segments which would be more willing to purchase certified coffee (Williams et al., 2021). Consumer preferences are related to multiple factors, including genetics, physiology, and socio-cultural factors (Spinelli et al., 2017).

Purpose and Objectives

This study aims to measure Latin American coffee consumers' willingness to pay (WTP) extra to support local producers. Three objectives were proposed:

- To describe consumer characteristics and ground coffee preferences in Latin America.
- To measure consumers' willingness to pay for ground coffee to support local producers in LA.
- To analyze consumers' socio-demographic characteristics affecting their willingness to pay for ground coffee to support local producers in LA.

Methods and data sources

The data comes from a survey conducted in 2022 to 800 randomly selected participants regarding coffee consumption in four Latin American countries (Ecuador, Colombia, Guatemala, and El Salvador). The survey was divided into three sections: 1) coffee consumption characteristics, 2) a set of contingent valuation questions to determine consumers' monetary support for coffee producers, and 3) socio-demographic characteristics (adjusted to each country).

Coffee consumption and purchasing characteristics were designed based on previous literature. The contingent valuation section started by describing the current situation of coffee producers in Latin America and their inherence to beans' quality and plant care. A double-bounded dichotomous choice format was used. Initially, participants were asked if they would pay an extra value for the ground coffee to support producers, assuming they could control the price increase. The initial percentage bid was assigned randomly. If they indicated yes, they were then asked if they would be willing to pay a higher price bid. If not, a lower price bid was offered. The bid values for supporting producers were based on existing literature and adjusted after a pilot test.

Results, products, and conclusions

From 881 collected responses, 804 were used after data cleaning. The consumers were equally distributed by country, El Salvador (25.4%), Ecuador (25.1%), Guatemala (25.0%), and Colombia (24.5%). Most of the participants were male (52.7%) [DGC1] and with a college degree (74.37%, n = 598), high school (24.13%, n = 194), elementary (1.49%, n = 12). Most participants consume coffee 1 – 2 times daily (50.48%, n = 406), or 3-4 times (18.5%, n = 149), purchase ground coffee weekly (33.09%), and at a grocery store (76.88%). Also, the flavor is the most important characteristic when buying coffee (55.65%).

The contingent valuation experiment results found that consumers generally are willing to pay up to 31% more to support local producers in LA. However, the percentage of consumers willing to pay differs in every country. For example, Colombia and Ecuador consumers are willing to pay 35% and 32% (respectively) more to support their local producers. On the other hand, El Salvador and Guatemala consumers' WTP is 29% and 28%, respectively. Based on the results, we can associate a higher WTP from consumers to support local producers in countries that are more knowledgeable about their coffee products.

From the whole sample, we found that older consumers are less willing to pay extra to support local producers, decreasing by 0.1% every additional year. On the other hand, consumers with a college degree are willing to pay 2.0% more for the program than lower education levels. El Salvador consumers presented comparable results regarding socio-demographic characteristics. College-educated consumers' WTP increases by 4.0% compared with lower-degree consumers. Also, for every additional year, consumers decrease their WTP by 0.2%, while male consumers are less willing to pay than female consumers. We did not find an effect on consumers' socio-demographic characteristics from Colombia, Ecuador, and Guatemala.

Recommendations, educational importance, implications, and application

There is a high and rising demand for ground coffee in LA, but there is still a disconnect between producers and consumers. Yet, consumers are willing to pay an average of 31% extra from the retail price for a bag of coffee if it is intended to support producers. Unfortunately, producers are unaware of

this, and their lack of knowledge directly affects their income. Therefore, education and extension programs focused on coffee producers should address this opportunity since it could benefit producers without affecting the rest of the coffee value chain.

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What are the attributes that actually catch our eye? A choice experiment to understand Latin American Coffee Consumers' Preferences

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Abstract

Introduction

Globally, 165 million sacks of coffee were consumed in 2018, a 2.1% increase from the previous year (Discua Cruz et al., 2020). Coffee consumption differs from place to place and is highly influenced by consumer characteristics (Sales et al., 2020). Research about coffee consumption varies depending on age and geographical and cultural context (Samoggia & Riedel, 2018). However, little is known about the factors that motivate consumption, highlighting the importance of understanding consumers' perceptions and the factors involved in consumption and purchase (Sales et al., 2020).

There is an existing and growing opportunity in the coffee market for premium coffee attributes such as organic, sustainable, and country of origin (Esquivel, 2021). In addition, the increasing demand for coffee and the expansion of the industry have driven farmers to differentiate their products and offer added value to increase their market shares (Discua Cruz et al., 2020). Some farmers use third-party certifications such as fair trade, organic, or shade-grown labels to highlight their social and environmental efforts in production, get a market differential for existing brands, and generate a premium value (Fuller et al., 2022). Today, coffee consumers are enticed by product quality, origin, and sustainability (Samoggia & Riedel, 2019).

The scientific knowledge of characteristics and motives that drive coffee consumption remains incomplete (Samoggia & Riedel, 2018); there is a lack of research, particularly in Latin America, even though this region has the most coffee production worldwide.

Purpose and Objectives

This study aimed to define which attributes Latin American coffee consumers determine in their purchase decisions. Three objectives were proposed:

- To identify consumers' purchase habits of ground coffee in Latin America.
- To evaluate consumers' preferences for ground coffee attributes represented in a bag.
- To analyze consumers' socio-demographic characteristics affecting their preferences for attributes in ground coffee.

Methods

A survey instrument was developed and distributed online to collect data from coffee consumers in four Latin American countries (Ecuador, Colombia, Guatemala, and El Salvador), collecting data from 804

randomly selected coffee consumers. The survey had three sections: 1) coffee purchase habits and preferences, 2) a set of stated choice experiments to assess preferences on five types of attributes in ground coffee, and 3) socio-demographic characteristics (adjusted to each country).

Coffee purchasing habits and preferences questions were designed based on previous literature (Sales et al., 2020). The instrument included six choice scenarios where respondents could select between two presentations of ground coffee with different label attributes. Participants could also answer none. The evaluated attributes were: 1) organic labeling (USDA organic, "Organic," and non-labeled), 2) country of origin (Ecuador, Colombia, Honduras, El Salvador, Guatemala, and Brazil), 3) socio-environmental certifications (Fairtrade, Shade Grown, Good Agricultural Practices – GAP, Rainforest Alliance, UTZ Certified, and non-certified), 4) type of coffee (Traditional, Premium, and Specialty), and 5) price. Attributes were selected based on previous gaps in the literature. Countries of origin and socio-environmental certifications were the most prevalent for the assessed countries. Four price levels were established, adjusted for each country, and set using the average of market-available coffee presentations and prices in each country.

SAS software was used to create the experimental question design. The project's theoretical framework is based on Lancaster's (1966) demand theory stating that consumers obtain utility from the product's attributes rather than price. Participants' choices were analyzed using the random utility model (McFadden, 1980) and econometric analysis with a mixed logit model (Revelt & Train, 1998).

Results, products, and conclusions

From 881 collected responses, 804 were used after data cleansing. The consumers were equally distributed by country, El Salvador (25.4%), Ecuador (25.1%), Guatemala (25.0%), and Colombia (24.5%). Most participants purchase ground coffee once a month or more often (92.23%), and 33.09% purchase weekly. Also, most participants usually buy a bag weighing between 250 and 499 grams (0.5 – 1.1 pounds). The most important characteristic when purchasing coffee is flavor (55.65%). Most participants purchase ground coffee in grocery stores (76.88%). The preferred package for ground coffee is glass containers (36.12%), and the brand is what stands out more to them when buying (33.29%), followed by package information (33.29%) and design (20.52%).

Consumers generally presented a positive willingness to pay values for the type of coffee up to \$0.98 per pound and favorable premiums for socio-environmental attributes between \$0.44 to \$1.51 per pound in ground coffee. However, preliminary results found a negative willingness to pay for the country-of-origin attribute compared with Colombian coffee. Moreover, when the analysis is carried out for individual countries, the willingness to pay becomes positive for local coffee for Colombian coffee. Still, the willingness to pay for other countries remains negative. That indicates that the country-of-origin label, especially Colombian coffee, is perceived as a premium coffee, decreasing the willingness to pay for coffee in other countries except if it is produced locally.

A random effect model for the whole sample and individual countries presents mixed results for socio-demographic characteristics. Having a college education increases the willingness to pay for the entire sample. Most countries were positively willing to buy for the organic label except for Guatemala. Older El Salvador and Ecuador consumers are less willing to purchase the organic label. Second, we analyzed the country-of-origin label. We did not find a socio-demographic effect on the willingness to pay except for a negative effect on income in Ecuador and a negative effect on age in Colombia. Finally, we found

that with more frequency of consumption, there is an increase in the willingness to pay for socio-environmental certifications in the whole sample.

Recommendations, educational importance, implications, and application

Based on the findings, we suggest that local producers, associations, co-ops, and coffee agribusiness focus more on targeting their market. Since there are variations in what consumers are willing to purchase, a simple but appropriate change in the package could mean an increase in sales. However, it is on extension programs to communicate the findings and a way to address them adequately so the producers can benefit from these results.

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An Autoethnography of Agricultural and Extension Faculty's Journey to Embrace a Professional Identity as a Global Scholar

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Abstract

Introduction

Agricultural and extension educators continually strive to grow professionally and expand the impact of their work (Seevers & Graham, 2012). This growth mindset has been advanced and celebrated since the discipline's early foundations (Frantz et al., 2015). To foster such, university administrators have invested in agricultural and extension faculty by offering opportunities to disseminate their work at professional conferences while also obtaining unique opportunities to network with peers and gain access to novel professional development opportunities. However, some agricultural and extension educators have also seen value in extending their work beyond national borders to enact change on a global scale (Connors, 2022; Shinn et al., 2009). In 1984, this interest led notable pioneers in the discipline to create the Association for International Agricultural and Extension Education (AIAEE) as a way to "strengthen agricultural and extension programs and institutions worldwide" (AIAEE, n.d., para. 2). Although AIAEE's reach has expanded considerably since its beginning; anecdotal evidence has suggested that global scholarship in agricultural and extension education has remained a niche area of focus in the broader discipline. Consequently, a need emerged to understand how agricultural and extension education faculty across career phases have embraced a professional identity as global scholars. This knowledge could be valuable to early career professionals and graduate students who aspire to engage in international agricultural and extension education.

Statement of Purpose

Using a constructivist lens (Crotty, 1998), the purpose of this study was to tell the story of three international agricultural and extension education faculty's – representing early, mid, and senior career stages – journey to embrace a professional identity as a global scholar.

Methods/Data Sources

Our investigation was grounded in Ellis' (2004) autoethnographic approach. Autoethnography is a study of the self; therefore, researchers use a range of personal artifacts and reflective tools to situate themselves within an issue or problem (Ellis, 2004). Because the three researchers in this investigation served as sources of data, it was critical to provide insight into our backgrounds through pseudonyms. Katie was a female assistant professor at [State] University who had been in academia for two years and focused on agricultural communications and leadership. Meanwhile, Hank was recently tenured and promoted to an Associate Professor at [State] University and primarily focused on teacher preparation. The final researcher, Tom, was a professor at [State] University who split his focus between teacher

preparation and global education. The primary data sources for this investigation were a two-hour focus-group interview in which all three researchers used a semi-structured interview protocol to interview each other as well as engage in reflective writing. We also used artifacts from our past to triangulate the study's findings (Ellis, 2004). Those sources of data included: (a) curriculum vitae, (b) scholarly research, (c) research statements, and (d) teaching statements. For data analysis, we employed Corbin's and Strauss' (2015) constant comparative method, which facilitated our use of three coding cycles: (1) open, (2) axial, and (3) selective. Through this analysis and data reduction process, our findings emerged through three themes.

Findings

The themes of this study narrate our journey to embrace international agricultural and extension education.

A Forked Path

When reflecting on our motivation to engage in international work, we recalled unique global experiences that piqued our interest during childhood. However, we also had multiple bumps along our path to embracing global scholarship. For example, Tom explained that his mentor "discouraged getting involved [with international work]" during his graduate program because it could slow progress toward tenure and promotion. Meanwhile, Katie talked about how her "international connections were zero" as a young faculty member, which made it difficult to find new projects. As a result, each of us encountered a forked path in which we could either choose to focus our efforts solely on domestic projects or begin to engage in international work more purposefully. Each of us chose the latter path.

Peaks and Valleys

After pursuing international work, we individually traversed numerous career peaks and valleys along our journey. For example, we all have experienced a challenge with "funding" our work early in our career – a phase Katie mentioned she remained in as an early career professional. However, through persistence, Hank and Tom have found opportunities to have their international projects funded. On this point, Tom explained how he began to achieve success: "I was finally able to secure some partners working [on] USAID funding. I was not in a position at that time to take the lead, so I was typically a Co-PI and took the lead on one small piece..."

Navigating Beyond

Although we were at different career phases, we shared similar goals and philosophies regarding how we intend to navigate future challenges and enact positive change. For example, a common thread between our work was to "build capacity" (Tom) across multiple contexts. Moving forward, we also plan to address issues such as "global agricultural communications" (Katie), "food insecurity, water scarcity, and disease" (Hank), and improve the dissemination of research by maintaining a "reputable journal with an international audience" (Tom). In casting this speculative eye toward the future, we also hope to "expand our network" (Katie) to impact individuals across the globe through agricultural and extension education.

Recommendations/Educational Importance/Applications

When viewing our findings through the lens of constructionism (Crotty, 1998), three themes emerged. The themes told the story across our different career stages as we navigated embracing a professional identity as a global scholar. We recommend that the lessons learned from this investigation be used to prepare young professionals and graduate students for the challenges they may encounter while learning to embrace their own professional identities. We also recommend that other international agricultural and extension educators purposefully reflect on their own journeys to offer sound advice and wisdom to emerging scholars. The product of such work could result in quality learning materials and professional development opportunities that leverage the discipline's collective professional growth.

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Factors predicting the food security status among U.S. adults during the COVID-19 pandemic

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Abstract

Introduction

Food security can be defined as having at all times, both physical and economic access to sufficient food to meet dietary needs for a productive and healthy life (USAID, 2022). Approximately 90% percent of people in the U.S. were food secure in 2020; with the remaining 10% being food insecure (USAID, 2022). During the COVID-19, many household have either lost their jobs or business experiencing income shock (Morales et al., 2021). Low-income households are prone to low food security. Although previous studies examined the association of person level or household level factors to food security (Choi et al., 2017; De Marco & Thorburn, 2008; Lauren et al., 2021; Morales et al., 2021), studies that examine the association of household and geographic factors to food security at the national level during the COVID-19 pandemic, are limited.

Purpose and objectives

To examine the household, personal, and geographic characteristics as the predictor of the food security during COVID-19.

Methods

We used retrospective secondary cross-sectional panel data, from the 2021 current population survey (CPS) food security supplements to examine the association between household and geographic factors and food security (United States Census Bureau, 2021). The CPS is conducted jointly by the U.S. Census Bureau and the Bureau of Labor Statistics (BLS) and are publicly available. Descriptive statistics was used to summarize the frequency of summary food security status, children's food security status, and adults' food security status for each of the 12 months recall and 30 days recalls, respectively. Logistic regression was used to examine the association between the household characteristics with each of the food security status. CPS food security supplements categorize food security status as (1) food secure high or marginal food security, (2) low food security, and (3) very low food security. We merged categorize 2 and category 3 as not food secure group to create a binary dependent variable (food secure vs not food secure). Independent variables in the logistic regression include residence type, family income, total number of person living in a household, has a business or a farm, region, metropolitan status, income range above or below poverty.. All analysis were weighted for household supplement weight (HHSUPWGT) to generate unbiased population level estimates.

Results

A total of 30343 household were included. Descriptive statistics for completed response of 12 month recall summary food security status, showed 89.77% (n=27357) of the households were food secure whereas 10.23% (n=2937) were not food secure. For children (0-17 years old), we observe 93.77% (n=7553) were food secure whereas 6.23 % (n=472) were not food secure. For the adults, 82.93% (n=25346) were food secure whereas 17.07% (n=4948) were not food secure. Logistic regression results for summary food security status (SFSS), children's food security status (CFSS), and adult food security status (AFSS) showed that compared to household without payment of cash rent those households which was owned or are bought by a household member were significantly more food secure ($\beta=0.4161$, $p<.0001$, $OR=1.558$), ($\beta=0.5658$, $p=0.0006$, $OR=2.737$), ($\beta=0.3736$, $p<.0001$, $OR=1.402$), respectively. On the other hand, for SFSS, and AFSS, compared to household without payment of cash rent household which was rented for cash were significantly less food secure ($\beta=-0.3889$, $p<.0001$, $OR=0.696$) and ($\beta=-0.4093$, $p<.0001$, $OR=0.641$), respectively. For SFSS, CFSS, and AFSS, compared to household with \$100,000 or more in family income, households with less than \$49,999 in family income were significantly less food secure ($\beta=-0.7127$, $p<.0001$, $OR=0.220$), ($\beta=-0.8371$, $p<.0001$, $OR=0.146$), and ($\beta=-0.6694$, $p<.0001$, $OR=0.228$), respectively. For CFSS and AFSS, compared to household with \$100,000 or more in family income, households with \$50,000 to \$99,999 in family income were significantly less food secure ($\beta=-0.2477$, $p=0.0287$, $OR=0.264$) and ($\beta=-0.1396$, $p=0.0002$, $OR=0.387$), respectively. For SFSS, CFSS, and AFSS, increase in the total number of people living in the household was significant predictor of the reduction in the food security ($\beta=-0.0954$, $p<.0001$, $OR=0.909$), ($\beta=-0.1015$, $p=0.0092$, $OR=0.903$), and ($\beta=-0.1206$, $p<.0001$, $OR=0.886$), respectively. For SFSS, and AFSS, household with business or farm compared to those without business or farm were significantly more food secure ($\beta=0.1143$, $p=0.0243$, $OR=1.257$), and ($\beta=0.1211$, $p=0.0025$, $OR=1.274$), respectively. For SFSS, household in the south were significantly less food secure compared to those in Midwest ($\beta=-0.0834$, $p=0.0288$, $OR=0.961$). For SFSS, CFSS, and AFSS, household with below 185% poverty were significantly less food secure compared to those with above 185% poverty level ($\beta=-0.4385$, $p<.0001$, $OR=0.416$), ($\beta=-0.2561$, $p=0.0008$, $OR=0.599$), ($\beta=-0.5434$, $p<.0001$, $OR=0.337$), respectively.

Conclusions

Household characteristics such as residence type, family income, having own business or a farm, geographic region, income range above or below 185% poverty level predicted food security status. Owning own house, having higher family income, owning own business and farm, and having income range above 185% poverty level was predictor of greater food security. On the other hand, increase in the number of family members and residing in the south was predictor of lower food security.

Implications

Households with large family members, adults, and with lower income were vulnerable to food insecurity during the COVID-19 pandemic. Thus, policymakers at the federal and local level should provide targeted relief efforts such as income support for household facing financial hardship and at the same time increase the food assistance programs.

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Evaluating Rural Health Disparities in Colombia: Identifying Barriers and Strategies to Advancing Farmworker and Refugee Health

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Abstract

Introduction

Extension organizations frequently work to address health disparities among rural communities. These disparities are well documented with farmworkers representing the population segment that exhibits the most significant issues (Acury & Quandt, 2007; Adams & Shanderson, 2016; Hoerster et al., 2011; Kim-Godwin, 2006). Farmworkers face significant disease burden and mortality rates for diseases and injuries, which stem from occupational exposures and socioeconomic and political vulnerabilities (Hoerster et al., 2011; Harwell et al., 2022). Many of these farmworkers come from internally displaced communities or are refugees from other countries that makes health disparities further confounded by their migrant life (Kim-Godwin, 2006).

These issues are particularly salient in the rural areas surrounding Medellin, Colombia. Medellin has a tumultuous past, filled with violence and the marginalization of communities at the behest of the drug cartels (Jubilut et al., 2021). Many families and individuals were forced to leave their homes and migrate into the rural areas (Jubilut et al., 2021). Additionally, refugees from other countries have migrated to Colombia and now reside in these same rural areas (Jubilut et al., 2021). This has caused a significant public health issue because these rural areas were already experiencing systematic constraints, now further exacerbated by the continued influx of low resource families and individuals (Otálvaro Castro et al., 2017; Otálvaro Castro et al., 2019). Extension professionals in Medellin are taking an active role in partnering with communities and organizations across sectors to address these issues and advance rural health outcomes.

Purpose and Objectives

To address these issues in a systematic manner, the University of Florida is partnering with the University of Antioquia, Fundacion Huellas and Children Beyond our Borders, to develop a strategic plan to address health disparities among the rural communities surrounding Medellin. To inform these efforts, a Delphi study was created to identify consensus on barriers and strategies to advancing rural health. The study was guided by the following objectives:

- Identify consensus on the most pervasive barriers to health care access and quality of care for farmworkers and refugees.
- Identify consensus on the most effective strategies to advancing health care access and quality of care among farmworkers and refugees.

Methods

We used a modified, two-round Delphi study to leverage the expertise of a panel of community health workers. The panel included 16 experts that worked across in the rural areas of Medellin and were well in tune with the health care needs of both farmworkers and refugees. Data collection used online surveys, which were developed and administered in Spanish.

The first-round survey asked panelists to list the barriers to health care access and quality of care for both farmworkers and refugees in the rural areas of Medellin. Additionally, panelists were asked to list what they perceived to be effective strategies to advance both health care access and quality of care. Data was analyzed using a three-step thematic analysis process, which resulted in the items for the round 2 survey.

We used the second round of the study to refine the list of barriers and strategies based on the panel's agreement. Panelists were asked to rate each barrier on a 4-point scale of extent of barrier and each strategy on a 5-point scale of perceived effectiveness. Our a priori definition of consensus was set as 2/3 selection of "major barrier" for barriers and "somewhat effective" and "extremely effective," for strategies.

Results

The results of the Delphi process provide public health partners with a prioritized list of barriers and strategies to consider for addressing the health disparities in rural areas. The panelists identified a breadth of barriers that must be addressed for farmworker health care access and quality of care including: (1) lack of localized healthcare centers, (2) mistrust issues between patients and medical professionals, (3) self-diagnosis and self-medication, and (4) lack of knowledgeable health care navigators. Likewise, a prioritized list of barriers was also created for refugees including: (1) lack of legal documentations, (2) lack of sufficient healthcare centers willing to treat them due to their legal status, (3) xenophobia situations, (4) lack of access to proper healthcare insurance, and (5) insufficient knowledge about humanitarian aids.

Additionally, the respondents identified a set of strategies they perceived to be most effective for improving health care access and quality of care for both communities. The panelists identified the following strategies for farmworkers: (1) creating localized healthcare centers in rural areas, (2) additional teams of medical specialists that visit periodically, (3) creating a transportation system to improve mobility of healthcare teams, (4) have a professional advisor for public resources, (5) education and promotion of preventative healthcare, (6) access to telemedicine and virtual resources, (7) create a healthcare center that is equipped with adequate resources and availability of specialized doctors with technical audits, (8) access to professional advisors to help navigate the healthcare system, (9) economic support for local food processes, (10) increase local preventative and emergency health education, and (11) expose medical professionals to the realities of the communities.

Finally, the panelists identified the following strategies as effective for improving health care access and quality of care for both communities: (1) creating a localized healthcare center and interdisciplinary medical team, (2) help to acquire legal documents, (3) overall navigation of the healthcare system, (4) having access to educational and physical resources (such as vaccines) that focus on preventative care, (5) have more access to information on the healthcare system and legal paperwork, (6) increased focus

on preventative medicine both educationally and economically, (7) technical audits of healthcare centers to measure quality, and (8) humanization of healthcare providers.

Conclusion and Implications

Extension educators are uniquely positioned to partner with communities to address long-standing health disparities. Using the Delphi technique allows these educators to strategically organize the efforts of the collaboration with a prioritized list of barriers and strategies to consider. While not all of the items can be addressed by extension professionals and the reason for partnerships outside of academia, there are opportunities for extension to address many of the education, community development and coordination items to advance the mutual goals of the collaboration.

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U.S. Army Civil Affairs: Providing Stability and Security in Agadez, Niger through Agriculture

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Abstract

Introduction / Theoretical Framework

Niger ranks 189 of 191 countries for low human development in three basic dimensions: a long and healthy life, education, and a decent standard of living (UNDP, 2022). Additionally, Niger ranks 153 of 170 countries for low inequality between women and men in three dimensions: reproductive health, empowerment, and labor (2022). These issues further stress a country facing governmental instability and food and water insecurity.

The U.S. military has been operating Air Base 201 in Agadez, Niger since 2019. Niger is an essential partner of the U.S. in deterring and defeating terrorist threats in West Africa and the Sahel region. To continue its long-standing bilateral relationship with Niger, the U.S. military works to identify and address the concerns of local civilians through Civil Affairs (CA) (U.S. Africa Command Public Affairs, 2017). This group plays a critical role in supporting and providing humanitarian assistance, serving as an intermediary between militaries and local people.

Purpose and Objectives

This qualitative study presents baseline data collected by CA teams in Niger. It serves as the 'civil common operating picture' (CCOP) by providing information relevant to local people's concerns and needs. The purpose of this project was to identify local agricultural-related concerns and productive methods to support U.S. Embassy goals. The following objectives guided this work:

1. Develop a CCOP to identify local agricultural and food-related concerns and needs.
2. Identify local agricultural and food-related civilian-lead initiatives connected with U.S. Embassy goals.
3. Identify learning opportunities for effective knowledge exchange and dissemination.

Methodology

CA teams conducted 102 civil engagement sessions in Niger with government representatives, community members and leaders, academics, village women's associations (VWA), shopkeepers, non-governmental organizations (NGOs), intergovernmental organizations (IGOs), and Nigerien and U.S. military partner forces. Interviews were conducted utilizing Nigerien and Department of Defense French and Hausa contracted interpreters. Detailed observation memorandums were used to capture information. Data were transcribed and manually coded using an inductive data driven coding process (Creswell, 2007). Additionally, the CA teams conducted civil reconnaissance of local farms and

marketplaces to compare staple crop prices with the World Food Programme (WFP, 2022) prices. Methodological decisions corresponded to local conditions and safety priorities for CA team members.

Results

As described below, we identified three local needs and opportunities for knowledge enhancement.

Civil populace agricultural-related concerns

First, the data revealed that stakeholders experience concern over the Nigerien food supply. They mentioned that the Nigerien food supply is highly dependent on international aid. With a growing migration crisis, there is increased pressure on local agricultural production, which emphasizes the need for more international assistance. Stakeholders expressed that the available food is more frequently serving the growing population of displaced people in Agadez, rather than local people in rural areas. Additionally, many aid organizations have stopped operating in the Agadez region, further increasing community members' concerns.

Second, stakeholders were concerned about water availability. The Sahel region has limited rainfall and water storage capacity, making wells with year-round water access a high priority for drinking and agriculture. Stakeholders shared they often choose between drinking water or the ability to water their crops and animals.

Third, stakeholders were concerned about food and livestock feed prices. Food prices have increased for consecutive quarters and are higher than projected WFP prices for this region. Livestock feed prices have tripled in value over six months. Many herders shared they could not afford retail prices for livestock feed and access to fodder was limited or non-existent. Finally, women experience low employment rates in rural and urban areas in Agadez, although several women's associations have advocated for increased labor force participation for women. Women expressed a lack of economic opportunities continues to negatively impact familial well-being.

Civilian-led initiatives

Two low-cost projects were identified. The first project is the Village Fodder Project, which provides education on growing livestock fodder hydroponically and operates a small agricultural business for two VWAs. This project includes training on structure maintenance, disease prevention and treatment, livestock feed ratios, water conservation, and business management. One village shared how this project will aid the VWA in producing high-quality goat cheese to sell at the city market.

The second project is the Village Poultry Project. It provides training on raising egg-laying chickens and operates a small agricultural business for two VWAs. The project teaches women farmers: proper care for poultry, disease identification and treatment, structure maintenance, waste management, and business management. A VWA member shared that the project gives them an opportunity to work in agriculture and make day-to-day decisions regarding their business.

Learning Opportunities and Knowledge Exchanges

Results show that the academic sector is promoting knowledge exchange activities. The University of Agadez provides basic agricultural training to over 3,000 citizens per year at their 'experimental farm.' CA teams are helping their department of agriculture with its first conference to discuss food and agricultural issues and identify potential solutions.

Recommendations / Implications / Application

The U.S. military should address local agricultural and food-related concerns. To build human and technical capacity, teams could be deployed to areas that food aid agencies cannot access. Based on our results, we recommend the following. First, a focus on long-term efforts and solutions aimed at eliminating food insecurity and malnutrition is essential. In a post-conflict area, food can aid local rebuilding efforts. Second, entities in these areas should take inventory of local projects to inform current and future efforts. This creates opportunities for collaboration and sustainable programming. Third, we encourage the U.S. military and other local stakeholders to include agriculture as a pillar for their intervention agendas. Areas of conflict often have food insecurity issues. Addressing both conflict and food insecurity will result in a larger likelihood of success. Finally, we stress the importance of providing opportunities for women to enhance local agricultural development, as they are essential to the wellbeing of their communities and the household's agricultural production. Agricultural extension educators and practitioners can help development agencies in collecting appropriate data and implementing sustainable projects.

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The Unlikely Innovators: A Proposition for Positive Deviance in Agroforestry Extension

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Abstract

Introduction

Agroforestry, the practice of intentionally incorporating trees on farms and pastoral land, has often originated from indigenous or traditional systems (Nair et al., 2017). Agroforestry can benefit smallholders in the Global South (Bettles et al., 2021). The benefits of adopting agroforestry include poverty alleviation, providing ecosystem services, restoring degraded land, and climate change mitigation and adaptation (Bettles et al., 2021; Lasco et al., 2014; Toensmeier, 2016). The probability of agroforestry adoption increases when institutions engage stakeholders and integrate local and scientific knowledge into agroforestry practices (Bettles et al., 2021; Dumont et al., 2019).

Extension services are essential in helping communities address new and evolving challenges (Davis & Sulaiman, 2014). However, throughout the Global South, the trend is often to identify existing weaknesses (Lamm & Lamm, 2018). Positive Deviance (PD) is a methodology that counters that trend. PD has historically been used in the public health field, where “champions” in a community are identified for their unusual practices that have positive outcomes (Pascale et al., 2010). PD was first implemented in Vietnam in the early 1990s in a child nutrition program. The information from the PD activities was used to promote local nutrition solutions to families (Herington & van de Fliert, 2018). PD is often used to address problems in communities and institutions that are “enmeshed in a complex social system, require social and behavioral change, and entail solutions that are rife with unforeseeable or unintended consequences” (Pascale et al., 2010, p. 10)

The premise of the PD approach is that (1) solutions to difficult problems already exist, (2) solutions have been discovered by members of the community already, and (3) these innovators have succeeded even though they share the same constraints and barriers as others (Pascale et al., 2010). We propose that PD can be used by agroforestry extension programs, allowing them to use an asset-based problem-solving approach. This will allow communities to identify local agroforestry solutions and increase adoption.

Purpose

The purpose of this paper is to apply PD in communities to identify agroforestry innovations. The steps required for PD in agroforestry extension will be applied to a project in Haiti.

Methods and Data Sources

The use of PD in agroforestry extension is limited. PD requires the commitment of leaders and local sponsors who want to tackle problems that have yet to be solved. The community must own the entire process. The Positive Deviance Initiative (2010) outlines the five-step methodology. The steps to the PD methodology are (1) define, (2) determine, (3) discover, (4) design, and (5) monitor and evaluate.

Step one entails defining and reframing the problem, examining the magnitude of the problem, articulating a desired future, exploring barriers and challenges related to the problem, and common practices. In Haiti, the stakeholders create a baseline of data by mapping the current land uses in the community. Issues impacting the lack of agroforestry are explored, and current behavioral norms are discussed in community dialogues. The stakeholders also create a time-framed goal to increase local tree cover by a specific percentage. Stakeholders that should be involved are identified, and the findings are shared in a community-wide meeting.

The second step is to determine the presence of positive deviant individuals or groups. Community members who exhibited successful agroforestry behaviors and desired outcomes are identified. Exclusion criteria are selected and listed. Only those who face the same or worse challenges and barriers as others but have increased tree cover are selected. The team that will carry out the PD inquiries is selected.

Step three is discovering uncommon but successful behaviors and strategies through inquiry and observation. In Haiti, on-site visits are conducted with identified individuals who exhibit increased agroforestry on their property and meet the selection criteria. The PD practices, strategies, and behaviors are compiled, documented, and shared with the community. The results are vetted by the community.

The fourth step is to design an initiative based on the findings. In Haiti, the broadest range of appropriate stakeholders are involved, connecting people who have not connected before. Once people have connected, they can start applying the discovered PD behaviors and strategies. At this time, the focus should be on creating opportunities to learn practices through hands-on activities and small demonstrations in the community. This step will involve local demonstration plots, field visits, and the organization's small-forest program that provides technical assistance to those starting micro-woodlots.

The fifth step is to monitor and evaluate the resulting initiative. In this step, the community will develop indicators to monitor agroforestry plots being started and how frequently they are evaluated. The results of the agroforestry work will be shared with the community in community meetings and events such as the Day of the Forest, which is celebrated by the local community. This will help the community to discern the initiative's effectiveness.

PD is a participatory approach that requires facilitators with participatory facilitation skills. It also requires hearing from a broad range of stakeholders in the community to find solutions (Pascale et al., 2010).

Results and Products

A nongovernmental organization has been promoting micro-woodlots in communities in Haiti (Blank, 2010). To date, through PD approaches, stakeholders in the community have identified agroforestry practices being used locally to improve the implementation of the micro-woodlots.

Through identifying positive deviants in the community, stakeholders have improved agriculture and tree management practices on agroforestry plots, selected trees that have proven success, tree planting strategies that have increased survival rates, and found living fencing practices that provide security from roaming livestock.

Finally, using a community-driven asset-based approach, there has been improved community ownership and increased behavior and social change related to implementing agroforestry plots in the community.

Applications and Implications

PD is an innovative asset-based problem-solving approach that can be used to identify locally appropriate agroforestry solutions. This will provide agroforestry programs with a methodology to identify context-appropriate practices. PD should be tested to address other complex agricultural challenges. Implications include enhanced engagement, locally appropriate solutions, and fewer outside resources.

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Technology Implementation for Ugandan Smallholder Farmers for Agriculture Improvement

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Abstract

Introduction/Need for Innovation

In today's digital age, there are several digital teaching tools and strategies that are available for different communities for online instruction. Farmers who are more knowledgeable about the integration of technology are more likely to engage in other communities to solve agricultural issues, connect with other farmers, and grow their knowledge in different agricultural topics, especially in rural Uganda. "Certain types of social organizations [community groups] allows for cooperation that enables farmers to engage in various activities and generate new ideas that facilitate sustainable agricultural intensification to improve food security" (Andersson et al., 2012). There are many social and financial barriers to technological adoption in rural farming communities, but access to these assets, particularly for women, could address Sustainable Development goals: "there is enough evidence to show that women are at the center of sustainable development, and that ensuring greater gender equalities in all sectors would mean that society as a whole will benefit" (Denton, 2002).

This project focuses on women as over 70% of women in Uganda are farmers, contributing 90% of the nation's food (Muhanguzi, n.d.). A new nonprofit, Her Mighty Hands, has been established to provide agricultural extension services through a solar-powered smartphone for women in northern rural Uganda.

Purpose

Extension services could assist in providing resources, yet there is an extreme shortage of these services in sub-Saharan Africa, particularly in Uganda. Only 20% of households have access to extension sources which are notoriously unreliable or lack updated methods (Rugadya, 2022). Nchake (2022) concludes promoting gender inclusivity for women farmers on the African continent through digital extension services will increase economic stability. The following objective guided this project: identify how Her Mighty Hands can combat Ugandan gender disparity and the resulting malnutrition crisis.

Methods

To complete this project, connections were needed to find participants and conduct a year-long pilot program in Uganda. Her Mighty Hands partnered with Field of Hope, a non-governmental Christian organization that works primarily in Uganda in the agricultural sector. Their mission is to build resilience in livelihood, food, and nutritional security in resource-constrained communities through youth agricultural education, smallholder farmer advancement, and leadership development. Through their

work, they have identified several smallholder farmer groups, villages, and partners that they work with yearly.

In 2021, Field of Hope connected with 280 farmers and enrolled them in the women's program. They had new groups and 75 new women farmers on-boarded into the program. There were 225 women farmers trained across all groups through the eleven different training sessions and one demonstration garden conducted. There were also six community outreach trainings conducted, and 153 farmers trained through the program in 2021.

Two groups of women were purposefully selected from Field of Hope cohorts in rural northern Uganda. Ten women were selected to be in the control group and ten were selected for the experiment group following an experimental design method. To mitigate land and water fluctuations, two different villages were sampled. In Apac village, five women were control participants, and five women were experiment participants. This method was repeated for Amalotar village.

The control group used only what they had previously learned from Field of Hope classes. The experiment group was given smartphones with downloaded agricultural extension videos, solar chargers, and protective cases. Field of Hope staff conducted all training and monitoring visits of the 20 women.

Before the experiment group received their smartphones, participants completed an in-person training to teach them how to use their phones to access uploaded extension videos. A pre-survey to evaluate the previous growing season's agricultural output was delivered orally for accessibility purposes with responses recorded electronically.

The extension videos were developed using Field of Hope agricultural extension curriculum. The videos were uploaded to the women's phones in three separate phases: (one) field preparation, (two) crop maintenance, (three) harvest techniques.

Phase One finished in early February 2022. Phase Two launched March 11, 2022. Phase Three launched in July 2022. A post-training visit occurred one week after smartphone release to the experiment group to ensure women could successfully navigate their device. In addition to the initial training, three in-person visits to change out extension videos and collect phones and five remote check-ins, done via phone calls, occurred.

During the last visit the phones and chargers were collected and a post-survey was delivered orally, and responses were recorded electronically.

Results

Data was collected at the end of August and is in the analysis phase. Results are estimated to be reported within the next couple of months. Based on previous research done by Field of Hope and cross referenced with methods, the pilot program expects a 150% increase in agricultural productivity from the experiment group. This projection would increase a family's income by 25%.

As a part of the creative process, oral interviews were conducted and yielded extremely high praise as a result of the pilot program. In-country Her Mighty Hands project managers also gave positive support.

Photo evidence of field comparisons between control and experimental group participants taken on the same day show a large difference in crop health and yield potential. Preparation is taking place for implementing the extension videos next growing season through collaborative efforts of Her Mighty Hands and Field of Hope.

Application

After data is analyzed and published, Her Mighty Hands has a strategic and scalable vision for expansion. In the next five years, the goal is to get a phone in the hands of every woman in the Field of Hope cohort for access to the training videos. In the next ten years, continued success would ideally yield partnerships with other non-governmental organizations (NGOs) with a sustainable revenue stream. In the next twenty years, other cultures and countries would have access to training materials and videos, with Her Mighty Hands acting as a consultant for other NGOs and partners.

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DELINEATION, BENEFITS AND CHALLENGES OF WATER-SMART AGRICULTURE: PERCEPTIONS OF SMALLHOLDER FARMERS IN BUSHBUCKRIDGE, SOUTH AFRICA

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Abstract

Introduction

Environmental changes such as climate change and forest degradation amongst others are the most critical problems confronting the world today. The agricultural sector has not been an exception on this challenge (IPCC, 2007). Numerous reports points to the issues of reduced agricultural production which leads to food insecurity levels increasing. All this is owing to the changing climatic conditions worldwide. Climate change has resulted in water scarcity. The FAO (2013) and Sithole & Agholor (2021) suggests that approximately 70% of the world's water is used for agricultural purposes. However, the agricultural sector has continued to experience water scarcity due to the different demands from other sectors, such as the construction and mining sectors (Mekonnen & Hoekstra, 2016). As a result, it is of paramount importance that water is used more considerately. Water-Smart Agriculture approaches play a huge role in the conservation of readily available water, for use in agriculture and other sectors. Contemporary literature suggests that farming helps to feed millions of people, it is of importance that those farmers be taught about the ways of saving water from the soil and water harvesting during rainfall for future use (Agricultural Statistics, 2008; Greyling, 2015).

Purpose and objectives of the study

The aim of the study was to examine the perceptions of smallholder farmers about Water-Smart Agriculture, in South Africa. The objectives of the study were to (i) assess smallholder farmers access to the sources of water and types of irrigation water management strategies employed by the smallholder farmers in the study area and (ii) to examine the perceived benefits and challenges of Water-Smart Agriculture as used by smallholder farmers in Bushbuckridge.

Methodology

The investigation was completed in the Chochocho (Dingledale) area of Bushbuckridge Local Municipality in Ehlanzeni District, which is adjacent to Mbombela Local Municipality in Mpumalanga, South Africa. With inhabitants of 4845 people, with majority of them involved in agricultural activities. The soil of the valley is a substantial source of cassava, cowpea, sweet potatoes, maize, millet, pumpkins, soybeans, vegetables, and natural products. Chochocho was chosen for the territory study because the majority of the occupants are effectively engaged in agricultural activity.

The study used simple random sampling method to sample a total of 261 smallholder farmers out of 750 smallholder farmers registered with the Department of Agriculture. All the respondents were randomly sampled from Chochocho and majority of them are involved in the Dingledale Irrigation Scheme. The sample size was determined using the Slovin's formula. The researchers assumed a margin of error of 0.5 with confidence level of 99% for the determination of the sample size. Therefore, a sample size of 261 respondents was determined, after which the researchers opted to decrease the sample size from 261 to 219 due to time constraints. However, from the data collected, researchers were able to generalize due to the peculiarity of the study.

The adopted research design was mixed method, comprising of qualitative and quantitative research designs. Data was collected from the smallholder farmers through the use of structured questionnaires, focus group discussions, rural resource mapping, as well as the timeline analysis. The Scientific Package for Social Sciences (SPSS) version 27, was employed to analyze the quantitative data collected from smallholder farmers. Descriptive statistics, with likert scale was used to analyze the data collected for the study.

Results and Conclusion

The study assessed the sources of water and the irrigation water management strategies used by the smallholder farmers as well as the benefits and challenges faced by the smallholder farmers in the use of Water-Smart Agriculture. Findings reveals that 98.60% of the respondents uses water from the nearby dam, while only 1.40% of the respondents do not irrigate, but farm under dryland farming systems. Majority (99.50%) of the respondents who uses irrigation water in their farms asserted that they use farrow irrigation system, while the 0.50% used drip irrigation system. 27.40% of the respondents asserted that they perceive some benefits coming with the use of Water-Smart Agriculture, while 72.60% of the respondents perceived no benefits at all. The perceived benefits involved increased productivity, improved income and soil temperature management. However, challenges perceived involves lack of infrastructure, lack of facilities and technical skills as well as financial support.

Recommendations

policymakers should expand the number of extension officers working with smallholder farmers and promote CA teachings and trainings in order for them to be resilient to the ever-changing climate, particularly in WaSA areas.

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Developing a theoretical framework for researching farmers' protests against public policy for promoting climate smart agricultural (CSA) practices rooted in populism.

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Abstract

Introduction and theoretical framework

Global agriculture is at a crossroads because of climate change and political polarization, necessitating the adoption of climate-smart agriculture (CSA) informed by science and accepted by society. CSA is a strategy for accomplishing three primary objectives: increasing agricultural productivity and income; adapting to a changing climate; and reducing greenhouse gas emissions (Amadu et al., 2020). Despite overwhelming scientific consensus on the effectiveness of CSA in making agriculture more climate resilient, CSA adoption remains low (Kangogo et al., 2021). Researchers have reported a drastic decline in public trust in science and public institutions in recent years as a result of rising inequality and political polarization, which has resulted in science denial and distrust in democracy, negatively impacting farmers' attitudes toward CSA (Funk, 2017; Lewandowsky et al., 2017; Mansoor, 2021). Governments all over the world are attempting to reduce nitrogen oxide (N₂O) emissions, a potent greenhouse gas (GHG) and a key component of chemical fertilizer.

Many farmers are protesting the government's decision to reduce chemical fertilizer usage due to their economic concerns. Dutch farmers' recent protests against their government's plan to reduce N₂O emissions have brought attention to similar concerns shared by Canadian farmers (Ryan, 2022). The Canadian Net-Zero Emissions Accountability Act requires ambitious action to reduce agricultural emissions (Government of Canada, 2022). N₂O accounts for 75% of Canadian agricultural emissions because usage of chemical fertilizer has increased by 89% since 2005 (Environment and Climate Change Canada, 2022). However, many Canadian farmers fiercely oppose the government's goal of reducing N₂O emissions by 30 percent below 2020 levels by 2030 (Massow et al., 2022). Thus, policymakers' failure to recognize farmers' economic anxiety worldwide is becoming a barrier to the adoption of CSA, which empirical evidence suggests will benefit farmers in the long run.

The authors will present a theoretical framework for researching populism's influence on farmers' protests against public policy promoting CSA in this study. The authors contend that rural populism distorts farmers' perceptions of CSA as detrimental to their well-being. The authors argue that rising populism among farmers in rural communities manifests the systemic crisis of globalized neoliberal capitalism, effects of which are particularly visible in the countryside. Finally, the authors conclude that political history, agrarian structure, and rural culture all play important roles in shaping populist movements among farmers from rural communities.

Implications and educational importance

Global agriculture employs 26.5% of the world's population, making \$3 trillion in global trade (The World Bank, 2018). By 2050, the world will have to feed nearly ten billion people, requiring us to grow 70% more food (FAO, The UN, 2009). Hence, failing to adopt climate-resilient agricultural practices backed by scientific knowledge will bring about devastating socioeconomic consequences. Researchers have found a link between science denial and the rise of populism from both the right and left political parties (McIntyre, 2021). The recent rise of the rural right has posed a significant threat to the promotion and adoption of CSA. Right-wing populism has gained ground in Europe in recent years, as evidenced by recent elections and referendums demonstrating that right-wing populism has a strong rural and agrarian constituency (Heino, 2016). Every third European government today is made up of or is dependent on a populist party (Hann, 2019). Therefore, building a theoretical framework to research farmers' attitude and susceptibility to be co-opted by populist politics is immensely important to promote CSA.

Purpose and objectives

The purpose of this research is to use CSA and populism literature from various fields as data to propose a theoretical framework for studying the influence of populism on CSA adoption.

Data sources

This study searched populism and the adoption of CSA research literature published between 2016 and 2021 using different databases.

Theoretical Proposition and Conclusion

Adoption of technology and new practices are social processes which are influenced by social attitudes and confidence in the technologies and practices under consideration (Davidson et al., 2019). The political affiliations of agri-food stakeholders can influence the adoption of CSA (McIntyre, 2021; Turner, 2013). Researchers have reported a rise in populism among European rural and agrarian communities (Mamonova & Franquesa, 2020). Similar trends have been observed in India's farmers' protest, which has demanded progressive solutions to protect farmers' interests while supporting populism, which appears counterintuitive from the outside (Mehta & Sinha, 2022).

Under neoliberal global capitalism, the inherent contradiction of capitalist agriculture traps rural farming communities in a cycle of systemic despair, making them highly susceptible to populism (See Case & Deaton, 2021). Thus, the farming community's economic anxiety and capitalist dislocation contribute to their distrust of science and social institutions (Hochschild, 2018). For example, farmers protest in Europe manifest capitalism's endemic crisis, which fuels European populist politics. In recent years, Europe's populists have been gaining ground in rural areas by playing on people's fears of being left behind and their animosity toward urban elites, foreigners, and minorities (Mamonova & Franquesa, 2019). However, populism in rural and agrarian communities has received little attention, and the authors of this paper argue that it poses a significant threat to food security by impeding CSA adoption.

Hence, the development of a theoretical framework to examine farmers' opposition to public policies mandating the adoption of CSA will be a major contribution made by agri-food researchers promoting CSA adoption.

