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QUALITATIVE UTILIZATION OF THE THEORY OF PLANNED BEHAVIOR TO UNDERSTAND SUBSISTENCE FARMERS' FOOD SECURITY CONDITIONS IN UNITY STATE, SOUTH SUDAN

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ABSTRACT

This study sought to identify strategies to improve food security and agricultural development in Unity State, South Sudan. In addition, the study was designed to investigate proper way to diminish gender inequality through improved agricultural extension services that target subsistence farmers in rural areas of Unity State. South Sudan is the world's newest nation and due to the war for independence and ongoing civil war, the population suffers from extreme food insecurity. Subsistence farmers in Unity State are food insecure due, in part, to conflict, climate irregularities, the absence of appropriate technology, lack of access to agricultural markets, and gender inequality. To better comprehend the food security conditions in Unity State, 19 key informants were interviewed, including agricultural professionals, agricultural scientists and extension specialists, and gender development workers who work with agricultural communities, profit, and non-profit organizations. All interviews were transcribed verbatim, coded using a semi-open coding scheme, and analyzed to discover themes. The identified themes included lack of access to infrastructure and capital and gender inequality. Findings showed that women are being systematically discriminated against with respect to education, civic engagement, and the ability to make independent decisions. Providing agricultural training and information about organizations that supply farm equipment to small farmers in rural areas seemed to be essential to improving food security. Results substantiated that when farmers received agricultural training and farm equipment, they would be able to farm. Subsequently, farmers would be capable of producing their own food and have a decent living that supports food security conditions.

Keywords: Food Security, Conflict, Extension Education, Gender inequality, Farm Cooperatives.

INTRODUCTION

Subsistence farmers in Unity State, South Sudan are presently in the state of food insecurity. Unity State is rich in natural resources, yet its people are extremely food insecure. Unity State is in the northern South Sudan along the border with the Sudan. South Sudan is the world's newest nation and extremely food insecurity (Edward, 2014). A civil war, which started in 2013, has led to food insecurity and has decimated interstate and regional trade and agro-pastoral practices (Committee on World Food Security, 2015). The civil war has initiated a vicious cycle of economic failure and food insecurity in all regions of Unity State, South Sudan

(Lokosang *et al.*, 2016). The war creates severe food insecurity (International Year of Cooperatives (IYC), 2012). Food insecurity exists when people have narrow access to markets and inadequate capacity to obtain food to eat and missing new technology (FAO, WFP & IFAD, 2012). Conflict creates unemployment, food shortages, and increases food prices (IYC, 2012). Lack of income due to unemployment also contributes to food insecurity and leads to social exclusion problems (World Development Report, 2008). The economy of Unity State depends on subsistence agriculture, which is being devastated by the civil war. This declining agricultural productivity is creating consistent starvation, undernourishment, and poor health not only in Unity State, but in most parts of South Sudan (IYC, 2012). Beside the conflict, other factors that are believed to be

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contributing to food security threats include climate change (Borresen *et al.*, 2015), gender inequality (Calderbank, 2013), and a lack of enabling infrastructure and markets (Borresen, 2015), microfinance (Calderbank, 2013), agricultural inputs (Lokosang *et al.*, 2016), and effective agricultural extension services. Food and Agriculture Organization of United Nations (FAO), (2011) and Food Security Network (FSN), (2014) described food security as a state in which all people, at all times, have physical, social and economic stability to adequate, secure, and nutritious food that satisfies their dietary needs and food favorites for an effective and healthy life. Based on the literatures, the following major threats to food security in Unity State have been explored and described in the subsequent paragraphs: Poor leadership is number one factor that return South Sudan to civil war just after two years of independence. South Sudan got her independence in 2011; unfortunately, the country went back to war when the debates within the Sudan People Liberation Movement (SPLM) party about reform turned violence. The conflict destroyed much of Unity State property and displaced tens of thousands of state residents (Human Rights Watch, 2015; Lokosang *et al.*, 2016). Climate change aggravated with insecurity deters successful agricultural production in South Sudan (FAO, 2010; Ayuel, 2010). The environmental hazards and droughts that come from the deficiency of recurrent rains are blamed for poor harvests and livestock health and food insecurity in many parts of the South Sudan (FAO, 2010, IFPRI, 2013). Unstable social environment, poverty, failed rains and pasture shortages bring about serious food security threats in the country (FAO, 2010; IFPRI, 2013). Underprivileged agricultural inputs resulted in poor harvest. The main threats of agricultural development in Unity State today are lack of agricultural inputs, lack of irrigation and soil dreadful conditions. Weak farmers' food production systems and absence of agricultural extension, research and development create poor agricultural productivity. Agricultural pests and insufficient access to the necessary external inputs such as pesticides and improved seed varieties results in low yields (DFID, 2011; Fanzo, 2015; Roberts & Rodriguez, 2014). To improve production, livestock waste products can be used to fertilize cultivated soils. Limited access to microfinance to small farmers limits subsistence farmers' capability to acquire farm

equipment to produce adequate food. Men and women farmers in Unity State have little or no access to financial assistant such as microfinance or small loan. This absence of micro-grants and microfinance to finance farms enterprises keep small farm holders in poverty because they do not cultivate large acres to produce varieties of food products (Rola *et al.*, 2002). Financial institutions often deny subsistence farmers' financial credit because they believe that these poor farmers will use money wrongly as they lack financial management experience microfinance (Calderbank, 2013).

Research Purpose and Questions: The purpose of this study was to explore food security conditions in Unity State, South Sudan and identify necessary strategies to improve food security. The key questions guiding this study were:

1. In what ways are smallholders farming communities' food secure or insecure in Unity State, South Sudan?
2. How does gender inequality impact food security of smallholder farming communities in Unity State, South Sudan?