Recommendation

Neoliberal capitalism poses a major threat to global agriculture when humanity faces multiple existential crises like climate emergencies, ongoing war, and unprecedented political polarization. These crises pose a significant risk to global food security. Affective politics fuels populist movements among farmers from rural communities, threatening sustainable agriculture. Hence, developing a theoretical framework appropriate for global agriculture can aid policymakers and agri-food practitioners in catalyzing the adoption of CSA.

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Determining if Country of Origin Impacts Pro-Environmental Behaviors Among Young Consumers to Inform Agricultural Communication Messages

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Abstract

Introduction

Unsustainable production and consumption, the root causes of environmental deterioration (Tripathi & Singh, 2016), call on agricultural communicators worldwide to understand the behaviors of young consumers and utilize messaging that promotes the adoption of pro-environmental lifestyles (Thapa, 2019). Green consumerism entails producing and promoting the utilization of environmentally friendly goods and services (Connolly & Prothero, 2008). Green consumers, therefore, look for products and services that are good for the environment (Akenji, 2014) and choose organic goods from businesses with little or zero negative environmental effects (Connolly & Prothero, 2008). Young consumers labeled 'Generation Z', who were born between 1993 and 2005 (Priporas et al., 2017; Song et al., 2020), control much of the market, readily purchase green products (Song et al., 2020; Turner, 2015), and are more aware of environmental issues compared to earlier generations (Deloitte, 2021; Nguyen et al., 2022). Messages that are well-framed or strategically planned to promote green attitudes among young consumers (e.g., Taufique, 2022) may result in a future workforce that includes agricultural communicators who are actively engaged in environmental stewardship and green consumption (Azrai et al., 2019; Ichsan et al., 2019; Nguyen et al., 2022). People have studied Generation Z's (global citizens) green consumption habits without much attention to how or where they live in the world affects those habits (Song et al., 2020; Turner, 2015). The theory of planned behavior (TPB) applied in this study postulates that perceived behavioral control, subjective norms (associated with the location), and attitude all influence an individual's intent to engage and actual engagement in certain behaviors, including green consumption (Ajzen, 1991). Thus, understanding and creating the most effective messages about agricultural production methods, products, and services beneficial to the environment, require researchers to explore diversity in green consumerism based on country of origin.

Purpose and Objectives

The purpose of this study was to investigate differences in green consumerism levels of young consumers by country of origin. The study was guided by two research objectives:

RO1: Describe the demographic characteristics associated with green consumerism tendencies among young consumers in the United States, Nepal, and Kenya.

RO2: Compare green consumerism levels among young consumers from Kenya, the United States, and Nepal.

Methods

A cross-sectional survey design (Fraenkel et al., 2015) was utilized to study green consumerism of a convenience sample of young consumers ($N = 563$) that were undergraduate students at universities in Kenya, Nepal, and the United States (U.S). The Green Consumerism Assessment Scale (GCAS; Haws et al., 2014) and demographic questions were included in the instrument distributed online through Qualtrics™ (Dillman et al., 2014). The level of green consumerism was measured using the GCAS, which comprised six items, each scored on a 5-point Likert-type scale (1 = *strongly disagree* to 5 = *strongly agree*). Three demographic items included country of origin (U.S., Nepal, Kenya), gender, and academic level.

A one-way Welch ANOVA was conducted at .05 alpha level set a priori to compare the group means of green consumerism by countries of origin. The scores from the six green consumerism items were averaged to form a single measure used as the level of green consumerism. All assumptions, including outliers, normality, and homogeneity, were evaluated to validate using an ANOVA (Field, 2018). There were no outliers, and data were normally distributed based on boxplot and Shapiro-Wilk test ($p > .05$). Following a significant test of Homogeneity of Variance ($p = .003$), Games-Howell was applied as a robust post-hoc test to determine the extent of differences in students' green consumerism levels by country of origin (Field, 2018). Summary statistics were cross-tabulated by country of origin.

Results and Conclusion

Descriptively, Kenyan respondents ($n = 277$) were mainly seniors (46.70%), U.S. respondents ($n = 77$) were mainly juniors and seniors (71.02%), and Nepalese respondents ($n = 216$) proportionately comprised first-years, sophomores, juniors and senior. The Kenyan and U.S. groups had more female respondents than males, and the Nepal group had nearly equal representation of male and female respondents. Kenya's mean age (23.9 years) was slightly higher than the U.S. (21.6) and Nepal (21.4). The green consumer levels of respondents from the US ($M = 4.11$; $SD = .37$) was higher than those of Kenya ($M = 4.07$; $SD = .66$) and Nepal ($M = 3.66$; $SD = 0.59$). The ANOVA results indicated a significant effect of country of origin on respondents' green consumerism, $F(2, 560) = 33.33$, $p < .001$. Country of origin explained 11% of the variance in respondents' green consumerism levels. A Games-Howell post hoc analysis revealed statistically significant differences between respondents from Kenya and Nepal ($p < .001$) and between respondents from the U.S. and Nepal ($p < .001$). In addition, the mean difference in green consumerism levels between respondents from Kenya and the U.S. was insignificant ($p = .77$). The findings reveal green consumerism values of male and female respondents younger than 24 years old that ranged between 3.66 to 4.11, indicating a positive attitude toward environmentally friendly behaviors and corroborating previous research on the consumption habits of Generation Z consumers (Deloitte, 2021; Nguyen et al., 2022).

Recommendations

Respondents' green consumption levels provide an opportunity for agricultural communicators to strategically engage with a generation primed for environmentally friendly consumption given their existing positive green attitudes and potential for environmental stewardship (e.g. Azrai et al., 2019). Global agricultural communicators can mobilize young consumers to engage in the consumption and promotion of green agricultural products by communicating green messages that appeal to their interests regarding environmental values. Communicators should further research the communication channel preferences of young consumers in each targeted country. The lower and slight differences in

green consumerism recorded for Kenya and Nepal, and the highest score for U.S. indicate more agricultural communication efforts may be necessary particularly in Nepal and Kenya to close the global green knowledge gap (Singh, 2015). Future researchers should employ robust research methods to examine the cultural and economic influences behind the green consumerism levels in more countries, particularly developing economies, to employ strategic, targeted agricultural communication to promote green consumption.

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Faculty Perceptions of Climate Change Competencies, Skills, and Experiences Needed by Agricultural Graduate Students

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Abstract

Introduction

There are direct and indirect effects of climate change on agricultural productivity (FAO, 2022). Climate change is occurring now with irreversible consequences (Arora, 2019), and climate change-related agricultural challenges are immense. As an illustration, Bangladesh has transformed itself over the past 50 years from being dependent on imported food to self-sufficiency in rice production. This has been achieved through agricultural research and extension focused on flood protection practices, plant breeding, and new technologies (Lynamm et al., 2010). Yet, global climate change threatens all of this progress and compromises the stability of food and agricultural systems (Harmeling, 2011; Kamruzzaman et al., 2020). While global climate change effects are disproportionately harsh in developing countries, agriculture in every country is increasingly exposed to extreme weather and other climate change consequences (Ortiz-Bobea et. al, 2021).

The *AGree Report on Food and Agricultural Education* emphasized that workforce preparation was needed to mitigate challenges to food and agriculture from climate change and related problems (Mercier, 2015). As climate change undermines the food and agricultural sector (Moore et al., 2017), research is needed to identify the competencies that graduate students need to address the challenges of climate change. While ample employment opportunities for agricultural graduates are anticipated (USDA, 2015), climate change is one of the multiple challenges demanding that curriculum be assessed to ensure a scientific and professional workforce (Stripling & Ricketts, 2016).

Purpose and Objectives

The purpose of this study was to identify the perceptions of faculty – who were regarded as experts in climate change – about climate change-related agricultural challenges and agricultural graduate students' preparation for meeting those challenges. The specific research questions were:

1. What are the greatest climate change challenges faced by current and future agriculture professionals?
2. Presently, what courses and/or experiences related to climate change are available for graduate students?
3. What are the needed knowledge and skills for the graduate students preparing to mitigate climate change-related agricultural challenges?
4. What are the specific courses and/or experiences needed to prepare graduate students to face climate change-related agricultural challenges?

Methods

This was a Delphi study whereby agricultural experts were asked to address questions relative to climate-change-related agricultural challenges and the knowledge, skills, and experiences needed by agricultural graduate students to address the challenges. First, the 12 department heads in the North Carolina State University College of Agriculture and Life Sciences were asked to nominate faculty for this Delphi panel who they viewed as experts in climate change. The department heads nominated 31 faculty. Next, the nominees were contacted via email and invited to participate, and six agreed to participate on the Delphi panel. In the first round, participants were asked four open-ended questions, aligned with the research questions. Researchers summarized the results in preparation for the second round in which panel members were asked to consider the first round responses and rate each response using the following scale: 1 (*not important*), 2 (*least important*), 3 (*somewhat important*), 4 (*important*) and 5 (*very important*). In the second round, panel members were asked to include any responses that may have been overlooked in the first round. In the third and final round, panel members were asked to identify the priorities from those responses ranked as important and very important. All of the surveys were completed using Qualtrics, and no names or other identifiers were reported.

Results

Regarding the greatest climate change challenges faced by current and future agricultural professionals, the panel prioritized two challenges: (a) building leadership capacity for climate change mitigation “so that they can motivate and guide their communities as they address the need to change crops and practices for success in changing conditions,” and (b) understanding, predicting, and mediating how climate change will impact water availability. Additional challenges were decreasing agricultural emissions, using less land while increasing total agricultural outputs, and changing people's behavior in preparation for a changing climate.

Limited courses and experiences related to climate change are available for graduate students with the exception of biological and agricultural engineering which includes climate change in a number of courses including microbiology, bioprocessing, wetlands, and air quality. Panel members described the major knowledge and skills needed by agricultural graduate students as being able to find, evaluate, and synthesize information from multiple sources and distinguish trustworthy sources from misinformation; understanding how our current agricultural systems work and contribute to climate change; and understanding the potential for crops to help mitigate climate change. The specific courses and/or experiences needed to prepare graduate students to face climate change-related agricultural challenges were prioritized by panel members along two perspectives. First, students need more opportunities to learn about the “ultimate drivers of climate change” including poverty, inequity, and culture as part of our socioecological systems. Second, graduate students need a mandatory course exploring climate change and agriculture that does not conceal the influence of agriculture on climate systems.

Recommendations and Implications

Only six of the 31 nominated climate change experts agreed to participate in the study. While the study was conducted during the fall semester, one of the busiest times for agricultural faculty engaging in teaching and advising, this low participation is concerning. It may point to faculty reluctance to participate in climate change issues, and research is needed to understand the context in agriculture and academia for climate change conversations and research. Furthermore, an earnest concern is the low number of graduate courses and student opportunities related to climate change reported by panelists,

underscoring the need to explore context. The panelists prioritized the need for a graduate course exploring climate change and agriculture, and a systems-thinking approach, inclusive of leadership development, water availability, and mitigation strategies, is recommended. Graduate coursework in agriculture should prioritize equipping students to access and decipher trustworthy climate change research. One of the major implications of this study is that human and resource systems were prioritized, and agricultural and extension education faculty should provide leadership for the interdisciplinary approaches called for in this study.

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Promoting Critical Thinking in Kenyan Undergraduate Students: Is the Critical Thinking Inventory the Right Tool?

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Abstract

Introduction

Critical thinking is a cognitive process characterized by logical reasoning, inference, and problem-solving (Cottrell, 2011; Facione, 1990; Lamm, 2015a, 2015b; Paul & Elder, 2003). Developing critical thinking has received significant attention, particularly in developed nations, due to its positive relationship with academic success, employability, psychological health, and other areas of life (Barrick & DiBenedetto, 2019; Ongesa, 2020; Shavelson et al., 2019; Stuppel et al., 2017). Research indicates that students with adequate critical thinking skills draw sound conclusions, make well-informed decisions, and significantly contribute to society (Stuppel et al., 2017). In Sub-Saharan Africa, educators are being urged to utilize pedagogical models that enhance students' critical thinking (McCowan et al., 2018; Schendel, 2020). For example, Kenya has historically pegged its educational reforms on reports emphasizing knowledge acquisition over practical application or critical thinking (Ongesa, 2020; Schendel et al., 2019). Consequently, many students cannot complete critical thinking tasks, attributable to teachers who did not get the necessary training (Ongesa, 2020). Kenya recently transitioned from a curriculum emphasizing memorization, rigidity, and passive learning to a competency-based curriculum (CBC) in an attempt to impart critical thinking skills (Ongesa, 2020). The new CBC's educational objectives include teaching critical thinking with no lack of an explicit critical thinking philosophy or action plan that specifies how learning outcomes should be measured (Ongesa, 2020). With Africa's population expected to hit a billion by 2050 (Winthrop & McGivney, 2017) and a large proportion of the population under 24, fostering critical thinking among the continent's youth, including those in Kenya, could spur economic growth (Winthrop & McGivney, 2017). Therefore, validating a critical thinking inventory (CTI) in Kenya could pave a road toward identifying a cheap and valid criterion-referenced instrument for assessing critical thinking in educational settings.

Purpose & Objectives

This study aimed to examine if the proposed model structure for the Critical Thinking Inventory (CTI; Lamm & Irani, 2011) was consistent with the set of observed variables in the Kenyan higher education system. The study was guided by one research objective.

RO: Assess the validity and reliability of the CTI in the Kenyan higher education system.

H₀: The CFA model adequately fits the CTI in the Kenyan higher education system.

H₁: The CFA model does not adequately fit the CTI in the Kenyan higher education system.

Methods

A confirmatory factor analysis (CFA) was used to evaluate if the CTI developed by Lamm and Irani (2011) had model fit, validity, and reliability (Lamm & Irani, 2011) when used on a convenience sample of 387 Egerton University undergraduate students using pre-determined standards (e.g., Hair et al., 2019; Hooper, 2008; Kline, 2015). The CTI was distributed online to respondents via Qualtrics (Dillman et al., 2014). The CTI consisted of twenty (20) Likert-type questions scored on a five-point scale ranging from *Strongly Disagree* (1) to *Strongly Agree* (5). (Lamm & Irani, 2011). Thirteen items assessed information-seeking preferences when thinking critically, while seven assessed engagement preferences when thinking critically. The statistical software AMOS 26 was used to analyze the data. Chi-Square (χ^2) goodness of fit, root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI) were used to assess the CFA model's fitness (Hair et al., 2019; Hooper et al., 2008). The composite reliability and multiple squared correlations (R^2) were used to assess the CTI's reliability and identify those variables that should be eliminated from the model, respectively (Hair et al., 2019; Hooper et al., 2008). Construct validity was assessed using convergent validity and discriminant validity.

Results

Measurement Model Fit

The CFA results indicated that none of the model fit parameters were met, $\chi^2(169) = 503.204, p < .000$; CFI = .835; TLI = .795; RMSEA = .072 (Browne & Cudeck, 1992; Hooper et al., 2008; Hu & Bentler, 1999; Schreiber et al., 2006). The results imply the hypothesized measurement model of the CTI did not sufficiently fit the Egerton University data (Shek & Yu, 2014).

Construct Validity

The average variance extracted (AVE) for the engagement (0.34) and seeking (0.29) constructs were below the recommended value of .05, implying convergent validity for the hypothesized CTI measurement model was not met (Fornell & Larcker, 1981). The Fornell and Larcker criterion, which examines if the square root of AVE for the seeker (0.59) and the engager (0.53) constructs is greater than the inter-construct correlation (.94), was used to assess the discriminant validity for the hypothesized CTI in the Egerton University model and was not met.

Reliability

The Cronbach alpha values for engagement ($\alpha = .82$) and seeking ($\alpha = .76$) scales indicated acceptable item consistency. Composite reliability computed for a CFA, for the engagement (0.78) and seeking (0.83) constructs were greater than the required limit of 0.60, indicating acceptable composite reliability (Hair et al., 2019).

Multiple Squared Correlations (R^2)

Multiple squared correlations revealed that two seeking items and one engager item had R^2 values less than .20, which, if removed, could enhance the validity of the CTI in the Kenyan context (Hooper et al., 2008; Kline, 2015).

Conclusion and Recommendations

The CFA test statistics for the study indicated the model fit parameters and construct validity were not met. Therefore, the CTI's hypothesized measurement model did not effectively assess critical thinking among Kenyan undergraduate students. The indices, however, were not far from the acceptable limits of $TLI \geq .95$, $CFI \geq .90$, and $RMSEA \geq .70$, suggesting the instrument could still be validated or modified to fit the Kenyan context. It is worth noting the sample size of the current study limits the generalization and interpretation of the findings. Apart from the respondents coming from one university, the sample size of 387 was closer to the lowest recommended limit and may have compromised the CFA results. Given these limitations, future research should consider larger samples and diversity across several universities to enhance validity of the CFA results and improve the generalizability of the findings. Furthermore, the ineffectiveness of the factorial structure of the present CTI study presents an opportunity to conduct more research devoted to creating one applicable in Kenya.

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Teaching Outside of the Margins: School-Based Agricultural Education Teachers' Perspectives on Globally Competent Teaching During an International Experience

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Abstract

Introduction

The globalization of our world has seemingly reshaped society's social and professional fabric (Longo & Saltmarch, 2011). This shift has led individuals to engage in more globally integrated activities across borders, which has been crucial to growing our world's economy (Myers, 2010). For individuals to be competitive in this rapidly changing workforce, it has become critical for them to understand how their careers have become situated in the global landscape (Cseh et al., 2019). This notion has become particularly relevant for the agricultural industry, which has been tasked with preparing future generations to succeed in the global economy (Radhakrishna et al., 2003). On this point, some researchers (Brooks & Williams, 2001; Gorter et al., 2020) have called for using international experiences to expand SBAE teachers' perspectives on globally competent teaching. For instance, Brooks and Williams (2001) found that after teachers participated in an international experience in Costa Rica, they felt more prepared to teach concepts in SBAE from a global perspective. Although these findings have been encouraging, insufficient evidence has examined the role of international experiences in shaping SBAE teachers' perspectives on globally competent teaching. Consequently, Tichnor-Wagner et al. (2019) model of globally competent teaching emerged as the most appropriate lens to interpret the findings.

Purpose

This investigation sought to examine Louisiana SBAE teachers' perspectives on globally competent teaching.

Methods/Data

We used Stake's (1995) instrumental case study design to achieve this investigation's purpose. The case was bounded by career and place; for example, all participants were SBAE teachers from [State] who were selected using a competitive application process to engage in an international experience in Costa Rica, which was funded by a USDA-NIFA grant. During the international experience, the teachers were required to submit the following reflective items: (a) audio reflections of their most salient experiences abroad, (b) a photograph and caption of their most significant cultural takeaway, and (c) a photograph and caption of their most significant teaching takeaway. We also conducted persistent observations and a two-hour focus group interview with all eight participants on the final day of their experience abroad in Costa Rica.

After the data were collected, we analyzed the data using the following first-cycle coding procedures: structural, descriptive, and in vivo (Saldaña, 2021). Next, we utilized axial coding to examine the existing relationships among the first-cycle codes and reduce them to categories. At this point, we met as a research team to negotiate our categories to ensure they made sense in the context of this investigation. During this phase, we also employed thematic analysis to distill our findings further and emerge the study's three themes.

Findings

As a result of our analysis of the data, three themes emerged (1) teaching outside of the margins, (2) global storytelling, and (3) innovative global experiences.

Theme #1: Teaching Outside of the Margins

During their time in Costa Rica, the teachers began to articulate a shift in their thinking in regard to teaching agricultural and environmental concepts that extended outside of the margins. In particular, they began to talk about the need to feature the experiences of marginalized populations when teaching. For example, Participant #7 said: "I am beginning to understand that teaching ag is more than just about teaching facts but also changing the hearts and minds of my students to [create a more] just world." Moreover, Participant #2 shared: "when I get back home, I want to make sure to teach about how agriculture has a great diversity of people, traditions, and practices. I need to [do a] better job highlighting that diversity in my ag classes."

Theme #2: Global Storytelling

As a result of the teachers' shifts in global thinking during their time in Costa Rica, they began to ponder ways to instill such a perspective in their students – a notion that was not included in Tichnor-Wagner et al. (2019) model. Perhaps the most common strategy the teachers articulated was how to use storytelling to resonate with their students to build empathy and have them more authentically engage in global problem-solving. For example, we observed Participants #1 and #6 capturing video throughout the international experience. When asked why they did such in the focus group interview, Participant #1 shared: "We got the video because I do not think my reflections are powerful enough. I want my students to really feel and experience what I have here in an impactful way."

Theme #3: Innovative Global Experiences

The final theme, innovative global experiences, emerged during the international experience as teachers brainstormed ways to integrate global learning into their curriculum (Tichnor-Wagner et al., 2019). For example, we observed the teachers talking informally about ways to integrate global concepts into the content they had already taught in SBAE. Further, several participants mentioned organizing an international agriculture experience that would allow teachers in [State] to take their students abroad. We also observed several teachers exchanging contact information with professionals and individuals they met in Costa Rica so they could arrange virtual guest lectures for their SBAE classes.

Conclusions, Discussion, Implications, and Recommendations

This investigation examined [State] SBAE teachers' perspectives on globally competent teaching. We demonstrated that the teachers expressed three primary strategies they intended to use to foster global competence for their students as a result of their international experience: (1) teaching outside of the margins, (2) global storytelling, and (3) innovative global experiences. Consequently, we conclude that this short-term international experience for SBAE teachers appeared to expand their perspectives on globally competent teaching positively. It should be noted, however, that although two of our themes aligned with concepts expressed in Tichnor-Wagner et al. (2019) model, the second theme did not. Further, multiple elements outlined in the model were not articulated by the teachers in this investigation. As such, we conclude that the SBAE teachers in this investigation should not be considered fully globally competent; instead, their global identity appeared to be still emerging. Consequently, we recommend that future research examine whether Tichnor-Wagner et al. (2019) model should be revised to reflect different phases of global competence.

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Case Study: Catracha Coffee, a Replicable Business Model?

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Abstract

Introduction

Rural communities' economic and social development can be attributed to the input of organizations and business models dedicated to developing programs that can create a sustainable approach to improving livelihoods through income-generating activities. Small and medium-sized businesses (SMEs) are crucial to a country's wealth production, job creation, and economic growth. As a result, the emergence and survival of these business models are fundamental for the economic development of many communities across the globe (Ibarra et al., 2020). Therefore, these rural initiatives must follow an approach that combines the characteristics and values of the business for income generation while still integrating the three pillars of sustainability within its core.

In communities where agricultural products are the basis for income generation, many limitations hinder producers from acquiring the necessary resources to improve productivity, limiting the possibility of increasing profits from their production and ultimately impacting their ability to improve their livelihoods (Fernández Martínez et al., 2020). In this context, the presence of small and medium-sized businesses allows these communities access to opportunities that reduce these limitations, creating a link for the community toward sustainable development through these businesses. When discussing sustainability, it is crucial to assess the economic value of the activity and social and environmental value, which leaves enough space for the emergence of social enterprises, which foster inclusiveness in the communities it serves (Yunus et al., 2010).

A Social Enterprise [SE] is a fast-emerging entity that generates social impact through an entrepreneurial approach (Jilenga, 2017). It can also be defined as a private organization that works towards one or more social welfare goals while participating in the marketplace. It attempts to create and legitimize new institutional entities by combining market and social values (McInerney, 2012). A SE is designed and operated like a 'regular' business enterprise, with products, services, customers, markets, expenses, and revenues. It is a no-loss, no-dividend, self-sustaining company that sells goods or services and repays investments to its owners but whose primary purpose is to serve society and improve the lot of the poor (Yunus et al., 2010).

Purpose and Objectives

This study aimed to define the replicability of a social entrepreneurial approach to coffee production and marketing in Honduras.

Methods and Data Sources

A qualitative approach was employed for this study's data collection and analyses. A purposive sample of coffee producers was included to collect data using focus groups to understand the business model's value among producers. A total of 40 coffee producers participated. Descriptions were facilitated to enhance the transferability of the data, and . keywords-in-context was used to identify themes that emerged from the focus groups, following data saturation in general and across-group saturation. Data triangulation was used to establish the trustworthiness of the research and to strengthen the analysis and authentication of the study. (Creswell & Creswell, 2018).

Results and Conclusions

A total of forty producers participated in the four focus group sessions, of which 14 were women with an age range from 28 to 78 years. The other remaining participants were men with an age range from 27 to 68 years old. This representation of women participating in focus group sessions is similar to the findings of the European Commission in 2018 regarding women's involvement in the coffee value chain in Honduras.

Women's engagement in this study was predominant. Some of the key findings in the focus sessions were mentioned by female participants. The findings were centered on what *Catracha Coffee* as a social enterprise can offer compared to other entities that follow a more traditional business model. In several ways, all benefits were linked to "accessibility." Within the scope of what accessibility is, specific keywords and phrases were predominant: finance, service delivery, capacitation, international coffee market, better prices, and workforce.

According to the findings, there is a link between *Catracha Coffee* and access to services and benefits that are essential for the socioeconomic development of the producers and their families. The perceptions suggest an intrinsic relationship between the community's socioeconomic development and the presence of social enterprise in the community. In their view, since *Catracha* has been present in the community, there have been significant changes for them as producers and the community. A perfect example of this significant change are the social programs that provide trainings to farmers and their family members aiming to learn different income-generating activities such as embroidery and pastry making. These findings are similar to the ones obtained by Nega and Schneider (2014) in South Africa. They found that social entrepreneurs positively impact communities' development (Nega & Schneider, 2014).

Implications

Overall, this study allows researchers and practitioners to comprehend better the importance of small and medium-sized businesses operating within rural communities. It also highlights that qualitative research plays a fundamental role in understanding how locals perceive these businesses' presence in rural communities and the impact these businesses can have on them.

The findings suggest that access to financial services, information, and markets for many producers are the key challenges when trying to expand or innovate their farms. *Catracha Coffee's* business model demonstrates that small agricultural communities can achieve sustainability by integrating programs that promote food security, economic development, and cultural heritage. It also links that access to financial assistance, in turn, allows a higher purchasing power that allows producers to invest in the

farm, family, and other needs, promoting development in rural communities and supporting social entrepreneurial activities.

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International Interests: Student and Industry Perspectives on Agricultural Communications Curriculum Development in Ontario

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Abstract

Introduction

Agricultural communications programs have existing in U.S higher education since the early 1900s (Tedrick, 2009). Despite notable growth and roughly 35 of such programs, there are no comparable programs at any Canadian institution (Weckman, Witham & Telg., 2000; Miller et al., 2015; Cannon et. al., 2016; Fernandez, Goecker, Smith, Moran & Wilson, 2020). With both countries' industries being under more scrutiny than ever, Canadian agriculture faces issues such as increased industry scrutiny, the rise of misinformation, and a decrease of agricultural literacy without traditionally-trained agricultural communicators to combat them (Miller, Large, Rucker, Shoulders & Buck, 2015; Cannon, Specht & Buck, 2016; Kurtzo, Hanson, Rucker & Edgar, 2016; Agriculture and AgriFood Canada, 2018).

With this in mind, the University of Guelph Ontario Agricultural College (OAC) is largely regarded as the flagship agricultural institution in the country and serves as a prime location for the flagship modern Canadian agricultural communications program.

Purpose & Objectives

With the purpose of agricultural communications programs being to serve students and industry, these two perspectives were the key stakeholders considered for this study. This study explored and highlighted the cultural elements existing within Ontarian agriculture and the University of Guelph, OAC and highlighted these populations' understandings of and attitudes toward agricultural communications in industry and academia.

The following research questions guided this study:

1. Do current/future Ontarian agriculture students desire an agricultural communications program?
2. Do Ontarian agricultural industry professionals desire an agricultural communications program?
 1. How important are skilled agricultural communications graduates in the eyes of industry professionals and how hireable would these graduates be?

Methods

This study follows the conceptual framework by Wolf (2007) and the process-oriented curriculum theory by Glatthorn (2005). Glatthorn (2005) defines process-oriented curriculum theories as describing and recommending curriculum development, connecting to the preliminary curriculum development stages of this study. The Curriculum Visioning stage of Wolf's (2007) focuses on initial conversations with key stakeholders to assess the curriculum and identify ideal traits for graduates and important curriculum content and opportunities. This stage was the focal guide for this study.

This study was a qualitative descriptive case study that utilized focus groups of students at the University of Guelph OAC (n = 18) and Ontarian agricultural industry professionals (n = 6). Participants were selected using purposeful and snowball sampling methods. Focus groups were conducted over Zoom with students and professionals separately and a demographic survey was distributed after via Qualtrics.

Data were analyzed through an open-coding process to identify common themes. A combination of triangulation and crystallization methods were used to accommodate for researcher connections to the study and to increase validity.

Results & Conclusions

Students indicated a self-identified lack of understanding of agricultural communications in industry and academic contexts and used this as rationale for the importance of having such a program at the University of Guelph. Professionals had a more nuanced understanding of the field, noting the importance of storytelling, translating, and being a people sector.

Students responded positively to either a major or minor option being available. Notably, two students indicated not having a personal interest, but both upheld the value of the program for other students and industry. Students unanimously noted that the program would not only coincide with the culture of the OAC but uplift it and allow the institution to remain at the forefront of agriculture. Professionals collectively asserted that educating and training in agricultural communications is a priority and that all students should have some form of education in this area. Further, they asserted that graduates coming into positions in the field lack the necessary formal grounding from their education to be successful.

Finally, professionals reiterated this importance by noting that graduates with the desired agricultural communications skills are in demand and that new opportunities are being created in the field. Professionals also noted their belief that most agricultural jobs require communications elements, making education in this field a priority for all agriculture students.

Implications & Recommendations

The lack of understanding of students of agricultural communications contrasted with the more nuanced industry comprehension can directly correspond with a lack of agricultural communications representation in education. Professionals in their nuance also connected to common science communication themes reflected in literature, such as acting as storytellers and translators (Morgan & Rucker, 2013; Joubert, Davis & Metcalfe, 2019).

With student support (even from the two disinterested students), the inherent value of a future program is upheld. It reiterates that while not every student will be interested, the program would still

offer valuable education and would also expose other students to opportunities they perhaps did not realize they were missing.

Industry responses surrounding the growth of agricultural communications and a shift in the industry are substantiating by similar trends occurring in the U.S. industry (Weckman et al., 2000; Miller et al., 2015; Cannon et. al., 2016; Fernandez et al., 2020). Moreover, professionals emphasized the high priority placed on training students in this field, with one professional noting that each student she hired from the University of Guelph for communications positions claimed that their education did not prepare them for the position. This indicates a specific gap at the University of Guelph that should be addressed.

From these responses, and other responses from the broader study, a basis for the “ideal” program for the University of Guelph was designed using Wolf’s (2007) Curriculum Development model.

Further research in this subject should continue the other stages of Wolf’s (2007) framework to have a comprehensive curriculum development plan. Other stakeholders’ opinions from outside Ontario or within the University of Guelph should also be taken into consideration through a similarly designed study to accommodate the most pertinent audiences.

Moreover, the Canadian agricultural industry should be more broadly engaged to rally support for such a program. The University of Guelph OAC should be involved in future efforts to identify how and where such a program would best fit within the institution.

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Participatory and Culturally-Responsive Needs Assessment to Identify Research and Extension Priorities for Agronomic Crop Production

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Abstract

Introduction and Literature Review

In the last 10 years, acreage under agronomic crops has declined by about 30% in California with a corresponding shift towards tree crops (California Department of Food and Agriculture, 2020; United States Department of Agriculture National Agricultural Statistics Service, 2020). Agronomic crops are adaptable to different soil and climate conditions providing management flexibility and other benefits, yet tree crops are replacing them in the state. University of California Cooperative Extension (UCCE) Advisors and Specialists conduct applied research and extension to address the needs of growers and allied industry sectors in the state. However, they are not in the required proportion to the number of growers they serve to be able to cover all the counties of the state. Most of the Agronomy Extension Advisors are covering multiple counties. On the other hand, there has been a significant decline in funding to Extension over the last few decades resulting in excessive workload both in terms of securing external funding for research and to cover multiple counties for extension programming.

To address this situation, the UCCE Agronomy Program Team designed and implemented a statewide collaborative needs assessment survey to identify priority areas for research and extension and make decisions on optimizing available resources to meet the grower and industry needs satisfactorily. This presentation will share the steps followed in developing this needs assessment in a participatory and culturally responsive manner and highlight how the Importance-Performance Analysis (IPA) framework was used to prioritize research and extension activities for UCCE Agronomy Extension Advisors and Specialists.

Purpose and objectives

The purpose of this presentation is to share the steps followed by the Agronomy Program Team in developing this collaborative statewide needs assessment idea, survey development and administration, data collection and analysis, and interpretation and use of the findings. We will also share the survey results related to the identified high priority topics for UCCE research and extension.

Methods

The Agronomy Program Team worked with the UCCE Evaluation Specialists right from the ideation stage to results utilization phase. Evaluation Specialists gave a presentation at the Program Team's meeting on benefits of conducting statewide and collaborative needs assessments. After that, a collective decision was made on the sampling frame and the survey distribution channels so both the current UCCE clients and those that are not being served currently were included in the sample. Various stakeholder groups were involved during the survey validation and pilot testing phases. Such a participatory and culturally-responsive approach is expected to ensure that the results are usable for all the stakeholders involved (Cousins & Whitmore, 1998; Patton, 1997). We used IPA to prioritize UCCE research and extension activities and making programming decisions. IPA "is a methodology that may allow Extension professionals to prioritize the characteristics of an issue, a resource, or so on that should receive the most attention" (Warner, et al., 2016, p.1).

A descriptive cross-sectional survey was administered using Qualtrics following the protocols for conducting an agricultural extension needs assessment ((Donaldson & Franck, 2016; Koundinya et al., 2020; Martins et al., 2019). The survey was administered to 4,813 growers, consultants, and allied industry professionals of agronomic crop production in California who were on the centralized contact list compiled by the UCCE Advisors and Specialists and to other stakeholders that UCCE is not currently serving by partnering with external organizations to assist in outreach. We received 483 responses.

Results and Conclusions

Survey respondents identified insect pest control, nutrient management, disease control, weed control, variety testing, irrigation management, soil health management, testing new products, and water conservation and storage as high priority needs and expressed overall high satisfaction with UCCE's program delivery on these topics. Areas of low priority and low satisfaction included niche marketing, emerging crops, harvest/post-harvest, salinity management, crop establishment, compost and manure management, and greenhouse gas reduction. There were differences in priorities by county and regions in the state.

UCCE should prioritize resources and support towards research and extension programs more directly impacting on-farm agronomic crop production to meet the needs of all the relevant stakeholders as identified in different regions of the state. At the same time, areas of low interest reflect an opportunity to better engage farmers on topics, particularly those concerning state environmental regulations and challenges to local and global food production and security.

Recommendations, Educational Importance, and Implications

Working with the evaluation specialists and adopting participatory and culturally-responsive frameworks ensured that addressing the identified priority areas will have buy-in from the various stakeholders involved in this study. The extension education program development method followed in this study has implications for extension researchers and educators working in the other states of the Cooperative Extension System and outside the United States, where they have similar resource constraints and workload situations.

Keywords: Participatory needs assessment, extension program development, culturally-responsive approach, Importance-Performance Analysis

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Explicating the Relationship Between Undergraduate Students' Critical Thinking Styles and Country of Origin

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Abstract

Introduction

The contemporary focus on the importance of critical thinking skill in many aspects of life has resulted in significant research focused on its antecedents, outcomes, and underlying dimensions (e.g., Barrick & DiBenedetto, 2019; Stupple et al., 2017). From the literature, critical thinking is a cognitive process involving methodical reasoning, sound decision-making, and problem-solving (e.g., Cottrell, 2011; Lamm, 2015a, 2015b; Paul & Elder, 2003). Critical thinking styles range from engagement to seeking information (Lamm, 2015c). Information seekers actively seek knowledge—expanding upon information and examining problems from multiple vantage points to make objective decisions (Lamm & Irani, 2011; Lamm, 2015c). Critical thinkers who engage use collaborative and hands-on approaches in their reasoning and problem-solving, clearly articulating their decision-making and problem-solving processes (Lamm, 2015c; 2015d). The most productive critical thinkers employ both approaches when analyzing a problem, as both are essential (Lamm & Irani, 2011). Most international scholars, including agricultural communicators, have focused on influencers of individuals' critical thinking skills (e.g., Changwong et al., 2018; Dehghanzadeh & Jafaraghaee, 2018; Erikson & Erikson, 2019; Oh et al., 2018; Sovacool et al., 2018; Zapalska et al., 2018) with only a few examining the antecedents of critical thinking styles (e.g., Lamm, 2015c; Lamm & Irani, 2011; Muali et al., 2018; Owens & Lamm, 2016; Putnam et al., 2017; Shirazi & Heidari, 2019). This study informs the agricultural communication and education fields by shedding light on how undergraduates from different cultures think critically, including those in agricultural communication.

Purpose and Objective of the Study

The purpose of this study was to identify critical thinking linear variates which best separate students by their country of origin. The study was guided by one research objective: Determine if undergraduate students in the United States, Nepal, and Kenya can be distinguished by a linear combination of critical thinking styles.

Methods

Survey data were collected via Qualtrics from 387 undergraduates, including agricultural education and extension students conveniently selected from three universities in Kenya, the United States, and Nepal. A discriminant function analysis was utilized with Wilk's test to discriminate between the students' critical thinking styles (seeking and engaging) at an alpha level pre-determined as significant at .05. The grouping variable (DV) was three-nominal level (0 = United States, 2 = Nepal, and 3 = Kenya). The

discriminating variables included 13 engagement-oriented and seven seeking-oriented items, which comprised the constructs measured using the Critical Thinking Inventory (CTI; Lamm & Irani, 2011) comprised of 20 Likert-type items (1 = *Strongly Disagree* to 5 = *Strongly Agree*). All validation assumptions were assessed, including normality, multicollinearity, variance /covariance matrix homogeneity, skewness, and kurtosis (Field, 2018). Significant factors were determined by calculating the coefficients with absolute values not less than half of the largest value of each function (Field, 2018; Hair et al., 2014).

Results

Findings revealed small differences between scores on the engagement construct of Kenyan ($M = 4.06$, $S.D. = .61$), Nepalese ($M = 3.79$, $S.D. = .47$), and U.S. ($M = 3.95$, $S.D. = .51$) students. Similarly, there were differences in the mean scores on the seeking information construct between Kenyan ($M = 4.07$, $S.D. = .59$), Nepalese ($M = 3.86$, $S.D. = .37$), and U.S. ($M = 3.68$, $S.D. = 1.61$) students. Two discriminant functions were revealed. The first variate explained 70% of the total variance, canonical $R^2 (R_C^2) = .05$, whereas the second explained 30%, canonical $R^2 (R_C^2) = .02$. Together, the two discriminating variables significantly discriminated between the students based on their country of origin, Wilk's Lambda $\lambda = .93$, $\chi^2 (4) = 48.24$, $p < .001$.

After removing the first function, the second function significantly differentiated between groups, Wilk's Lambda $\lambda = .98$, $\chi^2 (1) = 14.68$, $p < .001$. The structure matrix indicated a preference for engagement loaded highly onto function 1 ($r = .96$) and negatively and moderately onto function 2 ($r = -.29$). A preference for seeking information loaded highly onto functions 1 and 2, respectively ($r = .72$, $r = .69$). Both the standardized coefficients ($C_S = .80$) and structure matrix ($r = .96$) identified the level of engagement as the most influential positive measure of students' critical thinking style regarding function 1. It is worth noting that the first function differentiated between students' engaging ($r = .96$) and seeking preferences ($r = .72$) in a similar way, while the second differentiated students on a dimension affecting students' engaging and seeking preferences inversely. The model originally achieved 58% of the grouped cases correctly classified. Model reclassification achieved 91.2%, 17.2%, and 4.2% correct classification of students from Kenya, Nepal, and the United States, respectively.

Conclusion and Recommendations

The discriminant analysis showed that the respondents' countries of origin could be told apart by a linear combination of engaging and seeking preferences, above chance occurrence alone. The absolute values of the two dimensions were greater than half of the largest value when reviewing the standard canonical coefficients, validating the significance of the two critical thinking dimensions to the discriminate functions. The first function discriminated between students' engaging and seeking preferences in the same direction, while the second discriminated between them on a dimension that was inversely related to students' engaging and seeking styles. The international community of scholars should prioritize measurements, and educational content focused on both dimensions of critical thinking as they collectively define it. The results give communication and education scientists a chance to keep researching how to improve their students' critical thinking by letting them express themselves through both constructs. Other research methods, like experimental designs, should be used to understand how students think critically. As this was a self-reported online survey of students from three universities, some may have overestimated their critical thinking levels. The discriminant functions and model classification statistics invite agricultural communication and education research on the relationship

between nationality-related variables and others, including personality traits and learning styles. Lastly, examining more universities can generalize the study results to a larger group of people.

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Challenges and Opportunities of Using Information and Communication Technologies (ICT) in Groundnut Value Chains in Rural Uganda

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Abstract

Introduction

Smallholder farmers contribute significantly to the world's total food production but are located in some of the poorest regions, with challenges such as disinterest of youth, lack of mechanization, and reliance on outdated tools, techniques and methods which are major obstacles to maximizing their production capabilities (Amekawa et al., 2010). Interventions at the grassroots level are highly important to address these challenges and improve farmers working conditions. While capital investment, changes in policies, heavy machinery and mechanization are crucial to reform agriculture, micro-level changes in better information dissemination, communication and networking can lead to significant rural and agricultural development. Information and Communication Technologies (ICT) can enable rural transformation without disrupting well established native systems of agricultural practices and knowledge. The broad functions of ICTs in supporting this new notion of advisory services: the need to provide localized, customized, and highly accessible information; the need to archive and provide reference information for a wide array of actors in the sector (from fertilizer application rates to quality standards for food processors and exporters); the need to facilitate networks (local, regional, global) for collaborative, interdisciplinary approaches to problem solving and research diversification through shared knowledge bases, online forums, and collaborative spaces; and the need to empower and "give voice" to rural communities (World Bank, 2011).

In this context, ICT at the grassroots level can be useful for improving farmers' livelihoods, increasing youth engagement and modernizing agricultural practices. Manolo et al (2013) argue that ICT can change perceptions of young people about farming as gainful employment, as it presents agricultural work as more sophisticated and technical. With the technological advancements and telecom development, simple handheld devices can offer advanced facilities. Smartphones combine telephone and computer functions and can serve as useful tools for farmers. Access to information is a vital part of agricultural development, ranging from weather reports, pre and post-harvest factors such as business enquiries and cost of raw materials to post-harvest storage can all be eased by smartphone services. They have the potential to reform how business is conducted, agricultural extension and advisory programs are carried out, and mitigate constraints at different levels of the value chains (Cai et al., 2022; Daum et al., 2018).

Access to information about agricultural knowledge is essential to develop farmers' abilities to maintain and increase farm productivity. Smallholder farmers engage with various steps of the value chain and traditionally, agricultural information and technical knowledge is passed down in families and communities and disseminated via newspapers, television and programs run by governments or university extension services (Wright et al., 2016). Information dissemination and modernization both

can be achieved by smartphones. Since 2000, mobile phone technologies have been widely adopted in developing countries. Mobile phones have significantly improved people's access to information, especially for the rural poor who were never connected to landline phones before. Mobile phones have also reduced other types of transaction costs, thus improving the functioning of markets (Sekabira & Qaim, 2017, p1). Additionally, Ugandan youth are drawn to "modern" techniques and tools and seek business opportunities in agricultural value chains (USAID, 2016).

Smartphones can bridge this gap by introducing farmers to newer channels of information and communication providing opportunities for self-education, networking, and community organizing (Kayumova, 2017).

Purpose and Objectives

The objective of the paper are to explore a) smartphone adoption and usage by smallholder farmers in rural Uganda b) the impact ICT has on self-perception of the farmers in terms of their social status, business opportunities, and engagement with their work.

Methods

This study was conducted under the broad USAID Photovoice project in Uganda, wherein 60 farmers were provided smartphones and given training to take photographs of the groundnut value chain. In July 2022, a team from the University of Tennessee conducted semi-structured interviews with participants after completion of the Photovoice project. The interview guides contained questions regarding smartphone usage, social media usage, feelings of empowerment and challenges that came from owning a smartphone. The interviews were transcribed and read by researchers. Important statements were highlighted to create codes that were then condensed into recurring themes. The themes of networking, challenges and opportunities, empowerment, and integration in the groundnut value chain were used for analysis.

Results

Networking

Participants used applications like WhatsApp and Facebook to network with other farmers in the area as a medium of communication.

Challenges and Opportunities

It emerged that smallholder farmers benefit from efficient communication. Eased communication via smartphones provided opportunities for social development and networking by providing a relatively cost-efficient medium which can overcome challenges of time and distance. A recurring challenge for them, however, is the long-term overhead costs of owning and operating the smartphones. They have to bear the high costs of recharging the phone batteries and gaining access to internet services and if these were not available, they had to travel to nearby places to replenish the batteries or obtain access to the internet.

Empowerment

Access to smartphones also elevated the self-perceived social status of some participants, as they had access to the latest and more 'expensive' devices.

Integration into the Groundnut Value Chain

Some farmers reported that using smartphones and participation in the Photovoice project motivated them to participate in different parts of the value chain, especially marketing.

Recommendations/Educational Importance

Micro level changes such as efficient communication and access to latest personalized technology for farmers can prove beneficial and enable them to self-perceive practical and emotive growth from owning and using smartphones. There are still several ethical considerations of time and expenses that emerge. Especially, the costs of owning and maintaining a smartphone is important. Further investigation is needed on how effective communication and technical advancement policies can help relieve some of these everyday challenges of owning a smartphone. It is also important to note that the structural problems in rural and agricultural development, like mechanization, land reform and incentives for youth require proactive policies in addition to grassroots solutions.

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Ethnoveterinary Medicinal Plant Knowledge among Pastoralists in the Rangelands of Karamoja, Uganda: Prospective for Pluralism in Livestock Health Advisory Services

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Abstract

Introduction

Pastoralism is “a wide family of livestock-based, livelihood and food production systems that are highly diverse but that all share a specialization in improving animals’ diets (and welfare) by managing their grazing itineraries at a variety of scales in time and space” (FAO, 2021). It is a dominant form of production in agriculturally marginal areas or semi-arid environments. Medicinal plants are those that possess therapeutic properties or exert beneficial pharmacological effect on the human or animal body (Namdeo, 2018). Mathias-Mundy and McCorkle (1989), defined ethnoveterinary medicine as a system of maintaining animal health and curing diseases of animals that is based on folk beliefs and traditional knowledge, skills, methods and practices. Use of ethnoveterinary medicinal plants by pastoralist communities especially in hard-to-reach areas of the Eastern African region is still a common practice. Research on ethnoveterinary medicinal plants varies in relation to their utility and applicability in ruminants as well as stage of development for on-farm use. Mayanja et al. (2022) are currently reviewing evidence from formally-published scientific research into pharmacological activity and effectiveness of ethnoveterinary medicinal plants of Eastern Africa in control of livestock pests or disease pathogens. Ethnoveterinary knowledge has been referred to by Erarslan (2019), as the practice of local people in a given area to maintain the health and ensure the wellbeing of their domestic animals, and treat livestock ailments with their traditions, customs, and beliefs. The sources of ethnoveterinary medicinal plant knowledge as well as preferred modes of its acquisition within pastoralist communities of Karamoja, Uganda are not explicitly documented. In their paper on ethnoveterinary and bioveterinary knowledge, Majekodunmi et al. (2018) note that service provision to pastoralist communities is impacted by cultural and professional biases, as veterinarians with poor understanding of ethnoveterinary knowledge are unable to effectively deliver animal healthcare. **Purpose**

In pastoral systems, ethnoveterinary medicine can be a possible alternative to the conventional medicines which are increasingly not responding due to growing pathogen and parasite resistance. As part of a process to establish the prospects for sustainable use and development of ethnoveterinary plant technology for livestock pest and disease management, this study set out to determine the five topmost ethnoveterinary medicinal plants preferred for further research and development. The study also intended to establish participants’ initial source of information about selected plant items and the

topmost preferred sources of ethnoveterinary knowledge. The target was the pastoralist communities of Karamoja region, Uganda. **Methods**

A cross sectional study was done in seven districts of the Karamoja region of Uganda. Multistage, proportional to size sampling was used. Parishes were selected using simple random sampling while households and one participant from each were chosen purposively. A total of 422 participants were involved in a questionnaire survey between February and April 2022. A language interpreter familiar with the local dialect and ethnic group was engaged as interviewer for each study parish. Individual interviews were conducted in the Ng'Karimojong language and translated by the interviewers into English for filling the questionnaire and data analysis. The household survey questions specific to this communication gathered quantitative data. Subsequently, 345 questionnaires were analyzed. A one-way Anova and chi-square were used to check whether age and gender, respectively, are associated with choice of priority ethnoveterinary plant for research and development. The significance of the relationship between ethnicity and choice of priority ethnoveterinary plant was assessed using Kendall's tau correlation coefficient. A binary multivariate logistic regression model was used to assess the association between ethnicity and preferred source of ethnoveterinary knowledge.

Results

Of the 345 respondents, 78.6% were the household head, 13% parents or grandparents, 2.3% sons and 6.1% wives of the household head. From a list of twenty-two, the five ethnoveterinary medicinal plants (and their Ng'Karimojong names) selected by a collective 63.2% of participants (n=345), as priority for further research and development were: *Azadirachta indica* (Elira); *Warburgia salutaris* (Abach/Emukwa); cured *Nicotiana tabacum* (Etaba); *Dalbergia melanoxylon* (Ekapangiteng); and *Balanites aegyptiaca* (Ekorete). There was a statistically significant association between ethnicity and choice of priority ethnoveterinary plant however, neither age nor gender showed any relationship with that choice. For example, 45% of the Eture ethnic group selected *Azadirachta indica* while 51% of the Matheniko ethnic group selected *Warburgia salutaris*. The initial source of information about use of each plant was an Elder, i.e. matriarch, elders' council member or kraal leader, for 68 -75% of participants. Only 20 - 27% of participants did not know about use of one or the other of the five priority ethnoveterinary plants. The pastoralists (n=342) mentioned the preferred sources of information about ethnoveterinary control methods for livestock pests and diseases, in order of priority, as: Recorded voice stories of, or face to face instruction by, knowledgeable elders (74.85%); Designated community-based animal health workers - CBAHWs (43.86%); Farmer-to-farmer technology / knowledge dissemination (40.35%); Traditions to pass on knowledge through deliberately maintained / stabilised people-based systems (38.01%); and formal agricultural extension and veterinary service providers (36.26%). It is notable that choice of recorded voice stories of or face to face instructions from knowledgeable elders was significantly associated with ethnicity.

Conclusion, Implications and Recommendations

The elders' council members, female elders and kraal leaders are the source of initial information, to pastoralists in the Karamojong region, about the use of *Azadirachta indica*, *Warburgia salutaris*, cured *Nicotiana tabacum*, *Dalbergia melanoxylon* and *Balanites aegyptiaca* in management of livestock pests and diseases. The mention of five different preferred sources of traditional ethnoveterinary knowledge underscores the need for pluralistic extension which, according to Ong'ayo et al. (2016), is the appropriate mix of players and mechanisms in delivery of extension services. Among the preferred sources of ethnoveterinary knowledge is voice recordings of and face to face instructions from

knowledgeable elders. This is considered similar to Stucki et al. (2019) who in their study of ethnoveterinary contemporary knowledge in the Swiss cantons, established “family, ancestors and friends” as the source for the majority of users.

However we are cognizant of a possibly similar state in the current study area - as observed by Fre (2018) in Eritrea and Eastern Sudan - that numbers of men of knowledge have been greatly reduced by ongoing instability, the decimation of herds by drought and famine, and the reduction in medicinal plant material. We therefore put forward a case for investigation into the efficiency and ethnic acceptability of use of recorded voices of knowledgeable elders. The fact that study participants considered formal agricultural extension and veterinary service providers among the top five preferred sources of knowledge, supports the notion that as well as informal knowledge sharing, formal training should be encouraged, in order to document indigenous knowledge and practice, and the ways in which traditional adaptive strategies can be combined with new technology (Fre, 2018). In a pluralistic pastoralist society, it should be acceptable for different people to suggest alternative solutions to a problem, despite their opposing ideas. An implication of the study findings is that ethnoveterinary medicinal knowledge is still important for pastoralist communities, thus ways to ensure it is passed on – albeit together with biomedical knowledge - need to be investigated by extension educationists and researchers.

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Coffee Agroecological Systems, Adaptation, And Sustainability in Valle Del Cauca, Colombia

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Abstract

Introduction

Colombia is one of the most important producers of Latin America and the world (Ocampo & Alvarez, 2017). Still, statistics published by the National Federation of Coffee Growers have shown a decreasing number of total cultivated areas (Federacioncafeteros.org). The situation endangers the development of one of the most important crops for Colombia's rural sector. Consequently, the trend calls for attention as small coffee producers are the most susceptible individuals to abandoning coffee production (Forero Álvarez, 2010). More than half of the national production relies on small producers to satisfy the coffee demand (Rettberg, 2010). Thus, this study analyzes the different factors upholding sustainability in Valle del Cauca to understand its agricultural situation.

Purpose

The purpose of this study was to explore the challenges of coffee production and to highlight perspectives and experiences from interviews made with small and medium coffee producers. Three research questions guided this study: (a) how are agricultural models of coffee production for small and medium coffee producers in the region, and (b) How are the general attributes of the coffee agroecosystem upholding sustainable production? Furthermore, (c) How is sustainability predicted to continue in the agroecosystem of Valle del Cauca?

Methods

MESMIS is a methodological tool commonly used to evaluate sustainability from the smallholder and local perspective (Lopez-Ridaura et al., 2002). The evaluation cycle can be divided into two phases: the initial phase or analysis stage to identify and select the most relevant attributes for sustainability, and the synthesis phase, which consists of monitoring relevant indicators based on the analysis stage (López-Ridaura et al., 2005). This research explored the lands of Valle del Cauca by applying the initial three steps of the MESMIS cycle.

The lead researcher conducted semi-structured interviews, farm visits, and geographic observations to capture the coffee producers' recent experiences and perceptions. The fieldwork proved helpful in collecting information to elaborate on the sustainability assessment. Moreover, the first step of the research consisted of an open coding session (Saldaña, 2013) considering the data obtained from interviews performed during fieldwork, corroborating with the literature review, and consulting with the extension agent in the region to reduce any bias (Lincoln & Guba, 1985). The second step grouped codes and themes by similarity and frequency into a matrix (Saldaña, 2013). The matrix served to identify

relationships with each attribute of sustainability, considering the definitions and diagnostic criteria from the MESMIS theory. The third step consisted of selecting the most relevant themes and indicators from the second step to analyze the most significant factors for sustainability and incorporate them into the MESMIS scheme.

Findings

The information gathered during the interviews suggested that despite FNC's efforts to achieve better profitability and high-quality coffee, the current strategic plan to encourage sustainability tends to be insufficient and not even applicable to every coffee producer. Technification, agricultural diversity, and institutional arrangements were the most significant concepts noticed that are driving sustainability in Valle del Cauca. The three themes represented an extensive and versatile spectrum to analyze the crop's socioeconomic and environmental attributes.

Technification requires farmers to follow a set of practices and recommendations to achieve maximum efficiency when implemented adequately. However, producers' difficult economic situation demands more than agricultural technification. Increasing technification and adopting a more technified model can reduce coffee producers' self-sufficiency.

Agricultural diversification is one of the best strategies playing a significant role in increasing the cash flow for coffee producers. Crop associations, animal production, and agroforestry techniques can often boost a necessary balance to the biodiversity in the coffee zone. These practices increase farmers' capacity to use and pollute less water, minimize the use of agrochemicals, reduce organic and inorganic waste, and promote soil conservation.

Regarding institutional arrangements, we must acknowledge the FNC's mission to achieve sustainability. The organization has worked since its foundation on elaborating, disseminating, and implementing a considerable amount of educational material that has helped many coffee producers regain self-sufficiency. The FNC extension programs have offered trustful relationships between coffee producers and the rest of the coffee sector, promoting the importance of a more socially equal coffee sector.

Conclusions and Recommendations

Understanding the coffee sector in Colombia is a multifaceted challenge. Recognizing the background knowledge of environmental and social factors contributing to agroecosystem development is necessary. Our findings showed that technification, agricultural diversity, and institutional arrangements were the most significant concepts driving sustainability in Valle del Cauca. Most coffee producers in this region produce at a small scale and rely on using improved coffee plants, which is consistent with the work of Forero Álvarez (2010). At the same time, farmers often face harsh socioeconomic conditions that challenge the management of coffee crops and reduce profitability (Ocampo & Alvarez, 2017). Environmental challenges confronting coffee producers also explain the downward trend in coffee production in the region and, more broadly.

The FNC, a prominent coffee sector leader, has developed various strategies to overcome issues and encourage farmers to keep growing coffee. Still, these strategies tend to be challenging to implement because of uncontrollable factors, like climate change and the necessity of synthetic pesticides and fertilizers, which producers must use, undermining the potential for sustainable production. The major

conclusion is that with limited collateral, small and medium coffee producers find themselves in low productivity cycles that have been significant in the gradual decline of coffee cultivation, which is consistent with the work of Forero Álvarez (2010).

To maintain sustainability, strategies must be adaptable regarding producers' capabilities. Thus, extension officers should advocate for agroecology practices, which offers steps that can support sustainable coffee production. Likewise, it is crucial to keep the coffee sector's development and its institutions under constant evaluation through research to ensure that Colombia will continue to reap its agroecosystem responsibly. Additional research incorporating agroecological principles is encouraged because it orients toward developing agricultural strategies that can be adaptable regarding producer capabilities so small and medium-holder producers can implement more sustainable coffee production.

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Mentoring in International Agriculture Graduate Education: A Mixed Methods Study

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Abstract

Introduction

As the global economy evolves and awareness of global issues increases, agriculture serves as an essential sector for connecting local and global contexts. The global connections have been addressed in various ways through a disciplinary umbrella called international agriculture and development (National Center for Educational Statistics, n.d.). An example of international agriculture and development collaboratively communicating across complex issues is the Sustainable Development Goals (United Nations, n.d.). These goals help communicate the different problems that occur around the world and progress toward solutions to the problems. Competent professionals are essential to advancing international agriculture and development to help solve global issues (Roberts et al., 1999). Graduate programs have developed competent professionals in all fields of work, international agriculture and development. In addition to the coursework delivered in graduate programs, mentorship is essential to education and professional development (University of Washington: Graduate School, n.d.).

Theoretical Framework

The theoretical frameworks of the study were social cognitive career theory (Bandura, 1986) and social cognitivism (Lent et al., 2002; Vygotsky, 1986). Both theories emphasize the importance of social interaction which translates into development, growth, and behavior. In this study, the social interactions were interpreted as the interactions between the graduate students (mentees) and graduate faculty members (mentors) in an international agriculture and development program.

Purpose and Objectives

The focus of the study was to understand the state of mentorship, the types of mentoring support, and mentoring outcomes between the graduate students (mentees) and the faculty members (mentors) in the international agriculture and development graduate program at a land-grant institution, focusing mainly on the mentees' perspectives. The research objective is as follows: (a) Examine the perception of mentor, perceived mentoring support, and current perceived mentoring outcomes; (b) explore how the mentors are perceived; (c) explore the different mentoring support received; and (d) explore the mentoring outcomes perceived by international agriculture and development graduate students.

Methods

This study utilized an explanatory sequential mixed methods case study design (Creswell & Plano Clark, 2017) to investigate mentorship in an international agriculture and development graduate program at a

land-grant institution. For the quantitative phase, a survey instrument was used to collect the data from current graduate students in the international agriculture and development program as well as from graduate students in non-international agriculture and development programs. A t-test was used to compare (a) the international agriculture and development graduate students and non-international agriculture and development graduate students and (b) social sciences disciplined and natural sciences disciplined graduate students in the international agriculture and development program. For the qualitative phase of the study, semi-structured interviews were conducted. Data was collected from current graduate students, former graduate students, and faculty members of the international agriculture and development graduate program. Thematic analysis was utilized to develop themes.

Conclusion

Quantitative

The study's primary findings indicate that mentoring, is not disparate in the context of international mentoring and non-international focused areas, nor different in social and natural sciences disciplines. However, both the personal growth support and professional growth support had a higher mean value compared to current personal development outcomes and current professional development outcomes, respectively.

Qualitative

Six themes were developed through the thematic analysis: (a) Qualification of mentor, (b) perceived aspects of mentor, (c) relationship, (d) area of mentorship, (e) achieved results, and (f) improved mentorship. Qualification of mentor was the participants' definition of a mentor. Words such as "coach," "parental figure," and "supporters" were used to define a mentor. Perceived aspects of mentor was the description the participants provided of their current mentors. Perspectives included mentors having professionalism and mentoring that revolved around the mentees' needs and wants. Relationship was the frequency, mode, and satisfaction of the mentee and mentor interaction. Depending on the parties involved, the regularity and the method of interactions varied, and most participants were satisfied with the interactions. Area of mentorship was the specific topics and supports discussed and provided through the mentoring relationship, and the topics and supports revolved around personal and professional growth. Achieved results were the actual development that the participants perceived to have developed through the mentorship, which included knowledge, skills, and attitude. The specific competencies included teaching ability, understanding international context, and technical writing skills, while attitudes included persistence, confidence, and problem-solving. Improved mentorship was the area that the participants felt could have been improved to enhance the mentoring experience. Participants talked about agreement and understanding between mentees and mentors, and opportunities and exposure to practical experiences.

Recommendations

Recommendations for future practices and research were made. For recommendations of future practices, first, a shared and agreed definition of a mentor and the type of mentoring support that can be provided need to be clearly communicated to set expectations and understanding of the role of mentors and mentees. Second, mentors need to help the graduate students understand the foundation of international agriculture and development to guide the students away from being misinformed about

the goals and purpose of the field of study. Third, there need to be continuous and expanded opportunities for practical experiences provided to graduate students to further develop knowledge and skills in the international agriculture and development field of study.

For recommendations for future research, first, rigorous quantitative research needs to be conducted to investigate the relationships of mentoring constructs and to compare mentoring in the international agriculture and development field of study to other fields. Second, a study to understand the dynamics of demographic, attributes, or characteristics of mentees and mentors in a mentoring relationship needs to be probed. Third, because international agriculture and development in academia is new, long-term outcomes associated with mentorship in the field of study need to be investigated. Fourth, because mentoring is a relationship between mentees and mentors, mentors' benefits, outcomes, and perspectives of mentorship in the international agriculture and development field of study need to be examined. Lastly, a study on structured mentorship in the international agriculture and development field of study needs to be examined to understand and compare unstructured and structured mentorship.

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Horses Teaching Us to Lead: An Exploration of Horse Association Members' Authentic Leadership Competencies

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Abstract

Introduction

Even with the prevalence of horses in the world, the most recent literature on horse population found that there were approximately 58 million horses in the world as of 2008 (Khadka, 2010). However, availability does not make them accessible to every demographic, especially financially. The American Horse Council Foundation (AHCF) reported that 46% of horse owners in the U.S. earn between \$25,000 and \$75,000 a year, while another 28% earn over \$100,000 a year (Raia, 2020). This has made horseback riding an elite sport and even access to horses difficult for the average person, let alone youth from middle- to low-income families. Despite inaccessibility, horses have been increasingly used to effectively teach various skills through equine assisted learning (EAL) programs around the world.

From their experience in Helsinki, Mickelsson (2019) stated that, "equine communication is universal, and in many cultures the horse furnishes a metaphor for beauty, strength and godliness." Research in the U.S. focused on EAL programs for leadership development has shown positive effects of EAL on learning (Adams-Pope & Stedman, 2014; Duff, 2010; Dunn & Paxton, 2014; Gunter et al., 2017; Kelly, 2014; Maziere & Gunnlaugson, 2015; Serot Almeras & Bresciani, 2021; Williams, 2021; Wojtkowska et al., 2019). Similarly, Mickelsson (2019) described their use of equine-assisted social education (EASE) in schools and the benefits they observed, including developing trust and responsibility. In Estonia, Koris et al. (2017) found support that the skills learned from horses are transferable to interacting with people. While in Latvia, Gektmane-Hofmane (2019) performed a literature review of EAL and argued that "evidence-based research has examined the relationship between humans and horses, and how such bonds may contribute to human learning and development is limited and lacks empirical support." Combined, this begs the question of what leadership skills are horses inherently teaching people regardless of the type of programming involved.

The aim of this exploratory study was to begin to identify how having horse experiences as a youth, outside of planned leadership programs, can impact those adults' leadership capabilities in the future. Authentic leadership was chosen as the theory to frame this study due to its focus on self-awareness and emotional intelligence, both of which have had their development linked to horse experiences (Hays, 2018; Johnson et al., 2017; Lesté-Lasserre, 2021). This study was significant because it could help isolate the impact of a horse on development of authentic leadership competencies during youth. Specifically, it could help organizations that strive to make horse programs more accessible to and inclusive of youth from different demographics by giving them support for why they should be granted funding.

Purpose

The purpose of this quantitative study was to identify the impacts of having horse experiences during youth on horse association members' authentic leadership competencies.

Objective

Identify the self-perceived authentic leadership competencies and horses experiences of horse association members.

Methods

This study used a quantitative survey design that consisted of a questionnaire which collected both demographic and leadership competency data. The demographic questionnaire portion of the survey design was researcher developed and included questions about participants' horse experiences as well as personal experiences. The instrument chosen to measure self-perceived leadership competencies was the authentic leadership questionnaire (ALQ) (Avolio et al., 2007). It was comprised of 16 behavioral items with five frequency ratings from "not at all" with a score of 0 to "frequently, if not always" with a score of 4 (Avolio et al., 2018). From Walumbwa et al.'s (2008) initial sample analysis in three different countries, it has been shown to be a valid construct with the estimated subscale internal consistency alphas (Cronbach's alpha) ranging from 0.70 to 0.92. The combined questionnaire was distributed by three horse associations to their membership groups via email.

After the questionnaire had been made available to associations for five weeks, raw data from the combined questionnaire was collected from Qualtrics and analyzed in SPSS. Demographic questions were analyzed by item to find descriptive statistics. ALQ item scores were combined to gain component scores for each participant. Those component scores were then analyzed to find the mean scores. Cronbach alpha coefficients were also calculated for each of the four components of the ALQ to ascertain item reliability.

Results

Of the surveys sent out to three horse associations, there were 23 responses, 4 of which were incomplete and therefore removed from the data set. Of those 19 participants, 89.5% were female and 94.7% were Caucasian. The majority were over the age of 50 with 47.4% of the group having a master's degree or higher level of education. In terms of horse experience, 94.7% of this group owned a horse before the age of 18 with the majority having had horse experience at 6 years-old or younger. Altogether, participants had a minimum of 14 year of horse experience (M = 42 years, SD = 14).

The mean scores for components of authentic leadership, transparency, moral, balanced processing, and self-awareness, were 3.3, 3.7, 3.5, and 3.3, respectively (SD = 0.4, 0.4, 0.4, 0.5 respectively). The Cronbach alpha coefficients for each of these components were 0.55, 0.57, 0.67, and 0.78, respectively.

Conclusion

This exploratory study highlighted a unique link between horse experiences and authentic leadership competencies. Mean ALQ scores from this sample of individuals with a wealth of horse experience were higher than those of students' pre- and post-treatment tests who took a graduate level course on authentic leadership (Whitehall et al., 2021). Similarly, a study measuring nurses' ALQ scores in relation

to their safety climate score found lower scores than this group, with mean scores ranging from 2.86 to 2.95 (Dirik & Intepeler, 2017). This exploration gives preliminary support for the idea that horses have some impact on authentic leadership development.

Recommendations

Future research should focus on expanding this line of inquiry to more populations with horse experience. In particular, different cultures should be analyzed for different potential impacts of horse experience. It is also recommended that qualitative research is done to better understand the connections between horse experiences and authentic leadership competencies.

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Designed by Culture: A Q Methodological Examination of International Agricultural Education Curriculum Developers' Cultural Preferences

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Abstract

Introduction

Education is a key factor in the reduction of poverty and economic growth in developing nations (Damon et al., 2016). As such, international development agencies have deployed programs to support educational efforts in developing nations. Successful knowledge dissemination is limited by the system that transmits it (Headey et al., 2012). Challenges related to scale, sustainability, relevance, and responsiveness have hindered the effectiveness of educational initiatives in less developed countries (Aker, 2011).

Culture drives a rich complex of beliefs, values, and norms which are known to differ across regions and societies (Schwartz, 2006), but many institutions fail to incorporate local cultural nuances in knowledge transfer (Benford & Snow, 2000). Sharif and Gisbert (2015) observed that the culture of curriculum designers is often reflected in their materials. However, failure to develop educational materials aligned to the culture of the learner results in discrepancies between students' lived experiences and concepts taught in schools (Smith, 2002). To increase knowledge transfer between developed and less developed countries, we must consider the cultural perspectives that curriculum developers may be subconsciously integrating into learning materials.

Purpose

The purpose of this study was to investigate the cultural preferences of [Country 1] curriculum developers who create resources for agricultural educators in [Country 2].

Method

We used Q methodology (Watts & Stenner, 2012) to identify the cultural preferences of individuals that develop [Organization's] teacher resources. Stephenson (1993) said Q methodology allows for "self-referent proliferation" (p. 5) in research through the objective ranking of subjective values by participants. This results in the emergence of distinct personas that describe unique perspectives related to the topic of study (Valenta & Wigger, 1996).

We purposively selected 20 ($n = 20$) [Organization] volunteers, staff, stakeholders, and curriculum writers who contribute to the development of [Organization] agricultural education teacher resources in [Country 2]. A demographic survey gauged participants' gender, age, [Organization] association, country of residence, and travel experience. We identified 29 key themes in relevant literature and conversations with field experts. Participants completed a Q sort by ranking the statements on a forced,

normal distribution based on importance to their culture when learning. During the Q sort, we asked semi-structured questions to gain a deeper understanding of participants' ranking decisions.

We used QMethod Software™ (Lutfallah & Buchanan, 2019) to perform factor analysis, factor rotation and factor extraction. We computed an unrotated factor matrix using Principal Component Analysis (PCA). Guided by the Kaiser-Guttman Criterion (Kaiser, 1958), we extracted factors with Eigenvalues greater than 1 for further investigation. The extracted factors were statistically arranged using Varimax rotation (Watts & Stenner, 2012).

Results and Conclusions

The study resulted in seven factors that explained 80% of the study variance. Each factor had a 0.80 composite reliability score. We interpreted the factors as *realists*, *structuralists*, *cultivators*, *achievers*, *generationalists*, *moralists*, and *globalists*.

Factor One: Realists

Realists explained 34% of the variance and was comprised of two females and one male from [Country 1]. This viewpoint identified knowledge acquisition as the highest priority for their culture when learning. They believed language, technology, inventions, and leadership guide the learning process. *Realists* indicated their education was driven by fact rather than culture, and they placed lower priority on elements like symbols, tradition, and religion.

Factor Two: Structuralists

Structuralists explained 11% of the variance and was comprised of one male and one female from [Country 2]. This viewpoint prioritized the fundamentals of traditional society and emphasized the importance of maintaining the cultural roles defined by community, family, and leadership in education. Entertainment, vacation, and technology were of low priority to *structuralists* who focused more on community success rather than personal endeavors.

Factor Three: Cultivators

Cultivators explained 9% of the variance and was comprised of one male from [Country 1]. This viewpoint placed high priority on the communal aspect of learning, emphasizing that shared experiences create meaningful learning. Therefore, they prioritize stories, customs, language, and knowledge in learning. *Cultivators* considered trade and political systems as abstract concepts that are inconsequential to learning and ranked them with low priority.

Factor Four: Achievers

Achievers explained 8% of the variance and was comprised of one male and one female from [Country 1]. This viewpoint identified education as a process of personal achievement uninfluenced by background, upbringing, or personal status. *Achievers* prioritized language and greetings for building credibility in education, while placing low priority on status indicators like transportation, housing, and social class.

Factor Five: Generationalists

Generationalists explained 7% of the variance and was comprised of one female from [Country 1]. This viewpoint placed high priority on family as the core motivation in learning. They identified religion, community, and leadership as key indicators of educational success but placed low priority on manners, greetings, and social class for culture-based learning.

Factor Six: Moralists

Moralists explained 6% of the variance and was comprised of two females from [Country 1]. This viewpoint sought to benefit the majority when learning. They took a uniquely supportive stance on the function of law in education and advocated for equal access to knowledge through language, ethics, housing, and transportation. *Moralists* placed low priority on trade and vacation as they considered them routine procedures external to learning.

Factor Seven: Globalists

Globalists explained 5% of the variance and was comprised of one male from [Country 1]. This viewpoint considered education from a wholistic standpoint, believing cultural influences drove the pursuit of financial, career, and economic stability through education. Despite certainty in the global benefits of education, *globalists* considered trade to be a low priority when learning because it is not a means for seeking understanding.

Recommendations

Curriculum developers prioritized culture through seven viewpoints—*realists*, *structuralists*, *cultivators*, *achievers*, *generationalists*, *moralists*, and *globalists*. We recommend practitioners consider the impact of curriculum designers' cultural priorities when developing educational materials for use in a developing nation. Curriculum developers should be aware of the potential manifestations of their cultural preferences and be prepared to adjust their design to fit the culture of their target audience. Future research should consider the impact of culture on successful knowledge transfer and educational efforts in developing nations.

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Cultural Transmitters: A Q Methodological Examination of [Country] Agricultural Educators' Cultural Preferences

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Abstract

Introduction

Culture is a complex construct that drives engagement, meaning, and identity formation among a group of people (Schwartz, 2006; Stahl et al., 2009). Kana'iaupuni et al. (2010) identified education as a cultural process with schools and teachers being the primary transmitters of culture to youth. Teachers play an important role in cultural preservation and development, but not all educational resources support the transmission of culture from teachers to students (Smith, 2002). Teachers benefit from culturally relevant materials through improved student performance, as well as increased comprehension of the concepts they are teaching (Sinaturi et al., 2018). Many international development efforts seek to support teachers in developing nations through the provision of classroom materials; however, accurate cultural representation has a direct impact on the successful implementation of such resources (Smith, 2002). As developed nations become drivers of knowledge transfer in international development (Doerfert et al., 2007), understanding the cultural preferences of local educators can increase the utility of resources offered by development agencies.

Purpose

The purpose of this study was to investigate the cultural preferences of international agricultural educators in a developing nation [Country] when engaging with educational materials created by individuals in a developed nation [Country].

Method

We used Q methodology, guided by Watts and Stenner (2012), to identify the cultural preferences of agricultural educators in [Country] when engaging with [Organization's] teacher resources. Using Q methodology, researchers obtain quantitative data related to opinion formation and qualitative data that reflects participants' subjective opinions (Valenta & Wigger, 1996). Together, the data yields factors that represent the unique viewpoints of individuals who live in the reality of the phenomenon being studied (Brown, 1993; Leggette & Redwine, 2016).

We purposively selected 20 ($n = 20$) [Country] secondary teachers currently using [Organization] resources for routine instruction in their agricultural education courses. We administered a demographic survey to describe participant age, gender, duration of [Organization] association, and region of residence. Using key themes obtained from relevant literature and field experts, we constructed 29 statements related to culture for the Q sort. Participants then ranked the statements on a forced, normal distribution ranging from "least important" to "most important." Participants ranked

the items according to importance to their culture when learning. While completing the sort, we asked participants open-ended questions to acquire additional information about the motivations for their rankings.

Three steps are necessary for data analysis in a Q method study—factor analysis, factor rotation, and factor extraction (Watts & Stenner, 2012). We used QMethod Software™ (Lutfallah & Buchanan, 2019) to run Principal Component Analysis (PCA) and compute an unrotated factor matrix. The Kaiser-Guttman Criterion (Kaiser, 1958) was applied to identify factors with Eigenvalues above 1 that warranted further investigation. Finally, we used Varimax rotation to position the extracted factors according to statistical criteria (Watts & Stenner, 2012).

Results and Conclusions

The study resulted in six factors that explained 78% of the variance. We interpreted the six extracted factors as *philosophers*, *visionaries*, *harmonists*, *humanists*, *expressive symbolists*, and *traditionalists*.

Factor One: Philosophers

Philosophers explained 36% of the variance, had a 0.95 composite reliability score, and was comprised of five males from the northern and eastern regions of [Country]. This viewpoint placed high priority on the acquisition of knowledge and the preservation of religion, language, greetings, and traditions in education. They placed low priority on the presence of political systems when considering the impact of their culture on learning.

Factor Two: Visionaries

Visionaries explained 14% of the variance, had a 0.89 composite reliability score, and was comprised of two males from the northern region of [Country]. This viewpoint placed high priority on career success while taking a unique stance on the importance of holidays and entertainment in the process of education. *Visionaries* did not see the integration of cultural elements such as language, greetings, or traditions as necessary for education.

Factor Three: Harmonists

Harmonists explained 9% of the variance, had a 0.92 composite reliability score, and was comprised of one female and two males from the northern and central regions of [Country]. This viewpoint placed high priority on greetings as “the genesis of everything”. They held the functions of community in high regard and did not feel culturally bound by laws or political systems when learning.

Factor Four: Humanitarians

Humanitarians explained 7% of the variance, had a 0.92 composite reliability score, and was comprised of one female and two males from various regions of [Country]. This viewpoint focused on educational initiatives that were sustainable for both human and natural resources. They believed in societal progress and, therefore, seek to learn outside the cultural boundaries of symbols, customs, religion, and manners.

Factor Five: Expressive Symbolists

Expressive Symbolists explained 7% of the variance, had a 0.80 composite reliability score, and was comprised of one male from the northern region of [Country]. This viewpoint placed high priority on language as the cultural foundation of learning and took a unique stance on the importance of symbols in education. *Expressive symbolists* viewed entertainment, holidays, and inventions as luxuries inconsequential to the learning process.

Factor Six: Traditionalists

Traditionalists explained 5% of the variance, had a 0.89 composite reliability score, and was comprised of one male and one female from the northern region of [Country]. This viewpoint identified family as a key driver for learning and believed in preserving key elements of traditional culture such as community, traditions, customs, and manners. *Traditionalists* placed little emphasis on religion or symbols because they considered them detectible, but not critical, elements for learning.

Recommendations

[Country] agricultural educators prioritized culture through six viewpoints—philosophers, visionaries, harmonists, humanists, expressive symbolists, and traditionalists. We recommend curriculum designers consider the cultural priorities of their target audience when designing materials for classroom instruction, especially those who develop curriculum outside of the location the materials will be taught. Teachers should be aware of the benefits of integrating regional culture into routine instruction and adjust lessons to fit the culture of students. Future research should continue to explore the impact of culture on educational advancements in developing nations.

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The Penn School of South Carolina: A Case Study in Critical Race Theory

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Abstract

Introduction

The Penn School of St. Helena Island near Beaufort, South Carolina, was the location of one of the first schools for formerly enslaved people. The school formally opened in September 1862, almost three years before the end of the American Civil War. Laura M. Towne and Ellen Murray were commissioned by the Port Royal Relief Committee of Philadelphia to travel to South Carolina to provide schooling to formerly enslaved people. Towne and Murray established a comprehensive school program that provided academic and vocational training, medical care to students and their families, and food and clothing. To formerly enslaved persons living on St. Helena. The Penn School met a critical need in the black community and provided a structure for educating formerly enslaved people as preparation to enter American society as free people.

Purpose and Objectives

This study examined the historical events associated with the creation of the Penn School on St. Helena Island near Beaufort, South Carolina, in 1862 to provide a contextual basis for understanding early efforts to provide agricultural education for African Americans.

The specific objectives of this project were to:

- Describe the development of the Penn School on St. Helena Island in South Carolina.
- Describe the social, political, and economic forces through the lens of Critical Race Theory.

Methods

Using the procedures for historical research outlined by Gall, Gall, and Borg (2010) and Schrag (2010), the research team examined primary sources, including correspondence, published manuscripts, diaries, and speeches of the first instructors at the school. Additional primary sources included government records and reports related to the Penn School. The Penn School papers, located at the University of North Carolina at Chapel Hill, provided information about the establishment of the school. The records of plantation owners in South Carolina were made available to the research team through the South Carolina Digital Library and the Low Country Digital Library.

Results

Establishing a school for formerly enslaved people on the fringes of a war zone was a difficult and dangerous task. The federal government provided soldiers to guard against marauding bands of guerillas who wished to capture and re-enslave blacks in the region. However, the federal government's interest in the Penn School was tangential. The United States government needed raw cotton to ship to northern mills for processing into cloth. The cloth was necessary for the war effort and propelled the northern economy through international trade. However, the 1863 cotton crop was in danger of failure on the South Carolina Sea Islands (Pierce, 1863). No plantation owners or skilled farm managers were available to manage the crop's production and subsequent harvest. While there was a shortage of experienced farm operators, thousands of formerly enslaved people lived in the Sea Islands. The federal government looked to these formerly enslaved people to continue cotton production on the South Carolina Sea Islands. However, these formerly enslaved people could not reach the level of cotton production achieved in the brutal years of slavery (Rose, 1999). Cotton production in the sea islands continued to decline and was eventually supplanted by upland cotton varieties grown further inland (Porcher, 2010). As the federal government's interest in the sea island region waned, so did its support for the Penn School. The school's continued existence depended upon the efforts of the two teachers, Towne and Murray, to seek and secure philanthropic funding (Towne, 1912). This proved problematic and unsustainable, given their present teaching duties.

The Penn School and Critical Race Theory

Critical Race Theory proposes that race is a social construct and that racism is not merely the product of individual bias or prejudice but also something embedded in society, the economy, legal systems, and government policies. One specific core of CRT undergirding the Penn School's founding is the concept of Interest Convergence. Interest Convergence is a belief that whites will allow and support racial justice and progress to the extent that there is something positive in it for them or a "convergence" between the interests of whites and non-whites (Bell, 1980).

The Penn School was created because it was an "interest" of white abolitionists who held religious and political ideals for supporting this effort, specifically Freeman Groups. Moreover, Lincoln's Emancipation Proclamation, the subsequent Freedmen's Bureau, and the eventual system of tenant farming sharecropping that came forth during Reconstruction are examples of "Interest Convergence." The maintaining of the cotton crop by the Penn School students supported a "White Interest" and thus a "Convergence" that was intertwined under the auspices of an "Educational" institution.

President Lincoln's Emancipation Proclamation freed formerly enslaved people in those areas of the South held by the federal army during the American Civil War and thus allowed these formerly enslaved people to participate in educational and economic endeavors. However, the Emancipation Proclamation was not drafted by President Lincoln because he was an ardent abolitionist. Instead, it was a strategic military move aimed at destroying the core of Southern culture and economic structure, thus crippling the Confederacy (Lincoln & National Archives, 2021). If enslaved people could be inspired to rebel and join the Union, it would negatively impact the Southern states and lead to the war's end.

The Penn School was a classic example of CRT and one of its underlying tenants of Interest Convergence. The federal government and northern cotton mill owners were only involved in the education of formerly enslaved people to the extent to which they could continue their role in the production of cotton. While the Penn School's teachers were motivated by abolitionist sentiments, their presence in South Carolina and the school's operation depended upon a government more interested in exploiting formerly enslaved people for economic benefit.

Recommendations

The researchers recommend that further research uncover the political and economic drivers associated with educational opportunities for underserved students. A clearer understanding of how political-economic models influenced the development of career and technical education and agricultural education may lead educational policy-makers to examine current initiatives for hidden biases that strengthen discriminatory practices.

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Perceptions of Mentors on Borlaug International Fellowship Program: Implications for International Agriculture

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Abstract

Introduction

International scientist exchange programs contribute to development by promoting trade, policy, capacity building, and food security (USDA-FAS, 2021). Scientific exchange and international mobility are essential in training young scientists (Rodrigues, et al., 2016, p. 1). Studying abroad in agricultural sciences can develop learners' cultural, academic, and communication skills and build their professional capacity (Myer, et al., 2019; Wals & Sriskandarajah, 2010). The Borlaug International Agricultural Science and Technology Fellowship Program (Borlaug Fellowship Program) advances USDA's agricultural research goals of promoting collaborative programs among agricultural professionals of eligible countries and agricultural professionals of the United States by providing fellowships in agricultural education, research, extension, or other related fields. USDA places Fellows with U.S. research institutions for 10-12 week, intensive programs. Fellowships promote food security and economic growth in eligible countries by educating a new generation of agricultural scientists (USDA, 2019). Young scientist exchange programs greatly contribute to scientific discovery (Rodrigues, et al., 2016). However, little is known about the outcomes of agricultural scientist exchange programs (Kone, 2013; Searle, et al., 2006) such as the Borlaug program.

Purpose and Objectives

The specific objectives of this research were to understand the perceptions of Borlaug fellowship program mentors in terms of the benefits derived by participants, and the challenges mentors faced when organizing and implementing the program.

Methods

We used the focus group method to conduct this research. The focus group method is useful in exploring complex concepts (Cyr, 2016) such as assessing the outcomes of the Borlaug program. The focus group was comprised of 25 agricultural scientists who have already mentored or planning to mentor a visiting international Borlaug fellow. With the help of the USDA Foreign Agricultural Service Office, we selected 25 Borlaug Mentors representing 19 Land-grant Universities including three 1890 land-grant universities and one USDA-ARS station for the Borlaug Fellowship Mentor Focus Group. This is a very diverse group of participants including minorities representing various locations across the US.

Four of the mentors are female with the remaining 21 being male. We took notes and recorded the specifically arranged focus group discussions of Borlaug mentors. We used the comparative analysis technique to compare and contrast the data for achieving research objectives.

Results

The fellows who completed the program acquired cultural competency, new knowledge, skills, and research capacity. Fellows developed networks and collaborations with the US mentors and other faculty and jointly published research. The mentors, other faculty, and students of the hosting university gained cultural competency by interacting with the visiting fellows.

By completing the reciprocal visit to the fellow's home country, many mentors gained international and cross-cultural experience and professional growth. The visits of some mentors contributed to arranging Fulbright fellowships. The Borlaug Fellowship Program was instrumental in enhancing the research supervisory and coaching capacity of Mentors. Continued interactions with the mentor and the fellow led to develop expanded international partnerships between their institutions. Collaborative partnerships between the fellow and mentors contributed to improved mutual learning, joint research, and publications.

Some of the fellows were able to secure grants and funding support to complete their Ph.D. in the US. As a result of earning a doctoral degree and demonstrating professional growth, some of the fellows got promotions to lead their institutions and high-level government positions in their countries. Many fellows contributed to agriculture development in their countries with their new knowledge and skills. Fellows' promotions to leadership positions in their respective institutions and linkages with the US institutions further consolidated the network for mutual collaborations. Some of the fellows and mentors used these established professional networks to promote US products and businesses in the fellows' home countries and create new business opportunities for US manufacturers. Additionally, these established partnerships also contributed to developing international agriculture programs for US students.

Mentors experienced seven challenges when they implemented the Borlaug Fellowship Program. These seven challenges are 1) providing accommodations for the short duration of the visiting fellow, 2) timing of the fellowship overlapping with the winter weather that is not familiar to some of the fellows, 3) meeting the expectations of the visiting fellow, 4) facilitating fellow's understanding of the US culture, 5) budgeting small expenses under the Borlaug Fellowship grants, 6) managing institutional changes and facility limitations of the host institution, and 7) planning mentor's reciprocal visit to fellow's home country.

Recommendations, Educational Importance, and Implications

Mentors recommended to select promising young and middle-aged scientists because they will be the decision-makers in the near future in their institutions. It is important to share the fellow's selection criteria with mentors for seeking their input in the selection and matching interests. A virtual orientation of fellows before they come to the US is necessary for them to understand the policies and procedures of the hosting institution and the US culture. Mentors emphasized the need to communicate with fellows before they come to the US to understand their professional background and expectations to plan for a realistic learning opportunity for them. Mentors also should be prepared for possible

contingencies by having a plan and a backup plan for the fellowship mentoring. Mentors should provide a variety of professional development opportunities in addition to lab work to enrich their professional experiences in the US. Mentor's follow-up visit to a fellow's home institution can be used to explore potential US business opportunities. Mentors also emphasized the need for follow-up with fellows to keep the mentor-mentee linkage for professional collaborations. Securing additional funding from other sources to support collaborative work was suggested by mentors as an option to sustain collaborative partnerships beyond the fellowship.

The educational significance of this research is the documentation of the perceptions of agricultural scientists who mentored the visiting international fellows for use in similar international fellowship programs for greater impact. The major implication of this research is understanding the broader educational ramifications of the Borlaug international fellowship program in international agriculture development.

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Whose Culture? A Qualitative Study of Cultural Perceptions in International Agricultural Education

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Abstract

Introduction

Culture functions largely on a subconscious level (Stahl et al., 2009), making it difficult to recognize the impact of culture on individuals' actions. Integrating students' culture into classroom instruction can improve information retention, real-world relevance, and overall academic performance (Sinaturi et al., 2018). However, there are multiple opportunities for diluted cultural representation in education as instructional designers, teachers, parents, and stakeholders infuse their personal cultural perspectives into educational materials. Schwartz (2014) stated that culture is difficult to observe directly but can be inferred from its manifestations. In education, Sharif and Gisbert (2015) noted that backgrounds, beliefs, values, and experiences of instructional designers are often reflected in the materials they create. In the field of international development, the issue of culture increases complexity as individuals of diverse cultural backgrounds seek to develop and deploy resources relevant to the cultures of their target audiences. As educational materials transition from instructional designers, to teachers, and on to students, the question becomes, "Whose culture is being transmitted, and what cultural values are being instilled in children?" (Kana'iaupuni et al., 2010, para. 5).

Purpose

The purpose of this study was to investigate the impact of cultural perceptions on the development and deployment of educational resources in international agricultural education in [Country].

Method

We used qualitative, semi-structured interviews (Neuman, 2014) to describe the impact of instructional designers' cultural perceptions on the development of educational materials disseminated in [Country]. Interviews were conducted in two phases. We purposively selected 20 ($n = 20$) secondary agricultural education instructors from [Country] for Phase I and 20 ($n = 20$) [Organization] volunteers, staff, stakeholders, and curriculum writers who contribute to the development of agricultural education teacher resources in [Country] for Phase II. We designed interview questions for each phase to target the unique perspectives held by members of each group. Phase I questions were designed to assess participant perceptions of the cultural relevance of [Organization] teacher resources and evaluate the frequency and nature of their revisions to the materials. Phase II questions were designed to evaluate instructional designers' perceptions of [Country] culture and the methods they use preserve culture in the resource development process. Participant responses to a demographic survey provided additional insight about the background and experiences of participants from each phase.

We analyzed the data using open and axial coding to identify preliminary codes and data clusters (Neuman, 2014). This allowed recurring themes to be identified for further analysis (Galletta, 2013).

Results and Conclusions

Cultural Representation

We asked Phase I participants to describe the representation of their culture in [Organization] teacher resources. Three themes emerged for cultural representation: *adequately represented*, *somewhat represented*, and *not represented*. Most participants said their culture was adequately represented in [Organization] teacher resources with relevant descriptions, culturally appropriate teaching methods, and realistic descriptions of life in [Country]. Three participants said their culture was only somewhat represented in the materials and emphasized the need to incorporate more local knowledge and language in the materials. Finally, one participant indicated their culture was not represented in [Organization] teacher resources and expressed the need for the materials to be developed according to regional cultures and resources.

Cultural Revisions

We asked Phase I participants how frequently they revise [Organization] teacher resources prior to classroom implementation. Of the 20 participants, 15 ($f = 75\%$) indicated they make some revisions while five ($f = 25\%$) made no indication of revisions. Two themes emerged as areas for revisions made by Phase I participants: *cultural relevance* and *National Curriculum Development Center (NCDC) standards*. Participants indicated they make revisions for cultural relevance prior to using [Organization] materials in their classrooms. The nature of these revisions was revealed through the subtheme, *regional knowledge*, where participants expressed that variations in crops, weather patterns, and language require revisions to increase cultural relevance. Participants also noted NCDC standards as a motivation for their revisions. Recent changes in educational requirements set forth by the NCDC require some curriculum revisions related to the subthemes *content depth* and *practical knowledge* to improve student performance on national exams.

Cultural Perceptions

We asked Phase II participants about their perceptions of [Country] culture. Three themes emerged as cultural perceptions: *improvement*, *human connection*, and *core values*. Participants agreed that westernized and [Country] cultures place a similar value on improvement, both as individuals and societies. The subtheme *education* was identified as a primary means of improvement by multiple participants. A desire for human connection was also identified as a similarity between westernized and [Country] cultures. Participants indicated a difference in the manifestations of human connection through the subtheme *social structure* which noted the different motivations of collectivistic and individualistic societies. Finally, participants described their perceptions of [Country] culture through a series of core values. Participants identified the subthemes—*structure*, *hospitality*, and *hope*—as three core values held by individuals of [Country] culture.

Cultural Protection

We asked Phase II participants how they safeguard [Country] culture when developing [Organization] teacher resources. Two themes emerged as methods for cultural protection: *cultural review* and *collaboration*. Participants identified efforts to review [Organization] resources for cultural relevance prior to dissemination as one of the most effective methods for protecting culture during resource development. Cultural review was supported by subthemes—*physical presence* and *source validity*—that emphasized the value of in-country experiences for instructional designers and reliance on [Country] subject matter experts for relevant knowledge. Participants also identified collaboration with [Organization] staff as an effective method for safeguarding culture. The subtheme *empathy* was identified as a result of collaboration by participants who expressed that connection to real people motivates them to pursue cultural relevance from an empathetic standpoint.

Recommendations

Future research should explore the impact of cultural perceptions on the development of educational resources or international development curricular materials. When creating educational materials, instructional designers should be aware of their cultural perceptions and take action to safeguard the culture of the target audience. Finally, differing perceptions of international cultural representation, even among individuals of similar culture, should be considered in situations requiring cultural analysis.

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Do stakeholders share their view of the competencies needed in the agrifood systems of Latin America?

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Abstract

Introduction

The agrifood systems of the world are constantly demanded to fulfill the food, fiber, and fuel needs of a growing population. The agricultural industry has contributed to addressing a growing population's needs. However, due to a growing population, food demand is estimated to increase by at least 60% in the upcoming 30 years. Contradictorily an estimated third of the world's food production is lost or wasted along the food system with a substantial economic, social, and environmental cost. Challenges in the agrifood systems have driven researchers, practitioners, and policymakers to redefine the role of the world agrifood systems in a way that approaches to solve world problems using a holistic approach to address the needs of the world sustainable, resilient, and equitable, to ensure that current and future needs are covered while not disturbing future resource to ensure food security and nutrition (FAO, 2018).

Technology and globalization have driven educational systems across the world. Employers have transitioned from requiring employees to possess cognitive abilities to employees that demonstrate cognitive skills and attitudinal competencies to address challenges and remain relevant in the face of a constantly evolving world (Martin, 2018). In an educational system transitioning to provide competencies to students and the emergence of non-traditional education providers, higher education institutions are demanded to evaluate their academic offers and understand the competencies demanded by employers (Li, 2020). Taking into account the existing challenges of the agrifood systems, higher education institutions with an academic offer within the field of agricultural sciences and natural resources should aim to respond to the growing demands of the agrifood systems by preparing their students to become competent to address the complex challenges ahead.

Following Oliva's conceptual framework of curricular design, an essential component at the macro level is determining society's needs (Oliva, 2009). In this study, these needs are centered on the agrifood systems of Latin America.

Purpose and Objectives

This study aimed to identify the societal needs of agricultural and natural resources academic programs to address the agrifood systems of Latin America as defined by stakeholders. Two objectives guided this study: 1) to identify the essential competencies (cognitive, skills, and attitudes) needed for future graduates of agricultural sciences and natural resources, and 2) to compare the prioritization of essential competencies (cognitive, skills, and attitudes) among stakeholders.

Methods and Data Sources

An action research approach was used in this study to engage participants in a way that allows societal change needed (Mills, 2000; Vidal & Rivera, 2007). A Delphi Technique was used to obtain participants' consensus regarding the competencies that future agrifood systems will demand from future graduates of agricultural sciences and natural resources programs in Latin America (Custer et al., 1999; Hasson, Keeney, & McKenna, 2000; Linstone & Turoff, 2002).

A panel of experts was defined by incorporating practitioners, policymakers, and industry leaders of the agrifood systems of Latin America. Additionally, a second panel was built to identify the perceptions of faculty members who teach at a higher education institution representing multiple nations across the region. Following the procedures of the Delphi Technique, two iterative processes were defined to minimize participants' exhaustion and maximize response rate (Delbercq et al., 1975; Hasson et al., 2000; Hsu & Sandford, 2007; Turoff, 1970; Wright & Defields, 2012). During the first round, participants were asked to indicate the cognitive, skills, and attitudinal competencies that future graduates of agricultural sciences and natural resources programs will need to address the challenges of the region's agrifood systems. In the second round, participants were asked to rate the level of importance of each cognitive, skills, and attitudinal competencies identified in the first round. A total of 366 individuals were invited to participate in the study in 2021. The response rates obtained were 70% and 100% in each round.

Results and Conclusions

Participants during the first round provided multiple competencies needed from future graduates of agricultural sciences and natural resources. A total of 540 competencies were suggested by participants (201 cognitive, 153 skills, and 186 attitudinal). A curricular expert team sorted these areas in each domain to define unique areas. After this analysis, participants were presented during the second round the unique domains to define the level of importance at the cognitive, skills, and attitudinal levels. While practitioners, industry, policymakers, and faculty prioritize similar cognitive skills and attitudinal competencies. However, differences were observed in the level of importance assigned. Practitioners tend to evaluate the cognitive and skills competencies with a higher level of importance, while attitudinal competencies are similarly rated.

Implications

Identifying the cognitive, skills, and attitudinal competencies is essential in defining societal needs to address the challenges of the agrifood systems in Latin America. Understanding what practitioners, industry, and policymakers require from future graduates allows higher education institutions to design curriculums pertinent to society. However, an essential resource for higher education is all faculty members. Faculty should be frontrunners in their fields and the industry they serve. In this study, we found that while there is a coincidence in the cognitive, skills, and attitudinal competencies needed, substantial differences were found in the level of importance assigned by participants. These differences may cause perspective from future employers that higher education institutions are not addressing their needs and, as such, begin to lose relevance in the society they serve. Therefore, it is essential in curricular designs to continue to incorporate all relevant stakeholders and promote faculty engagement with society. These interactions will support how faculty engage stakeholders, update their course and proactively support curricular reforms to address societal needs.

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Plasticulture for food security and agricultural growth in LMICs: farmers perceptions of the opportunities and barriers to support extension and sustainability

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Abstract

Introduction

Plastic use in agriculture, known as ‘plasticulture’, is a widely adopted technology and promoted by extension services to farmers in many low- and middle-income countries (LMICs) to improve crop yields, water use efficiency, permit off-season production, reduce weed and pest attack, reduce labour and improve farmer incomes. The narrative used by global innovation actors is that plasticulture transforms agricultural production, increasing food security and enhancing smallholder farming opportunities.

Plasticulture is primarily used in the cultivation of the cash crops of fruits and vegetables rather than staple foods. Different plastics are used seasonally, offering protective cover using poly tunnels, shade nets and plastic mulch films. There are also plastic micro-irrigation equipment and waste materials. The use of plastics in agriculture results in the accumulation of single-use plastics on a massive scale which in the absence of sustainable methods of waste disposal or sustainable alternatives is potentially creating a legacy of microplastic contamination impacting future soil fertility, food safety, and human and animal health.

To date, most studies have focused on the effects of plastic mulch on specific soil and crop traits or the impact of contamination on soil and crop health. Research on socio-economic influences are too limited in sample size to offer alternative narratives. There is an emerging debate about the role of farmer decision-making and behaviour change, and implications for agricultural extension and support from wider innovation actors that seek to facilitate sustainable alternatives. Using data from across five countries at different stages of plasticulture adoption (China, India, Egypt, Vietnam and Sri Lanka), this paper provides a better insight into the role of farmers’ views of the benefits and risks in plasticulture and their implications for improving agricultural extension services and plastic waste management options.

Objectives

(i) To examine patterns of adoption and use of plastic mulch, poly tunnels, and shade nets across China, India, Egypt, Vietnam and Sri Lanka with perceptions of the benefits and risks by farmers.

(ii) To explore the dynamics of farmers' motivations and barriers for adoption of alternatives, disposal and recycling across the case study locations.

(iii) To consider the implications for agricultural innovation actors supporting farmers in plasticulture alternatives and for wider sustainable plastic management.

Methods and/or data sources

Five case study countries were selected to illustrate different levels of plasticulture use and form the basis for an interdisciplinary research project 'Do agricultural microplastics undermine food security and sustainable development in developing countries?'. The consortium are Bangor University, University of Bristol, University of Reading, China Agricultural University, Chinese Academy of Agricultural Sciences, Mansoura University, Peradeniya University, SLINTEC, Institute for Agricultural Environment, Soils and Fertilisers Research Institute, and the Indian Institute of Soil Science.

Each country purposively selected three locations with different cropping systems, plasticulture use and ecozones. For the research presented in this paper, a subset of data from a quantitative survey with 1750 farmers (300 per country) is used. Villages were selected using purposive random sampling, with sample households selected using proportionate random sampling within operational farm size classes. Data was entered using Kobo ToolBox, analysed using Excel and SPSS and contextualised within the Theory of Planned Behaviour. Analysis also draws on transcripts and participatory exercises from focus group discussions in each of the three locations per country. Up to eight participants in each focus group, with groups stratified into locally meaningful divisions, such as farm size and consideration of socio-cultural factors to limit bias. In addition, informal interview and recorded field observation is used. Qualitative narrative analysis was carried out using thematic coding and SPSS software.

Results and conclusions

The paper details the difference in patterns of adoption and use of plastic and farmers' perceptions of the adoption factors. The study reports on farmers' perceptions of the agricultural innovation system that frames their agriplastic use, the role of change agents, and communication channels for information and agricultural education. Key differences between locations are reported, as well perceptions about the value of extension services as compared to other actors, including the private sector.

The paper reports farmer perceptions of the benefits and risks of plasticulture, compared to alternatives, with important differences. China remains the largest user of agriplastics, accounting for six million tonnes annually, but currently less than 10% of used plastic mulch is recycled. Thin mulch only lasts one season and is difficult to remove. Farmers in China highlight local cost-benefits and good infrastructure for agricultural information. In other countries, there is no systematic data collection on agricultural plastic use. In India, use is encouraged by extension services, reflecting known science about how plastic mulch favourably influences soil moisture and productivity. In Bhopal for example, plastic mulch is used by middle income and commercial farmers with decisions controlled only by men. Cost limits smallholder farmers in India, but also in Sri Lanka and Vietnam, with middle income producers focusing on cash crops with socio-economic constraints to disposal. While organic mulches are common, the introduction of biodegradable plastic alternatives would need to be affordable. High input farming in Egypt has limited subsidies and a lack of an organised recycling market. Farmers have limited

information about the quality of plastic mulch and rely on suppliers as key brokers of information. Availability of rural waste disposal units vary across the countries, with rates of waste collection, recycling and regulation low in most. Lack of awareness of alternatives remain, with a need for better networks and cooperatives, improved regulation and microcredit.

Recommendations, educational importance, implications, and/or application

Insights provide an understanding of the role of farmers' perceptions of the benefits and risks of plasticulture for food security and agricultural growth in LMICs. These fill a gap in knowledge, especially due to the research scale and identification of actors that can facilitate more sustainable pathways.

Outreach

Besides academic audiences, partners are connected with actors in national innovation systems, influencing policy and practice, co-designing solutions and training.

Fostering community reciprocal learning through farmer field visits with global service-learners

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Abstract

Introduction and theoretical framework

Service-learning has been regarded as a teaching pedagogy linking universities to communities (Howe et al., 2014). The pedagogy has been part of the history of the U.S. education system (Bringle & Hatcher, 2011), which was developed on land grant principles of learning/teaching, discovery/research, and engagement/extension (Croft, 2022). The [Country] service-learning program is part of the U.S. efforts of globalizing service-learning. The program was conceptualized in 2005 as an educational approach of the [State University], [Country University], and the [NGO-1] (Nonnecke et al., 2015). School gardening was adopted as the most practicable activity that could fulfill students learning objectives and [NGO-1's] goal of solving hunger in schools in [District], [Country].

The [Country] service-learning program adopted an experiential learning model to implement school gardens and related activities. Experiential learning theory, therefore, grounded this study which underscores the vital role that experience plays in learning, "the process whereby knowledge is created through the transformation of experience" (Kolb, 2015, p. 49). Experiential learning encompasses an engagement in specific experiences, reflecting on and intellectualizing those experiences while enthusiastically participating in experimenting with those experiences (Kolb, 2015).

Service-learners participate in farmer field visits to learn about agricultural systems. Most farmers visited are engaged in evolving agricultural practices with generous support from [NGO-1] (Ikendi, 2019). Field visits are done every afternoon on Tuesdays and Thursdays each week for six weeks of summer service-learning. Students are briefed on farmers to be visited and expected activities. On-site, farmers welcome students, their facilitators, and bond through conversations. Students work with farmers on several activities including harvesting/threshing of beans or amaranths; planting/pruning of bananas, passionfruit, or mangoes; and renovation of livestock houses which deepen their connections to agricultural theory, practices, and extension models.

Purpose and objectives

This study sought to examine the influence of farmer field visits on the [Country] service-learning alumni's academic development during service-learning via two objectives:

1. Identify the level of influence of farmer field visits on alumni's academic development.
2. Determine if there are any differences between [State University] and [Country University] alumni's influence of farmer field visits on their academic development.

Methods and/or data sources

This study was part of a census study that investigated the impact of the [Country] service-learning program on alumni's development (Ikendi, 2022). The study was approved as "Exempt" by the Institutional Review Board at [State University] (IRB #21-263-01). Qualtrics was utilized to collect data from alumni who completed the summer service-learning program between 2006-2019 (N= 291, n = 166 [Country University] students, n = 125 [State University] students). Service-learning program director provided the E-mails some of which were updated by investigators.

The survey instrument design and data collection followed the guidelines of Dillman et al. (2014). This paper focused on a set of five-point Likert scales ("1=Not at all Influential" through "5=Extremely Influential") measuring alumni's agreement with the level at which farmer field visits influenced their academic development during service-learning. Validity was established through rigorous review of the instrument by a panel of eight professors and five graduate students using a panel of expert guidelines designed by investigators. All items in the instrument were modified as necessary and retained.

Data collection started in February 2022 with an "advance notice" sent to all 291 alumni informing them of the upcoming survey. Seventeen e-mails were returned, and alumni could not be traced in time, therefore, we settled with 274 respondents in subsequent communications. In [Country], [Country University] alumni were provided with a \$10 internet stipend to cover their data costs. An "invitation letter" that explained the purpose and confidentiality was then sent with a survey link. Consent was embedded in the first question. Three subsequent reminders were sent to stimulate responses after which data collection was closed in 30 days with a total of 258 (94.2%) responses.

Results and conclusions

The study sought to determine the influence of farmer field visits on the academic development of service-learning alumni. A total of 241 alumni (n =97 [State University]; n = 144 [Country University]) had complete responses. We found that the majority 127(52.7%) of all alumni believe that farmer field visits were "very influential" on their academic development during service-learning. By university, most [Country University] alumni 84(58.3%) and 43(44.3%) of [State University] alumni all rated farmer field visits as "very influential" to their academic development.

To determine the differences, an independent sample t-test was conducted. Levene's Test for Equality of variances showed no violation of equality of means ($p < .106$). The results showed that farmer field visits had higher influence on the academic development of [Country] University alumni ($M=4.45$, $SD=.774$) than [State University] alumni ($M=4.16$, $SD=.909$); $t(239)=-2.624$, $p < .106$, although differences were not significant. On average, farmer field visits were "very influential" ($M=4.34$, $SD=.841$) on all alumni's academic development.

Recommendations, educational importance, implications, and/or application

Farmer field visits provided service-learners with opportunities to get immersed into communities, working with farmers, their instructors/facilitators, and extensionists to accomplish farm activities, bridging the gap between theory, research institutions, extension programs, and were equally influential

for both [Country University] and [State University] students. These activities depict the reciprocity in service-learning which promotes the co-creation of knowledge through mutual interaction. Service-learners interacted with hosts and sought insights into the facts, rationale, and worldview underlying their various agricultural practices. During pre-departure orientations (Ikendi et al., 2022a), service-learners are cautioned at all times to be respectful of farmers' dignity, integrity, and refrain from instantaneous and public judgments of their roles and beliefs which influence their co-learning in a respectful manner.

These field interactions foster community empowerment, a major role of education in the creation of better communities through a problem-solving approach to learning (Dewey, 1938). This approach of interaction makes the community identify their problems and brainstorm solutions with the educators and learners in that process. Similarly, the community immersion of students is essential in navigating their cultural uniqueness and mitigating preconceptions to have effective learning as they too develop intercultural competencies (Ikendi et al., 2022b).

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Deepening research and academic learning through bi-national team projects in global service-learning programs

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Abstract

Introduction and theoretical framework

Historically, service-learning has been part of U.S. higher education emphasizing the “centrality of working with not just in or for the community” as students get immersed in communities (Bringle & Clayton, 2020, p. 48). In [Country], a service-learning program was conceptualized in 2005 by stakeholders of [State University], [Country University], and the [NGO] to develop the next generation of responsible global citizens (Nonnecke et al., 2015). The program identified a school garden learning approach to fulfill the learning objectives and solve invisible hunger in schools (Ikendi, 2022a; 2022b; Nonnecke et al., 2015).

Bi-national team projects are part of school gardens addressing school/community issues (Ikendi et al., 2022a; Nonnecke et al., 2015). There are eight main projects including agroforestry, livestock, soil/composting, irrigation, beekeeping, hygiene/sanitation, postharvest, and school feeding. Students choose two projects and both [Country/State University] students who are assigned the same project link up through e-mails during the spring semester to develop a 3-5 page proposal with guidance from their facilitators and outreach staff. The program provides \$1000 to implement the projects. Outreach staff decides what projects students work on commensurate with [NGO] Workplan/goals. Students work on projects half-day every Tuesdays, Thursdays, and Saturdays during their six-week summer service-learning.

This study was conceptualized using experiential learning theory because of the essential role it plays in the learning process (Kolb, 2015). Experiential learning supports an engagement in particular experiences, reflecting on them, intellectualizing those experiences, and actively participating in experimenting with those experiences (Kolb, 2015). In [Country] service-learning, students are oriented on the projects which provide a basis for project selection based on their experiences (Ikendi et al., 2022b).

Purpose and objectives

This study sought to examine the influence of bi-national team projects on the [Country] service-learning alumni’s academic development during service-learning, achieved with two objectives:

1. Identify the level of influence of bi-national team projects on alumni’s academic development.
2. Determine if there are any differences between [State University] and [Country University] alumni’s influence of bi-national team projects on academic development.

Methods and data sources

This study was part of a census study that investigated the impact of [Country] service-learning program on alumni development (Ikendi, 2022a). The study was approved as “Exempt” by the Institutional Review Board at [State University] (IRB #21-263-01). Qualtrics was utilized to collect data from alumni who completed the summer service-learning program between 2006-2019. The total number of alumni were 291, (n=166 [Country University]; n=125 [Iowa State University]). Service-learning program director provided the e-mails, some of which were updated by investigators.

The survey instrument design and data collection followed the guidelines of Dillman et al. (2014). This paper focused on a set of five-point Likert scales measuring alumni’s agreement with the level at which bi-national team projects influenced their academic development during service-learning. The scale was composed of “1=Not at all Influential” through “5=Extremely Influential.” Validity was established through a rigorous review of the instrument by a panel of eight professors and five graduate students using a “panel of expert guidelines” designed by investigators. All items in the instrument were modified as necessary and retained.

Data collection started in February 2022 with an “advance notice” sent to all 291 alumni informing them of the upcoming survey. Seventeen e-mails were returned, and alumni could not be traced on time hence we settled with 274 in subsequent communications. In Uganda, Makerere University alumni were each provided a \$10 internet stipend sent directly to their mobile money accounts. An “invitation letter” that explained the purpose and confidentiality was sent with a survey link. Consent was embedded in the first question. Three subsequent reminders were sent to stimulate responses and data collection closed in 30 days with 258 (94.2%) responses.

Results and conclusions

The study sought to determine the influence of bi-national team projects on the academic development of service-learning alumni. A total of 238 alumni (n=97 [State University]; n=141 [Country University]) had complete responses. We found that the majority (n=115, 48.3%) of alumni believe that bi-national team projects were “very influential” on their academic development. By university, most [State University] alumni (n=49, 50.5%) and [Country University] alumni (n=66, 46.8%) rated bi-national team projects as “very influential” to their academic development during service-learning.

To determine the differences, an independent sample t-test was conducted. Levene’s Test for Equality of variances showed no violation of equality of means ($p < .139$). The results showed that bi-national team projects had a higher influence on the academic development of [Country University] alumni ($M=4.26$, $SD=.873$) than [State University] alumni ($M=4.21$, $SD=.978$); $t(237)=-.406$, $p < .139$, although differences were not significant. On average, bi-national team projects were “very influential” ($M=4.24$, $SD=.916$) on all alumni’s academic development.

Recommendations, educational importance, implications, and application

Bi-national team projects promoted service-learners’ community engagement and reciprocity through learning from and addressing challenges faced by schools/communities in food nutrition security, public health, and postharvest. An example project related to grain storage was the adoption of a “pedal-operated grain cleaner” for schools/communities, which was designed by a service-learner and

supported by MAK/ISU faculty and CSRL (Ikendi et al., 2022a; Mayanja et al., 2018). The adoption of this “pedal-operated grain cleaner” signified how CSRL relies on indigenous knowledge (Masinde & McMillan, 2015) and scientific research findings to guide innovation adoption and field operations (Acker et al., 2015).

Hygiene and sanitation projects promoted harmony and healthy living through adolescent menstrual education. The installation of tippy taps in schools promoted sanitation after using latrines and pupils transferred health education practices to their homes which reduced the communities’ predisposition to health-related diseases like diarrhea (Ikendi, 2019). Projects on gender-based violence reduced child abuse through sensitization on gender roles which reduce children’s predisposition to nutrition insecurity caused by family breakages in communities (Ikendi, 2019). Generally, bi-national team projects were found to promote deep learning through service-learners’ dedication to research, problem-solving, and teamwork for a common goal, for which such an idea could be adopted across high-impact programs.

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Current Pedagogical Practices in Professional Development for Gender Integration into Agricultural Research and a Suggested Framework for Future online Professional Development

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Abstract

Introduction

Integrating gender into agricultural research is necessary for further advancements in our field, as well as identifying and addressing systematic gender inequalities, but many agricultural researchers are not systematically instructed on how to integrate gender into academic research or how to conduct a gender analysis to understand structural inequities present. In Sub-Saharan Africa, women have limited access to agricultural inputs and access to labor, which limits their productivity and further diminishes their quality of life (UN Women, 2019). Senegalese women make up approximately 70 percent of the workforce, yet still have restricted access to land, education, and agricultural services (UN Women, 2022). Research that attempts to identify gender inequalities and/or attempts to explain possible gender inequalities present in our field and possible sustainable solutions for these problems is necessary to address global issues and create better living conditions for men, women, and children globally. This research requires researchers to conduct a gender analysis, which focuses on identifying inequalities between sex and gender, looking at physical capital and discrimination between access to services, such as credit and extension services. The need for further human capital development on gender integration into agricultural research is imperative to meet global challenges (Duckett, 2022; FAO, 2009; Nieuwkoop et al., 2022). This study seeks to address the gap in the literature on current professional development (PD) programs and materials that are offered as free resources for researchers and professionals who are interested in integrating gender equity in their work and gaining knowledge on gender topics and gender analysis frameworks.

Theoretical Perspective

This study uses an interpretivist approach or that “knowledge is deeply tied to the act of interpretation; there are multiple apprehendable and equally valid realities as opposed to a single objective reality” (APA, 2022).

Purpose and Research Questions

The purpose of this study is to synthesize current educational PD programs and materials that are offered as open-access online resources for researchers and professionals to apply gender integration into their research and daily work. By synthesizing the open-access PD, we also hope to suggest an effective professional program design, both content and pedagogical strategies, to increase awareness of gender integration practices and to promote practical implementation to address the need for more

gender integration work. The research tackles the following research question: What are the current practices and content covered in the selected PD?

Methods

This study utilized a systematic review of open-access online PD for integrating gender into academic research. Thirteen online asynchronous and hybrid PD opportunities were identified for analysis. Materials were located using google, suggestions by university faculty, and the Consultative Group on International Agricultural Research (CGIAR) website. Frequencies and percentages were reported to track current pedagogical practices, and inductive coding was used to track principles of effective PD using hermeneutic analysis (Vieira & Queiroz, 2017; Le Cunff, 2022).

Results

Research Question: What are the current practices and content covered in the selected PD?

Results show a trend in focusing on asynchronous content, with certifications being offered (67%) and built-in assessments to show progress and collect data. The modalities used were online asynchronous modules (69%), offline asynchronous modules (15%), webinars (7.5%), documents being offered (23%), and hybrid models (15%). The time needed to complete the ranged between 3 hours and 30 hours to receive the certification, with approximately 70% of the PD being below 5 hours. All modules utilized PowerPoint, PDF, or other presentation slide formats. The strategies used were videos (45%), PDF documents (27%), end-of-unit assessments (54%), guiding questions (27%), panel discussions (9%), and planned activities/coursework (27%).

To analyze content, eight content categories were developed: introduction to gender concepts (91%), research/project design (73%), introduction to gender analysis (55%), Introduction to gender analysis frameworks (55%), gender mainstreaming (55%), international policy on women's rights (36%), gender-specific data collection (36%), and introduction to humans rights (27%). The results show that the topics of human rights, international policy, and gender-specific data collection are the least covered PD topics, with gender-specific data collection being important for all aspects of data collection, gender analysis, and evaluation. Basic gender concepts and project planning/research design are the most covered topics, and only half of the modules discuss gender analysis and gender analysis instruments.

Recommendations

The primary method of instruction is an asynchronous online module that requires approximately 1.5 to 5 hours of time commitment, using presentation slides to convey information. The current PD modules focus primarily on the use of the information deficit model and the contextual model. Both models use behaviorist principles by treating individuals as passive learners with little subject matter knowledge. Future PD must allow participants to reflect on PD content and actively manipulate learned knowledge through creating tools, selecting gender analysis frameworks, developing sections of an academic paper, or more. Effective PD must focus on content and skill acquisition (Guskey, 2003; Guskey & Yoon, 2009; Visser & Terlouw, 2010; Wayne, 2008), and current PD must improve their methods of instruction.

In regard to content, modules must be closely aligned with researchers' applications. Studies have shown that participants' involvement in PD design may increase the effectiveness of the study (Bayar,

2014; Birman et al., 2000; Guskey, 2003; Guskey & Yoon, 2009; Penuel, 2007; Visser and Terlouw, 2010; Wayne et al., 2008). Modules should be designed with feedback from researchers to increase both the coherence of the curricular materials, as well as the overall relevance of PD opportunity to real-world application. There is a division between PD and the application of PD content, given the lack of instruction on data collection, gender analysis, and gender analysis instruments. Modules aimed toward emulating the stages of research, increasing the adoption of content as well as allowing for the transfer of curricular materials (McKim & McKim, 2022; University of Louisiana, 2022). Future PD programs that aim for equipping researchers and professionals with knowledge and skills of gender integration must be designed based on research-based communication and/or education and real-world application to improve effectiveness.

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Perceived Threats and Pandemics: Understanding Americans' Perceptions of Immigration During COVID-19

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Abstract

Introduction

The topic of immigration generates complex opinions among the general public in the United States. Research suggests that the COVID-19 pandemic has influenced public perceptions of immigration (Esses & Hamilton, 2021; Findling et al., 2022). Immigration has received extensive media coverage throughout the pandemic, contributing to polarized views on the issue (Mitchell & Jurkowitz, 2021; Rowe et al. 2021). Messages related to COVID-19 that emphasize threats have been found to increase biases and xenophobia toward certain immigrant groups (Dhanani & Franz, 2021). The present study will contribute to the academic literature related to perceptions of immigration during a time of crisis. Findings will expand upon theoretical understandings of how perceived threats impact perceptions of immigration, assisting communicators and Extension professionals in promoting a more informed public related to immigration.

Purpose

The purpose of this study was to examine Americans' perceived threats related to immigration during the COVID-19 pandemic. Three objectives guided data analysis:

1. Describe Americans' perceived threats of immigration.
2. Describe Americans' perceptions of immigration related to COVID-19.
3. Determine whether perceived threats of immigration are associated with perceptions of immigration related to COVID-19.

Theoretical Framework

Integrated threat theory (ITT) predicts prejudice toward groups by categorizing perceived threats into four categories: realistic threats, symbolic threats, intergroup anxiety, and negative stereotypes (Stephan & Stephan, 1996). Realistic threats are threats to physical existence, political/ economic power, or wellbeing. Symbolic threats jeopardize values, beliefs, or attitudes. Intergroup anxiety is the discomfort experienced when interacting with individuals from another group (Stephan, 1985). Negative stereotypes are preconceived beliefs about others. ITT framework has been utilized in the literature to explain how perceptions of threat influence attitudes toward immigration (Murray & Marx, 2013; Nshom & Arzamastseva, 2020).

Methods

Data were collected from March 11 to 21, 2022, using an online survey distributed by Qualtrics. The sample included 1,509 adult, natural-born U.S. citizens with similar characteristics as the 2020 U.S. Census. To measure realistic and symbolic threats, respondents were asked to indicate whether they believed immigration would threaten: (1) my personal economic opportunities, (2) the United States economy, (3) the availability of government benefits, (4) the safety of my community, (5) traditional American culture and way of life, and (6) my personal culture and way of life. To measure intergroup anxiety, respondents were asked to indicate the degree to which they felt the following emotions during their most recent interaction with an immigrant: (1) apprehensive, (2) comfortable, (3) anxious, and (4) safe. Negative stereotypes were measured by asking respondents how they would describe the majority of immigrants in the U.S. using the following bipolar sets of traits: (1) lazy – hardworking, (2) dishonest – trustworthy, (3) rude – friendly, (4) unintelligent – intelligent, and (5) dangerous – harmless.

To assess perceptions of immigration during COVID-19, respondents were asked to indicate their level of agreement with the following statements: (Q1) “I believe that immigration into the United States is responsible for the high number of COVID-19 cases,” and (Q2) “I believe that the United States should restrict immigration in order to slow the spread of COVID-19.” The perceived threat variables were combined into indices. Bivariate correlations were used to examine associations between perceived threats and the COVID-19 items.

Results

Results from this study found that respondents were most concerned about immigration threatening the availability of government benefits and the United States economy. Respondents perceived the least threat to their personal culture and way of life. During their most recent interaction with an immigrant, most respondents reported feeling safe and comfortable. In general, respondents did not possess negative stereotypes toward immigrants. Most respondents believed immigrants could be described as hardworking, intelligent, friendly, harmless, and trustworthy.

The majority of respondents did not feel that immigration was responsible for the high number of COVID-19 cases. Respondents were conflicted over whether immigration should be restricted to slow the spread of COVID-19, although more respondents agreed with restricting immigration than those who did not agree. Spearman’s correlations were conducted between the threat variables and perceptions of immigration related to COVID-19. Realistic and symbolic threats had substantial, significant relationships with the belief that immigration was responsible for the high number of COVID-19 cases, and the belief that immigration should be restricted to slow the spread of COVID-19. The COVID-19 items also displayed moderate, significant relationships with intergroup anxiety and negative stereotypes.

Implications & Applications

Since immigration plays a key role in the agriculture industry, it is important for Extension professionals to be aware of public attitudes toward immigration. The correlations between perceived threats and perceptions of immigration during COVID-19 indicate that respondents who felt more threatened by immigration possessed harsher views toward immigration during the pandemic. Findings from this study contribute to the theoretical literature on ITT. Recommendations emphasize the need for targeted

communication related to immigration. Negative messages can exacerbate feelings of threat, which is compounded by the anxiety produced by COVID-19. It is recommended that communicators and Extension professionals openly discuss immigration within their communities to combat threatening messages that have been prevalent across major news platforms.

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Examining the Reasons why Students Choose Specific Study Abroad Experiences at University of Georgia

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Abstract

Introduction and Review of Literature

Participation in study-abroad experiences has continually increased in recent years, as it has been shown to impact students' academic performance, professional development, adaptability, worldview and cultural awareness, and the likelihood of future international travel (Chieffo & Griffiths, 2004; Donnelly-Smith, 2009; Ingraham & Peterson, 2004; Kitsanas, 2004; Ruth et al., 2019). Study abroad experiences are one of the most recognizable opportunities for experiential learning in undergraduate education, as they provide students the opportunity to travel to many different countries for varying time lengths (Ruth et al., 2019). In addition to the travel opportunities, faculty-led study-abroad experiences also provide students with the opportunity to develop knowledge and skills to be successful in the classroom and in the workforce (Ruth et al., 2019). Additionally, study-abroad experiences also allow students the chance to connect with faculty outside of the traditional classroom (Pascarella, 1980), and form friendships with other students within their field of study and in other fields (Swenson et al., 2008).

While the number of students studying abroad decreased in 2019 and 2020 by 53 percent, from a total of 347,099 students to 162,633 students, due to the COVID-19 pandemic which halted participation starting in March 2020, the current trends in study abroad participation seem to indicate an increase in the 2021-2022 year (IIE, 2021; NAFSA, 2021). However, as institutions have begun to provide study-abroad opportunities to students again, faculty seek to understand why students choose to participate in the study-abroad experiences that are offered. Prior to COVID-19, there was a persistent gap noted by practitioners in the number of students who intended to study abroad and those who studied abroad (Kim & Lawrence, 2021). Factors associated with students either participating or not participating in study-abroad experiences have included student background including race, income, gender, prior travel experiences, and academic success (Kim & Lawrence, 2021). Additional factors that have influenced participation in study-abroad also include study major and the program of the study-abroad experience, which includes aspects of what is to be learned during the experience (Kim & Lawrence, 2021; Presley et al., 2010).

In recent years, study-abroad opportunities have become increasingly popular at [University], due to the requirement of an experiential learning credit for graduation and to earn a bachelor's degree. Prior to COVID-19, over 2000 students were participating in study-abroad experiences each year. Students at [University] have the opportunity to participate in faculty-led programs, international study-abroad experiences at [University] centers, exchange programs, non-[University] programs with non-profit or for-profit organizations, and independent experience programs. To better understand why students choose to participate in study-abroad experiences, researchers at [University] examined student intent and choice of study abroad during the 2021-2022 academic year.

Purpose

The purpose of this study was to examine factors that affected students, who were selected to engage in a study abroad program, decision to enroll. The objectives of this study were:

1. Describe contributing factors that affect students' decision to enroll in specific study abroad programs.

Methods

A researcher-developed survey was used to examine what factors affected a student's decision to enroll in a Maymester/Summer study abroad program. During the Maymester/Summer 2022 session, 78 students from the College of Agricultural and Life Sciences were accepted to participate in a University of Georgia study abroad program. All students were sent a 12-question survey examining their goals for the study abroad program, reasons for selecting a specific study abroad program, and student demographics. Thirty-three students responded for a 42% response rate. The survey instrument was evaluated for face and content validity by a panel of study abroad and student enrollment experts. An initial email was sent to the students three days prior to the survey being opened and a reminder email was sent on days seven and 13 (Dillman et al., 2009). Data were analyzed using SPSS.

Results/Conclusions

The majority of participants were upper-class females who had traveled internationally prior to their enrollment in study abroad. The six most important factors for students selecting the study abroad program for which they were enrolled were: 1) travel with a friend, 2) learn a new language, 3) improve knowledge of a language, 4) travel dates, 5) personal benefits (build resume), and 6) make new friends outside of their major. The three least important reasons for a student to engage in the study abroad program for which they were enrolled were: 1) experience a different culture, 2) witness differences and similarities between cultures, and 3) improve their cultural awareness. Finally, the majority of students learned about the program they were enrolled in from personal interactions with the professor leading the trip in class or at the [University] study abroad fair.

The results of this survey indicated that the professor leading the trip was a major factor for the students to learn about the study abroad program, but not a major factor as to why the students enrolled in the program. Furthermore, while developing culturally aware students is a major tenant of study abroad programs (Chieffo & Griffiths, 2004; Donnelly-Smith, 2009; Ingraham & Peterson, 2004; Kitsanas, 2004; Ruth et al., 2019) it was found that the least important reason for students to enroll in a study abroad program. Finally, personal benefits such as: building their resume, traveling with a friend, and making new friends were among the top reasons a student enrolled in a study abroad program. This leads us to question the way that we advertise programs and recruit students.

Recommendations

The researchers recommend the following research study:

- Examine factors that influence all students' decision to enroll in study abroad programs.

The researchers recommend the following for study abroad advisors/administrators:

- Change recruitment strategies used to enroll students in programs and focus more on personal development rather than the content of the course.

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Exploring Science Communication Views of Leaders: A Case Study of a Global Coalition in an Evolving Agricultural Industry

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Abstract

Introduction

The United Nations call upon governments, international organizations, and industry to work collectively toward opportunities that align with long-term sustainability to achieve the Sustainable Development Goals (SDGs; Independent Group of Scientists appointed by the Secretary-General, 2019). To contribute to nine SDGs, a coalition was formed in 2021 to safely and sustainably scale up an agricultural industry featuring a promising crop previously underutilized in the Western world. The coalition – funded by a non-profit organization and housed inside a French research institution – promotes the growth of the industry for workers, consumers, and the environment, primarily through the funding of crop-related grant proposals. The coalition employs five secretariat members, all from varying backgrounds, who participate in its day-to-day operations.

To effectively communicate the science behind this crop, the knowledge needs and contexts of various audiences should be considered (National Academies of Sciences, Engineering, and Medicine, 2017). However, diversity of thought across a leadership team may lead to differences in priorities surrounding science communication. Developed by Gittell (2002), relational coordination theory “proposes that relationships characterized by shared goals, shared knowledge, and mutual respect tend to support frequent, timely, accurate, problem-solving communication” (Bolton et al., 2021, p. 2). Varying levels of knowledge can lead to mismanagement of information; therefore, successful coordination of scientific knowledge sharing is needed to ensure it is effective in reaching its target audiences (Lamm et al., 2020). Therefore, perhaps relational coordination theory can be used to frame how shared communication goals influence this coalition’s science communication efforts.

Purpose and Research Questions

The purpose of this case study was to explore the science communication views of leaders in a coalition formed to build a safe and sustainable agricultural industry for the environment, workers, and consumers. The research questions guiding the study were: 1) How do secretariat members view the coalition’s agricultural science communication goals? 2) What audiences do secretariat members prioritize when communicating their science? 3) What are the existing coalition science communication practices?

Methods

In this qualitative study, data were obtained through semi-structured interviews conducted with four out of five secretariat members. Interviews lasted ~40 minutes and were conducted over Zoom. Data

were additionally obtained through a communication audit of the coalition's website, social media, and online stakeholder platform. The interviewer utilized inductive content analysis to allow for the emergence of research themes through frequent occurrence in raw data (Thomas, 2006). Participants were assigned pseudonyms. The interviewer had worked with the secretariat members as a science communication intern and triangulated data using her own reflection journal and coalition meeting notes. A codebook and audit trail were maintained for transferability and trustworthiness (Lincoln & Guba, 1985) and peer debriefing assured reliability (Barber & Walczak, 2009).

Results

Participants identified four themes in the coalition's agricultural science communication goals: *evidence-based*, *credibility/trust*, *narratives*, and *obtaining resources*. Arthur, the communications manager of the coalition, focused on the importance of promoting *evidence-based* information to ensure messages were scientifically sound and did not "feed into the silver-bullet narrative that [crop] can save the world" so that all members of the coalition could "keep their *credibility*" while "shifting the image of [crop] to a global, ultra multi-faceted product". Kyle, the coalition manager, saw science communication as crucial to avoid the pitfalls associated with "greenwashing" the industry. He recognized "science communication quality establishes *trust* by the UN, cultivators, and processors". Natalie, senior advisor on partnerships, engagement, and communication, saw science communication as a tool to help "protect the industry from ideas that aren't *evidence-based* that could have negative affects" and create a cohesive *narrative* within the industry that "helps us get on the right page". Victor (stakeholder engagement, relationship manager and coalition spokesperson) said science communication was "critical and pivotal" in filling the "gap in terms of [*obtaining*] *resources* to study [crop]" so that scientists could do their jobs. He also recognized the importance of stakeholders sharing *narratives*.

Secretariat members identified three themes in prioritized science communication audiences: *companies*, *consumers*, and *policymakers*. Arthur said "everyone needs more information about [crop]", but he prioritized risk-taking startup *companies* within the industry as key beneficiaries. Kyle said *consumers* of the crop and the *companies* looking to incorporate it into their businesses needed to understand crop benefits. Natalie emphasized the importance of communicating the "nutritional benefits of [crop] to *policymakers* working on science and nutrition." She identified the coalition's role as influential in providing "concrete, global policy recommendations to combat the current inconsistencies" in the food space. Finally, Victor said *consumers*, along with *companies* and *policymakers* in the form of "investors, big food brands, private sector, regulators" needed science communication about the crop.

The communication audit revealed three themes: *coalition stakeholders*, *events*, and *reports*. Facebook, LinkedIn, and Twitter accounts were maintained regularly and primarily shared the work of *coalition stakeholders* (industry partners and scientists). *Event* recordings were occasionally published on YouTube, and Instagram was only updated for periodic *events*. A separate platform was maintained to help *stakeholder* companies share information about sustainable crop innovations, but engagement was limited. *Event* highlights were the primary focus of the website's news section. Website science communication included links to lengthy crop *reports* from credible organizations.

Conclusions, Implications, and Recommendations

Members of the secretariat were each passionate about the importance of evidence-based information for the advancement of the industry, but their goals and target audiences were not strongly aligned.

Shared goals are crucial to effective organizational communication (Gittell, 2002), therefore, inconsistencies in the coalition's science communication perceptions and target audiences among its secretariat members may contribute to the lack of uniformity in science communication efforts revealed in the communication audit and confirmed by the interviewer's reflection journal and meeting notes. Establishing shared goals could lead to more accurate and consistent science communication, therefore reinforcing the trust identified as crucial to industry growth (Bolton et al., 2021). As a young organization, the coalition may gain credibility by establishing specific target audiences and shared science communication goals so they provide sufficient, evidence-based science communication, rather than attempting to reach too many audiences.

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Exported through the theory of change: An inquiry into the compatibility of the U.S. land grant philosophy in Uganda

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Abstract

Introduction and theoretical framework

It is 160 years since the 1862 Morrill Act was to land-grant institutions [LGIs] in the United States (Croft, 2022). The Act was born out of the need to provide students with field and practical experiences to prepare them for the world ahead after classrooms. The LGIs were designed to achieve three goals including learning which involves teaching to provide/share knowledge, discovery involving research/creation of new knowledge/new use/application of old knowledge, and engagement which involves extension/sharing/application of knowledge. Historically, Iowa State University was the first LGI to accept the Morrill Act in 1868 (ISU, 2016). Over time, many countries have sought to adopt the land-grant philosophy. One example is the work of Iowa State University in Uganda.

Iowa State University realized a need to feed a greater proportion of Uganda who were starving. By its mission "Create, share, and apply knowledge to make world a better place." (ISU, 2016, p.2) [State University] joined the world's call to give deliverance to the hungry through philanthropy (Butler & McMillan, 2015). These efforts resulted in establishment of [NGO-1] in [College]. The benefactors wanted their dollars to help "the poorest of the poor" in [Country]. A thinktank was conducted, and Uganda was selected because of high poverty levels and reliable partners (Butler & Mazur, 2015). [NGO-1] established its base in [Country] in 2004 under a three-partner model with [Country University] and a local NGO called [NGO-2] between 2004-2014. However, in 2014 she established her NGO called [NGO-3] to improve on its operations.

This inquiry was based on the Theory of Change (ToC). Doing developmental work overseas in vulnerable communities is challenging. However, it is in the DNA of [NGO-1] to uplift the status of its people beginning where they are (Masinde & McMillan, 2015). The ToC was embedded into the [NGO-1] mission to "use the power of education to develop sustainable communities and responsible global citizens" to uplift everyone's wholesomeness (CSRL, 2020, p. 2). The praxis of innovative ideas that improve livelihoods rests in understanding the communities' assets. Community mapping through participatory appraisal becomes important to give an idea of how assets can be productively harnessed (Sseguya et al., 2009). Also, understanding indigenous knowledge customs determine most of the buy-in for the innovations (Masinde et al., 2015).

Purpose and objectives

The purpose of this inquiry was to gain knowledge and an understanding of how [NGO-1] has executed its mission abroad to meet its goal of working within the framework of the land-grant philosophy.

Methods and/or data sources

We founded this inquiry on a constructivist approach based on “epistemological considerations focusing exclusively on the meaning-making activity of the individual mind” (Crotty, 1998, p.58). We employed a case study design to conduct a content analysis (Cresswell & Poth, 2018) with the units of analysis as the [NGO-1] annual reports. There were a total of eight reports available to us in digital form between 2014 through 2022 and are all provided in the reference list (CSRL, 2022). We selected four even-numbered reports starting with 2014. The year 2014 was selected because it is when [NGO-2] was operationalized as a new partner. Data were contained in these reports. We collected and analyzed data on each report.

During analysis, we began with naïve reading to hone ourselves with the information contained in the reports and further employed an in-depth reading and analysis. We engaged in a dialogue with our data and sought to recognize and classify commonalities across the reports as well as perspectives that appeared distinct. Three categories of learning, discovery, and engagement were assigned *a priori* based on LGI goals. We wrote analytic memos to reflect on emerging unique ideas within and across reports and developed themes inductively (Lincoln & Guba, 1985; Saldana, 2016) in line with our categories. We also critically observed artifacts/pictures captioned in reports, took notes and memos on each intuitive caption that we used to generate new knowledge on projects’ accomplishments as a form of triangulation. We shared drafts among ourselves for peer reviews to help in conclusions.

Results and conclusions

The results of this inquiry are in three categories that represent LGI's goals of learning, discovery, engagement in relation to ToC. In learning, six themes emerged including intercultural competence, home learning, learning infrastructures, youth entrepreneurship, service-learning, and health education. These describe an interface between the new knowledge and the real world.

In discovery, with support from both university faculty and program staff, three discoveries were established including hermetic silos that are important in grain storage, a mobile phone application to predict the live weight of pigs for farmers, and a pedal-operated maize cleaner to use in sieving maize before storage and/or consumption.

In engagement which defines the transfer of knowledge through extension, four themes emerged including local knowledge, empowerment, change agent, and flexibility. These depict the recognition of local customs and the need to build capacity of communities which can ensure sustainability of livelihood strategies should the program choose to close its operations in the communities.

Recommendations, educational importance, implications, and/or applications

Based on the findings, the three LGIs’ goals work within the framework of [NGO-1’s] ToC model. The learning was demonstrated through university students when they are engaged in the service-learning program working with elementary school teaching Math, English, Science, and youth in high schools all supported by [NGO-1] (Ikendi, 2022).

The students' discoveries were supported by supervisors from Uganda and Iowa State University, and these were based on solving community problems (Ikendi, 2022; Ikendi et al., 2022). Engagements were tailored towards sharing discoveries both in schools/communities, with university service-learners and program extension staff working side-by-side, promoting reciprocal learning.

The three cores of LGIs are interconnected. In engagement, we must go out to the people with the knowledge that we have discovered in research to share. In doing so, the role of extensionists is to be collaborators and the community as partners. It is important to see how that reciprocity element plays a key role in the co-creation of knowledge in community conversions.

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Influence of school garden learning approach on the academic development of global service-learners

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Abstract

Introduction and theoretical framework

The school garden concept was coined in Europe by Froebel in 1800s but became adopted in United States in 1900s (Sobel, 2016) through progressive movements of Dewey (1918) whose mission was educating the whole child. During world wars, school gardens were converted into garden armies to produce food for veterans and as patriotic movement avenues (Dooley, 2017; Hayden-Smith, 2014). Children (9-15 years) participated under the slogan *I consecrate my head, heart, hand, and health through food production and food conservation to help the World War and world peace*. In 2000s, Food and Agriculture Organization established guidelines for adoption of school garden learning approach (FAO, 2005).

Espoused by Dewey (1938) in his experiential learning approach, school gardens are a learn-by-doing concept, an effective teaching model that fosters learning with hands-on experiences. Students use their prior experiences, observe them, reflect on them and form abstract concepts which are experimented with as they perform their activities (Kolb, 2015). Kolb argued that learners learn and re-learn from their experience in hands-on activities resulting in mastery of concepts in the learning process.

In Uganda, school gardens serve as outdoor learning laboratories to connect classroom concepts with hands-on experiences (Ikendi, 2022a; 2022b; Nonnecke et al., 2015). School gardens were conceptualized in 2005 through service-learning program of [NGO] based at Iowa State University in partnership with [Country University] (Nonnecke et al., 2015). Service-learners work with [NGO] coordinators, garden teachers, and faculty to establish gardens of vegetables like collards, amaranths; food crops like potatoes; herbaria like basil, mint; orchards like guava; and woodlots like acacia.

An average of 3.2 acres of land is available for gardens in each of the four elementary schools working with [NGO]. Students work on land mapping to design rotation plans and appropriate agronomical practices. They set up nurseries to raise seedlings that are planted. Students participate in bi-national projects like school feeding to nutritional aspects of foods and their storage (Ikendi et al., 2022).

Purpose and objectives

This study sought to examine the influence of school gardening on students' academic development during service-learning, achieved with two objectives:

1. Identify the level of influence of school gardening on alumni's academic development.

2. Determine if there are any differences between [State University] and [Country] University alumni's influence of school gardening on academic development.

Methods and data sources

This study was part of a census study that investigated the impact of [Country] service-learning program on alumni development (Ikendi, 2022a). The study was approved as "Exempt" by the Institutional Review Board at Iowa State University (IRB #21-263-01). Qualtrics was utilized to collect data from alumni who completed the summer service-learning program between 2006-2019. There were a total of 291 alumni (n=166 [Country University]; n=125 [Iowa State University]).

The survey instrument design and data collection followed guidelines of Dillman et al. (2014). This paper focused on a set of five-point Likert scales ("1=Not at all Influential" through "5=Extremely Influential") measuring alumni's agreement with the level at which school gardening influenced their academic development during service-learning. Validity was established through rigorous review of the instrument by a panel of eight professors and five graduate students using a "panel of expert guidelines" designed by investigators. All items in the instrument were modified as necessary and retained.

Data collection started in February 2022 with an "advance notice" sent to all 291 alumni informing them of the upcoming survey. Seventeen e-mails were returned, and alumni could not be traced on time hence we settled with 274 in subsequent communications. In Uganda, [Country University] alumni were each facilitated with \$10 internet fee sent directly to their mobile money accounts. An "invitation letter" that explained the purpose, confidentiality was then sent with a survey link. Consent was embedded in the first question. Three subsequent reminders were sent to stimulate responses and data collection closed in 30 days with 258 (94.2%) responses.

Results and conclusions

The study sought to determine the influence of school gardening on alumni academic development. Alumni 247(n=102 [State University]; n=145 [Country University]) had complete responses. We found that majority (n=104, 42.1%) of alumni believe that school gardening was "very influential" on their academic development during service-learning. By university, most [Country University] alumni (n=42, 41.2%) and (n=67, 46.2%) of [State University] alumni rated school gardening as "extremely influential" and "very influential" respectively to their academic development.

To determine the differences, an independent sample t-test was conducted. Levene's Test for Equality of variances showed no violation of equality of means ($p < .578$). The results showed that school gardening had higher influence on academic development of [Country University] alumni (M=4.28, SD=.856) than [State University] alumni (M=3.96, SD=.954); $t(245) = -2.777$, $p < .578$, although differences were not significant. On average, school gardening was "very influential" (M=4.15, SD=.909) on all alumni's academic development.

Recommendations, educational importance, implications, and application

The school garden experience was very influential academically for both [Country University and [State University] students. They allowed service-learners to practice agronomical principles learned in classrooms. Principles including land use planning, nursery and seedbed management, propagation,

agroforestry, postharvest handling were demonstrated to pupils, linking classroom teaching to school gardens. These hands-on experiences makes lessons learner-centered which improves knowledge acquisition. This is what Situated Cognition Theory emphasizes that knowledge is constructed within and linked to the activity, context, and culture in which it was learned (Brown et al., 1989; Lave & Wenger, 1991). Linking teaching to specific activity, place, and/or social situation enhances the learning process because of learners' familiarity with that situation.

As school gardens provided knowledge on production, proceeds were supplemented to school lunches, keeping pupils in school which improves their academic performance and motivation to continue participating in gardening (Byaruhanga, 2016; Ikendi, 2022a; 2022b; Snodgrass, 2022). Service-learners worked with pupils in agricultural clubs to maintain gardens and achieve sustainability (Ikendi, 2022a; 2022b; Kugonza et al., 2015). Pupils transferred the knowledge back home through implementing vegetable production to improve household food supplies and income to meet scholastic materials like books, pens, and uniforms (Duerfeldt et al., 2016; Ikendi, 2022b).

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Opportunities and Challenges in Adopting the Global Classroom Model within a College of Agriculture

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Abstract

Introduction

As global food systems continue to become more deeply integrated, complex, and holistically oriented, agriculture colleges must strive to provide educational experiences that model these trends and produce students who are capable of being leaders and problem-solving in such dynamic environments.

Enter in the Global Classroom Model (GCM), a virtual class taught between two institutions, with roots in the Global Service Learning (GSL) and Problem Based Learning (PBL) pedagogy, that seeks to provide experiential learning and professional development opportunities for students in cross-cultural settings (Oberhauser & Daniels, 2017; Gonzalez, 2009; Helle et. al., 2006).

In this study, the researchers examine and evaluate a pilot GCM course co-taught in spring 2019, 2020, and 2021 at the University of Maryland (UMD) and the Liberia International Christian College (LICC). The course, Global Agriculture, is the first Global Classroom taught at both institutions' respective College/Department of Agriculture. The course was structured around 15 weekly units that each sought to highlight a macro-level concept within "Global Agriculture" (e.g. gender, climate change, innovation, spirituality, food security). Through case studies, guided discussions, and projects, students learned how to analyze and connect various trends in global agriculture, while also designing and implementing solutions.

Purpose and Objectives

This study presents and analyzes opportunities and challenges documented by U.S. and Liberian students participating in a Global Classroom course (over a 3-year period) as a means to promote and improve future iterations of inclusive global education modalities. The goal is that these insights can help to lay the groundwork for establishing best practices for other agricultural institutions to consider as they are looking to adopt and implement a GCM.

Methods

A pre-post mixed-method survey, designed with both Likert and open-ended questions, was used to interview both LICC students (n= 21) and UMD students (n=25). The survey questions sought to help students reflect on the GCM as an innovation within higher education and to examine specific characteristics of the GCM that might influence its effectiveness and therefore rate of adoption elsewhere (Rogers, 1962).

Students were specifically asked about their perceptions regarding the relative advantage, complexity, compatibility, trialability, observability, and constraints of the course. Students were also asked about what made the course unique in their eyes, whether/how it helped them to meet their objectives, and suggestions for improving the course.

All data were collected, recorded, transcribed, and analyzed using multiple qualitative coding cycles within nVivo qualitative data analysis computer software. Data were reviewed, coded, and then compared to identify patterns related to both opportunities and challenges of the GCM.

Results

Opportunities

In post-surveys, 92% of the LICC students and 66% of the UMD students strongly agreed that this class had a relative advantage, with 71% of UMD and 72% of LICC students strongly agreeing that the impact of this course (on themselves, their community, their school) and connection to other coursework (85% UMD, 72% LICC) was clearly visible. One-third of all the students mentioned that this was their favorite class and 94% of the students agreed that this course helped them in meeting their personal and professional objectives. Additionally, 89% strongly agreed that they would recommend this course to a friend and 95% agreed or strongly agreed that this course should be replicated and expanded to other departments and institutions.

Some of the opportunities of this course that they particularly enjoyed were 1) the unique synchronous virtual class model which allowed them to have a 2) small class size with 3) more opportunities to develop relationships with others abroad as they 4) participated in student-led discussions that integrated 5) project-based learning opportunities allowing them to 6) connect information from other courses and 7) develop themselves professionally while 8) solving food security-related problems within their communities.

Challenges

When asked about the feasibility of replicating this course and potential constraints in implementing this type of innovation more broadly, students noted some challenges related to technology (21%), communication (15%), scheduling (24%), workload (34%), and cost (16%).

The technology challenges were related to the unreliable internet and electricity systems, while the comments regarding scheduling were related to differences in time-zones and semester schedules between UMD and LICC. The workload on both the teachers and students was high because of the upfront reading that a discussion class of this nature requires and the ever-changing schedules/challenges which meant reworking assignments/timelines. The concerns about costs were related to the technology needed (ie. computers, videos, internet) and also project materials for extension outreach activities that the class did. Communication challenges, related to accents and cultural norms in addressing issues, were likely exacerbated by the virtual nature of the relationships. Many of the challenges noted were to be expected and aligned with those mentioned in other studies (Weik et. al., 2013)

Educational Importance

While the effectiveness of GCM courses in building cross-cultural competencies and transformational learning spaces has been outlined in other research studies, the GCM model itself and those elements that make these experiences unique and effective are still being defined (Weik et. al., 2013; Devereux & Glenn, 2022). This study, which highlights how students perceive the course and its relative value within their respective educational settings, provides insights into those aspects of the course that students valued and appreciated, along with challenges that they experienced, thereby giving practitioners a better understanding of those key elements of a GCM that contribute to designing a successful course. Interestingly, many of the elements that made the GCM course unique and valued, were the same elements that also brought challenges (i.e. the synchronous virtual class connected people from two different cultures, but also brought communication, technology, and cost challenges).

By analyzing both the opportunities and challenges that students observed, we hope to help practitioners better design and anticipate the opportunities and realities involved in adopting and teaching a GCM so they can prepare accordingly. This study is also unique because it provides insights from a GCM situated within a College of Agriculture, a fitting context given the global complexities and linkages of today's food system.

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Moving into the Future: Immigrant Communities Perceptions of Extension in an Urban Setting

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Abstract

Introduction

The United States Cooperative Extension Service was created over a century ago through the Smith-Lever Act (Olson, 2013) as a unique educational system utilized to educate and inform community members about aspects in the areas of agriculture, home economics, leadership, economic development, and other related subjects. Still, the role of Extension has shifted over time, and while it was originally heavily focused on disseminating knowledge to rural areas, as US populations have shifted towards residing in more urban and suburban areas, Extension has had to mirror this shift. Therefore, in order for Extension to stay relevant and realistic, it must continue to appeal to new audiences within more urban areas; in many cities, this includes a variety of immigrant populations. Cultural innovation – or working with new audiences utilizing proven programming in new and novel ways – is an excellent way to engage new immigrant communities. Yet, reaching out and engaging with these audiences often poses its own unique considerations and challenges, which can stagnate educational programming. As such, it's especially important to garner the voices of these immigrant populations, not only to determine their needs and perspectives, but also to take away some of the fear of the unknown and make engaging more promising and impactful.

Conceptual Framework

Reaching out to immigrant populations is not new for Extension, with mention of engaging across cultures as early as the late 1940s (Smalkoski, Axtell, Zimmer, & Noor, 2016). And while Extension professionals are often asked to engage with several audiences at once, there are unique considerations with immigrant populations. Aspects such as different languages, diverse religions and religious holidays, and cultural norms (i.e. direct vs. indirect communication) all make education and engagement much more multifaceted.

So how then does Extension effectively engage with immigrant populations? Smalkoski, Axtell, Zimmer and Noor (2016) would argue one can't utilize a one-size-fits-all approach, but rather a longitudinal approach utilizing community engagement and relationship-building methods is more appropriate. Within the realm of nutrition education, extension educators would contend that understanding the religious and cultural practices of the immigrant audience is particularly salient when developing the foundation of a well-planned educational program (Van Offelen, Sherman, May, & Rhodes, 2011). Finally, when considering immigrant entrepreneurs taking risks to pioneer new business strategies and formats, it is recommended for Extension to step in and provide needed educational opportunities for these business owners to be successful beyond the traditional ethnic boundary (Kim, Im, Park, & Lee, 2018). When considering each of these examples it is clear that a one-size-fits-all approach won't work,

and that further knowledge of resident immigrant populations is necessary to understand how to engage with these populations most appropriately.

Purpose & Objectives

This pilot study was undertaken with the express purpose of giving voice to the immigrant population in a southern urban center. As such, our specific purpose of this exploratory study was to answer this research question:

R1: Within one of the largest counties in {a southern state}, what are immigrant communities' perceptions of Extension?

In addition, these three sub questions were outlined as objectives of the study:

1. What educational resources have immigrant community members heard of or utilized in {urban center}?
2. What educational resources provided by Extension have immigrant community members heard of or utilized?
3. What educational resources would immigrant community members like to see provided by Extension in the future?

Methods

This pilot study was undertaken to determine the perceptions and needs of immigrant populations in {urban center} in a Southern state. The study population included five immigrant communities in {urban center}; each purposively selected due to relationships with community entre. A researcher designed survey was facilitated at identified community gatherings. After transcription, demographics and themes were reported within each of the areas of interest. The results of this survey are intended to be utilized as the foundation for a larger study.

Results

Results indicated that a majority of the respondents were male (77%) with 23% being female, and a majority of the respondents designating they were 35 or older (82%). The Democratic Republic of Congo and Mexico were the top countries immigrants hailed from, with the average household size being 4 to 6 family members. Many of the community education resources immigrants identified using were associated with the local government, churches and targeted non-profit organizations. Not surprisingly, a majority (92%) of immigrant respondents had never heard of Extension; for the 8% who recognized Extension, this was through 4-H programming in public schools. Finally, educational programming needs fell into three primary themes – 1) social and communication skills, 2) food access, cooking and preservation skills, and 3) community and cultural knowledge.

Educational Importance & Implications

As aforementioned, for US Extension to remain relevant and realistic, they must innovate (Smalkoski, Axtell, Zimmer, & Noor, 2016). A primary way to do this is to reach out to new audiences – a chief audience who could benefit from Extension within urban areas are immigrant communities. As this pilot

study illustrates, Extension is not well known by immigrant populations within {urban area}. This should be considered an opportunity – both by area Extension educators but also by the immigrants themselves. Still if Extension is to effectively engage with new audiences, no matter who they are, this engagement needs to be well-thought out, purposeful, and designed with the specific audience in mind. This is no different when working with immigrant populations.

Speaking from an international front, technology continues to allow us to engage with diverse audiences around the world. As such, extension educators around the world need to continue to develop their skills in working with new and diverse audiences and cultures. No matter what country you call home, there is a strong possibility there are immigrant populations who could benefit from the life-changing services that extension has been known to offer. Culminating the presentation, researchers will discuss aspects to consider when engaging with immigrant populations, as well as explore future research.

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Farmers' Satisfaction with Extension Services in Trinidad and Tobago: A Comparison of Private Sector and Public Sector Services.

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Abstract

Introduction/Review of Literature/Theoretical Framework

For decades, the Government of Trinidad and Tobago, through its Ministry of Agriculture, was the only agency that offered extension services to farmers. Since 1990 however, several private agencies, mostly input suppliers, have been providing such services independent of the Government. While these private organizations initially targeted specific clients, farmers now receive extension services from the public (government) and private agencies. According to Rope and Pöllänen (1994, as cited in Ihalainen, 2013), when an organization serves its clients well and keeps them happy, they tend to create long-term, customer-satisfied relationships.

Private extension agents attend specifically to the educational needs of farmers related to the inputs they offer. In contrast, Government extension agents, in addition to providing educational services to farmers, are required to attend to a range of other non-agriculture-related issues over which they have little or no control. There has been some expressed dissatisfaction with the public extension service as a result. Moreover, limited funding to support public extension led to poor delivery of extension services, which, directly impacts the performance of smallholder farmers, (Luki et al., 2020; Afful & Lategan, 2014). In contrast, while private extension better access to resources serves farmers' interests well, some have questioned their loyalty (Labarthe & Laurent, 2013).

Farmers require an extension service that satisfies their needs in a timely and effective manner. If farmers are not satisfied, the authorities need to determine the extent of farmers' dissatisfaction and, more importantly, the issues that give rise to such dissatisfaction and make interventions (Author et al., 2014). Moreover, in a pluralistic system, it is important to understand the level of service received from different organizations. The sharing of best practices would enhance each other service delivery function, all to farmers' benefit.

Purpose and Objectives

This study aimed to compare farmers' satisfaction with extension agencies that provide services to them and make recommendations for improvements. Objectives were to; (a) assess the level of satisfaction farmers have with private and public sector extension services, (b) describe the main sentiments that contribute to satisfaction levels for each organization, (c) determine relationships between selected demographic factors and farmer satisfaction for each organization and (d) determine if farmer satisfaction levels are statistically different between organizations.

Methods

The target population was Trinidad farmers who received Agricultural Extension services from public and private sector organizations. A screening question ensured respondents were receiving service from both agencies. A convenient sample of 200 farmers (n=200), selected from the major vegetable farming districts in Trinidad, were surveyed between August and September 2022.

The survey instrument consisted of selected socio-demographic variables (location, gender, age, farm size, farming status and frequency of extension visits); and a 30-item Likert-type scale which sought to assess the farmers' satisfaction with both private and public sector extension services. Respondents were asked to select their level of agreement to each item on a 4-point Likert scale, scored as follows: strongly agree=4; agree=3; disagree=2; strongly disagree=1. Cronbach Alpha (α) assessed the internal consistency of the scale. Data analysis was done using SPSS v.25. An index to assess farmers' satisfaction was derived as follows:

$$\text{Farmers' Satisfaction Index (FSi)} = \frac{\sum R_i}{R_{\max}} * 100$$

Results were presented as frequencies, correlations based on Spearman's Rho coefficient and an independent t-test.

Results

The majority of farmers were male (81%), more than 35 years old (70%), from the south/central/eastern regions (65%), were farming full-time (65%) reported regular visits from extension (36%) and occasional visits (35%).

For the public extension service, farmers' highest agreements were to the statements: "The Extension Officer respects my opinion" and "The social media platforms assist me with the information needed".

For the private extension service, farmers' highest agreements were to the statements: "The Extension officer offers a high-quality service" and "I believe officers treat all farmers fairly and equally."

The Satisfaction scale appeared to have good internal consistency ($\alpha=.89$). Farmers Satisfaction Index (FSi) for the private extension service was 0.83 and 0.58 for the public extension service. The independent t-test showed that the indices were significantly different ($P < 0.05$ level). Farmers were much less satisfied with the public extension system.

For the public extension service, which had the lower FSi, farmers expressed the highest disagreement with the statements; "I can call my extension officer at any time", "The service can be relied upon to keep its promises", and "I believe the information provided is based on sound principles". These areas all represent points of intervention to strengthen the public extension among farmers.

For private extension, a weak significant relationship was determined between the number of extension visits and satisfaction levels ($r = 0.262$, $p < 0.05$). This suggests that as farmers receive more visits, they are more satisfied with the extension service.

For the public extension, there was a weak but significant negative correlation between the status of farmers (part-time or full-time) and satisfaction level ($r=-.149$, $p<.05$). This implies that those farmers who spend more time on their farms (full-time) are less satisfied with the extension services they received compared to the part-time operators.

Conclusion

The marked difference between satisfaction levels for the public and private extension services presents several opportunities to strengthen the public extension system.

Recommendations, Educational Importance, and Implications

If the public extension system is not serving clients as it should, as evidenced by their low level of satisfaction, then government efforts to reduce the high level of food import (>75%) will be stymied.

The public extension service is by far the dominant system. There is an urgent effort to retrain staff for better service delivery and for government to provide more resources for this service.

Formal linkages with the private extension service and sharing their best practices would enhance the public extension system. In contrast, the reported finding that farmers perceive the public extension officers a high-quality service, when linked to their belief that their social media platforms assist them with the information needed presents excellent opportunities for the educational advancement of farmers.

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Using Virtual Delphi Method Focus Groups to Conduct Participatory Research during the COVID-19 Pandemic: Implications for Extension

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Abstract

Introduction, theoretical framework, and review of literature

The COVID-19 pandemic created challenges in all spheres of society and in particular, accelerated shifts towards virtual methods of community-based participatory research due to the need for social distancing. Although participatory research is intended to be a continuous process of collaboration among researchers and the community where all parties involved share their experiences, knowledge and resources, and plan together, participatory methods had been used in the past to extract information from the community without commitment to benefit the community (Ellis-Jones et al., 2005). As the pandemic widened the digital divide among some members of society (Lai & Widmar, 2021) and the use of technology to conduct research became necessary, the pandemic also provided unexpected opportunities to explore new participatory research methods to ensure inclusive participation by research subjects.

This study modified traditional Delphi methods by adding virtual focus groups to enhance the opportunity for multi-stakeholder conversations and mutual understanding among diverse participants. Traditional Delphi techniques aim to utilize expert knowledge and judgment to develop a consensus answer to a complex health science issue (Niederberger & Spranger, 2020; Warner, 2015). A main feature of the Delphi technique is utilizing aggregated group answers from questionnaires, then creating new questionnaires to reconsider judgments and revisiting when appropriate. The Delphi process can be run multiple times until consensus has been achieved, however, it has been found that typically three rounds are sufficient in obtaining the necessary information and reaching consensus (Hsu & Sandford 2007).

The modified Delphi method used in this study helped researchers meet the needs of the community by creating a collaborative space for diverse participants to share their thoughts and explain their opinions to each other. In contrast to traditional Delphi, the modified Delphi method better fit the study's community-engaged approach and better met the needs of study participants during the pandemic.

Purpose and objectives

This article aims to describe the development and success of a modified Delphi method using a virtual focus group format. The innovative approach to the Delphi method can be used by the Extension academics to create collaborative and inclusive spaces for the agriculture, food, and environment communities across the world.

Methods and data sources

Three Delphi focus groups were administered online over Zoom with an expert panel of 12 individuals between January 24th and February 7th, 2022. Focus groups lasted 1.5 to 2 hours, were conducted using simultaneous translation in English and Spanish, and were recorded. Notes from the focus groups were subsequently coded to identify common themes and patterns. By supplementing the traditional survey form of inquiry in the Delphi method with focus groups that build on Delphi survey findings, this project tapped into a novel approach to Delphi research instruments.

The innovative Delphi focus group method was evaluated in two ways: focus group participants provided their feedback on the focus group process by taking a poll at the end of the focus groups, and focus group organizers (8) provided written and verbal feedback following each focus group. By bringing together stakeholders with different roles and relationships to the study topic and by creating space for collaboration between English and Spanish-speaking participants, the project implementers created a unique platform for participants to share, discuss, and challenge their perspectives. Additionally, research partners emphasized that the presence of linguistically diverse participants added a great value to the project and simultaneous translation contributed to the opportunity for greater cross-cultural understanding and a stronger sense of social cohesion among study participants.

Results and conclusions

One major finding of this study was the potential for modifying conventional Delphi methodology to include iterative focus groups combined with iterative surveys to yield more nuanced and robust qualitative results. A strength of this method was the opportunity to create an inclusive space for a heterogeneous panel of experts from different stakeholder groups and localities using a virtual platform. Despite the concern on the researchers' part about the risk of excluding some community members due to limited access to technology, the Delphi focus group participants shared satisfaction with the method and appreciation to participate in an inclusive study using virtual means. A potential limitation of this method to consider are barriers to accessing technology and it is important to utilize a case-by-case approach to determine whether a virtual or in-person Delphi focus group and survey is more appropriate. A noteworthy aspect of this method to consider is the challenge of effectively designing and delivering mixed methods simultaneously which can be overly taxing for researchers with limited time, expertise, or personnel capacity.

Recommendations, implications, and application

Benefits of the modified Delphi method used in this study include that it increases inclusivity amongst multi-stakeholder participants and personalizes the experiences for participants. It also allows diverse stakeholders to explore and inform each other's opinions and perspectives. As a result, the outcomes of the consecutive surveys can be positively impacted, allowing focus group participants to influence each other in their responses.

One of the main strengths of this approach is to bring diverse groups of participants together to facilitate space where members can listen to each other to reach mutual understanding and hear each other's perspectives. There are several recommendations that can help improve the experience of the modified Delphi method:

1. Consider modifying method for in-person Delphi focus groups and surveys.
2. Explore use of collaborative technology tools such as real-time surveys, Jamboards, Mentimeter and other tools.
3. Allocate ample time for discussion in either break-out sessions or as a large group for deeper conversations among focus group participants.

Conclusion

Despite economic and societal challenges, the pandemic forced the need to utilize virtual research methods that promoted direct communication and collaboration between diverse project stakeholders. This study enabled researchers to explore an innovative methodological approach to doing community-engaged research, implement a novel approach to the traditional Delphi method, and reflect on the outcomes of the modified method.

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How the Global Classroom Model Creates Transformative and Inclusive Spaces for Students in Agriculture & Extension

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Abstract

Introduction

By internationalizing project-based learning experiences, higher education institutions expose students to new perspectives and ways of solving problems, enabling them to develop the skills and cross-cultural competencies needed to contend with major global challenges such as food security and climate change. The Global Classroom Model (GCM), a relatively new iteration within the Global Service Learning (GSL) framework, was designed to develop global competencies through collaborative and transformative partnerships (Oberhauser & Daniels, 2017; Gonzalez, 2009; Asia Society, 2022).

Much of the global competency literature stems from Western scholarship that centers the experiences of students in the ‘developed’ world relative to counterparts elsewhere, with competencies based on Neoliberal labor frameworks for individuals preparing to enter the ‘global workforce’ (Devereux & Glenn). Courses that offer these competencies as learning outcomes can inadvertently reinforce unequal power dynamics and foster student interactions in which one group is learning and the other is being learned about (Chun & Evans, 2016).

The goal in developing a novel undergraduate *Global Agriculture* Global Classroom course was to create an inclusive cross-cultural experience that was equally responsive to the respective needs, priorities, and challenges of two diverse student groups as they learned together, and to reflexively address and seek to transform existing power imbalances within their broader socio-historical contexts (Núñez et al., 2015). We evaluated student outcomes from this course co-taught in springs 2019, 2020, and 2021 between two universities in the U.S. and Liberia.

This longitudinal study offers critical insight into how global educational models can not only build cross-cultural competencies at the college level, but also create transformative and reparative relationships through intentional collaborative frameworks that decolonize curriculum and establish equitable practices for working together in project-based learning environments (Devereux & Glenn, 2022).

Purpose and Objectives

The purpose of this study is to examine how technology supports multiple modalities of global learning and exchange by creating spaces for students of diverse backgrounds to learn and work together in small, mission-driven settings. This research examines student outcomes across relevant global competency frameworks to determine the extent to which the GCM created a transformative and inclusive learning environment.

Methods & Conceptual Framework

We used a constructivist grounded theory approach, which positions researchers as collaborators with the participants as they construct meaning out of phenomena, so each subsequent iteration of data collection and analysis was informed by what previously emerged (Charmaz, 2014). This presentation focuses on the student participants: 1) U.S.-based (n=25), and 2) Liberia-based (n=21) from across the three years. We developed a mix-method questionnaire implemented at the beginning and end of each semester, in addition to employing other qualitative approaches such as participatory ethnography.

The interview instrument used the KASA analysis framework popular in agricultural extension, in addition to other frameworks such as Fair Trade Learning principles and global competency domains, in order to frame the GCM as an innovation in education (Bennet, 1975; Hartman, 2016; Asia Society, 2022). All data collected were recorded, transcribed, and analyzed using grounded theory methods, using multiple qualitative coding cycles within nVivo qualitative data analysis computer software.

Results & Discussion

We examined the role of the GCM in enabling students to achieve four traditional domains of global competence: 1) investigating the world beyond their immediate environment; 2) recognizing perspectives; 3) communicating ideas effectively with diverse audiences; and 4) translating ideas into effective action (Asia Society, 2022).

1) Both groups of students reported increased levels of technical knowledge and skills from the world beyond other course experiences. UMD students for example were interested in Africa-centered learning, with 15 out of 25 noting that this was a significant advantage of the course. Liberian students were focused on topics like climate change and humanitarian crises, which elicited an increased sense of global interconnectedness (e.g. “we are not alone with these problems”).

2) Multiple iterations of ‘new perspectives’ were the most widely reported course outcome by all students, with around 300 total references in the interviews. By 2021, having an increased sense of ‘global perspective’ was reported by 75% of the U.S. students and 83% of the Liberian students. Ultimately many students shifted their perspectives on what it means to work with global partners, and the role of the international aid community.

3) Students communicated ideas with their classmates and counterparts abroad through multiple platforms and modalities. The course utilized a variety of ICTs, enabling students to form relationships on their own terms, and evolved to directly address some of the reported communication challenges. Providing semi-structured environments led to meaningful group discussions, a frequently reported benefit, and addressed to the extent possible challenges for the Liberian students in terms of access.

4) Almost all students reported that the ability to work and translate ideas into action with students from another country was their favorite component of the course, and led to a sense of empowerment. In 2019, approximately a third of U.S. students and almost 80% of Liberian students reported feelings related to “empowerment” and “having an impact;” by 2021, this jumped to 80% of U.S. students and a full 100% of the Liberian students, who highlighted feeling more equipped and confident to identify and solve agriculture related challenges in their community. Students also frequently mentioned how this

class helped them understand and transform power dynamics within their relationships, and develop confidence that even as students they could make an impact.

Educational importance

By examining student outcomes across three semesters in which multiple technological modalities were employed (e.g. synchronous and asynchronous online learning, social media) we determined how technology both highlighted existing learning inequalities *and* also leveled the playing field and created bridges between a U.S. university and a minority institution in rural West Africa.

This research contributes to a growing body of scholarship on diverse modalities of global learning, and the course sets a precedent for other departments to meet the demand for globally minded graduates with hands-on collaborative experience. We want this research to enable new and diverse iterations of this course model and partnership.

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Evaluating Impact: Assessing Impacts of an American NGO Working Globally in Extension and Technical Resourcing

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Abstract

Introduction and Theoretical Framework

ECHO is an international NGO based in Ft Myers Florida, but working globally through its headquarters and Regional Impact Centers in Thailand, Tanzania, and Burkina Faso. It exists to reduce hunger and improving lives worldwide through partnerships that equip people with agricultural resources and skills (ECHO, 2022). ECHO achieves this mission by co-creating innovations and practices with a diverse network of over 16,000 actors, which include development actors, local leaders, farmers, agricultural missionaries, government extension agents and academics. The overarching end goal of the organization is co-creation via the core functions of identification, validation, dissemination, and evaluation of innovations and practices to reduce hunger and improve lives. Particular elements of expertise include evaluation of the concept of the Small Farm Resource Center (Bicksler et al, 2022), community seed banking (Gill et al., 2013), and Green Manure Cover Crops (Trail et al., 2019). In existence since 1981, the organization made a strong push beginning in 2017 to better document and evaluate its multiplicative effects through its network approach.

Purpose and Objectives

The purpose of this work was to explore the multiplicative effect of ECHO training across its centers and a wide variety of training recipients. This purpose was accomplished by engaging a consulting firm to develop and implement a pilot study to estimate the multiplicative effect of its 2016-2017 training events at its Florida headquarters and each pilot region. The objective for the study was to measure the multiplying impact of ECHO's direct training by ascertaining the extent to which trainees actively shared new knowledge and skills with others.

Methods and Theoretical/Philosophical Themes

ECHO contracted an outside consultant to conduct follow up surveys in the Winter and Spring of 2021 with trainees who attended an in-person training for seven or more hours at one of the three international ECHO centers from the time period of Aug 2018 – July 2019. A census was conducted based on the registration information and respondents were asked about the degree to which they utilized the skills learned, whether they had shared what they learned, and the total number of people to whom training was multiplied. A multiplier was then calculated and confidence intervals created. The overarching goal of the work was to ascertain if directly-trained recipients of ECHO trainings were applying and sharing what they had learned.

Results and Conclusions

Beginning with trainee population estimates of 2,968 (West Africa), 1,029 (East Africa) and 273 (Asia) for 2018-2019, there was a response rate of 36.5%, 21.1% and 18.3% respectively. In East Africa, 83% of respondents continued to use ECHO skills in their work at some level, in Asia 73% of respondents continued to use ECHO skills in their work at some level, and in West Africa 70% of respondents continued to use ECHO skills in their work at some level. In terms of passing along what they had learned with others, 87% of respondents from East Africa, 83% from West Africa, and 98% from Asia passed along information to at least one other person in the time period from their training until the survey was conducted. Techniques for sharing those information pieces and skills varied by geography, with West Africa trainees reaching personal and community networks through group discussion while East Africa and Asia trainees used a nearly equal mix of group and one-on-one discussions to share information.

With regards to measuring multiplication, for trainings conducted in 2018-2019, it was estimated that for each of the following regions, each trainee trained an average of the following: East Africa – 73 with 95% CI of 61.9–84.6; West Africa – 12 with 95% CI of 10.7–12.8; Asia – 107 with 95% CI of 63.4–150.3. It is interesting to note how much of the multiplication varied by regional center. One of the key tenants of the ECHO model is that each of the Regional Impact Centers, while operating within the core functions of the organization, should retain some autonomy in terms of methods, processes, and operations based on the cultural and ecological contexts and needs of each respective area. When these multiplication rates are extrapolated across the entire population of certified trainees, the following impact estimates of total people trained by trainees were obtained: East Africa – 96,813 with 95% CI of 81,808–111,818; West Africa – 39,238 with 95% CI of 35,636–42,839; and Asia – 29,161 with 95% CI of 17,298–41,024.

These numbers are certainly impressive, but ECHO would like to go one step further with its new strategic plan, and attempt to quantify impact and efficacy of its RAS methods and content employed.

Recommendations, Educational Importance, Implications, and Application

Based on this work, we are happy to begin the measurement of the extent of implementation as well as multiplication of innovations, practices, and ideas by those network members that ECHO directly trained from 2018-2019. Challenges persist, however, and must be overcome in each region. These include difficulty of follow-up, language barriers, and technological hurdles. Specialty organizations, like ECHO, who engage in extension and advisory services, would benefit from guidance and direction from professionals working in RAS and M&E to help better define uptake and success. With ECHO's next strategic planning process being launched at the end of 2022, we would welcome inputs to validate or challenge the multiplication indicators and to help us move beyond measurement of individual implementation and multiplication into measuring impact and efficacy.

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Examining Community Viability and Attitudes Toward Mental Illness: Insights for Global Community-Based Care

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Abstract

Introduction

Approximately one billion people live with a mental health disorder, yet “governments around the world allocate just 2% of their health budgets to the treatment and prevention of mental health conditions” (World Health Organization [WHO], 2022, p. 58). Due to healthcare disparities, mental illness is a leading disability worldwide (WHO, 2022). Farmers, specifically, encounter occupational and economic uncertainties, which pose risks to their mental health (Kolstrup et al., 2013). Perceived stigma or discrimination felt by those in a community varies culturally and can delay help-seeking or service use (Allen et al., 2017). Stewart et al. (2015) revealed older adults in rural areas more highly stigmatized mental illness. Examining community viability can help us understand how communities support mental health. Viable communities are resilient, adaptable, and have stable social and economic infrastructure that aid in change (Bush et al., 2022). A community’s attitude toward mental illness (CAMI) provides insight into social acceptance and reveals potential threats compromising their healthcare infrastructure. We used the Community Viability Indicator (CVI) model as a framework to examine parts of social infrastructure. CVI is grounded in sense of community theory and explores the human components of community viability (Bush et al., 2023). Taylor and Dear (1981) designed the CAMI scale to assess perceptions of people with mental illness (PWMI). Integrating CAMI with CVI allows us to investigate cultural stigma and acceptability as potential barriers to community viability for PWMI.

Purpose and Objectives

This study aimed to examine stigma of mental illness across community types and to better understand the relationship between CAMI and community viability. These objectives guided research:

1. Determine the effect of community type on CAMI scores for rural, urban, and suburban community members.
2. Examine the relationship between CVI and CAMI scores.

Methods

We administered a cross-sectional, general population survey, using two pre-existing scales. These included the CVI (Bush et al., 2023) and three of four CAMI (Taylor & Dear, 1981) subscales for benevolence, social restrictiveness (SR), and community mental health ideology (CMHI) at 10 items each on a 5-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*) to assess attitudes toward PWMI.

Cronbach (1951) alpha coefficients for benevolence ($\alpha = .812$), SR ($\alpha = .779$), and CMHI ($\alpha = .865$) scales yielded acceptable internal consistency. Overall CAMI reliability was $\alpha = .929$. CVI ($\alpha = .944$) examines three constructs—capable leaders, community sentiment, and community vision—and rates 19 items on a 5-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*) to assess opinions about the human components of community viability (Bush et al., 2023). We used quota sampling via Qualtrics panels to achieve a representative sample ($n = 1,028$) of adults in rural ($n = 350$), suburban ($n = 340$) and urban ($n = 338$) communities. We used an ANOVA to address objective one and a Pearson's correlation with a split data set for community type (rural, suburban, urban) for objective two.

Results and Conclusions

Objective One

There were no significant interactions between community type and scores for total CAMI, benevolence, or SR. There was a statistically significant difference between rural ($M = 36.07$, $SD = 7.19$), suburban ($M = 34.39$, $SD = 6.69$) and urban ($M = 35.20$, $SD = 6.71$) audiences for CMHI as demonstrated by a one-way ANOVA ($F(2,1025) = 5.14$, $p = .006$, $\eta_p^2 = 0.01$, 95% CI [0.31, 0.82]). A Tukey post hoc test indicated rural members had significantly higher CHMI than suburban community members.

Objective Two

In examining relationships between CVI and total CAMI scores, we observed weak, positive correlations for rural, $r(348) = .11$, $p = .047$, and suburban community members, $r(338) = .27$, $p < .001$. Greater perceptions of community viability for these populations could foster more acceptance of mental illness in their communities. No significant relationship existed between total CAMI and CVI scores for urban community members. We used correlational analyses to examine relationships between CAMI subscales and CVI for each community type. All those observed were weak, positive relationships, except for an inverse relationship between urban community members' benevolence and community viability, $r(336) = .13$, $p = .021$. This aligns with literature regarding how associated attitudes could be place-based and are often less present in densely populated communities (Howard & Piliavin, 2001; Smith, 2005). Also of significance was a positive relationship between SR and CVI for suburban community members, $r(338) = .23$, $p < .001$, where higher SR scores equated to less social restrictiveness. Higher perceptions of community viability could produce less socially restrictive attitudes in suburban residents. Finally, results indicated a positive relationship between CMHI and CVI for rural, $r(348) = .13$, $p = .015$, and suburban community members, $r(338) = .25$, $p < .001$. In these communities, greater perceptions of viability could lead to greater acceptance and integration of PWMI.

Recommendations and Application

These results present opportunities to explore cultural, place-based interventions for mental health. The observed difference in CMHI suggests a need to capitalize on healthy ideologies and expand rural infrastructure through community-based care (Baker et al., 2022). Increasing social acceptance in these communities could be achieved through advocacy programs and efforts to increase social capital, which has been found to mediate stigma and predict help-seeking in international and agricultural contexts (Baker et al., 2022; Landfredi et al., 2015). Understanding perceptions of viability among social groups in a community could be an avenue to understand cultural nuances that might perpetuate stigma or create

barriers to care. Community leaders and Extension professionals can use CVI to assess social assets of communities (Bush et al., 2023) to determine capacity to support PWMI. Where vulnerabilities exist, they can implement innovative programming and policy. Future research should examine community viability from perspectives of PWMI and assess CAMI in various communities where relationships occurred. Results could uncover barriers or aids to healthcare access or service use unique to those communities. This is increasingly important in a global landscape where mental health infrastructure and lived experiences can vary greatly (WHO, 2022). Further research is warranted to explore global use of CVI and CAMI, especially in countries with greater stigma and health disparities.

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Examining Opportunities for and Threats to a Niche Marketplace: Recommendations for Next Steps in a Proposed Designated Halal Meat Processing Facility in Central Minnesota

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Abstract

Introduction

Each year the United States welcomes people from foreign countries as immigrants and refugees seek new opportunities. As new communities develop, infrastructure development meeting cultural and religious needs may afford the communities improved livelihoods and integrated establishment in the U.S. Somalian resettlement to the U.S. has remained consistent since 2014 at around 9,000 refugee arrivals annually (Population Movements, 2018). The country of Somalia recognizes Islam as the state religion; nearly all Somalis are Muslim. Bittle and Rochkind (2010) reported that 92% of Muslims stated the U.S. would be their permanent home, and the need for access to halal products in U.S. food markets will increase as Muslim American populations become established and grow. One Somali community in Central Minnesota desired to develop a domestic halal meat supply that could improve social, economic, and environmental conditions in their community. As scientists and researchers in higher education and industry, we have a responsibility to extend our expertise and resources to best serve these new Americans sensitively and within their cultural contexts.

Literature Review

Kagan et al. (2020) assessed halal and kosher markets in the state of Minnesota to understand the broad scope of religious meat markets in Minnesota. Findings led to a recommendation to develop a halal meat processing facility in Central Minnesota to serve local Muslim consumers. Kagan et al. (2020) recommended vertical integration to mitigate concerns such as loss of product integrity. Unlike dietary requirements dictated by allergies or personal preferences, consuming food is considered a form of worship to the Muslim person and is a way of life (Riaz & Chaudry, 2019). From the beginning of the production process until the product is consumed, all halal products must be held to acceptable integrity standards (Tieman et al., 2012).

Literature indicates a trend of food insecurity among resettled populations. Food insecurity can be defined as limited access to nutritionally sound and safe food, and as an inability to acquire acceptable food in socially acceptable ways (Dharod et al., 2011). They found that 72% of Somali mothers indicated their household was food insecure. In another study investigating food insecurity among refugees in the U.S., Hadley et al. (2010) found that 40% of respondents experienced difficulty in locating preferred foods within the food supply.

Purpose

The purpose of this study was to identify constituent perspectives of the prospective development of a designated halal meat processing facility in Central Minnesota.

Methods

Because a halal meat processing project is positioned within a supply chain intertwined with social, economic, and environmental considerations, we chose a case study method. This allowed for detailed data collection and analysis within the case (Yin, 2018).

Ten participants were interviewed; seven interviews consisted of one-on-one virtual meetings with the primary researcher; one interview consisted of 3 participants. Interviews lasted from 35 minutes to more than an hour. The protocol consisted of semi-structured interviews whereby respondents answered open-ended questions about logistical considerations and social components of the halal meat project. Questions were predetermined, but conversations were guided by respondents as they offered insight based on their unique positions in the project. Interview questions focused on logistical considerations for the design of a halal meat processing facility and on social impacts and other considerations within the proposed project. Probing questions were asked when deemed beneficial (Merriam & Tisdell, 2016).

Data Analysis

Interviews were audio- and video-recorded for ease of transcription and retention of verbal and non-verbal cues (Merriam & Tisdell, 2016). We used Descript, a transcription software that downloads audio and produces draft transcriptions to be reviewed and edited for accuracy. Additionally, I (primary researcher) kept an audit trail and reflexive journal to aid in accurate recording of respondent details. Data collected through transcription were coded and analyzed using the constant comparative method to identify key points and overarching themes. Using MAXQDA software, I coded and analyzed data, identifying recurring statements among respondents and significant themes to be considered in conclusions and recommendations. To assess credibility, another academic researcher peer-debriefed the data and my analyses.

Conclusions, Implications, and Recommendations

Findings concur with those of Kagan et al. (2020) that developing halal fresh goat meat is an interest among Somalians in Central Minnesota. Careful cultural understanding produced through genuine relationships is necessary as was recommended by Kuo et al. (2020) related to concerns about sovereignty. Clarifying halal standards and expectations throughout the supply chain remains necessary to produce processing models that comply with both regulatory and consumer faith expectations (Kagan et al., 2020).

Limited capital creates a barrier for forward movement in processes necessary for the project. Adherence to a niche marketing strategy in the operation of a designated halal meat processing facility does not predict the facility's role in serving domestic markets in culturally desirable ways. A co-ownership model may help to establish trust, but this model should be evaluated for its efficacy among other similar food systems and discussed with stakeholder groups to determine its applicability

and suitability to the issue of access to fresh halal meat. Funding should assist Somali community leaders in the project in providing educational and other relevant resources.

Leaders in both the Somali community and food systems development teams should develop plans to submit a request for American Rescue Plan funds issued by the USDA and President Biden in 2021. Funds could be requested for the development of new processing models or enhancement of existing processing facilities. Stakeholders should use design thinking methods in collaborative approaches to identify solutions and build and test prototypes, leading to deployment of a final vetted solution (Jamal et al., 2021). Ultimately, consideration of time and patience in building relationships and fostering trust among stakeholders should encompass the entirety of the project's continued development to ensure agreed-upon and equitable solutions are embraced by all facets of the unique halal meat food system and those involved in its development through fruition.

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Philosophies of Graduate Education in the United States: An Exploration of the Profession's Perspective

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Abstract

Introduction, Related Literature, and Framework

Graduate education is a critical component of post-secondary education, especially in agricultural education and its related specializations (Bowen & Miller, 2010). Harder et al. (2021), made the case that the discipline of agricultural education comprises four specializations (agricultural communication, agricultural leadership, extension education, and school-based agricultural education). The authors reached this conclusion after compiling a comprehensive list of the specializations' commonly accepted theories and philosophies (Harder et al., 2021). However, departmental philosophies of graduate education, specifically, were not compiled. Bowen and Miller (2010) contended that graduate degrees in agricultural education ought to provide students with (a) the value of theory-based practice, (b) the role of research, (c) effective mentorship, (d) career readiness, (e) an opportunity for career progression, and (f) the tools to be productive members of society. As graduate programs are newly designed and redesigned across agricultural education, it is essential to consider how purposes and philosophy might influence our graduate programs and degree tracks (Bowen & Miller, 2010; Shinn & Baker, 2010). This study was framed with human capital theory (Becker, 1964; Schultz, 1971). We studied the profession's varying philosophies around what knowledge and skills should be developed within students when completing a graduate degree in agricultural education.

Purpose and Objectives

The purpose of this study was to explore the philosophies of graduate education and its objectives as viewed by departments of agricultural education (i.e., agricultural communication, agricultural leadership, extension education, and school-based agricultural education). This study was guided by two questions: (a) Holistically, what is the philosophy of graduate education held by our profession? (b) How might philosophies of graduate education differ among institutional types (i.e., land-grant, non-land-grant, etc.)?

Methodology

This study was grounded in qualitative content analysis (Flick, 2009). To obtain a comprehensive list of U.S. institutions that offered programs in agricultural education, we obtained the electronic list from the American Association for Agricultural Education (AAAE) website (AAAE, n.d.). The list yielded a total of 103 institutions, but after further review of their websites, only 90 institutions still had active programs or faculty. A hiring authority (dean, department chair, program director, etc.) of the agricultural education discipline from the 90 institutions was sent an invitation to participate in our questionnaire. Thirty-one accepted the invitation, but two institutions did not offer graduate programming in our

profession's specializations, so 29 respondents represented 24 U.S. states. Institutions represented were 66% ($n = 19$) 1862 land-grant universities, 34% ($n = 10$) regional or non-land-grant institutions. Participants were administered an electronic questionnaire via Qualtrics© and asked to respond to the open-ended question, "What do you believe is your department's philosophy of graduate student education?" Data were analyzed using the constant comparative method of coding, which employed open, axial, and selective rounds of coding (Corbin & Strauss, 2015; Creswell, 2015; Flick, 2009; Miles & Huberman, 1994). IRB approval was sought before conducting this research.

Results

Statements were categorized, which led to the emergence of three themes: (a) career readiness, (b) personal and holistic development, and (c) research. Career readiness statements were categorized as philosophies in which career knowledge and skill development were the focus of graduate education. One participant stated, "the emphasis [of graduate education] is to help students engage in career development." Other participants summarized this development as gaining applicable career skills to become experts in their field. An additional participant stated that their philosophy of graduate education was "to prepare graduate students for career tracks that they have chosen by providing them with a breadth of experiences across the land-grant missions and by mentoring them in the philosophic foundations of our profession."

The second theme of personal and holistic development was outlined in statements citing the philosophy of graduate education is to focus on the individual and professional growth of the whole person. One such philosophy stated, "...graduate education is not one-size-fits-all, but rather is advanced coursework and experiences tailored to individual student needs." Relationship building and providing diverse experiences aligned with students' personal goals were the cornerstone of these statements. Another statement of this philosophy was "to graduate prepared, effective, and compassionate educators who seek to engage the next generation in sustainable agriculture such that our food systems are equitable and healthy." The personal characteristics of graduate students are highlighted in these personal development statements.

Research was also a common theme in philosophy statements. These statements were categorized as philosophies in which scholarly research was a central focus of graduate education. For example, one participant stated, "Graduate students take the next step in the academic profession to explore and understand the fundamentals of research." One participant noted that cultivating graduate student development "...is achieved, ideally, through partnering with faculty in research and teaching endeavors through assistantships." No trends in themes were recognized among the type of institution (i.e., land-grant vs. non-land-grant).

Conclusions and Recommendations

While findings were categorized by the three themes of career readiness, personal and holistic development, and research, the data were consistent with all six purposes of graduate education presented by Bowen and Miller (2010). This suggests that graduate education philosophies at various institutions are concerned with these purposes. It is recommended that a philosophy of graduate education for institutions be shared with potential graduate students to assist them in selecting an institution to attend. We find the split between institutions' focus on graduate education as a means for career development or personal and holistic development is reminiscent of the debate between the educational philosophies between Snedden and Dewey, but as Roberts and Ball (2009) purported, a

one-over-the-other approach should not be taken when both are attainable. Future research could explore how philosophies of graduate education might differ across the profession by region, institutional size, or even degree type (i.e., doctoral vs. master's).

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Evaluating Self-efficacy's Effect on Extension Agents' Intentions to Promote Precision Agriculture Technologies for Farmer Adoption

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Abstract

Introduction and Theoretical Framework

Promoting precision agriculture technologies is crucial for global sustainable development (Seitz et al., 2022). Precision agriculture technologies can improve farm management by providing detailed, timely, and site-specific farm information (Strong et al., 2022). However, farmers' perceptions of the benefits of various precision agriculture technologies are inconsistent (Baker et al., 2022). How quickly and extensively the agricultural community is expected to adopt precision agriculture technologies relies on the information disseminated by agricultural Extension change agents (Rogers, 2003). Inadequate communication of precision agriculture technologies from Extension staff may lower farmers' adoption rates (Lee et al., 2021).

The theoretical framework for this study builds upon the components of self-efficacy theory (Bandura, 1977). Self-efficacy refers to an individual's belief in the ability to exhibit the necessary behaviors to produce specific outcomes. Individuals with high self-efficacy will use great effort to perform demanding tasks, whereas individuals with low self-efficacy will avoid such attempts (Bandura, 1993). Expectations about one's self-efficacy to engage in precision agriculture technology promotion and adoption may evolve over time with age and previous experience (Seitz et al., 2022). Therefore, we examined self-efficacy and its relevant factors' contributions to Extension agents' intentions to promote precision agriculture technologies.

Purpose and Objectives

The study sought to understand the contribution of self-efficacy to agricultural Extension staff's behavioral intention to promote precision agriculture technologies to farmers. Objectives were:

1. Describe agricultural Extension personnel's self-efficacy, age, and work experience in regard to the intention of promoting precision agriculture technologies.
2. Investigate the effect of age and work experience on agricultural Extension staff's self-efficacy.

Methods and Data Sources

This study used a survey design with an instrument distributed to 223 agricultural Extension professionals in the United States. We recruited 153 agricultural Extension staff to participate in this study, resulting in a response rate of 69%. We adopted a 9-item self-efficacy (Irby & Strong, 2013) measure; the response scale was a 9-point Likert-type scale ranging from 1 (*very uncertain*) to 9 (*very*

certain). We used a 9-item measure of behavioral intention (Strong et al., 2014), with responses to each item indicated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

We used SPSS 28.0 to analyze the data. Cronbach's (1951) alpha coefficients for self-efficacy and behavioral intention constructs, were .93 for self-efficacy and .95 for behavioral intention. Regression and two-way ANOVA were used to analyze the data based on the research objectives.

The age range of participants was 24 to 73 years, with a mean age of 46.07 ($SD = 12.10$). The experience (i.e., range of years-served) as Extension staff ranged from less than six months to 42 years, and the mean years-served was 14.35 ($SD = 10.50$). We used a cross-sectional design in which we tested age differences based on U.S. Census age groups between young (<34), middle-aged (35-54), and older (55+) participants. We tested the experience variable using groups of lesser (<10 years), moderate- (10.1-20 years), and high (20.1+ years) experience.

Results, Products, and Conclusions

The first objective was to describe Extension staff's self-efficacy with the intention of promoting precision agriculture technologies. The highest scoring item of the self-efficacy construct was "To what extent does promoting precision technologies help you value learning?" ($M = 5.56, SD = 1.87$); the lowest scoring item was "How well can you implement alternative strategies in your field demonstrations when promoting precision agriculture technologies?" ($M = 4.36, SD = 1.80$). Data collected from this study showed the highest scoring item of behavioral intention construct was "I intend to keep up-to-date with the newest precision agriculture technologies" ($M = 3.62, SD = .73$); the lowest scoring item was "I intend to increase my promotion of precision agriculture technologies to assist with my extension tasks" ($M = 3.28, SD = .67$).

We found that participants' predicted behavioral intention to promote precision agriculture technologies was equal to 2.33 (intercept) + $.209$ (self-efficacy) + $.05$ (age) - $.03$ (experience) ($F(3, 109) = 15.322, p < .00$), with an R^2 of .55, indicating independent variables used in this study explained 55% of the variance in behavioral intention to promote precision agriculture technologies. The findings of this study showed that self-efficacy significantly predicted the behavioral intention to promote precision agriculture technologies ($p < .00$), but age ($p = .28$) and work experience ($p = .38$) had no statistically significant effect on predicting behavioral intentions.

Scores of older participants' self-efficacy ($M = 5.04, SD = 1.96$ for older-aged) were higher than scores for younger ($M = 4.96, SD = .98$) and middle-aged ($M = 4.87, SD = 1.52$) participants; scores of more-experienced participants' self-efficacy ($M = 5.21, SD = 1.76$) were higher than scores for less-experienced ($M = 4.77, SD = 1.31$) and moderate-experienced ($M = 4.85, SD = 1.61$). Simple main effects analysis showed that neither age ($p = .91$) nor work experience ($p = .31$) has a statistically significant effect on self-efficacy. Two-way ANOVA revealed no statistically significant interaction between the effects of age and experience $F(2, 106) = 1.267, p = .29$ on behavioral intention to promote precision agriculture technologies.

Recommendations, Educational Importance, Implications, and Application

Extension staff who have higher self-efficacy in precision agriculture will be more willing to promote precision agriculture technologies. Data indicated Extension staff are likely to perform better in

innovative tasks when proper motivation is provided toward a goal (Bandura, 1997). The results of this study suggests important considerations for using self-efficacy in agriculture Extension staff development programs. Agricultural program leaders and program development units need to be aware that Extension staff of any age or level of work experience need to increase their self-efficacy so that they are more likely willing to engage in precision agriculture technology promotion for farmer adoption. Promoting precision agriculture technologies should be demonstrated in current Extension staff's development programs to reduce their expectation of promoting precision agriculture technologies being a challenging task. Future research of Extension staff from other countries should investigate the relationship between groups in perceiving the barriers to the promotion of precision agriculture technologies.

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The Role of International Agriculture Offices in Global Development: A Literature Review

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Abstract

Introduction

Agriculture remains a key factor in economic and social development. As such, U.S. colleges of agriculture (COAs) have transformed rural communities around the world through disseminating scientific knowledge addressing global challenges (Lacy et al., 2021). Universities have the potential to serve as a gateway between international programs offices (IPOs) in universities and global partners (Etling & Barbuto, 2002).

The history of agriculture is rooted in colonialism. We must understand the influence and impact of colonialism in the access to knowledge, resources, and ultimately decision making within these capacities. IPOs in higher education institutions must examine their role and the role of foreign aid politics in this post-colonial context (Graddy-Lovelace, 2017; Schmitt, 2020). Internationalization, often blindly synonymous with colonization, has served as the vehicle to promote colonization on behalf of U.S. institutions. Historically, U.S. COAs have benefitted from a Western agenda in their international work through the domination of the English language, disrespect of Indigenous knowledge, and perpetuating a top-down approach in knowledge transfer (Graddy-Lovelace, 2017; Layman & Civita, 2022; Patel, 2011 as cited in Patel, 2017; Patel, 2017). This concept begs the question, how do institutions and international programs stop colonial behaviors and what should IPOs in agriculture look like?

Purpose and Objectives

The purpose of this analysis was to recognize the ways in which IPOs in U.S. COAs can better serve the interests of international development through a lens that honors culture, Indigenous knowledge systems, and the reciprocity of information. Our guiding objective was to explore how IPOs in COAs engage in international development and exchange.

Methods

We conducted a systematic literature review. Using key terms such as ‘international programs in agriculture; globalizing/internationalizing COAs; and decolonizing COAs’, we identified 9 relevant peer reviewed articles. Google Scholar and the [University] library database yielded results beginning with broad internationalizing concepts and narrowing to COAs. Articles were analyzed to identify themes by utilizing a Conceptual Synthesis Excel Dump (Pacheco-Vega, 2016). Through this method, the following themes emerged: Colonialidad in U.S. land grant institutions, westernization of COA international efforts, and pursuing a glocal education framework.

Results

Colonialidad

Graddy-Lovelace (2017) explains the concept of “colonialidad” as the mentality of colonialism that survives long after liberation, creating surviving patterns of power and influence (Graddy-Lovelace, 2017). U.S. land grant institutions were founded and accumulated their wealth and significance through the conquest of land (Stein, 2020). COAs have historically been leaders of disseminating scientific knowledge to advance and meet the needs of society (Lacy et al., 2021). However, agriculture continues to be biased as to which knowledge counts (Layman & Civita, 2022).

POs are often involved in international work conducted by faculty and graduate students and therefore play a significant role in the way knowledge is created and disseminated to cooperating institutions and their nations. As key players seeking to impact food security around the world, universities must be aware of how they perpetuate historical and colonial tendencies in food systems and development politics.

Westernization in U.S. COAs

IPOs serve as the link between international partners and the agricultural community of the university (Etling & Barbuto, 2002). Higher education often demonstrates the hegemony of the West by promoting technology transfer in nations without adequate infrastructure or training, with little regard to Indigenous knowledge (Patel, 2017). Workshops, college curriculum, and ideals guiding agriculturalists’ interactions are often guided by a historical Western lens (Patel, 2017), and they frequently ignore cultural differences and perpetuate top-down knowledge dissemination.

Universities frequently fail to reciprocate knowledge and are void of sustainability, justice, and ethics (Patel, 2017). In a study that explored U.S. COAs’ goals of international partnerships, every college examined had faculty engaging in collaborative international research. However, only 56% of college deans identified community development as an integral part of their international partnerships (Lacy et al., 2021). IPOs in COAs must examine the impact their work and their priorities of sustainability, justice, and ethical processes in the dissemination of knowledge.

‘Glocal’ education

Nursalam (2020) and Patel (2017) emphasize the need to create a Glocalization Education Framework, or a framework that includes the global with the local in mind, termed “glocal”. A Glocal Education Framework develops a curriculum that is fair, inclusive, and diverse (Nursulam, 2020). This design can help guide COAs to create more inclusive global outreach. This framework encourages the respectful exchange of knowledge while intentionally including Indigenous perspectives among local and global communities (Patel, 2017). It also focuses on communities as stakeholders, not only in the transfer of knowledge, but also in the decision-making processes. Institutions must prioritize partnering communities and nations and approach their interactions as reciprocal, not top-down exchanges. Doing so will challenge the historic tendencies of foreign policies and institutional norms.

Conclusions

Universities and IPOs must challenge existing paradigms and encourage a framework that honors and prioritizes cultural values, needs, and Indigenous knowledge. Agricultural sustainability should therefore include the preservation of cultural values and norms in addition to the conservation of energy, resources, and land. Through an interdisciplinary framework in international agricultural education and extension, true sustainability can be met in the context of foreign aid and development.

Recommendations

Institutions must first acknowledge the ways in which colonialism has influenced, determined, built, and existed within these structures. As key actors in social policy and foreign aid, they must also understand the interrelationships that influence the decision making (Schmitt, 2020). Conversations and decision-making must then be centered around those who will be impacted the most (Giraldo, 2019). IPOs should shift from a top-down approach of knowledge to a reciprocal transfer, valuing the knowledge of marginalized groups historically left out. We must shift from a domination of international spaces to valuing reciprocity in agriculture with an awareness of how ontologies have historically shaped development abroad (Layman & Civita, 2022). Higher education, and thus its faculty and students, should serve as a reciprocal bridge, lending their platform, knowledge, and power while simultaneously gaining cultural knowledge, values, and experiences valuable to the education process.

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Understanding the Agricultural Competencies Needs for New Extension Professionals in Florida

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Abstract

Introduction & Framework

Extension systems address the educational needs and solve emerging problems of American communities (Garst & McCawley, 2015). Nevertheless, United States (U.S.) communities are changing and becoming more diverse (Ghimire & Martin, 2012), prompting a recalibration to equip extension professionals with competencies to serve the nation's diverse clientele. Although new extension professionals are generally technically skilled, due to their various formal degrees (Benge et al., 2020), formal education rarely equips extension professionals with the competencies to be effective educators (Ghimire & Martin, 2012). Furthermore, new extension professionals have multiple job responsibilities beyond their formal training, albeit with limited competencies. Consequently, they frequently experience stress, burnout, and premature turnover (Benge et al., 2011). To be effective, extension professionals must have the appropriate skillset to be successful. Extension professionals have varied job roles and responsibilities for teaching and delivering wide agricultural practices for adoption, underscoring the requirement for diverse and specific competencies to address clientele needs (Davis & Sulaiman, 2014; Ghimire & Martin, 2012; Suvedi & Kaplowitz, 2016). Thus, Extension systems should continuously identify the organizational and individual core competencies needs and intentionally focus on building them (Harder et al., 2013; Moore & Rudd, 2004; Cooper & Graham, 2001). Whereas a plethora of research has investigated the competency needs of new extension professionals (Benge et al., 2020; Diaz et al., 2019; Halbritter et al., 2021; Harder et al., 2010), limited studies have explored the specific agriculture and natural resources (ANR) competency needs of new extension professionals.

McClelland (1973) suggests that competency approaches are more effective in ensuring employee and organizational success compared to intelligence, as they can be developed over time. Harder et al. (2010) identified nineteen competency need areas that extension professionals need to possess to be successful, one of which is having technical/subject matter expertise. Regarding the competency needs of ANR extension professionals, Halbritter et al. (2021) and Benge et al. (2020) suggested that general agriculture-related training would be appropriate as new ANR extension professionals do not have a broad-based knowledge and skillset upon entering the job; however, what these knowledge and skillset areas are remains unknown in the Extension literature. Understanding the competency needs of extension professionals and providing professional development opportunities is crucial to motivating them and maintaining the viability of extension services (Garst & McCawley, 2015; Ghimire & Martin, 2012; Harder et al., 2010).

Purpose and Research Question

The purpose of our study was to identify the general agricultural knowledge and skills needed by newly employed agricultural and natural resources (ANR) extension professionals. The research question that guided our study was: What agricultural-specific knowledge and skills do new ANR extension professionals need to know to be successful?

Methods

We used a qualitative research design to answer our study's research question because we were seeking to understand what the training needs were, whereas a quantitative approach would have assessed the level of need that existed (Creswell, 2007). Since Florida agriculture is so large and varied, we chose to utilize focus groups to hear from a variety of extension professionals and allow ideas to be discussed. A total of 54 UF/IFAS extension professionals (34 extension professionals and 20 extension specialists) participated in one of the nine following focus groups: (a) commercial horticulture, (b) row crops, (c) environmental horticulture, (d) integrated pest management, (e) livestock, (f) natural resources, (g) soil and plant nutrition, (h) sea grant, and (i) water. Our study's participants were nominated by a five-member section committee consisting of administrators, professionals, and specialists. A semi-structured interview protocol was created using Benge et al.'s (2020) open-ended survey as the founding for our protocol. The focus groups were conducted over a six-week period, averaging 52 minutes per focus group. The data was transcribed verbatim and, using the constant comparative method for data analysis (Merriam, 1998), coded using NVivo software. Trustworthiness, which consists of the credibility, transferability, dependability, and confirmability, was conferred using a variety of strategies including member checking, thick rich descriptions, and an audit trail (Lincoln & Guba, 1985).

Results

A total of twelve major themes and 80 subthemes relating to ANR knowledge and skills emerged from the focus groups. The major themes identified were: (a) holistic overview of [State] agriculture and natural resources; (b) UF/IFAS Extension and programmatic efforts for [State] ANR; (c) the extension professional role and remaining unbiased; (d) water; (e) soils and soil testing procedures; (f) pesticides and fertilizers, (g) conducting field and site visits; (h) environmental horticulture; (i) pest management; (j) animal sciences; (k) natural resources; (l) sea grant; (m) building social capital. Additionally, three other major themes emerged as critical for new ANR extension professionals to possess, but did not necessarily relate directly to ANR, which were building social capital, mentorship and shadowing, and connecting agriculture and natural resources programming together.

Recommendations & Application

Our findings show that there is a vast need in basic training for new ANR professionals upon entering Extension. As supported by previous research, professionals entering Extension are not equipped with the knowledge necessary for developing successful programs, which generates frustration and stress. Despite the onboarding and in-service trainings offered, some of the themes related to basic knowledge in agriculture, horticulture and natural resources are not currently covered in traditional trainings. However, considering the 12 themes and 80 subthemes described, it is unlikely that all can be accommodated in existing professional development platforms. On the other hand, not all professionals need all content. Given the diverse backgrounds, experiences, and formal education, content should be tailored to address gaps in knowledge and capitalize on existing strengths. An innovative approach should be considered to tend to those needs, while adapting to each individual's necessities (e.g., on demand training). Though our study was bound by time and to the Florida Extension context, other

Extension systems and professionals could use our research model and results to help guide their own competency understanding and workforce training needs.

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Examining Implementations of Place-Based Pedagogies Using Field Philosophies

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Abstract

Introduction & Review of Literature

Place-based education is a valuable educational pedagogy that uses the community as a focal point for teaching and learning. There are various ways to integrate community as an instructional design, but this also creates challenges when describing and differentiating between place-based education and similar models (Vander Ark et al., 2020). Current literature creates confusion with a multitude of terms being used interchangeably like place-based learning, community-based learning, place-and-community-based learning, place-conscious learning, environment as an integrating context, etc. The focus of these models may be on the community, but the implementation is vastly different, each having its own unique set of ideas and principles. For example, place-based learning is most often defined as learning that places a student in a physical location outside of the school building (Langran & DeWitt, 2020). In contrast, place-based education is the process of using the local community and environment as a starting point for teaching disciplines such as mathematics, science, or language arts, emphasizing a hands-on, real-world approach (Sobel, 2004).

Purpose and Objectives

The purpose of this paper is to establish clarity of the definitions in the field by analyzing three video examples through the lens of the following educational philosophies: essentialism, progressivism, and social reconstructionism/critical theory. The goal of this paper is to create a distinct definition between place-based education and other models to reduce confusion in the literature and strengthen the use of place-based education, as it benefits both students and the surrounding community. By clearly defining place-based education from other models, pedagogy can be implemented and studied using a succinct set of parameters, creating cohesion in the field. Additionally, the strengthening and adoption of a universal definition aids in teacher professional development and education by reducing the barriers to entry that result from discipline-specific training.

Data Sources and Philosophical Themes

Data Sources

Three videos highlighting the implementation of place-based education were selected to analyze the differences in implementation based on two philosophical themes, 1) philosophical assumptions of place-based learning in curricular design and 2) pedagogical delivery. Two videos were selected from Edutopia, a popular website for practitioners. The third video came from the Teton School of Science, a K-12 school that emphasizes place-based education.

Theme 1

Each video was examined using the assumptions of three educational philosophies, essentialism, progressivism, and social reconstructionism. Essentialism is a teacher-centered philosophy, where the focus is on the core subjects like math, reading, history, etc. (Perez, 2022). In place-based practices, this might look like place-based learning or environment-as-an-integrating context (Gruenwald & Smith, 2008) where the learning of disciplinary knowledge takes center stage, and the place or location is a bonus. On the contrary, progressivism focuses on human experiences as the basis for knowledge and is student-centered in nature (Perez, 2022). This translates to place-based education or place-and-community-based educational practices where engagement with the place or community supersedes disciplinary knowledge and is used as a teaching tool (Smith & Sobel, 2010; Sobel, 2004). Social reconstruction extends community by focusing on reconstructing society. Rather than just learning in the community, practices such as critical pedagogy of place (Azano et al., 2020) engage students and actively try to address societal issues in the community.

Theme 2

In practice, the philosophies can be seen in the three video examples. The first video focuses on exploring history through the use of community stories and images. Although students are engaged in the community, there is a lack of depth and a strong focus on standards-based learning of history. While using the community in this capacity creates relevance, it does not extend beyond the core content of the class. However, in the second video example, the students explore ecosystems and recreate ideal habitats for local animals. One species they specifically focus on is trout, which the students raise to add to the current population in a stream on the school's property. The experience of engaging in and learning about habitats and ecosystems indicates place is more than a backdrop for learning. The third video takes it one step further by researching local waterways and presenting their findings to local politicians and stakeholders. The findings of the students had geographical, chemical, historical, and cultural implications on the community and sought to create change.

Results & Conclusions

Based on the analysis of the videos, there are distinct differences in the implementation despite using place-based education to describe it. This is caused by people viewing it from different epistemological perspectives, creating different implementations. The three videos were approached using different educational philosophies, the first being essentialism, the second progressivism, and the third being social reconstructionism. Despite the clear differences, all three videos claimed to use place-based education as their pedagogical approach. Rather than place-based education, the first video uses place-based learning or community-based learning, using the community as a backdrop for learning. The second video contains all the characteristics of place-based education and is a strong example of the method. The third video more closely resembles the critical pedagogy of the place, as place is being viewed from a cultural and critical perspective in order to enact change. This further emphasizes the need for clarification not only in the literature but also in teacher professional development and preparation programs.

Educational Importance, Implications & Applications

Using geographical location to create relevance for students is a powerful teaching tool, however, the terminology of the pedagogical methods being used should be differentiated rather than using place-based education as a 'one-size-fits-all' phrase. This will not only improve clarity in the literature, but also improve implementation, as the goals and characteristics of each practice vary. There are direct applications for instructional design, learner-centered teaching, and integrated STEM education, which are all fertile fields for this methodology. As place is contextually relevant to an individual's geographic location, this is not bound by state or country, but is an international method for teaching, and can be used to create global awareness and connectedness.

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Artisan Cooperatives in East Africa's Impact upon Women's Ability to Improve Diet

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Abstract

Introduction

Previous research has highlighted the positive impacts of cooperatives on women around the globe (Dol & Odame, 2013; Dooley et al., 2020; Ferguson & Kepe, 2011; Lecoutere, 2017; Meinzen-Dick et al., 2011). Artisan cooperatives provide an opportunity for artisans to work together with increased demand for their products (Indego, n.d.). Dol and Odame (2013) determined women felt a sense of community and increase in their empowerment as they participated in an artisan cooperative. Being a part of the cooperative allows for the community to come together and learn more from each other. Cooperatives can provide a place of training and development for individuals working in the cooperative for different facets of their lives. Women in developing countries have higher micronutrient deficiencies (Ruel et al., 2010). Cooperatives may act as the agent in providing information to their artisans for improving their diet and health.

To better understand empowerment and changes for women in artisan cooperatives in East Africa, social capital theory was used to frame this study. Woolcock and Narayan's (2000) definition of social capital is defined in four ways: (a) the communitarian view, (b) the network's view, (c) the institutional view, and (d) the synergy view.

Purpose and Objectives

This study examined the impact of an artisan cooperative on changes in women's nutrition because of increased income. The study sought to understand what these cooperatives were doing to help positively change the diets of women involved in their cooperatives.

Methods

This study used a phenomenological approach to understand women's lived and shared experiences in artisan cooperatives in East Africa. The researcher used rapid rural appraisal techniques to gather data from three cooperatives in Rwanda and Kenya. The diet activity used a poster that listed different food groups. The poster had a scale from zero to seven, representing the days participants ate items from that food group. Participants indicated with a red sticker how many times a week they ate one of those food items before participating in the cooperative. They repeated the activity using a blue sticker and indicated their consumption after joining the cooperative. A priority matrix was also conducted where participants worked together to determine the largest challenges they faced before and after the cooperative. Semi-structured interviews, observational data, and photos were gathered while the women worked.

Results

The women involved in this study came from varying backgrounds, locations, tribes, and ethnicities. This influenced how they implemented the changes in their lives. Being a part of a cooperative and having a stable income allowed many women to experience three meals a day. Some of the cooperatives provided morning tea or lunch for those working. Women mentioned the freedom of having a consistent salary that encouraged them to try new foods. Even with an increased income and increased knowledge about proper diets (many of the cooperatives conduct trainings on what a balanced diet usually consists of), women did not necessarily eat healthier. For example, some participants consumed more sugar or ate fewer vegetables after they started working in the cooperative. The average fruit consumption increased for women after working in the cooperative.

Culture had significant impacts on women's diets. For example, in Rwanda, many women explained how milk was culturally important. It was a sign of poverty if one could not have milk daily. Now, after participating in the cooperative, women have milk daily. Women discussed how infrequent meat was in their meals before. Meat consumption increased afterward, but it was still seen as something saved for bigger events and holidays. Another large factor that impacted changes in the women's diet was their home location. Those in the city had higher averages before and after in almost all food categories. Those in the village had access to a wider variety of food, but those in the village had lower food costs or were able to grow some of their food. The change in women's diets was also attributed to how they were able to cook their food. Cooking food ranged from using a charcoal stove, the cheapest, to natural gas, which was the most expensive. Women expressed the ability to cook with whatever method they preferred versus before always having to choose the cheaper option.

Conclusions/Recommendations

The women working in the cooperative detailed how working for the cooperative increased their ability to choose. This supports Woolcock and Narayan's (2000) definition of social capital in how greater social connections increase an individual's economic gain, which gives them greater ability to choose. The increased community provides an opportunity for the artisans to learn from one another. Then these cooperatives function as the network in connecting their artisans to experts that present trainings that may help improve various aspects of their lives. Artisan cooperatives can provide dignified jobs to women in developing countries. Culture was still a large part of how diets changed or remained the same. This brings the importance of understanding the role of culture in one's diet before trying to implement a nutrition program. Practitioners need to be mindful of what foods are culturally appropriate while also trying to help individuals improve health. Forcing western diet choices upon others may not work in helping a community change and improve their diet. This is an area where both researchers and practitioners can work together to find and produce healthy and culturally viable food and nutrition programs. All the cooperatives conducted nutrition training programs, which is an area where future collaboration can help improve these trainings while recognizing cultural importance. Empowerment is about having agency and the ability to make one's own choices.

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Does Conflict Management Style Vary by Generation? A Multi-State Assessment in the United States using the Rahim Organizational Conflict Inventory

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Abstract

Introduction & Theoretical Framework

Conflict in the workplace is an evergreen issue impacting individuals of all ages. Within the United States (U.S.) Cooperative Extension model, Extension professionals have a unique position where in a single workday individuals may be required to engage with youth and volunteers, as well as colleagues and supervisors. This frequent interaction with diverse audiences underscores the importance of Extension professionals possessing competencies including problem-solving, interpersonal skills, and self-management (Harder et al., 2010). Conflict arises when there is incompatibility, disagreement, or dissonance within or between social entities and may develop when parties must participate in activities which are incongruent with their needs or interests, when parties have competing behavioral preferences, when parties compete for a mutually desirable scarce resource, when parties possess conflicting values, or when two parties must work together (Rahim, 2002). Factor in generation differences amongst colleagues and Extension professionals managing volunteers, Extension in the U.S. must navigate interpersonal relationships and conflicts from five generations. The specific U.S. generations include the Silent Generation (1928–1945), Baby Boomers (1946–1964), Generation X (1965–1980), Millennials (1981–1996), and Generation Y (1997–2012) (Pew Research Center, 2018).

The *Dual Concern Model of the Styles of Handling Interpersonal Conflict* (Rahim & Bonoma, 1979) was used to guide this study. Originating from the work of Blake and Mouton (1964), this model divides conflict into two concerns or interests: concern for self and concern for others. The first dimension, concern for self, includes the level (high or low) to which an individual will preserve their self-interest when conflict arises (Rahim, 2002). Concern for others highlights an individual's desire to satisfy the needs of the opposing party in the conflict. The intersection of the two dimensions creates five conflict preferences including a neutral option of compromising when both parties share similar interests (Rahim, 2002). Each conflict style has appropriate situations where each style is beneficial towards resolving the conflict. The five interpersonal conflict styles are: (a) avoiding, (b) accommodating, (c) competing, (d) collaborating, and (e) compromising.

Purpose and Objective

The purpose and objective of our study was to understand the interpersonal conflict styles used by County Extension Directors and 4-H/MG Extension professionals regarding their generation.

Methods

The target population for our study were County Extension Directors (CEDs), 4-H professionals, and Master Gardener Volunteer coordinators, because they supervise or manage other agents and/or volunteers. We targeted the following six U.S. states to participate in our study due to the researchers' work relationships and convenience: Florida, Georgia, Indiana, Maine, Maryland, and Mississippi. We utilized a descriptive quantitative design for our study using survey methodology to gather the data (Ary et al., 2006). We used the Rahim Organizational Conflict Inventory-II, Form B (ROCI) instrument, and we modified the instrument by removing the term "subordinate" and used the terms "those I supervise" and "volunteers" to fit the Extension context. The ROCI consists of 28 statements and respondents are asked to indicate how they handle their disagreement or conflict on a 5-point Likert scale. The response options were: 1 = *Strongly disagree*, 2 = *Somewhat disagree*, 3 = *Neither agree nor disagree*, 4 = *Somewhat agree*, and 5 = *Strongly agree*. The two demographic questions we asked respondents for this study was their state of employment and their birth year.

We received approval from the University of Florida Institutional Review Board prior to conducting the study. The questionnaire was reviewed and assessed by a panel of three experts for construct and face validity (Ary et al., 2006). We calculated Cronbach's reliability coefficient (Cronbach's alpha) to ensure the ROCI constructs maintained internal consistency (Cronbach, 1951), with all five ROCI constructs demonstrating high Alpha levels. Following Dillman's Tailored Design Method (Dillman et al., 2009) to increase response rate, a total of 272 complete and usable surveys were completed, yielding a 35.05% response rate. To minimize nonresponse error, we compared early to late respondents on each of the five ROCI constructs as recommended by Lindner et al. (2001); we did not find any differences on the ROCI styles between early and late respondents. We calculated frequency and descriptive statistics for our study objective.

Results

County Extension Directors ($M = 4.36$, $SD = .62$) and 4-H/MGV ($M = 4.39$, $SD = .45$) respondents were likely to use the same interpersonal conflict management style of collaborating. The interpersonal conflict management style most likely to be used by respondents was the collaborating style, followed by compromising, accommodating, avoiding, and then competing. Similar to agent type, all four generations were most likely to use the collaborating conflict management style more than the others, followed by compromising, accommodating, avoiding, and then competing.

Recommendations, Implications, and Applications

Overall, there is no difference in conflict style preference based on generation or position within the sample included in this research, aligning with some previous literature indicating that demographic data does not have an impact on conflict style (Korabik et al., 1993). However, when compared to a longitudinal study looking at graduates from an institution over forty years, the least preferred conflict style of Extension professionals compared to professionals and managers across all fields are different (Rahim & Bonoma, 1979; Rahim & Katz, 2019). To expand on this research project, conflict styles should be investigated within other areas of the Extension model, as well as other countries and their specific generation types. From a practitioner's perspective, training in conflict can help Extension professionals understand more about their conflict preference and those they work with. This study indicates that Extension professionals are likely to have high concern for others when engaging with conflict which can be a taxing preference. This should particularly be discussed with Generation Z employees as they are most likely to pair their high concern for others with a low concern for self. Regarding professional

development, leadership educators involved in Extension staff development can create training programs with all agent types in mind because the needs are the same across agent type.

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Using 6-Month Interviews to Understand if New Extension Professional Hires are Receiving Appropriate Levels of Support

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Abstract

Introduction & Theoretical Framework

Extension professionals serve a critical role in local communities as they disseminate research to clientele and stakeholders in the form of educational programs (Seevers & Graham, 2012). Challenges and difficulties often arise for Extension professionals, especially new hires, and they face a myriad of issues such as evaluating and reporting, policies and procedures, and work-life balance (Benge & Beattie, 2021). To help combat these challenges, [State] County Extension Directors (CEDs) and mentors serve in leadership roles and support newly hired Extension professionals by helping them learn the ropes and provide programmatic direction and guidance (Benge & Beattie, 2021; Kram, 1985). A CED manages the local Extension office, plays an integral role in onboarding new Extension hires, and “has a split appointment between their Extension program and their administrative and supervisory roles” (Benge et al., 2020, p. 21). [State] Mentors volunteer their time to mentor new Extension hires and provides them direction related to program development, methods of teaching, and establishing a healthy work/life balance (Harder et al., 2021). Extension systems should have a continual focus on new hires to ensure they are receiving adequate support from their CED and mentor during the vital onboarding period of the new hires’ experiences.

Sanders’ (2014) CED leadership competencies model and Kram’s (1985) mentoring framework to guide this study. The CED leadership competencies model provides a framework for important skills need by CEDs, such as coaching, emotional intelligence, communication, and building trust (Sanders, 2014). Regarding mentoring, Kram (1985) conceptualized that mentoring consists of the behaviors between a mentor and mentee that define the relationship are career development, social support, and role modeling. Kram (1983) theorized that if all three mentoring behaviors exist with the mentor-mentee relationship, the mentee’s job satisfaction and organization will increase, and turnover would decrease.

Purpose and Research Questions

The purpose of conducting the 6-month interviews was to understand the support new Extension professionals received from their CEDs and mentors. The research presented is part of a longitudinal research study exploring the onboarding experiences of Extension professionals during their first year on the job. I addressed the following research questions:

1. How are new Extension professionals being supported by their CED?
2. How are new Extension professionals being supported by their mentor?

Methods

The target population for my study were UF/IFAS extension agents who had been on the job for six months ($N = 42$). The [State] Extension provided me with a list of new agents every month, and at the agents' six-month mark I emailed them asking if they would participate in an interview. I used a phenomenological qualitative design utilizing one-on-one interviews via Zoom to understand their experiences of being a new extension professional related to the support they had received from their CED and mentor, their successes, and challenges. I created a semi-structured interview guide consisting of seven questions with multiple follow-up questions to help me understand the experiences of new extension professionals. I asked participants questions related to how often they talk with their CED mentor, whether meetings were formally or informally scheduled, how their CED and mentor were supporting them, and specific examples of support provided to them.

I obtained approval from the University of Florida Institutional Review Board prior to conducting our study. Out of the 42 new agents in the target population, 22 new agents agreed and completed an interview. I conducted interviews over a six-month span to capture new agent experiences at their six-month of hire, ranging from 19 to 31 minutes in length. I audio recorded and transcribed interviews verbatim, and organized, coded, and analyzed the data using the phenomenological reduction method by Stevick-Colaizzi-Keen as modified by Moustakas (1994). I used five strategies to maintain credibility of the study, as Eisner (1991) stated that establishing credibility within qualitative research "allows us to feel confident about our observations, interpretations, and conclusions" (p. 110). These strategies include investigator triangulation, peer debriefing, member checking, thick and rich descriptions, and clarifying researcher bias.

Results

The new extension professional participants felt varying levels of support from their CED and mentor. Regarding their CED, 68% ($n = 15$) of the participants felt supported by their CED. Types of support provided by CEDs included meeting regularly, guidance on the program development process, identifying community needs, work/life balance, and connecting with important stakeholders and clientele. New Extension professionals who perceived inadequate support experiences infrequent meetings, little programmatic direction, time-wasting, and poor relationship with their CED. Regarding their mentor, 50% ($n = 11$) felt they were supported by their mentor and 27% ($n = 6$) did not have a mentor yet, and 23% ($n = 5$) did not feel supported by their mentor. Mentors and exhibited similar types of support that the CEDs did, adding that having a mentor in their same programmatic area was important for gaining technical subject-matter and programmatic advice. Jamie, a new extension professional in an urban county, stated "I don't have a formal mentor. I've made three asks and I've gotten three no's because they were at capacity" I guess a challenge for me". Three of the new extension professionals did not feel supported by either their CED or mentor.

Recommendations and Applications

Conducting the interviews at the 6-month mark allowed for an important insight into the support system of new extension professionals, particularly support at the CED and mentor levels. The lack of appointed mentors for new agents, as well as some agents feeling weak support from their CED and mentors, is worrisome, and new agents are missing out on key benefits such as career development and social support (Kram, 1985). Furthermore, the three extension agents that do not feel supported by their CED and mentor run the risk of being alienated by two important support pillars that UF/IFAS

Extension enacts. Extension administrators and staff development specialists can use this information to help guide their own Extension system's onboarding process. Extension systems can also tailor the 6-month interview protocol to focus on other levels of support, potential challenges, and policy experiences.

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Artisan Cooperatives in East Africa's Impact upon Women's Family Dynamics, Community, and Self

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Abstract

Introduction

Around the world, the informal economy employs 60 percent of the working population (International Labor Office (ILO), 2018). The informal economy represents unrecorded activities that have market value and would add to GDP if recorded. A large portion of those working in developing countries work in the informal sector, which often includes agriculture (Delechat & Medina, 2020). Behind agriculture, the artisan sector is another leading industry that often operates in the informal economy (Indego Africa, n.d.). Many women in developing countries participate in the artisan sector in addition to their other work within the family. Recently artisan cooperatives have been formed to help women artisans come together in their craft (Indego Africa, n.d.). Cooperatives have formed to help develop this sector and provide an opportunity for these women to come together (Dol & Odame, 2013; Indego Africa, n.d.).

Empowering women through dignified work is one goal of many of these artisan cooperatives. Understanding the impact of an artisan cooperative on a women's life may be one way to help us understand how the artisan sector might be developed. To better understand the empowerment process, this study sought to use social capital to understand how women's social connections in their lives with the cooperatives brought about change and what areas of their lives were experiencing empowerment. Woolcock and Narayan's (2000) definition of social capital defines social capital in four ways: (a) the communitarian view, (b) the network's view, (c) the institutional view, and (d) the synergy view.

Purpose and Objectives

This study examined the impact of an artisan cooperative on women's personal growth, family dynamics, and community. This study uses the emic perspective to determine the impact on the community.

Methods

This study used a phenomenological approach to understand lived and shared experiences in artisan cooperatives in East Africa. The researcher used rapid rural appraisal techniques to gather data from three cooperatives in Rwanda and Kenya. Activities included a financial preparedness activity, a priority matrix, and a self-efficacy activity. The financial preparedness and self-efficacy activity had a poster with different scales to represent the instruments. Participants indicated with a red sticker on the scale their confidence level with the question asked before participating in the cooperative. They repeated the

activity using a blue sticker indicating their confidence in the question asked on how they currently felt. The priority matrix helped understand the largest challenges participants faced before and after joining the cooperative. Semi-structured interviews, observational data, and photos were gathered while the women worked.

Results

The women shared that before joining the cooperative, they were seen as having no value by family and their community. When they did find work outside of the home, they were seen as not being good mothers. The women discussed how if they were stay-at-home mothers, they were seen as lazy and often disrespected. They lacked the ability to discuss financial, social, and family issues with their husbands because they were not contributing towards family expenses. Yet when women did bring in a consistent income, husbands, children, other family members, and their community perceived them differently. A consistent income in their homes gave women greater respect from their husbands and children. Those around them saw them as having value now. Many women with consistent income from the cooperative became their family's breadwinners. This added value but also had negative impacts. Family and community members now asked women for financial assistance, and there was increased pressure to help them. There was also added pressure to maintain their socioeconomic status by starting side businesses which added more work and stress to their lives.

The women involved in the cooperative individually grew in many ways. In their handicraft skills, many were slow, or their craft was not as refined initially. They are much faster and have become experts in their craft, from learning how to weave a beautiful rug to stitching delicate birds onto a handbag. Women across all cooperatives took pride in their work. Women also grew in their social skills from interacting with other women and being able to practice their English with customers or with one another. Working with other women also allowed them to discuss issues specific to them as women, such as women's health issues, previous traumas, or even how they dressed. Before the cooperative, the women discussed how they lacked a social support group. They now had a community of women they saw as friends that could help them through their struggles. The women also expressed how their dreams and goals had changed after joining the cooperative. They dreamed of sending children to college, owning their land, or going on a trip. Their vision of what their future could be expanded.

Conclusions/Recommendations

A consistent income enabled many women feel empowered within their homes, communities, and work. One concern that came from this was that the value of a woman's life was tied to her economic output. Changing views on this culturally around the world is something future practitioners and researchers should investigate. The added economic gain increased the pressure felt by the woman to help family members. While all cooperatives conducted financial management trainings there is further need in this area. It may be helpful for cooperatives to work with experts to help develop their curriculum for these trainings and help the women grow in their conflict management skills. There is a need for practitioners to find different methods to help the women have greater autonomy over the money they earn. While results were more positive than negative from these cooperatives, there is a continued need for improvement, as well as helping other women find opportunities to grow their skills as artisans.

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Animated videos training for maize production: assessment of knowledge gained by small farmers in Pakistan

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Abstract

Introduction

Developing countries across the world face tremendous challenges to maintain food security due to climate change. Food security in Pakistan is under tremendous pressure due to climate change and other factors. Advanced information technologies can play an important role to overcome the issue of food security in developing countries like Pakistan. There is a serious need to conduct live training sessions for advances in agricultural technologies used to maximize crop production and to improve knowledge of those farmers with no or little educational backgrounds.

Although literature and electronic media always play its role in knowledge transfer to end users at grass-root level, however considerable literature does not effectively reach to intended audience to have significant impact. In developing countries, the capacity of agricultural extension workers to reach farmers through face-to-face training is severely restricted due to lack of professional trained employees, poor service delivery methods, personal security of the field staff and scarcity of necessary equipment (Benjamin, 2013). The need is to add new information and knowledge dissemination techniques for example three dimensions (3D) animated documentaries. The electronic media like smart phones provide a powerful platform for transfer of knowledge, experiences, and current technologies in the form of animated videos to less privileged small farming communities in remote areas of the country. In this context, the importance of animated educational videos broadcasting through appropriate means is growing globally (Zossou et al. 2009). Animated videos would be more visually attractive and be helpful in keeping people motivated (Tversky, Morrison & Betrancourt, 2002)

Purpose and objectives

To assess the use of animated videos through mobile phones to enhance agricultural knowledge among maize grower in district Chiniot Punjab, Pakistan.

The research objectives are:

- To find out the socio-economic characteristics of small farmers in the study area
- To assess the knowledge gain of participants for various stages of maize production through animated videos delivered on their cellular phones

Material and Methods

A single group pretest and posttest design was used in this study. The study was conducted in district Chiniot, Punjab-Pakistan. A total of 70 farmers were participated in the training program at two different locations of the district. Hence, data were collected from all respondents participated in the training program. A structural questionnaire was prepared by the experts for the test regarding different stages of maize production including 7 questions having maximum 70 obtainable marks for the test. The test used before and after the training for the study has had the same set of questions. The data were collected two times such as before the start of training and at the end of the training. Data were analyzed using SPSS statistical program and knowledge level and knowledge gain was computed.

Results and conclusions

The socio-economic characteristics of the participants were analyzed. The results showed that both young and old age farmers participated in the training program. The education level of the participants was of high concern since the training program contained research based contents. It was noticed that participants who had better education took more interest in animated videos training contrary to those who did not have good educational background.

The results showed overall knowledge of the participants for specific training units of maize production pretest was 42.85%, which attained up to 86.94% after posttest of the training and hence overall knowledge gain was 49.09% of different units of maize production training through video animation approach. Maximum knowledge gain was found in knowledge of regular weed control which is 60% and ranked 1st. On the other hand, minimum knowledge gain was found in knowledge of tillage approaches used by the small scale farmers which is 28.57% at ranked 7th. Findings are similar to Ashraf et al. (2012) where he reported significant development in knowledge after attending the dairy development workshop. It is concluded from the results of the study that pictures and animated material play significant role for delivery of the message where respondents have low education level.

Recommendations and policy implications

Animated videos need to be used more frequently to enhance the knowledge level of the respondents with low education and may be effective for those farmers who do not have access to advance knowledge diffusing opportunities. More training sessions are required to conduct on different crops like maize so that farmers' knowledge level regarding production of other crops may be increased. Policies are way forward to act in certain directions for optimal solutions of the problems. It is highly encouraged that sustainable long-term policies are required to combat challenges like low production and climate change. Animated videos may play a versatile role in improving the knowledge level of the end users and to reduce their vulnerability to certain dangers that they face in their daily life.

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Exploring the Impact of Students' Service-Learning Experiences on Rural Communities

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Abstract

Introduction

The prosperity of rural places and agriculture are intimately connected. According to the United Nations (2018), the global rural population is nearly 3.4 billion. In developing rural communities internationally, agriculture is the economic driver (Rutledge et al., 2022; World Bank, 2022). In rural America, 10 percent of the population is employed by agriculture. Other economic drivers include education and health care (Laughlin, 2016). Although numerous societal changes in rural America stem from structural evolution in agriculture (Newby, 1983), problems in rural communities tend to be multidimensional (Emery & Flora, 2006). To help address these problems, the Rural Scholars (RS) program at [State] University was developed. The RS program combines concepts of academic service learning and internships in a 16-week course followed by a 10-week, service-based experience in a targeted community. Scholars work with community members to conduct research and provide service to improve rural livelihoods. Research topics included water quantitative analysis and rural youth development.

Service learning allows students to apply classroom learning (Cooke & Kemeny, 2014), positively impacts their cognitive development and understanding of social issues (Yorio & Feifei, 2012), and improves self-efficacy (Bernadowski et al., 2013). Reflection on these opportunities helps students connect their experiences, and promotes a deeper comprehension of the world (Wawrzynski & Baldwin, 2014). However, the perception of community members of service-learning programs needs to be explored (Stoecker & Tryon, 2009). Ferrari and Worrall (2000) discovered community members tend to reflect positively on students' work skills and service involvement. However, Sandy and Holland (2006) found a disconnect between students and community members' perceptions of student impact on communities.

Purpose and objectives

The purpose of the study was to assess the RS program and its impact on Scholars and the communities in which they lived. The following research questions guided the study: (1) What was the experience of Scholars and community mentors involved in the program? And (2) What is rural community members' perceptions of the program?

Methods

Sixteen semi-structured interviews were completed at the conclusion of the RS program during the Fall 2021 semester. Each Scholar (N = 10) and community mentor (N = 6) in the 2021 RS experience were interviewed. Questions were asked regarding the program's effectiveness, Scholar's perceptions of rural communities, community changes, program improvements, and next steps for communities and

Scholars. At the conclusion of the interview, participants confirmed the accuracy of the moderator summary of the discussion as a member check (Creswell, 2012). Each interview was audio recorded. Internal consistency was addressed by comparing field notes with participants' recorded responses. Codes and themes were established using Glaser's Constant Comparative Method (1965). In addition to interviews, questionnaires were administered to citizens at community events to gain their perspectives. In all, 39 questionnaires were completed.

Results

To understand Scholars, community mentors, and community members, participants were asked to describe their experience in the program. The data yielded three major themes

Community Involvement and Interaction.

One mentor described Scholar's presence in the community, saying, "We got to know [the Scholars] and felt like they were part of the community. They offered advice on things. It was nice to get an outsider's perspective on projects." A Scholar explained their time in the community by stating, "People make experiences, and this is one of my best job experiences. A lot of that has to do with who I worked with, lived with, and talked to in [town]." Community members strongly agreed the program was a good investment of time for their community. One community member said, "I've got hope that there are smart youth that care about a town like ours."

Communication and Expectations are Essential to Success.

Mentors and community members would like to see the work of the Scholars promoted throughout the community. One mentor said, "If [Scholars] all wrote one thing [in the newspaper] about themselves and what their project is . . . it would help the community realize what they are here for and what they were doing for [community]." Mentors and Scholars agreed that increased communication and clear expectations would benefit the program. One Scholar said, "More supervision and more accountability would serve our projects better." According to the community member survey, members strongly agreed the faculty and Scholars involved in the program were working with community members to find solutions.

New Experiences Led to Personal Development.

Scholars and mentors noted this experience impacted them professionally and personally. One mentor said, "[The best part of this experience] was the interaction with different people with different views. They had different political views and social views." Scholars had a new perspective of rural America after this program. One scholar said, "[This experience] opened my eyes to the challenges faced in rural communities . . . that will help me as a public health provider, to realize people get affected by these things in different ways." According to the community member survey, members felt Scholars integrated easily into the community and were knowledgeable about their projects.

Conclusions

As in previous research, community members viewed the program positively (Ferrari & Worrall 2000). Scholars prioritized engaging in the community. Sharing the impact and results from research and

service projects was important to members of the communities. Establishing expectations, guidelines, and objectives earlier and more transparently in the program would benefit Scholars and mentors. All involved in the Scholars program gained valuable life experience. Living in rural communities allowed Scholars to develop relationships and witness rural resilience. Wawrzynski & Baldwin (2014) found service learning deepens students' understanding of their experiences, which aligns with the results of this study.

Recommendations

Immersing Scholars in rural communities globally has the potential to enhance the impact of the program and increase resiliency of communities worldwide. Therefore, target communities should expand to other parts of the state, US, and world. Future iterations of the RS program should focus on increasing consistency and clarity between all parties. A deeper understanding of community members' perceptions could improve the impact of research and the service-learning experience (Stoecker & Tyron, 2009). We recommend follow up quantitative and qualitative studies be conducted.

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Examining Diversity of Perception for Community Viability in Rural, Urban and Suburban Populations

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Abstract

Introduction

Communities today must be resilient and sustainable to respond to an increasing number of hardships and complex issues including food security and natural disasters. A viable community is one that can bounce back from these hardships, build upon their assets for growth, and where members can lead a meaningful life (Bush & Rudd, 2018). This includes utilizing community assets, which must be examined and harvested to improve the collective wellbeing of all members (Flora et al., 2016). Community development efforts often focus on the environmental and economic assets and infrastructure and do not utilize their social assets – known as the human components of community viability: community vision, community sentiment, and capable leaders (Bush et al., 2023). However, social assets are becoming increasingly fractured globally (Klinenberg, 2018). As extension professionals, we must explore divisions in civic engagement, social belongingness, and social infrastructure to reveal inclusive avenues for community development.

Community development can be defined as “a process that involves people working together in productive and non-exploitative ways in order to remove inequality and oppression to improve their collective condition of existence” (Blackshaw, 2010, p. 164). An important component of this definition is to remove inequality. However, a lack of access to valuable resources and opportunity to provide input often plagues vulnerable populations globally (Cohen & Schuchter, 2013). Therefore, when analyzing the human components of community viability, it is essential to examine the responses of individuals from different demographic backgrounds to uncover whether views are collective or fragmented.

Purpose and Objectives

This study aimed to examine similarities and differences in community member perceptions of the human component of viability (community vision, community sentiment, and capable leaders) based on demographic variables. These objectives guided the study:

1. Examine differences in community viability indicator (CVI) scores and community type for rural, suburban, and urban community members.
2. Examine differences in CVI scores and demographics based on community type.

Methods

We utilized a cross-sectional, general population survey which included the 19-item CVI instrument and seven demographic questions. The CVI instrument ($\alpha = .944$) examines three constructs—capable leaders ($\alpha = .892$), community sentiment ($\alpha = .857$), and community vision ($\alpha = .874$)—and on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree) (Bush et al., 2023). Demographic questions asked participants to select their community type (rural, suburban, or urban), age, gender, marital status, education, ethnicity, and household income. The Qualtrics panel sample included quota sampling with 1,028 adults in rural ($n = 350$), suburban ($n = 340$) and urban ($n = 338$) communities. To examine differences in CVI scores and community type, we employed an ANOVA. We then split the file according to community type and used an ANOVA to compare perceptions of CVI based on demographics. We employed a Tukey post hoc test to further examine significant differences ($p < .05$) between groups.

Results and Conclusions

Objective One

There were no significant differences observed in CVI scores between suburban and urban or rural respondents. There were significant differences between urban ($M = 70.54$, $SD = 13.66$) and rural ($M = 67.81$, $SD = 12.66$) participants observed for overall CVI scores, according to the ANOVA $F(2,1025) = 3.91$, $p = .02$, $\eta_p^2 = 0.008$, 95% CI [0.00, 0.02]. This result counters previous research indicating rural community members often feel more connected to their communities (Sørensen, 2016) and would have higher perceptions of their community's viability.

Objective Two

There were no significant differences in CVI score detected for gender and age, based on community type. Based on education, there were no significant differences observed in rural and suburban communities. However, in urban respondents, there was a significant difference between total CVI between those with a high school or equivalent degree ($M = 68.24$, $SD = 14.32$) and those with a master's degree ($M = 77.48$, $SD = 11.28$). In urban communities, there was a significant difference in marital status between married ($M = 75.28$, $SD = 13.24$) and individuals who were single ($M = 68.07$, $SD = 13.35$), divorced ($M = 66.05$, $SD = 12.44$), and widowed ($M = 65.07$, $SD = 11.87$). In urban communities, there was a significant difference observed between those earning less than \$40,000 ($M = 66.12$, $SD = 13.43$) and those earning \$65,000 or more ($M = 75.04$, $SD = 13.99$). In consideration of urban communities, Sørensen (2016) indicated social capital in urban areas may be more influenced by economic reasons, which both marital status and education often contribute.

Based on household income, there were significant differences between those in rural communities earning less than \$40,000 ($M = 65.22$, $SD = 12.31$) and those early between \$45,000-54,000 ($M = 74.53$, $SD = 11.01$) and \$55,000-\$64,000 ($M = 73.00$, $SD = 10.99$). There were significant differences observed based on ethnicity in rural communities between black ($M = 73.75$, $SD = 13.34$) and white ($M = 67.07$, $SD = 12.69$) respondents. While the ethnicity findings in this study differ from previous research on rurality (Carillo et al., 2021), these results could provide insight into the changing demographics. Rural America is increasing in ethnic diversity (Rowlands & Love, 2021), while the median income remains at \$45,917 (Economic Research Service, 2020) where perceptions of community viability are the highest.

Recommendations and Application

Communities are consistently revolving and changing in demographic make-up and community-based needs. Extension professionals are often challenged to find ways to meet the needs of various subsets of their population with diverse demographics. Communities with high scores in the human components of the CVI instrument can utilize social assets to drive change and respond to community-based issues. This paper makes a case for how the CVI instrument can be utilized and compared with demographics to analyze how individuals might perceive community viability differently. As provided as a case in this study, the findings can reveal unexpected, marginalized populations or inequality in the collective condition. Extension professionals looking to work in communities globally can utilize this tool to analyze barriers to stakeholder participation or willingness to contribute that could be explained by cultural differences, norms, or behaviors unique to a community group.

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THE PEAKS AND VALLEYS OF CONNECTION – LESSONS FROM EU/UK SMART VILLAGE POLICIES FOR A CANADIAN CONTEXT

Key Words: Smart Village, ICT, Rural Development, Policy, Digital Capacity Building

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Abstract

Introduction

In the 21st century, Information and Communication Technologies (ICTs) have become central to discussions on sustainable development (Stojanova et al., 2021; Weeden & Kelly, 2021; Zavrtnik et al., 2018). The utilization of ICTs can provide a number of benefits for rural communities in reaching their development objectives, expanding and accelerating access to essential services, political structures, and global markets. (Hariharan, 2018; Lowery et al., 2020; Suartika & Cuthbert, 2022; Zavrtnik et al., 2018). However, a gap exists between urban and rural regions in their ability to access reliable ICT infrastructure and build local digital capacity (Hambly & Rajabiun, 2021; Spicer et al., 2021; Weeden & Kelly, 2021; Worden & Hambly, 2022). This “urban-rural digital divide” is defined by a global pattern of rural spaces having weaker digital infrastructure and technical capacity than their urban counterparts. (Hambly & Rajabiun, 2021; Juan & McEldowney, 2021; OECD, 2018; Pant & Hambly, 2022, Spicer et al., 2021; Weeden & Kelly, 2021; Worden & Hambly, 2022). This digital deficit impacts the sustainability of rural and remote regions, exacerbating issues such as youth emigration and limited access to essential services (Markey et al., 2008; McNally et al., 2018; OECD, 2018; Spicer, 2021; Weeden et al., 2022; Worden & Hambly, 2022). For rural Canadians, this divide has been exacerbated by a lack of an effective policy regime at the federal and provincial level to enhance rural ICT infrastructure and local digital capacity (Pant & Hambly, 2022; Spicer, 2021; Weeden & Kelly, 2021).

Conversely, the European Union (EU) and the United Kingdom (UK) have developed their rural development policy around the Smart Village concept. (Bürgin & Mayer, 2020; Juan & McEldowney, 2021; Paniagua et al., 2020; Stojanova et al., 2021; Zavrtnik et al., 2018). This concept emphasizes the use of participatory and place-based approaches, using local assets and digital technologies to implement strategies to enhance environmental, economic, and social resilience (Bürgin & Mayer, 2020; Juan & McEldowney, 2021; Paniagua et al., 2020; Stojanova et al., 2021; Zavrtnik et al., 2018;). As an emerging concept in rural development discourse, there is limited knowledge of these policies’ effectiveness in addressing rural development issues amplified by the digital divide. Moreover, even less is known how these strategies impact communities located in areas of mountainous or difficult terrain.

Purpose & Objectives

This study aims to inform rural Canadian stakeholders of Smart Village initiatives and supportive policy frameworks, as well as how their implementation, can help improve local digital capacity and strengthening rural resilience. By investigating the experiences of those implementing Smart Village

policies and projects in the EU and UK, this research intends to take lessons from these actors to understand if and how these policies could be implemented in a Canadian context. Moreover, by focusing on mountainous areas, this research seeks to understand how the Smart village concept can be applied to foster sustainable mountain development. Through this process, this research will also provide provincial and federal policymakers with evidence of the value of the EU and UK approaches to rural digital development that can be used to strengthen Canada's current rural development policy framework. In achieving these objectives, this study poses three questions.

1. What aspects of the EU and UK rural development policies have been developed to support Smart Village development in the mountainous rural communities?
2. How have Smart Village projects impacted the perceptions and actions of various local stakeholders that live or contribute to community development in mountainous regions?
3. What lessons can be drawn from the EU and UK Smart Village projects and supportive policies to inform Canadian policy development in support of sustainable mountain development in Canada?

Methods

To answer these questions, this study uses an explanatory sequential mixed methods approach to study the impact of EU and UK Smart Village projects and supportive policies on rural development. This approach uses a two-phase quantitative and qualitative data collection process (Creswell, 2018, p. 304). Phase 1 consists of a content analysis of supranational, national and regional policies supporting the application of the Smart Village approach in rural regions across the EU and UK to answer question 1. Phase 2 includes a case study of Smart Village development within Scotland to gain a deeper insight into how Smart Village projects have impacted rural development in practice. By providing a contextual understanding of the decisions and lived experiences of Smart Village communities and community development professionals, Phase 2 aims to answer question 2. In combination with the results in Phase 1, the results of these two research approaches will generate a holistic answer to question 3.

Products

As part of the MSc in Rural Planning and Development requirements, this research will be used to create a Master's thesis, with plans to publish an academic research article upon a successful thesis defence. This project will also prioritize the creation of knowledge mobilization materials cooperatively with project partners in Canada and Scotland, including a plain language summary of the case study finding, blog posts and conference presentations.

Implications

The findings from this study will be used to inform policymakers and community development professionals focused in rural areas about the value and potential impact of the Smart Village concept, as well as place and participatory-based development approaches in reaching their sustainable development goals. This study also aims to help strengthen cross-cultural conversations on rural resilience and local digital capacity building in rural communities in areas difficult terrain across Canada, the EU, and the UK. I plan to continue this work after the completion of the thesis, advocating for place-based development strategies that improve rural resilience. Moreover, I hope this work encourages

more students to investigate the application of Smart Village strategies and seek ways to strengthen the “right to the rural” in Canada and beyond.

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Gender Lensed Curricula for International Development (GLCID): Written Materials, Lecture Guides, Activities, and Online Modules to Support Instructors

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Abstract

Introduction

The role of women in international development can be an overlooked area of importance. Herbert et al.'s (2022) analysis of sex and gender across publications related to the Sustainable Development Goals (SDGs) determined that the consideration of sex and gender was uneven across the SDGs.

Hudson, et al. (2020) shares a framework “linking the situation, status, and security of women in their households to broader phenomena of governance, stability, and national security within the larger society” (p. 342). Thus, every development project should take into consideration the role that women may play in the project. However, individuals often do not possess the knowledge or understanding of the many elements surrounding the role of women. Gender inequalities continue to exist and are worsening, particularly in the lowest income countries (World Bank, 2019); the pandemic exacerbating the situation.

Gender-sensitive approaches which can bring about change are needed to increase gender parity for transformative effects for marginalized populations, particularly women. Creation of these approaches by leaders and development workers requires education. Facilitating education requires instructional materials to allow instructors to effectively and efficiently educate both the future generation and active personnel involved in development efforts.

Purpose

Our purpose is to introduce a freely accessible curriculum, developed with grant funding, that aims to provide instructors and their students with resources to allow transdisciplinary education related to the role women in international development, particularly in agriculture, education, and food security.

Theoretical/Philosophical Themes

International development aid organizations direct substantial resources and efforts towards navigating through and even reducing inequalities, particularly through programming and policies that empower women in the various sectors of development. Preparing individuals to work in the area of international development is a role often played by universities in the United States (Leal Filho, 2011; National Research Council, 2006).

The four-dimensional curriculum framework (4D Framework) put forward by Moran et al. (2015) was used to guide the development process. Prior to developing materials, experts in areas specific to

women in international development were consulted and topics were selected and adjusted based upon their input. This process ensured that the topics covered and the way in which they are covered is appropriate.

Products

The curriculum contains 14 unique modules covering a wide range of topics within the context of international development. These modules specifically focus on bringing awareness to the important role's women play on all stages of development and the importance of valuing women and their contributions to building sustainable communities. The fourteen modules include: overview, natural resources, customs and traditions, violence against women and girls, food agriculture and livestock management, food security, education, family nutrition and health, economic value, conflict, post-conflict, evaluation, adopting gendered lens in development research, and the dynamics of change.

Each module includes items to be used by an instructor, organization, or group for both in person or online. An in-depth instructor guide provides an outline of the overall module, a listing of all resources, intended outcomes, and activities. In addition, each module includes handouts (i.e., key terminology, reading summaries), worksheets, quizzes, answer keys, references, and a detailed PowerPoint. An interview with an expert who helped craft each module is also included.

Educational Importance and Application

Effective international development includes elements impacted by issues connected to gender. Thus, self-efficacy, knowledge, and resources to address development issues through a gendered lens has the potential to greatly impact success. The topics covered in the curriculum can be impactful in the design, implementation, and evaluation of international development programs. It is essential that we address the need to prepare professionals to serve as change agents for equitable, transformative change in the communities in which we work. These modules can be used in multiple settings to inform, educate and ultimately transform the intended audience. Faculty can use these modules either as stand-alone or by incorporating them into existing courses to teach and inform undergraduate and graduate students. International development agencies can use the modules to train staff embarking on new or ongoing projects. Finally, individuals can use the modules for self-study. Hudson et al, (2020) noted, "It is time to take off the blinders and see the world in realistic terms, for the stakes are enormous for men, women, children, nation-states, the international system, and the world" (p. 378). Education is the first step in encouraging change; without education one does not even know that change is needed.

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An analysis of demographic characteristics of Ghanaian livestock farmers

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Abstract

Introduction

Non-Governmental Organisations (NGOs), both international, local, for-profit, and not-for-profit organizations, provide agricultural extension services to support Ghanaian livestock farmers. However, these organizations face challenges when identifying specific needs of these farmers (Munthali et al., 2018). This is because data on livestock farmers' demographic characteristics is not available both at the national and municipality level. Limited research on demographic livestock farmers' demographic characteristics is of the reasons for the absence of such data. Research on livestock farming in Ghana has often focused on technology and innovation adoption (see, e.g., Asante et al., 2018; Ansah et al., 2015; Amankwah et al., 2012), climate change impacts and coping strategies (see, e.g., Nuvey et al., 2021; Twumasi & Jiang, 2021; Shaibuet al., 2020). Moreover, many of these studies were carried out in different regions in Ghana. However, farmers' demographic characteristics vary from region to region. Understanding farmers' demographic characteristics are important as it may provide insights on specific agricultural extension services to address the needs of these farmers.

Literature Review

Livestock production in Ghana is predominantly practiced in the rural areas under extensive or free-range system (Adams et al., 2021; Covarrubias, 2012). The majority of these farmers depend on agricultural extension services for production information (Anang & Asante, 2020; Ansah et al., 2015). Also, Arfan et al. (2015) studied the association between extension service access and farmers' demographic characteristics such as age, education, annual income, and land holding of farmers in Pakistan. The result showed that young and educated farmers were in favor of extension service than older and less educated farmers. Similarly, a study by Ragasa et al. (2014) established the relationship between farmers' demographic characteristics and mobile phone use in Uganda. It was observed that farmers' age, household size, and farming experience significantly impacted on small-scale farmers' mobile adoption and use decisions. The knowledge of farmers' demographic characteristics and sociocultural values helps to plan and structure extension programs.

Purpose and objectives

The current study aims to examine the demographic characteristics of livestock farmers in the Ketu municipalities. Specifically, the study sought to:

- Identify demographic characteristics of livestock farmers.
- Establish the relationship between demographic characteristics and farmers' holding size and farming experience.

Methods

The current study employed a quantitative research design. The study was conducted in the Ketu North and South Municipalities of Ghana. Random sampling was used to select a total of 159 livestock farmers were selected for the study. The data was collected using a modified questionnaire from previous research studies (e.g., by Weng et al., 2018; Sánche & Hueros, 2010). To establish content and face validity, a pilot study was conducted with fifteen farmers. In addition, a panel of four experts reviewed the questionnaire. Based on the pilot study feedback, a final questionnaire was developed. The questionnaire was administered physically with the assistance of three enumerators. The data were analyzed using the Statistical Package for Social Scientists (SPSS) version 26, where descriptive statistics were generated.

Result

The result from the study showed that most of the respondents ($n = 124, 78\%$) were males, and ($n = 35$ 22%) of the respondents were females. It was also observed that most (80%) of the respondents earned less than GHS5000 (\$600) from livestock production annually, while just a handful (20%) earned above GHS5000. The result further showed that 60% of the respondents were above 36 years, and 42% of the respondents did not have any form of formal education, and 2% obtained tertiary education.

The results of crosstabulation analysis between demographic characteristics and income showed a positive association between farmers' education and income ($p = 10.532$). It implies that income increases with education and is significant at (0.015). Also, there was an association between farmers' age and farming experience ($p = 103.472$), and significant at (0.000)

Conclusion, implications, and recommendations

The demographic characteristics of the respondents showed that males predominantly practice livestock farming in the study area. The finding in the current study confirms the results of earlier studies by Asravor (2018), who also found males to dominate farming activities in Northern Ghana. These results are not surprising since livestock production, unlike crop production, requires a huge investment which makes it hard for women to be involved.

Furthermore, the study showed a positive association between livestock farmers' age and farming experience, their educational levels, and annual income. Highly educated farmers were reported to earn more than less educated farmers.

Moreover, many livestock farmers in the study area were above the youthful age, which may suggest that livestock farming is not attractive to the youth in the area. Based on the findings of this study, we cannot make sweeping statements about potential factors contributing towards limited participation of the youth in agriculture. As such, there is a need for more research to examine factors that may contribute towards limited involvement of the youth in livestock production.

Furthermore, the results of the study indicated that a significant number of the farmers can neither read nor write. The current finding is consistent with the study by Zagata and Sutherland (2015) on farmers' age in the European Union. This result implies that many farmers will find it difficult to access

information on digital platforms or search for information relating to livestock production without assistance, and this could negatively impact on introduction of digital extension services in the area.

The findings from this study give valuable insight into the socio and demographic profile of livestock farmers in the Ketu Municipalities. The present findings will serve as a reference document for the department of the agricultural extension during program planning and development in the livestock industry in Ghana.

It is recommended that the agricultural extension organizations and the department need to identify approaches collaborate with the youth groups in the area to develop and implement programs that will attract the youth into livestock production.

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Designing, Delivering, and Evaluating Program in Urban and Sub-urban Areas: Challenges and Solutions from the Perspective of Extension Educators

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Abstract

Introduction and background

The Cooperative Extension System (CES), as an essential component of the land-grant universities of the United States, was originally designed to serve the needs of rural communities. But over the years as more people are living in urban and suburban areas compared to rural areas. Considering these changing demographics and their associated needs, Extension needs to reevaluate its existing efforts in urban and suburban contexts to leave sustainable and long-lasting impacts on urban and suburban populations (Ruemennapp, 2017; Warner et al., 2017).

Because urban and suburban residents include people of color, different ethnicities, races, religious and political ideologies along with various cultural backgrounds, their needs and interests are also different from each other. This diversity results in need for more inclusive Extension programs in these areas. Evidently, there are also other leading faith-based, governmental, and non-governmental organizations in these contexts that have interests, goals, and objectives similar to Extension (Beaulieu & Cordes, 2014; Gaolach et al., 2015).

Such complexities in urban and suburban areas in addition to residents' diverse needs, interests, and competing priorities to keep pace with the surrounding intricacies contribute to the need for more robust and impactful Extension programs for urban and suburban audiences. To make this happen, an in-depth understanding of the challenges and their potential solutions in planning, delivering, and evaluating urban Extension programs is required. This study uses the Extension professionals' lens informed by their experiences to understand these challenges and solutions.

Purpose and objectives

Considering the above needs for this study, the major objectives of this study are:

1. Exploring the challenges faced by urban and sub-urban Extension professionals in planning, delivering, and evaluating Extension programs in urban and suburban areas
2. Investigating the suggestions or strategies Extension professionals offer for overcoming the challenges

Methods

A three-round modified Delphi study was used to collect data to answer the research questions. All the data are collected through Qualtrics surveys with approval from the Institutional Review Board. Delphi

study “allows the researchers to establish a systematic process to achieve consensus through a series of questionnaires among a systematically selected expert panel for an issue that is relevant to a specific audience dispersed across a large geographic area” (Chaudhary et al., 2020, p. 3).

In the first round, the Delphi panel including 25 Extension professionals situated in different urban areas of [State] were provided two open-ended questions related to challenges they face and potential solutions they suggest while planning, implementing, and evaluating Extension programs in urban and suburban contexts. The collected data from the first round were analyzed using a constant comparative thematic analysis method, where the initially coded themes in the first round were analyzed and compared to one another. This comparison and merging led to final themes that were used to represent the challenges and solutions in the second round. In the second round, we will provide panelists with 43 challenges and 34 solutions that emerged from the first round and then rate them on a five-point strongly agree to strongly disagree Likert scale. In the second round, the panelists will be provided with two additional questions to add any new challenges or solutions that were not on the list of themes representing challenges and solutions found in the first round. To screen challenges and solutions from the second round, we will use a priori consensus definition where consensus is reached when two-thirds of the panelists selected agree or strongly agree with the challenges and solutions. In the final and third rounds, the Delphi panel will be asked to mention if they agree or disagree with the challenges and solutions found in the second round and final challenges will be identified using the second-round consensus definition. Finally, the results after the three-round survey will be presented in terms of percentages and frequency.

Results

Currently, we finished the first round and collecting data through the second round of the Delphi study. The first round of the Delphi study identified 43 challenges and 34 solutions to overcome these challenges. The challenges Extension professionals face in designing, delivering, and evaluating Extension programs in urban contexts, as found in the first round of the Delphi study, primarily include transportation barriers, lack of program staff, partners, educator experience, funding, volunteer, participants and other resources in Extension programs, gaps in understanding the actual needs of urban audiences, cultural barriers between participants and educators, lack of trust, competing needs among the participants, low compensation for the educators compared to their time, effort and living costs in urban areas, inappropriate location of urban Extension offices, predominant agencies with similar interests and stakes as of Extension, culturally irrelevant programming efforts, higher costs of attendance, and many more.

The solutions suggested by the first round Delphi panel included easily available transportation for urban professionals, providing program materials in alternative languages, forming an urban advisory group, reducing educators’ workload so they can focus on programming efforts, more inclusive and flexible programming efforts, rebranding of existing programs, building strategic relationships and local partnerships, recruiting more staffs of specific expertise and experience, more administrative support and funding, prioritizing context-specific and need-based programs, providing competitive compensations considering the time and efforts needed for Extension professionals, easier and more streamlined process for evaluating programs, and so on.

Implications

Considering the multiple complexities and intertwining issues situated in urban areas, these findings have the potential to improve Extension programming efforts in any urban area in the United States and beyond. These improved programming efforts might lead to more inclusive, long-lasting, and impactful Extension programs with top-quality facilities for urban and suburban audiences. Additionally, the results and findings will act as an outline to inform future policy frameworks in Cooperative Extension System.

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Meaningful Skills for the Global Agricultural Workforce: Assessing the Confidence Levels of Agricultural Educators to Integrate STEM into AFNR Curriculum

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Abstract

Introduction

The global agricultural industry has increased curricular emphasis on Science, Technology, Engineering, and Mathematics (STEM; Swafford, 2018). As the world's population grows, the agricultural industry must increase the utilization of technology to produce more with less. According to Scherer et al. (2019), "Progress and prosperity within the United States, as well as its global competitiveness, cannot remain strong if young people are not STEM-literate and well prepared to enter the workforce of STEM professionals" (p. 29). Incorporating STEM into agricultural education equips a more competent workforce. While the necessity for STEM skills in the agricultural workforce is well documented in published literature, agricultural industry leaders claim that recent secondary graduates are inadequate in their STEM skills, especially on a global scale. More specifically, 53% of employers report that employees coming from secondary education have a deficiency in mathematics (Casner-Lotto et al., 2006), which could be a challenge when addressing some of the most daunting global challenges.

With STEM skill integration becoming significantly more common in agricultural education, successful methods of integration must be established. Some researchers claim that "The education community has embraced a slogan without really taking the time to clarify what the term might mean when applied beyond a general label" (Scherer et al., 2019, p. 28). To improve the transparency of STEM integration into international development and agricultural education, gauging the confidence levels of agricultural educators on the importance of integrating STEM-based Agriculture, Food, and Natural Resource (AFNR) standards into agricultural education curricula is vital to developing practical and adaptable skills.

Theoretical Framework

We used the Social Cognitive Career Theory (SCCT) as the theoretical framework for this study. The SCCT seeks to depict (1) "how basic academic and career interests develop", (2) "how educational and career choices are made", and (3) "how academic and career success is obtained" (Lent et al., 1994, p. 751). The theory illustrates that "career and academic interests" and "career success" is a function of three constructs including self-efficacy, outcome expectations, and goals. The formation of these three constructs is closely associated with the STEM skills sought in the agricultural industry. While the study was conducted with a domestic lens, the implications have a global reach as determining the confidence levels of agricultural educators to integrate STEM into their curriculum helps deepen the connection of how academic and career success is obtained, further preparing students for a global workforce.

Purpose and Objectives

The purpose of this study was to investigate agricultural educators' confidence in [State A], [State B], and [State C] in integrating STEM efforts into the existing curricula. The study was guided by one research objective—to describe the confidence levels of agricultural educators in integrating STEM skills into the AFNR pathways.

Method

We used Qualtrics to deliver the demographic survey and instrument regarding specific STEM-based AFNR standards in agricultural education. We used the Agriculture, Food, and Natural Resources (AFNR) standards crosswalk produced by The National Council for Agricultural Education (2015) to develop the statements ranked by agricultural educators. The AFNR standards are cross-referenced to the Common Core Mathematics Standards, Next Generation Science Standards, and the STEM sections of Green/Sustainability Knowledge and Skill Statements. Each statement used a Likert-type scale, ranging from 1 = "Not Confident at All" to 5 = "Extremely Confident".

We assessed the instrument's reliability using a post hoc, Cronbach's alpha reliability test on each subsection of the instrument. Reliability scores ranged from .895 to .985, which met the acceptable reliability of greater than a .7 threshold (Gliem & Gliem, 2003). To address sampling bias, systematic sampling was used to collect data and every third agricultural educator was chosen in each state. On the completion of the survey, we retained one partial response.

A spreadsheet of agricultural educators and their email addresses was compiled, which led to a list of 99 viable emails in Alabama, 185 viable emails in Georgia, and 115 viable emails in Florida (N = 399). We received a response rate of 16.04% (n = 64), which met the minimum 10% desired response rate for descriptive research (Gay & Diehl, 1992). To assess non-response bias and early/late response bias, we used a Multivariate Analysis of Variance (MANOVA) to compare differences between early responders and late responders. After analyzing for non-response bias and early/late response bias, no statistical differences were found. The analysis of all data occurred using SPSS Version 28.0.

Results, Conclusions, and Recommendations

The contributing agricultural educators claimed the least amount of confidence in incorporating STEM into the Power, Structural, and Technical Systems (PSTS) pathway. Overall, 45.4% reported having no confidence or to be somewhat confident in incorporating the PSTS STEM standards into an agricultural education curriculum. Educators also reported having the second least amount of confidence in integrating STEM standards into the Biotechnology pathway. Overall, 41.5% of participants reported having no confidence or being somewhat confident in incorporating these standards. This is congruent with recently published literature stating that educators are less confident in applying STEM into these pathways (Scherer et al., 2019; Smith et al., 2015; Stubbs & Myers, 2016; Wang & Knoblock, 2020). Additionally, 59.3% and 53.1% of educators reported being very confident or extremely confident in incorporating the cross-walked standards in the Plant Systems and Animal Science pathways.

International educational and Extension programming requires instructors to confidently integrate foundational, curricular standards into outreach efforts. Connecting global perspectives with elements related to STEM can help elevate international development efforts and educator self-efficacy as they

approach preparing youth for an interconnected, global workforce. As such, we recommend providing domestic and international agricultural educators with comprehensive professional development on STEM integration, particularly through the PSTS and Biotechnology AFNR pathways. Furthermore, we recommend assessing the ability of teacher preparation programs to integrate STEM components into learning objectives and educational activities. Assessments could include applications promoting global perspectives as well as improving STEM integration into formative and summative assessments.

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Is the evidence from Extension programs credible?

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Abstract

Introduction and background

Cooperative Extension System has been serving the rural communities of the United States for more than a century, but rapid globalization has led to more than 85 percent population living in urban areas by 2013 (Ruemenapp, 2017; USDA Economic Research Service, 2014). The urban and sub-urban audiences have different needs and unique issues considering their diverse race, ethnicities, religious ideologies, cultural beliefs, backgrounds, and many other aspects. These different dimensions of urban residents result in the need for more robust and inclusive Extension programs which are relevant and effective in serving these community needs. In this regard, Extension needs to prioritize its programming efforts so it can address multiple and intertwining issues of the urban and suburban audiences (Webster & Ingram, 2007; Young & Jones, 2017) as Extension programs are still guided by the curriculum and teaching materials that were intended to serve rural community needs (Ruemenapp, 2017).

To address this gap, the concept of credible evidence can be beneficial in Extension's effort to plan more relevant and trustworthy programs in urban and suburban contexts. Credible evidence refers to the evidence which is considered relevant and trustworthy by all the stakeholders for addressing their questions about Extension programs (Donaldson et al., 2015). There are three criteria for the credibility of evaluation evidence: evidence-based practice, evaluation designs, and usefulness of data for all the stakeholders. Interestingly, these criteria are not prioritized while planning and evaluating Extension programs. Many Extension professionals are not familiar with these criteria even though the credibility of evaluation results largely depends on different viewpoints, backgrounds, disciplines, goals and objectives, and outcomes (Silliman & Cummings, 2019).

Purpose and objectives

Considering the complexities of issues situated in urban and suburban areas, this study understands the concept of credible evidence and how it can be utilized in practice to evaluate Extension programs. The following research question guided this study:

a) What are Extension professionals' perceptions of the credibility of Extension program evaluation evidence in urban and suburban contexts?

Methods

The study used a qualitative case study approach to explore the selected Extension programs and the concept of credible evidence in terms of these Extension programs. The case study approach can be explained as an in-depth analysis of a case or phenomenon situated in a particular boundary or context

(Yin, 2015). Two Extension programs situated in urban contexts were selected by the researchers after some conversations with [State] Extension assistant directors. The details of these two programs were also reviewed by the researchers to see if these programs met the study criteria to be included in the study. The criteria were: situated in an urban area, offered by [State] Extension, and having a well-established evaluation format. The key informants or initial set of interviewees were finalized as per suggestions by [State] Extension assistant directors in addition to the information collected from [State] Extension County staff directory.

The key informants were contacted through emails with the study background and purpose. The potential interviewees were also asked if they were willing to participate in the study. Once they confirmed their agreement, the researchers conducted semi-structured interviews approved by the [State] Institutional Review Board. The interview protocol was also checked for validity by an expert panel. Each interview lasted for 40-50 mins on zoom as the interviewees preferred zoom conversation over in-person interviews. In total, seven interviews were conducted, including Extension educators and regional Extension coordinators with different years of working experience in the two identified programs. Therefore, the data included a wide range of viewpoints informed by participants' working experiences. Snowball sampling was used to identify interviewees.

The interview questionnaire primarily included different sets of questions addressing interviewees' perceptions of credible evidence and how it is practiced in the two Extension programs. The data were recorded with the permission of interviewees, transcribed with the help of software, and analyzed using thematic analysis. Finally, the themes were arranged and explained according to the study objectives. The results were shared with the interviewees through email to establish the trustworthiness of the results. Additionally, two coders discussed the initial codes to resolve any disagreements to establish the inter-coder reliability.

Results

Collected data reveals that the credibility of evaluation evidence is not a priority while planning for evaluation. The urban and suburban audiences are not associated with developing evaluation tools either. Instead, the Extension programs are evaluated using some common tools all over the United States that make the evaluation results more irrelevant and questionable for the urban and suburban audiences. Such irrelevant information collected in evaluation makes it difficult to achieve the intended outcomes of the Extension programs in urban and suburban contexts. While the purpose of evaluation should be to measure the change in the target audience, attendance and satisfaction of participants are prioritized in the evaluation design of urban and suburban Extension programs. These limitations of the evaluation design affect the trusting relationship between Extension professionals and the partners of Extension programs in urban and suburban areas.

The major themes found in this study were-

- a) Stakeholder-irrelevant evaluation- A more generalized "one size fits all" is commonly used to evaluate the programs.
- b) Repetitive clients and lack of diverse program audience- Irrelevant evaluation results lead to repetitive clients and a lack of diversity in the program audience.

c) Lack of staff with required skills and experience- There is a lack of staff with the skills and experiences required by particular urban contexts.

d) Changing and competing needs of urban audiences- Multiple complexities and competing needs of urban communities limit their participation in Extension programs.

Implications

The results generated in this study will help inform the application and practice of credible evidence in urban and suburban Extension programs. This study and its findings have the potential to determine the need for more relevant and trustworthy evaluation evidence in Extension programs while addressing urban community needs. The results will act as an outline to shape the Extension program delivery and implementation along with evaluation.

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Moodle platform adoption by class of 2021 for e-learning at Botswana University of Agriculture And Natural Resources

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Abstract

Introduction

The COVID-19 pandemic brought many changes in service acquisition and delivery. The restrictions in physical meetings led to changes in instruction delivery. To cope with the changes, universities worldwide switched to online learning (Kaisara & Bwalya, 2021). For example, the Botswana University of Agriculture and Natural resources (BUAN) integrated and adopted the Modular Object-Oriented Dynamic Learning Environment (Moodle) platform in 2020. Moodle is a free online learning platform that allows instructors and students to interact regardless of the differences in their geographical locations (Costa et al., 2012). It can be accessed both online and offline. Moodle is an example of technologies in the education sector that are transforming the sector all over the world (Engkizar et al., 2017).

In most developing nations, implementation of these digital educational technologies is lagging because of a lack of key infrastructure and limited access to high-speed internet in homes and schools. The introduction of e-learning platforms in traditionally oriented education systems will likely bring new changes and challenges. Understanding these changes and challenges is useful in ensuring the successful implementation of these technologies. The experience of BUAN class of 2021 regarding adopting e-learning instruction will be useful in understanding the changes and challenges.

Literature Review

The application of technology has led to improvements in teaching and learning by applying new and innovative ways of enhancing students' interaction with the content, instructors, and their peers (Cervenanská, 2013). Technology supports and enhances learning by creating opportunities for students to interact with other students and instructors and encouraging students to connect with information in new and exciting ways. For example, implementing technologies such as Moodle is known to increase students' motivation to learn (Oproiu, 2015). Despite the benefits of these online learning and teaching environments, students face challenges such as failure to access course materials and instruction due to limited access to the internet and technology devices such as computers and challenges in navigating these platforms (Kaisara & Bwalya, 2021).

Furthermore, the implementation of Moodle has mixed results. For example, Saw et al. (2018) reported that Moodle contributes towards improvements in teaching and evaluation but has not been linked to improved student performance and interaction with peers and instructors. On the other hand, Amage et al. (2022) reported that the Moodle platform improves students' engagement, performance, and satisfaction. The use of technology, such as online learning platforms, faces challenges associated with

the processes of adoption, which need both students and educators to be trained (the Guardian teacher, 2019).

Purpose and objectives

The study examined the experiences and opinions of BUAN class of 2021 regarding the use of blended Moodle platform learning to deliver classroom instruction in 2020. Specifically, the study sought to:

- i. Determine factors influencing the adoption of Moodle technology as an alternative classroom delivery tool at BUAN.
- ii. Assess the preparedness of BUAN class of 2021 students to use Moodle platform for learning

Methods

An exploratory quantitative research design (Shorten & Smith, 2017) was employed to examine students' experiences and views using Moodle for the first time. A researcher-designed questionnaire containing closed and open-ended questions were used to collect the data. The questionnaire contained questions assessing respondents' level of agreement with statements about their views and experiences using Moodle during the Covid-19 pandemic on a 5-point Likert-type scale. The questionnaire also included open-ended questions assessing students' preparedness to use the platform.

A pilot study was conducted to ensure validity and reliability (de Oliveira, Bellettini & Nogueira, 2020). For content and face validity, a panel consisting of two professors with more than six years of experience in education and research. The instrument was deemed reliable with a Cronbach alpha of .85. The data were analyzed using SPSS Software version 22, where descriptive statistics were run.

Results

Factors influencing the adoption of Moodle technology as an alternative classroom delivery tool at BUAN.

To assess their views and experience on the use of Moodle technology, the students were asked to indicate their level of agreement with a statement regarding their ability to access content; on average ($m = 4.46$, $SD = .83$), the respondents agreed that they could access the contents on Moodle anytime they wanted. Furthermore, on average ($m = 4.15$, $SD = .99$), the respondents agreed to statements regarding the role of Moodle technology in improving communication with their instructors and classmates.

Preparedness of BUAN class of 2021 students to use Moodle platform for learning

Results of open-ended questions indicated that students were not fully prepared for online learning through Moodle platform. For example, the respondents provided the following statements "...we were issued with a new gadget which we had to learn how to use" and "We also had to learn how to use Moodle." On average ($m = 2.18$, $SD = 1.24$). the respondents also disagreed with the statement on whether classrooms were well-equipped to use the technology.

Conclusion, implications, and recommendations

The results of the study indicated that respondents were able to access the content on Moodle anytime. Improved access to Moodle content can be linked to its design, as it is accessible online and offline. Furthermore, the results indicated that using Moodle assisted in improving communication between the students and the instructors and among these students. These results align with Amage et al. (2022), who reported that Moodle platform improves students' engagement. However, these results contradict the findings by Saw et al. (2018), who reported no association between using Moodle and improved students' performance and interaction with peers and instructors.

The results also indicated that students had to learn how to use new devices and the platform, which may have contributed to an additional source of stress. These findings, coupled with the difference in the results of this study and those by Saw et al. (2018), necessitate more research to examine other factors that may contribute to improving students' performance, satisfaction, and interaction with peers and instructors.

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Wild Food Plant Livelihood Strategies and Gender: A case study in Northwestern Cambodia

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Abstract

Keywords: wild food plant, gender, livelihood strategies, local and indigenous knowledge.

Introduction

Wild food plants (WFPs) are underutilized species increasingly recognized as important for food and economic security among low-income households in developing countries (Durst & Bayasgalanbat, 2014; FAO et al., 2019). This is no less true in Cambodia where WFPs feature in rural food systems and help ameliorate poverty, hunger, and malnutrition. Limited income-generating opportunities for rural people compromise food security and nutrition (CARD, 2017). The primary farming system in rural Cambodia is rainfed rice-based smallholder agriculture, which is more vulnerable to climate change (Eliste & Zorya, 2015; MoE, 2006, 2016). Many rural families confront additional challenges, including lacking resources to improve their agricultural systems (MoE, 2016). The Royal Government of Cambodia (RGC) has committed to addressing low returns to agricultural production and ensuring nutrition and food security by focusing on promoting intensifying and diversifying smallholder farming systems and improving linkages to markets. This intensifies and diversifies smallholder farming systems that only concentrate on mainstream cropping and livestock practices. More needs to be known about how to sustainably intensify the production and scale of WFPs (Eissler et al., 2021). Prevailing efforts to understand, improve, and disseminate the benefits of WFPs are limited.

At the same time, gender plays a vital role in food systems. At the risk of essentialism, women have been recognized as having a closer tie to nature than men (Bates et al., 2013; Sachs, 2018a), due to their livelihood strategies relying heavily on natural resources. Rural women have been considered central players in exploring diverse sources of nutritional food for family well-being and ensuring food security (Aryal et al., 2018; Gill et al., 2013; Cruz Garcia, 2012; Sachs, 2018b). Unfortunately, with respect to both literature and practice, current efforts to understand, improve, and disseminate the benefits of WFPs are limited. Moreover, little attention has been paid to the interrelation between gender and WFPs, as well as the sustainable intensification and scaling of WFPs.

Objective

This research focuses on the relationship between these two factors—gender and wild food plants. It explores WFP livelihood strategies in northwestern Cambodia, and how these strategies are gendered, particularly, with respect to the division of labor and decision-making patterns related to WFPs.

Theoretical approach

To better understand the relations of gender and WFPs, the theoretical perspective of feminist political ecology (FPE) has been used to guide, frame, and inform the research epistemology, methodology, research design, and analyses. FPE is a sub-field of political ecology (Elmhirst, 2011; Rocheleau et al., 1996). It focuses on the differences in rights and responsibilities between men and women in access to, control over, and utilize natural resources (Rocheleau et al., 1996).

Methods

Data collection took place from March – June 2022, in Banan district Battambang province, Cambodia. Mixed-methods data collection, including household surveys, in-depth interviews, and key informant interviews (KII), have been pursued. Twenty-seven key informants from a wide range of people who have firsthand knowledge about the topic of study at multi-levels (Crick, 2020), including nursery garden owners, community leaders, representatives of women farmer groups, agricultural cooperatives, NGOs, the private sector, and local government have been interviewed. A total of 231 household surveys have been conducted face-to-face. Twenty in-depth interviews have also been conducted, mainly with women and a handful of men to provide nuance and depth of understanding, especially women's agency as shaped by social and gender relations, as well as other factors, in relation to WFPs (Leavy, 2017).

Results

Survey results suggest that, as a collective, respondents were able to identify a very wide variety of wild food plants. Indeed, over one hundred (107) varieties of WFPs were named by respondents. Respondents also indicated widespread involvement with WFPs, although there was considerable variation in the type of that involvement. Specifically, the consumption of WFPs is quite common, however, more intensive activities related to production (transplanting and domesticating WFPs) are much less common.

By their nature, WFPs are frequently found in common areas. As is the case globally, in Cambodia commercial land development has encroached on the commons. Our results suggest that in the study area land development is implicated in declining WFP consumption and the erosion of local and indigenous knowledge of WFPs. It represents a hardship for people, but especially for women who are apt to be the ones collecting WFPs in places often far flung from their homes. For example, women expressed feeling insecure when collecting WFPs in the mountains. Land development constrained access to WFPs that used to be more available in nearby fields.

Gender differences were apparent in the responsibilities that respondents had about WFPs. Specifically, women are more responsible for collecting and cooking with WFPs, while men appear more responsible for the medical uses of WFPs. By age, young people, particularly those living more proximate to cities and towns, are less likely to get involved in WFP production or consumption. This has clear implications for the future of WFPs as a source of food and dietary diversity.

Our results suggest that additional challenges to WFP use going forward are seed availability for some plants in some places, lack of knowledge about specific seed-collecting techniques, and that some plants only survive in specific ecological zones. Obviously, also, climate change threatens the viability of WFP cultivation and consumption. As such, careful study is needed to promote the domestication and survival of WFPs.

Implications

The research findings will help fill gaps in scientific and practical knowledge by enhancing the understanding of and improving the dissemination of knowledge about the benefits of WFPs. More broadly, this research will benefit Cambodia and other countries by providing new knowledge about WFP production, consumption, and benefits. The project also aspires to provide evidence to inform policy recommendations concerning the significance of WFPs for food security and nutrition, and the place of gender and indigenous knowledge in this nexus. Particular attention will be paid to policy and program recommendations oriented toward scaling up WFP production and consumption.

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Are Students Developed to Lead Change and Promote Innovation Adoption? Evaluating Change Agent Efficacy with Contentious Issues

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Abstract

Introduction

Conversations surrounding validity in qualitative research remain a central concept within methodological literature (Kvale, 1995; Lub, 2015). One of the most well-known works in qualitative validity includes Lincoln and Guba's (1985) development of trustworthiness in qualitative research (Lub, 2015). Their quality criteria include methods to address credibility, dependability, confirmability, transferability, and authenticity. These concepts occur at various phases of the research process (Lincoln & Guba, 1985). To evaluate qualitative research rigor, or the act of being extremely thorough (Johnson & Rasulova, 2017), strengthening credibility, and gaining authentic data, Lincoln (1995) suggests focusing on prolonged engagement, persistent observation, peer debriefing, triangulation, and member checking.

Other researchers, including Kvale (1995), suggest further qualitative research validity steps and outline three approaches in the postmodern context including validation as investigation, communication, and action. By combining these three approaches, validity in qualitative research involves the researcher maintaining a questioning and critical attitude (Kvale, 1995).

Morse et al. (2002) suggested reconsidering the verification strategies from Lincoln and Guba (1985) to ensure rigor. Their strategies include investigator responsiveness, methodological coherence, appropriate sampling, an active analytic stance, and saturation (Morse et al., 2002). These strategies move the responsibility of rigor from the external judges to the investigator and require the investigator to attend to rigor throughout the entire research process (Morse et al., 2002). Morse et al. (2002) claim if the question of validity is only taken into account at the end of the study, the researcher may miss serious threats to validity and reliability that are too late to change.

Researchers suggest it goes further than just academic reflection and there may not be a single set of assessment criteria for qualitative research (Hammersley, 2007; Lincoln & Guba, 1985; Lub, 2015). Although the debate on qualitative validity standards continues, the use of certain methods remains prevalent in qualitative research. In this study, we found particular validity procedures to be useful as they contradicted findings from results produced via common qualitative methods in an international context.

Purpose and Objectives

The purpose of this study was to explore why contradictions occurred between the interview themes and observations due to prolonged engagement in a qualitative study of an international development fellowship program in Ghana. The specific objectives include:

- 1) Determine the relevance of validity measures including prolonged engagement, reflexive journaling, and observations.
- 2) Describe recommendations for future qualitative research.

Methods

This paper draws from a larger research study using mixed methods to examine the impact of long-term international experiences in agricultural education. The overall study used a convergence parallel mixed methods design (Creswell & Plano Clark, 2011). The population included a census of eight fellows from the International Agricultural Education Fellowship Program (IAEFP). The fieldwork took place for three months in Ghana, and one month in the United States, where the qualitative components included interviews, focus groups, and monthly open-ended survey questions. The researcher used a reflexive journal including all events that occurred throughout the study and allowed the researcher to reflect on their observations (Wallendorf & Belk, 1989). The reflexive journal and observations assisted in cross-checking the data collected (Wallendorf & Belk, 1989).

Results

Using the constant comparative method by Glaser and Strass (1967), through analyzing and debriefing the qualitative data, six themes were identified, including one theme describing “contradictions.” This theme came directly from the reflexive journaling and observational data the researcher kept through the prolonged engagement. This theme included three subthemes, contradicting monthly meetings, contradicting desire for feedback, and contradicting expectations.

Participants participated in monthly meetings with their cohort and during interviews and focus groups, described how they would like to have more structured monthly meetings. However, when a more structured schedule was implemented, participants retaliated and requested multiple changes to the schedule. This directly contradicted what was described by participants in qualitative data collection.

Participants also mentioned they desired more feedback on their teaching and 4-H advising. Because of this, the program coordinator provided an opportunity for participants to receive feedback from an expert. Then, however, multiple participants who had specifically described how they wanted feedback, contradicted themselves, asking if it was required because they did not want to complete the feedback opportunity. Further, participants wanted to know the quantitative expectations of the program. However, when numbers were given to them, for example, how many students they should bring to a camp, they expressed wanting to change the number and contradicted the previous responses.

Conclusions

The findings for the theme, contradictions, would not have been revealed without the three-month in-country prolonged engagement, reflexive journaling, and observations. The contradictions theme contributed to the overall study by providing more context to the mixed methods research and future

program adjustments. The use of prolonged engagement, reflexive journaling, and observations was useful to address validity and credibility, but it also deeply contributed to the research findings.

Swain and King (2022) suggest informal conversations can be just as valid, and have the same epistemological status, as formal conversations in interviews and focus groups, the findings in this study validated this conclusion. There is an advantage to increasing validity through observations and informal conversations. The threat of memory can lead to the possibility of contamination and degradation (Swain & King, 2022), however, this can be mitigated via reflexive journaling and reflecting on the researcher's own bias' (Swain & King, 2022; Symon & Cassell 2012). In this study, if the informal conversations produced from prolonged engagement, observations, and reflexive journaling did not occur, the qualitative findings would not have been as rich and descriptive.

Recommendations

In future mixed methods research and phenomenological qualitative methods, especially international research, we recommend placing prolonged engagement, reflexive journaling, and participant observation as a top priority. In order to reveal the richest findings in phenomenological research, the researcher should be completely immersed in the research process. Further, we recommend member checking vital and encourage the use of member checking in qualitative research. When the participants were able to partake in a second focus group post-fellowship, they could add to or edit what they have previously explained which contributed to the findings and either confirmed or disconfirmed what they had previously stated.

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Women's Leadership in Latin America: A Framework for Engaging in Women's Participation within Agricultural Groups

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Abstract

Introduction

Several of the world's poor belong to agriculturally based rural households (Shepherd, 2007). Poverty in rural contexts can be addressed by taking action to improve smallholder agriculture, especially with the development of collective action initiatives. Collective action refers to voluntary action taken by a group to pursue common interests or achieve common objectives (Meinzen-Dick & Di Gregorio, 2004). In the agricultural context, collective action can take different names depending on the site of action. Agricultural Cooperatives, Rural Producers' Organizations (RPOs), Common Initiative Groups (CIGs), and Agricultural Associations are some common terms to identify this type of organizations (Benard & Spielman, 2009; Kaaria et al., 2016; Sonwa et al., 2008; Sing & Gulati, 2012).

Agricultural cooperatives may significantly enhance the efficiency and productivity of processes at the farm level (Abate et al., 2014). Still, like other types of organizations and due to the traditional male-dominated field of agriculture, many agricultural groups tend to marginalize women as active participants of the decision-making process (Njuki et al., 2016). International research highlights the importance of collective action since agricultural organizations can promote women's leadership and their participation in the decision-making process (Burchi & Vicari, 2014; Lecoutere, 2017). Due to the lack of research in Latin American countries on women's participation within agricultural groups, we propose a framework to guide future research and increase women's engagement in collective actions.

Literature Review

Leadership is a complex term to describe, and its definition depends on the context studied. It can be defined as a process whereby an individual influences a group of individuals to achieve a common goal (Northouse, 2019). Leadership theory includes different approaches to address issues, like its relationship with gender studies. By working with both theories, people receive equal emphasis on their skills while including women and other minorities, considering them as leaders (Eagly & Carly, 2003). In development, gender can be understood as a sociocultural relationship related to the roles and meanings assigned to men and women (Moghadam & Senftova, 2005). Understanding gender implications within agricultural contexts it's important to analyze women's participation in rural communities and to identify opportunities and barriers to the development of a leadership culture.

Women's leadership research has proven that women play key roles in establishing and maintaining important relationships and networks in their communities (Hassan & Silong, 2008). Benefits of their participation in producer organizations can include improvement in governance and household well-

being (Kaaria et al., 2016). Factors that influence women's participation, especially in rural communities, are related to personal motivation, their family-and-team-oriented position, and the desire to inspire other women (Hassan & Silong, 2008). Agency, defined as the ability to determine one's goals and act upon them (Kabeer, 1999), is also part of the factors that can influence their participation at the household and community level. On the other side, there are restraining factors to women's participation such as socio-cultural norms, perceptions, lack of time and education, and even preferences and motivation. Some of these barriers are more intense in traditional-religious countries, added to poor quality education, poor training of teachers, and restrictions of female mobility (Menhas & Isar, 2013).

Purpose and Objectives

The purpose of this project is to develop a framework as a guide for future research on women's participation inside agricultural groups in Latin America. To achieve this goal, it's necessary to describe traditional roles that women play in agricultural production as well as to identify the barriers that prevent their participation.

Methods

Authors developed an extensive literature review related to women's engagement in productive organizations. Factors that promote and restrain rural women's participation are also analyzed through different data sources from several countries.

Product: Framework for Women's Engagement within Agricultural Groups

The proposed framework highlights the importance of studying leadership in relation to women's participation within agricultural groups. Identifying the factors that promote or restraint that participation is the first step in order to develop a true collective action, where all the participants have a voice and share the same rights. To identify them, it's necessary an initial exploration of the context studied, through an extensive literature review followed by a data collection substage using quantitative, qualitative, and mixed methods.

The next step is to determine the impacts caused by the factors previously identified. In this stage, comparison and statistics are required to analyze individually and collectively the effects of each one of the factors found in *Stage 1*. The socialization of the results is imperative inside the communities studied, so the findings can be discussed and used to create a baseline toward the creation of strategies to promote women's participation. Finally, the results and the feedback provided by the community, will allow the development of a baseline that can be used not only at the household and community level, but that can transcend to policy makers and institutions around the communities studied.

Recommendations and Application

Due to the long-term nature of social change, increasing women's participation in rural contexts requires holistic approaches as solutions to address inequalities in producer organizations. Discussions about gender roles and inequalities in rural areas must be developed not only at the household or the community levels, but with an institutional approach. Strategies like using participatory leadership styles for research will promote those conversations and future policy implications.

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The Necessity of Food Security for Occupied Palestine's Self-Determination...

Equipping the Next Generation to Lead

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Abstract

Introduction

Palestine, also known as the Holy Land, is a small territory between the Mediterranean Sea and the Jordan River. Strategically situated between three continents, Palestine has a tumultuous history as a crossroads for religion, culture, commerce, and politics. It is the birthplace of Judaism and Christianity and has been controlled by many kingdoms and powers, including: Ancient Egypt, Ancient Israel and Judah, the Persian Empire, Alexander the Great and his successors, the Hasmoneans, the Roman Empire, several Muslim Caliphates, and the Crusaders. In modern times, the area was ruled by the Ottoman Empire, then the United Kingdom, and since 1948 it has been divided into Israel, the West Bank, and the Gaza Strip. 1948 marks the establishment of the state of Israel.

Review of the Literature

Food security is a crucial step for Palestinian self-determination. While Palestinians were once self-sufficient, the Israeli government's seizure of land to allocate space for more settlers resulted in Palestinian dependence on Israeli food systems and severe food insecurity. The United Nations Committee on World Food Security has defined food security as "all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life." In Palestine, the working class is suffering from food insecurity, and according to the World Food Program (WFP), food insecurity currently affects 40 percent of Palestinians in the West Bank and 60 percent of Palestinians in Gaza, not including refugees.

The Youth of Palestine

Today there are 3.7 million children and young people in Occupied Palestine who make up the majority of Palestinians. Forty percent of those (2.5 million) are under 18, according to the Palestinian Central Bureau of Statistics. Faced with uncertain futures due to military conflict and political turmoil stemming from the Arab-Israeli dispute, Palestinian youth are faced with challenges regarding how they will lead a country in danger of losing its identity, land, and culture.

Land Barriers

Due to barriers established to separate Israeli and Palestinian land, many Palestinian owned farms have been lost to the Israeli side of borders, and they are forced to try to obtain a permit to use their own land. This prevents Palestinians from being able to plant the food they need to survive. 82.5 percent of Palestinian imports and 55 percent of Palestinian exports come from Israel, forcing Palestinian markets

to rely on them. The area known as the buffer zone between Israel and the Gaza Strip extends to around 1,000 kilometers, taking away 29 percent of Gazan farming land. This barrier has severely affected Gazan food security, forcing citizens to rely on Israeli products and international aid.

Dating prior to the establishment of the Israeli state, farming has been an integral driver of the Palestinian economy, particularly the production of plums, olives, olive oil, dates, and grapes, even producing more than Israel. In 1967, the West Bank exported 80 percent of their crops, as well as 45 percent of fruits produced. Today, farming only accounts for 4.8 percent of Gaza's GDP and 2.6 percent of the West Bank's, according to a 2018 study by the International Labour Organization (ILO). Additionally, according to the Food and Agriculture Organization of the United Nations (FAO), "an estimated 40 percent of rural Palestinian women at working age carry out unpaid work" in the agricultural and farming sectors specifically, and most of their work is considered informal. Their labor is thus not included in Palestine's GDP. Unpaid agricultural labor increases women's food insecurity by further preventing them from obtaining food and forcing them to rely on other methods.

Lack of Water Access

A lack of access to water also obstructs Palestinian food security, as the Israeli West Bank Barrier isolates 95 percent of Palestinians from the water sources they historically used. Palestinians are forced to rely on privatized Israeli water that is often unaffordable. As Palestinian agriculture is dependent on irrigation, this is a major issue.

Lack of Market Access

Another obstacle facing Palestinian farmers today is lack of access to markets, both locally and externally. Palestinians are required by Israel to obtain a permit in order to transport goods; this has become increasingly difficult due to Israel's closure of East Jerusalem as well as the many checkpoints Palestinians must go through.

Summary

Palestine has endured a history of colonialism and an ongoing occupation. It shares land west of the Jordan River, with Israel since the 1948 Nakba ("catastrophe"). While the West Bank, Gaza, and East Jerusalem are Palestinian — mostly Muslim and Arab, Israel is a predominantly Jewish State. Religion is not the cause for conflict in the region, rather a long-going dispute over land rights. The youth of Palestine are considered a "trapped majority" struggling for self-definition amidst uncertain notions of nationhood and positions of marginalization. Palestinian youth realize that protecting the Palestinian lands projected to Israeli occupation confiscations comes through cultivation and reclamation. This is why many are participating in cooperatives in their communities. Cooperatives are examples of collective work representing an inherited culture among the Palestinian society which can be seen during the harvest seasons where all the neighborhood, family, and friends gather to help crop cultivation, especially during olive oil season. Youth cooperatives aim to profit, employ youth, and prioritize providing social services to their community and surroundings according to societal needs. This is a phenomenon happening in a critical period of development and needs care and attention from the Palestinian community as its younger members are fighting internal and external social pressures, are lacking practical experience, and are simply... bored. The pervasiveness of finding solutions for youth to revive agriculture into the future begs practitioners involved in youth development, to investigate.

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Digitizing the Divide: Breaking Down Digital and Precision Agricultural Messaging for Science Communicators

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Abstract

Introduction and Theoretical Framework

The need for agricultural production has increased because of population growth and globalization. The world's population is anticipated to reach between 9.4 and 10.2 billion people by 2050, which requires food production to increase by 70% to avoid drastic global food insecurity (FAO, 2017). Annosi et al. (2021) suggested digital agriculture is predicted to play a significant role in achieving sustainable agricultural production. However, for digital agriculture to meet this need, farmers must engage in new practices to increase yield and improve crop efficiency. This raises the question of how international and domestic agricultural producers and stakeholders can use digital agriculture in existing and future practices to suit societal needs.

Guided by gadgets like remote sensors, robotic systems, unmanned aerial systems (UAS), etc., digital agriculture is expanding quickly to meet global agricultural production demands (Fountas et al., 2020). The quick development of digital agriculture has altered how agricultural production operates. Many times, it has enhanced farming techniques, increased output and yield, and reduced environmental externalities (Colussi et al. 2022). Odini (2014) discovered that, despite the rapid development of digital agriculture, most rural farming communities have a poor acceptance rate due to ineffective communication and exchange of agricultural information about technology. Colussi et al. (2022) also discovered that inadequate communication and education have contributed to the lack of information and discomfort about the adoption of digital agricultural instruments among stakeholders throughout the agri-food production chain.

The biggest barrier to digital agriculture is many farmers still lack the skills required to use communication technologies. Especially on a global scale, farmers' inability to use digital technology is largely a communication and comprehension barrier (Gelb et al. 2009). Agricultural producers' understanding and perception of the term "digital agriculture," can be improved over time, but requires localized adoption of these technologies and practices. Scientific communicators must share messaging related to digital agriculture if stakeholders are to comprehend its scope and value to the industry. Colussi et al. (2022) discovered that it is possible to inform farmers about digital agriculture in a variety of ways, including mass media (e.g., newspapers, magazines, radio, television, websites/blogs), social media (e.g., WhatsApp, Facebook, YouTube, Instagram, LinkedIn), and in-person interactions (e.g., field days, conferences, retailers, Extension agents, peer groups, neighborhood chats).

The theoretical framework for this innovative idea is Rogers and Adhikarya (1979) diffusion of innovations theory. In their framework, they discussed the impact related to international audiences with challenges facing gaining community support for new technologies as there may be limiting factors facing the adoption of new ideas. Increased communication leads to improvement in knowledge and information among stakeholders which plays a major role in planning inputs, increasing the production of quality foods, and improving business decision-making (Boehlje et al., 2021). Likewise, gaining community support often depends on the success of messaging and communication strategies, which play a vital role in international outreach efforts.

Purpose and Objectives

The purpose of this teaching innovative idea was to equip science communicators with an innovative tool to teach communications strategies related to digital agriculture and the global adoption of emerging technologies. The objectives were to (1) identify communication needs related to digital agriculture, and (2) identify communication strategies to connect with varying audiences at the different approaches that exist in communicating about digital agriculture at macro-, meso-, and micro-levels (Klerkx et al., 2019).

Method

For this innovative educational model, we adapted Klerkx et al.'s (2019) model for digitalization and adoption of emerging agricultural technologies and Rogers and Adhikarya (1979) diffusion of innovations theory to teach science communicators in "Communicating Agriculture and Science to the Public" at New Mexico State University how to break down messaging for digital agriculture on a macro-, meso-, and micro-level. We first shared key innovations emerging in digital agriculture, such as drone technology, sensors, precision agriculture, and satellites, and highlighted their potential connection to alleviating global food insecurity. We, then, asked students to identify three examples of digital agriculture in the media.

Using their brainstormed list, students selected their favorite topic, and we shared Klerkx et al.'s (2019) model for digitalization and adoption of emerging agricultural technologies, which helps communicators break down messaging targeting audiences on a macro-, meso-, and micro-level. Using a guided notes handout, we asked students to break down messaging strategies they could incorporate at the global, state, and local levels to teach approaches for targeted communication efforts.

Results

Following the educational activity, students shared their perspectives related to the challenges communities, stakeholders, and farmers might face related to digital agriculture. Some students explained they were aware of the drastic need for digital agricultural innovations to alleviate challenges on a global scale but had not thought the messaging required at varying levels—global to local—to be able to invoke change in communities broad enough to encourage agriculturists to engage and policymakers to support. Students also shared the scope that messaging efforts will vary on the different levels, which should engage different communications strategies to connect with domestic and international audiences.

Recommendations, Implications, and Application

Providing tools for science communicators to engage global and domestic audiences on pivotal agricultural issues, such as digital agriculture, is vital to moving the agricultural industry forward. Using Klerkx et al.'s (2019) and Rogers and Adhikarya's (1979) models for inspiring change, we recommend that educators allow students creative spaces to adapt their own interests related to agricultural challenges. We also recommend engaging local stakeholders in the brainstorming sessions. We allowed students to search for topics on the internet prior to breaking down the audience analysis components and targeting messaging efforts. However, engaging local or international experts in the brainstorming phase could help students grasp the connection of communication efforts with international and domestic agricultural solutions.

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Promoting Precision Agriculture Technologies: Enhancing Capacity of Extension Personnel

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Abstract

Introduction and Theoretical Framework

Precision agriculture applies to traditional farming with new technology and new practices to ensure crop productivity and sustainability (Schut et al., 2020). The 2050 Food Challenge calls for global scientific innovation focused on sustainable agricultural practices that support the process of healthy dietary solutions in agriculture (Mckenzie & Williams, 2015; Strong et al., 2014). The adoption of precision agriculture technologies provides one of the solutions for sustaining the global environment and global poverty reduction (Erickson & Fausti, 2021).

Extension personnel need professional development in communicating precision agriculture attributes to improve adoption rates (Lee et al., 2021; Olsovsky et al., 2021). Strengthening the capacity of Extension personnel is a necessary part of improving services to meet farmers' needs (Mikwamba et al., 2021). Understanding the factors determining agricultural Extension personnel's intention to promote precision agriculture technologies can help reveal gaps in information dissemination and improve farmer adoption.

We explored the behavioral intention of agricultural Extension personnel to promote precision agriculture technologies in their Extension programs by applying the unified theory of acceptance and use of technology model (Venkatesh et al., 2003). The theory suggested four independent variables: performance expectancy, effort expectancy, social influence, and facilitating conditions that may influence the outcome variables of behavioral intention and change.

Purpose and Objectives

The purpose was to understand the factors affecting Extension personnel's behavioral intentions to promote precision agriculture technologies. Specifically, the objectives of this study were to

1. Examine the effect of performance expectancy, effort expectancy, social influence, and facilitating conditions on agricultural Extension personnel's behavioral intentions to promote precision agriculture technologies.
2. Investigate the variance of performance expectancy, effort expectancy, social influence, and facilitating conditions on agricultural Extension personnel's behavioral intentions to promote precision agriculture technologies.

Methods

A survey design was used with 223 agricultural Extension personnel in the United States. A seven-page survey was developed in Qualtrics with most of variables measured as multi-item scales and administered via email to recruit participants. We followed Dillman et al.'s (2014) tailored design method to collect data, resulting in a response rate of 69%. Construct validity was based on prior literature and researchers' instrument assessment from Texas A&M University. We used SPSS 28.0 to analyze the survey data. Cronbach's (1951) alpha coefficients for constructs were .89 for performance expectancy, .89 for effort expectancy, .76 for facilitating condition, .87 for social influence, and .95 for behavioral intention. The closer the Cronbach's (1951) alpha coefficient is to 1.0, the higher the internal consistency of items in the scale. Cronbach (1951) indicated that reliability coefficients of .70 or higher are acceptable and .80 or higher are good.

One-way ANOVA analysis was used to test the group mean differences of the significant predictors/independent variables. Tukey's Post Hoc test was used to determine the effect size. We used multiple linear regression analysis to test whether four predictors have statistically significant power to predict the dependent variable, behavioral intention.

Results and Conclusions

The ANOVA analysis showed that performance expectancy ($F(4, 120) = 16.93, p < .01, \eta^2 = .36$), effort expectancy ($F(3, 121) = 14.84, p < .01, \eta^2 = .27$), social influence ($F(3, 122) = 14.82, p < .01, \eta^2 = .27$), and facilitating conditions ($F(3, 122) = 11.25, p < .01, \eta^2 = .22$) each has a statistically significant effect on the behavioral intention. Tukey's post hoc analysis indicated that the effect size of .36 for performance expectancy, .27 for effort expectancy and social influence, and .22 for facilitating conditions is medium.

Multiple linear regression was calculated to predict behavioral intention based on performance expectancy, effort expectancy, facilitating condition, and social influence. A significant regression equation was found ($F(4, 119) = 43.55, p < .01$), with an R^2 of .77. Participants' predicted behavioral intention to promote precision agriculture technologies is equal to .715 (intercept) + .439 (performance expectancy) + .02 (effort expectancy) + .13 (facilitating condition) + .25 (social influence), where four predictors were coded as 1 = strong disagree to 5 = strong agree. The regression model presented in this abstract provided a good fit ($p < .01$) for the data collected with an R^2 value of .77.

Effort expectancy, in conjunction with the other three predictors, was not a significant predictor of behavioral intention ($p = .755$), while the other three significantly predicted behavioral intention ($p = .000$ for performance expectancy, $p = .011$ for facilitating conditions, and $p = .001$ for social influence). Whether Extension personnel who have higher or lower expectations of the ease of promoting precision agriculture does not significantly influence their intention to promote precision agriculture. Findings suggest that when agricultural Extension personnel are able to enhance the level of performance expectancy, facilitating conditions in precision agriculture technologies, and social influence from others, they are more willing to promote these innovations (Ganpat et al., 2016).

Recommendations and Educational Importance

To sustain successful behavioral change to address local and global issues in agriculture, active and sustained capacity building of agricultural Extension personnel is essential (Seitz et al., 2022). Data from this research suggest opportunities to develop professional development programs for Extension personnel on communicating agricultural innovations with educators, Extension personnel, and stakeholders to help accelerate the adoption of precision agriculture technologies to ensure future food security (Munthali et al., 2018; Opola et al., 2021). Performance expectancy, facilitating conditions, and social influence reveal changing and improving capacities in Extension personnel's behavioral intention to promote precision agriculture technologies to farmer adoption.

U.S. Extension personnel need professional development from agricultural program developers in performance expectancy, facilitating conditions, and social influence as each variable forecasted behavioral intention to promote precision agriculture technologies for farmer adoption. Data indicated no significant relationship between self-efficacy and behavioral intention to promote precision agriculture technologies. Data from Extension personnel from other countries is needed to investigate the relationship between groups in perceiving the barriers to the promotion of precision agriculture technologies to understand further whether communicating effort expectancy (Venkatesh et al., 2003) and low complexity (Strong et al., 2022) are factors affecting Extension behavioral intention to promote precision agriculture technologies.

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A Goal Without a Plan is a Wish: Assessing the Global Orientation to Agricultural Learning

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Abstract

Introduction and Theoretical Framework

As the world continues to grow increasingly interconnected, the value of being a globally competent citizen cannot be understated, nor can the need for globally competence in educators who are rearing the next generation (Tichenor-Wagner *et al.*, 2019; OECD & Asia Society, 2018). While international experiences is one of the most impactful approaches, it is often one of the least realistic methods for students, so other methods of programming and immersion should be sought after (Tichenor-Wagner *et al.*, 2019; Kerkhoff & Cloud, 2020).

In order to meet this need, the Global Orientation to Agricultural Learning (GOALS) program was created by the Global Teach Ag Network (GTAN). The GOALS program began in the fall of 2021 and has continued in 2022 with its second cohort of agricultural education students. In October, the students take part in an immersive experience at the World Food Prize Foundation's Borlaug Dialogue. There, students are exposed to GTAN Global Guides (another GTAN program), globally competent educators from around the world, in order to learn, grow, and create relationships. Debriefing is accomplished in the remaining sessions of the semester. In the spring of 2022 students prepare, through coursework, for their second immersive experience at a secondary institution (most of which were schools of Global Guides) where they teach a unit, based on their fall experience, during their respective spring break. Further debrief is completed with the remaining class sessions.

The GOALS program is funded by USDA NIFA and has been developed by the numerous faculty members that are engaged in the delivering of content. This globally focused curriculum is in its second year of delivery and has attained funding for three more years, with the capacity to increase both partnerships and the number of student participants. As programming continues, evaluation continues to improve its overall efficacy.

Purpose and Objectives

The GOALS program is an innovative and highly intentional means of meeting two objectives.

Objective 1. Providing globalization to the teacher educator curriculum.

Objective 2. Filling gaps in research data and programming needs that are transferable.

Methods

Agriculture students at partnering institutions are recruited through word of mouth and filling out an application to participate. Upon acceptance to the program, students enroll in a course for credits at their respective institutions in the fall semester. During this fall semester students have content and programming delivered to them on a weekly basis. In some cases, group virtual meetings occur between all partners (both as a group with their institution or as an individual) to deliver content related to the UN Sustainable Development Goals (UN General Assembly, 2015), food insecurity, or other information deemed pertinent to the GOALS participants. Other weeks students meet only with their respective institutions or have asynchronous programming dedicated to the aforementioned content.

All of this frontloading is done in preparation for the initial immersive experience that takes place at the Borlaug Dialogue in October. At the Borlaug Dialogue, students are given premiere access to the event's programming, as well as its own deliverable programming that is in partial collaboration with the Global Guides programming. This creates opportunities for students to engage with global educators from around the world in various educational disciplines, and get to share experiences and learn from them. Further, students have the opportunity to engage with world leaders that are working and researching on the ground. These world class contributors to the UN Sustainable Development Goals (UN General Assembly, 2015) provide inspiration, education, and networking for the pre-service educators. GOALS also has unique closed meetings with several individuals that are participants or leaders at the Borlaug Dialogue, providing students with once in a lifetime communication opportunities with some of the most globally competent citizens from around the world.

After the October immersion experience, students then spend the remaining class sessions reflecting, debriefing, and planning their spring semester. In the spring semester students enroll in a second course at their respective universities. During the coursework, the students plan a trip during their respective spring breaks in which they will travel, with a fellow student, to a secondary agricultural education program and teach deliverables that they have learned and developed as a result of the fall semester. During this experience, students are given a budget and select a program to work with. They have to manage the rest on their own, forcing them to now put their travel knowledge and critical thinking to the test. Once on the ground, the students provide one week of instruction surrounding global food security and concepts related to the UN Sustainable Development Goals (UN General Assembly, 2015). The remainder of the coursework in the spring semester is used to debrief and reflect, as well as help evaluate and further develop the GOALS program.

Conclusions

The GOALS program results in research data in studies that show significant growth in overall global competence through both qualitative and quantitative studies. The results of these studies reveal that GOALS, though always developing, is highly effective in equipping pre-service educators with significant global competence. Students walk away with exposure to global food security concepts, the United Nations Sustainable Development Goals (UN General Assembly, 2015), interactions with world leaders, and an experience that requires them to put into practice teaching these concepts to secondary agriculture students. These experiences help shape the individual as a global citizen and as a globally minded educator.

Recommendations and Educational Importance

It is recommended that continued evaluation be done to improve the GOALS program, as it has already proven to be effective. It is further recommended that other institutions look to partner with GOALS, as that opportunity will be available in the future. If not partnering with GOALS, instituting a similar program with references to the existing GOALS program. Regardless of how teacher educators choose to go about delivering effective education to pre-service educators, the ultimate desire teacher educators should look to is taking conscientious consideration of preparing pre-service educators to be effective global citizens and teachers to prepare future generations to be globally mindful. The GOALS program does just that and is a critical piece of the puzzle to helping our increasingly connected world function gracefully and mindful of its citizens.

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Employing the Next Global Generation: Defining the Need for Employability Skills Integration Through the Lens of School District Superintendents

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Abstract

Introduction

Educators seek to prepare a competent workforce (Symonds et al., 2011). However, agricultural industry leaders have reported that students exiting secondary education programs are not prepared for most entry-level positions (Casner-Lotto et al., 2006; Jaschick, 2015; McNamara, 2009; Robinson & Garton, 2008). In fact, 73% of employers claim that they have issues finding qualified employees who value their organization, and 51% of employers claim that the “education systems have done little or nothing to help address the skills shortage” (SHRM, 2018, para. 8).

While the importance of employability skills to success in the workforce is well established, industry representatives still note that students exiting these programs are unprepared to enter a domestic or international workforce (Casner-Lotto et al., 2006; Free, 2017; Jaschick, 2015; McNamra, 2009; Norris et al., 2022). Understanding the perceptions of superintendents on the importance of integrating education on each individual employability skill into agricultural education will provide critical insight into which specific skills agricultural educators should focus their integration efforts.

Conceptual Framework

The conceptual framework used to guide this study was the Perkins Collaborative Resource Network (PRCN) Employability Skills Framework (PRCN, 2018). This framework depicts the areas of employability skills that students need to develop to be successful in the workforce. The perceptions of superintendents on the integration of employability skills into agricultural education can shed some light on the quality of integration. The various iterations of the Carl D. Perkins Act have provided federal funding and guidance for the betterment of CTE and agricultural education. This framework depicts the skills students should gain from CTE courses.

Purpose and Objectives

The purpose of this study investigates the importance of employability skills integration into agricultural education based on the perceptions of Superintendents in [State A], [State B], [State C], [State D], [State E], [State F], [State G], and [State H]. The following research objective was assessed—assess the principal component analytic properties of employability skills and determine any correlational relationships between each individual skill in the component.

Method

The researcher utilized a descriptive correlational research design. Perceptions of the importance of employability skill integration into agricultural educators utilized a five-point Likert-type scale ranging from 1 = "Not Important at All" to 5 = "Extremely Important".

The reliability of the survey instrument was measured post hoc, and the instrument was deemed suitable for the purpose of the study. Reliability coefficients (Cronbach's alphas) for scales measuring the perceived importance of employability skill integration into agricultural education were utilized. The reliability test scores ranged from .868 to .946. This indicates that the scales are extremely reliable (Gliem & Gliem, 2003). The employability skills assessed in the instrument were developed from the Perkins Collaborative Resource Network Framework.

We completed a list of superintendent email addresses for the frame. The list contained viable emails for 169 superintendents in Kentucky, 75 in South Carolina, 260 in Arkansas, 54 in , 62 in Florida, 128 in Virginia, 191 in Georgia, and 135 in Mississippi (N = 1,074). Due to mistakes in online superintendent directories, frame error is a possible limitation of the study.

We used a census to collect data and alleviate sampling bias. Gay and Diehl (1992) suggested that a response rate of 10% is necessary for descriptive research. We achieved a response rate of 12.01% (n = 129). To assess non-response bias and early/late response bias, we used a Multivariate Analysis of Variance (MANOVA) to compare differences between early responders and late responders and no statistical differences were found. The analysis of all data occurred using SPSS Version 28.0.

Results

To analyze the research objective, we used Principal Component Analysis (PCA). We rotated the data using Promax rotation with Kaiser normalization for the 41 originally assessed educational law issues (Kaiser, 1958).

Due to the sample size being 129 subjects, we satisfied the requirement of reducing error in the PCA (Hair et al., 1998). We also analyzed the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, which was .907 and met the standard of a KMO value of .6 or higher for a quality factor analysis (Shrestha, 2021). The screening process for the original 41 variables included selecting eigenvalues greater than or equal to one and a scree plot to evaluate slope changes in eigenvalues (Tabacknick & Fidell, 2001). In addition, we used factor loadings of $\pm .35$ to further screen variables in each component. The components retained in the PCA were named #1- General Employability Skills, #2- Personal Qualities/Integrity, #3- Problem Solving, #4- Applying Academics to Real-World Scenarios, #5- Managing Materials, and #6- Initiative.

Conclusions and Recommendations

The responsibility of preparing students for their future chosen profession will largely fall on CTE educators (Fristoe, 2017; Martinez, 2007; Symonds et al., 2011). However, because industry leaders still report that students are not prepared for the workforce, we recommend investigating agricultural education curricula to identify gaps between effort and preparedness. Overall, the superintendents rated all employability skill constructs as "Very Important" or "Extremely Important" with critical

thinking, resource management, and personal qualities being ranked as the most important employability skills.

Engaging a competent workforce requires equipping leaders who have relevant employability skills to meet the needs of a global workforce. Industries such as international development and Extension could benefit from working with secondary superintendents to equip students at the secondary agricultural education level. We suggest investigating additional opportunities to integrate employability skill development into primary and early secondary education and through extracurricular activities. Programming efforts that also involve a global mindset lens and global perspective could be valuable to equipping the global workforce. Many programs, particularly in CTE courses, exist to prepare students to be career ready with the skills necessary to be successful in the workforce. As a result, it is valuable to gauge career readiness at the secondary, collegiate, and workforce stages to adapt curricular needs to international agricultural industry demands.

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Exploring the needs of international graduate students for American educational and cultural experiences

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Abstract

Introduction & Literature Review

In the past several decades, globalization has greatly impacted higher education. Akgun and Alpaydin (2022) state that worldwide, the number of international students has risen from 89 to 200 million. The U.S. is the leading destination for international students (Akgun & Alpaydin, 2022). International education offers lucrative opportunities, thus attracting a large pool of applicants (Firang & Mensah, 2022).

International students play pivotal roles in both their host and mother countries. While pursuing higher education, international students serve the host nation in numerous ways (Smith & Khawaja, 2011). For instance, international students bolster the host country's intellectual capital and labor force by bringing diverse knowledge and expertise (Smith & Khawaja, 2011). Furthermore, diverse cultures enrich academic conversations and increase domestic students' awareness of the world (Arthur, 2017; Lopes-Murphy, 2013). However, studying in a foreign country presents many challenges to international students (Smith & Khawaja, 2011; Elliot et al., 2016; Lopes-Murphy, 2013). They grapple with language issues, unfamiliarity with the U.S. educational system, integration into new cultures, finding resources, and separation from family and friends (Sullivan & Kashubeck-West, 2015; Rodriguez et al., 2019; Lopes-Murphy, 2013).

International students encounter acculturative stress and adjustment issues while studying abroad (Berry & Sam, 2006). Desa et al. (2012) define acculturative stress as anxiety caused by blending two opposing cultures. "While these symptoms of distress are similar to other stress responses, acculturative stress has been identified as resulting from and arising out of moving to and living in a new culture, including somatic manifestation, depression, anxiety, and decreased self-esteem" (Sullivan & Kashubeck-West, 2015a, p.2). Furthermore, psycho-cultural stress can also be triggered by cultural disparities between the host and receiving culture (Desa et al., 2012; Sawir et al., 2008). Personal characteristics, exposure, education and skill level, gender identity, age, language, race, psychological and spiritual strengths, and the host's contemporary political and cultural attitudes toward immigration shape international student experiences (Desa et al., 2012). These barriers tightly interact, shaping international students' graduate school experience.

To successfully acclimatize to the U.S., international graduate students require academic orientation, counseling, and vibrant language assistance programs to help build cultural competency (Zhai, 2004). Moreover, international graduate students can draw support from their academic departments and communities (Rodriguez et al., 2019; Lopes-Murphy, 2013). Social assets, such as teaching staff, advisors, and domestic students, are pivotal in acclimatizing international graduate students (Arthur,

2017). They support international students by providing high-quality educational experiences while building their cultural competency and intelligence.

This study seeks to contribute to the scholarship of acculturative studies by incorporating current experiences and reflections of international graduate students. This inquiry will enhance acclimatizing strategies for international graduate students studying in the U.S.

Purpose and Research Questions

The purpose of this exploratory quantitative survey was to investigate the acculturation experiences of international graduate students at [University]. The following research questions guided the study.

1. What are the cultural competence and cultural intelligence of international graduate students?
2. What resources help international graduate students acclimate to American educational and cultural experiences?

Methods

The target population for this study was current international graduate students in the college of agriculture and environmental sciences at [University]. We purposively sampled to include all international graduate students using a census approach. We developed a survey instrument previously used by Lopes-Murphy (2013) to evaluate the importance of two globalization concepts on students: cultural competence and cultural intelligence (CQ). The research team modified the instrument to capture the lived experiences of international graduate students in the college. We kept all questions from the first section on opinions and behaviors and added more questions on acculturation experiences.

The survey had 39 questions comprising Likert-type, multiple-choice, and open-ended questions. The survey was reviewed and modified by two faculty members and an expert working with a non-profit whose mandate is providing hospitality and friendship to international students. After obtaining Institution Review Board (IRB) approval, the survey was distributed to all international graduate students in the College of Agriculture and Environmental Sciences at [University] via Qualtrics.

Results

As of now, 13 participants completed the pilot survey. Using SPSS v.27, post-hoc Cronbach's alphas were run on the two constructs to estimate the internal consistency of instrument scales. The constructs tested were cultural competence ($\alpha = .774$) and cultural intelligence (CQ) ($\alpha = .772$). As an exploratory study, these Cronbach's Alphas were deemed acceptable (Hair, Anderson, Babin, & Black, 2010; Nunnally, 1967).

First, the study's findings indicate international graduate students need support to acclimatize to American cultural and educational experiences. Respondents had low cultural competence ($M=2.51$; $SD = .36$) and high cultural intelligence ($M=3.42$; $SD = .36$). Respondent demographics showed ($n=6$, 46.2 %) of the study participants were Ph.D. students in their first year of study. The respondents were mostly single ($n = 7$, 53.8%) and the majority ($n = 7$, 53.8%) were born on the African continent. Secondly, responses to the open-ended questions revealed that study participants struggled with finding culturally

appropriate food, cultural shock, a disconnect from domestic students, issues reading and interpreting leases, and filing taxes.

Recommendations

The findings of this study have implications for increasing the success of international graduate students as they undergo their professional development. First, we recommend that future research should replicate the study with similar graduate programs in agricultural and environmental sciences to increase awareness of the lived experiences of international graduate students. Second, the study was limited to a single college at [University]. Therefore, expanding the study to include more participants from colleges across campus would provide a more in-depth view of students around the University. Thirdly, conducting a qualitative follow-up study could assess international students coping strategies. Finally, we acknowledge that this study did not address international undergraduate students, and further research should be conducted to capture their experiences. Agricultural and extension educators must support international students who may encounter acculturative stress impeding their success while studying in the U.S.

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How Do Preservice Teachers Reflect on Global Food Security Education? Thoughts from a Domestic Immersion Experience

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Abstract

Introduction and Theoretical Framework

Successfully navigating the 21st century requires sharing of resources, knowledge, and communication regularly involves people from different backgrounds and cultures working together toward a common goal (Boix-Mansilla & Jackson, 2012). Scholars in both multicultural education and global education agree that our future rests upon the abilities of young people to interact effectively with people different from themselves and take action in transforming structures of local and global oppression and inequity into structures that can bring about social and economic justice (Banks & Banks, 1995).

Educational administrators task educators with instilling global competence in students (Boix-Mansilla & Jackson, 2012). Agricultural educators are not immune from this request. Hurst (2015) noted the importance of agricultural education taking responsibility to prepare globally aware students for employment in the workforce. Globally competent students prepare for complex societies and a global economy through their persistent efforts to understand the world in which we live and act in ways that improve societies (Boix-Mansilla & Jackson, 2012). Teachers with increased global competency relate to increased communication skills and student learning (Walton, 2002).

Some of the most successful tools for developing global competence in educators include participating in intercultural conversations and completing intercultural conversations, and self-reflection (Tichnor-Wagner et al., 2019). Self-reflection can enhance teacher development, as well as enhance programs through participant self-reflection (Pai, 2015; Pedrosa-de-Jesus et al., 2017; Ritter & Barnett, 2016; Christodoulou, 2010). A study of preservice teachers in Australia revealed increases in global mindedness when preservice teachers were asked to complete discussions on intercultural topics and detailed self-reflections (Moloney & Oguro, 2015). Agricultural study abroad reflections have indicated shifts in global competence for study participants (Edger, et al., 2015; Pigg, et al., 2021; Russell & Morris, 2008), but little is known about what themes exist in the reflection of preservice teachers about global competency outside of study abroad programming.

The study was framed through the theory of planned behavior (TPB) as developed from the theory of reasoned action (Hackman & Knowlden, 2014). The Theory of Reasoned Action (TRA) is used to explain and predict behavior based on attitudes, norms, and intentions (OER, 2018). The components of TRA include behavioral beliefs, evaluations of behavioral outcomes which leads to attitude, then normative beliefs, which leads to motivation to comply and subjective norms (OER, 2018).

Purpose and Objectives

This study was part of a larger study to examine the impacts of tailored programming for undergraduate preservice teachers from the Pennsylvania State University and the University of Idaho. The research question for this portion of the study was:

RQ1: *What will preservice agricultural educators reflect on related to global competency domains following the completion of a year-long domestic global food security program?*

Methods

This qualitative study involved a content analysis of video reflections from $n = 13$ preservice agricultural education students who participated in a year-long global food security education program. According to Schierer (2012), a content analysis is in order when the goal of the research is to determine the presence of themes or concepts within a gathered set of qualitative data.

The program included fall coursework related to describing global food security, a fall immersion at the World Food Prize Foundation Borlaug Dialogues, spring coursework and a spring immersion where preservice teachers traveled to a domestic school and taught five days of global food security curriculum. Reflections were collected from students at six points in the program: before course, prior to fall immersion, following fall immersion, nightly during the spring immersion, and at the completion of the course. A total of $n = 108$ reflections were cataloged over the course of the program.

Data were collected through the Flipgrid online video reflection tool and transcribed verbatim. Three research team members, who were not directly involved with the development, implementation, or initial evaluation of the Global Orientation to Agricultural Learning (GOALS) program, individually completed open and axial coding of all transcripts. Trustworthiness was established as outlined by Lincoln and Guba (1985). We kept audit trails for each meaning unit, triangulated axial codes between team members, and conducted member checking with cohort members. Team members collected potential bias through reflexivity statements noting their interaction with global food security issues prior to the analysis.

Results, Products, and/or Conclusions

Data analysis revealed several themes and levels of understanding across the program. These themes included: recognizing professional growth through authentic experiences, the importance of being exposed to unfamiliar environments, a sense of community among cohort members, and the benefit of supportive and caring mentors.

The most prominent theme was students' reflection on a lack of global competence at the beginning of the program, with all students noting their global competence lower at the initial stages than later in programming. As the reflection prompts continued, and most specifically following the first three nights of the spring immersion, students commented on their growth as a globally competent educator. Second, students continually described the impact that youth had on them through a portion of the GOALS program while at the second immersion experience. Another highlight that was derived from student reflections was, through observed changes in their reflections, the content delivered prior to

the first immersion and between the first and second immersions was beneficial for growing their knowledge on global issues.

We can conclude from the reflections that students felt more connected to global issues through their participation, that the year-long immersion yielded tangible growth for the cohort members as educators, and that there was a noted impact from the program.

Recommendations and Educational Importance

This study not only highlights the need for pre-service educators to become globally competent, but also displays effective programming that can accomplish that need. The GOALS program is a major step in helping educators become more aware of global issues in order to teach more effectively and responsibly in their classrooms. It is recommended that further program study be conducted, as well as similar programs be developed and evaluated to fill gaps in the literature and to press toward the goal of globally competent education throughout our world.

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Kids-2-Cows: Incorporating Unmanned Aerial Vehicles (UAVs) in Agricultural Extension in Florida

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Abstract

Introduction

The University of Florida has increased its utilization of drones or unmanned aerial vehicles (UAVs) in its agricultural production research. In alignment with the increased efforts in artificial intelligence, drones provide a new venture on how agriculture production can be evaluated, monitored, and taught. The use of UASs has expanded in recent times due to increased equipment affordability and reliability as well as the availability of processing software developed specifically to process UAS data. Industry sectors are consequently developing innovative ways to use UASs in agriculture by leveraging the ability to fly on-demand missions at low altitudes, allowing for frequent monitoring of crops (Gago et al. 2015).

The utilization of UAVs for livestock monitoring and herd inventory provides a non-invasive alternative to current observation methods. Drones are a solid option for monitoring herds from overhead and tracking animal quantity and activity level on one's fields (Veroustraete, 2015). In many sectors, including agriculture, there is a growing demand for people who can understand, develop, or fly drones. To satisfy this demand, we must train and educate professionals that can fulfill these roles. To this end, new pilot educational programs were developed for youth and adults.

Purpose and Objectives

To increase the understanding of where and how UAVs can be implemented into agriculture production, educational efforts were designed to provide opportunities for youth and adults to engage in modern production practices. The objectives of the project were to: 1. Provide a safe learning environment for youth to explore UAVs and how they can implement their utilities, 2. Teach prospective youth and adults how to properly pilot and comply with Federal Aviation Administration guidelines in the United States and 3. Provide on-farm application demonstrations of UAVs for livestock herd management.

Methods

To achieve the objectives of this project, multiple trainings, demonstrations, and engagements have occurred since 2019, when the first workshop was held. Training workshop topics included Federal Aviation Administration (FAA) requirements, drone equipment, flying methods, standards of operation, and pre-planned flight missions. Youth and adults were provided the opportunity to actively train and fly UAVs to understand their maneuvers and how to operate the control systems. Various flight challenges were presented to the participants to increase awareness and understanding of the knowledge taught.

Extension educators provided expertise to livestock producers across the Florida panhandle on taking inventory of their cattle utilizing UAVs. Three cattle ranches across the Northwestern Panhandle of Florida were surveyed utilizing UAVs. Each ranch varied in size from 400 head to 1200 head of cattle. Drone missions were flown utilizing pre-planned flight paths to capture visual and thermal images throughout the duration of the flight mission. Images of the drone flights were cataloged and analyzed for comparison for accurate animal identification. Certified UAV pilots were incorporated for each mission.

Results

Through the utilization of mixed teaching methods, Extension educators were able to provide nine programming events reaching over 140 adults throughout the duration of the project. Over 60 youth were taught remote pilot skills through two day camps and a 4-H club. In addition, Extension educators were able to perform three pre-planned flights with cattle operations across Northwest Florida to provide both insight and integration of UAVs for future livestock management. Approximately 1,156 livestock were surveyed during drone mission flights. Images provided by visual and thermal imaging provided a basis to increase model accuracy for animal surveillance algorithms and programs. Images were populated utilizing proprietary data logs to provide additional support for program priorities.

Application

Integration of advanced technologies in agriculture extension programming provides a novel approach to the pioneering utilization of UAVs in agriculture. The ability to engage with youth and adults on innovative technologies is easily incorporated with other efforts that are offered. Utilization of UAVs in traditional agriculture Extension education should be performed within the guidelines of local and national regulations. The introduction of modern agriculture technology to youth should be an integral part of future Extension programming. The source of UAVs in regard to make, model, and type can vary but should meet the priorities of the Extension program. It is encouraged that all educators of UAV implementation have the proper training and program priorities to implement the technology.

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Digital Equity - Building a Coalition for Collective Impact in Guelph and Wellington County, Ontario

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Abstract

Even before the COVID 19 pandemic, and certainly during it, there have been many people in Canada, and locally, in the City of Guelph and Wellington County, who experience life in the "digital divide" each and every day (Steele, 2019; Hambly et al, 2022; Hambly & Rajabiun, 2021). Recognizing the importance of actions to build digital literacy and ensure credible information access, agricultural and rural extension specialists are coming to terms with digital hesitancy associated with privacy concerns and misinformation and working with various stakeholders to address barriers to Internet service and mobile device access. This presentation draws on "theory in practice" by examining the practical learning and growing experience of the Guelph Wellington Digital Equity Coalition, a multistakeholder coalition of organizations dedicated to digital equity. The Coalition includes our public libraries, community health center and volunteer service organizations as well as the University of Guelph's Regional and Rural Broadband (R2B2) Project. Two areas to achieve digital equity are highlighted: digital skills building and advocacy. Some individuals in Guelph/Wellington lack confidence in online service interactions including services that provide access to food, health care and emergency support. Our local health center writes "social prescriptions" for Internet technology access that provide devices and tech support to those in need. The irony of the COVID-19 pandemic was that when more community outreach services rapidly moved online many of the individuals who needed them most were people living in the digital divide. A combination of actions was used to support Internet access including #PhoneDriveGuelph, device lending programs, parking lot hotspots, laptop loans for virtual court appearances and legal aid counselling and one-to-one digital volunteers eased barriers to digital services. While short term solutions were made, longer term digital equity advocacy got underway. This included a "Vital Focus" policy report and forum that generated a "call to action" and the formation of the Guelph Wellington Digital Equity Coalition that continues to support collective impact work. Private sector partners joined in to support accessible Internet services. Links were made to the Poverty Task Force and Sustainable Circular Food Economy initiatives in the city/county. Through this ongoing work, the Coalition found that social inclusion is not necessarily equitable, and therefore, some individuals attending Coalition meetings access a living wage arrangement to ensure diverse representation of those personally affected by the digital divide. Organizations involved in the Coalition have created and keep updated an inventory of digital equity resources including a "Digital Scorecard" adapted from the Alliance for Healthier Communities for self-assessing equitable access to online services. The Coalition also networks across the province and Canada, even internationally, to ensure that no one is left behind in the digital society.

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