Literature Review

Challenges to Stability of Food Security in Unity State, South Sudan: Studies have shown that subsistence farmers in Unity State, South Sudan are food insecure due to conflict, environmental deterioration, and gender inequality, and absence of appropriate technology (Lokosang *et al.*, 2016). In the South Sudan, an estimated of 87% of the population relies heavily on agriculture, livestock, fishing and forestry (Intended Nationally Determined Contribution, 2015). However, due to subsistence type production, these economic sectors add little to the state economy and Unity State imports food from neighboring countries for its urban population. Subsequent paragraphs described the major causes of food insecurity in Unity State, South Sudan.

Conflict: The number one challenge to food security in Unity State is conflict, which disrupts livelihoods and food production systems (Lokosang *et al.*, 2016). Moreover, conflict multiplies morbidity and mortality and causes large scale displacement, property damage, food insecurity and malnutrition in Unity State (Human Rights Watch, 2015; Lokosang *et al.*, 2016) The food insecurity has negatively affected the health, agricultural development, and productivity of small farm holders (DFID, 2011; Fanzo, 2015; Roberts & Rodriguez, 2014). According to the IPC (2015), about 3.8 million people out of a total population of 12.3 million are severely food

insecure and are unable to meet their food needs. The deteriorating food security is a consequence of prolonged unrest and insecurity. Lack of security prevents farmers from farming, blocks the smooth running of businesses, and obstructs development all over the state (Lokosang *et al.*, 2016). The unrest restricts the functionality of markets and causes high food prices throughout Unity State (IPC, 2015). Moreover, the conflict has triggered hyperinflation and depreciation of South Sudan's currency, which has reduced the ability of citizens to purchase necessities, exhausted household stocks and increased the cost of living. For instance, in Juba prices of both locally produced and imported cereals, vegetable oil and sugar increased by 24 - 69 per cent in the first quarter of 2015 and were 90 normal 100 per cent above normal seasonal levels. (IPC, 2015).

Deterioration of environment: The second major threat to food security in Unity State is environmental deterioration caused by climate change, overhunting, and burning of forests (Action Contre La Faim, 2008; Mishra, 2014). Climate change and variability may lead to either too much rainfall and flooding or too little rain when needed and drought (Serra & McKune, 2016; Verchot, Noordwijk, Kandji, Tomich, Ong, Albrecht, Mackensen, Bantilan, Anupama & Palm, 2007). Increased climate variability amplifies the scarcity of water and reduces crop yields resulting in declining rural community's livelihoods (Mishra, 2014; Serra & McKune, 2016; IPCC, 2007; FAO, 2009; Nelson, Rosegrant, Koo, Robertson, Sulser, Zhu & Magalhaes, 2009). The Food and Agriculture Organization of United Nations (FAO) reported that climate variability is causing untold devastation on subsistence farms (FAO, 2009). If necessary climate instability precautions are not taken, food insecurity situation in rural areas will increase (FAO, 2009).

Climate variability is expected to reduce agricultural productivity in Unity State (Nelson *et al.*, 2009). Subsistence farmers find it more difficult to adapt to climate change because they lack the resources or knowledge to invest in adaptive plans to protect their crops, assets, and households from climate variability (Thompson *et al.*, 2007).

An additional cause of environmental deterioration in Unity State is the exploration and extraction of oil, minerals, and other natural resources that contaminate agricultural lands and environments and threaten

people's health (CORDAID, 2014; UNDP, 2012). The inability of the government of Unity State and oil and mining companies to protect the environment threatens the sustainable use of the region's natural resources. The decline in stocks of fish, wildlife, soil, trees and water is growing worse and urbanization is decreasing the availability of farm labor in the rural areas (Dawe *et al.*, 2011; Conforti, 2011). Trees are being depleted at unsustainable rates for construction lumber, firewood, and charcoal production (UNDP, 2012).

Gender inequality: Gender roles are the socially established norms, rules, roles, and activities for males and females within a society (World Health Organization, 2013). The gender role determines the rural communities' social expectations for a man and a woman including their ability to access outside household's resources (Mersha & Laerhoven, 2016; World Health Organization, 2013). Gender inequality is among the major causes of food insecurity (Mersha & Laerhoven, 2016). Cultural norms that restrict women to unpaid household work and limit their ability to participate in income generating activities lead to food insecurity (Afshar, 1985; Mersha & Laerhoven, 2016).

Juanah (2005) noted that women are often not allowed to own farm plots on their own. Other studies indicated that women are not allowed access to credit in Sudan (Juanah, 2005; Afshar, 1985). Afshar (1985) found that men are considered farmers, but women are farm workers although both males and females work and share the same farms. Many other studies have specified that rural females do not have access to financial assistant services, extension services, input and seed supply services, while males do (Adekunle & Fatunbi, 2014; FAO, 2009).

Required Food Security Intervention Strategies in Unity State, South Sudan: The solutions for decreasing food insecurity increased food availability, access and nutritional value for all people (Mwaniki, 2006). As the food insecurity in Unity State is absolutely associated with conflict (IPC, 2015), it is essential to focus on education and training in conflict resolution and good governance to promote the interest of farmers and alleviate poverty (Roberson, 2013). Facilitation of agricultural markets is another way to create wealth and reduce food insecurity (Mwaniki, 2006). Food security requires the joint sincerity and vision of all stakeholders to guarantee that the food insecure benefit (Mwaniki, 2006).

The literature suggests extension education services, mitigation of environmental deterioration, farm cooperatives, and microfinance to be used as food security intervention strategies to reduce food insecurity. The aforementioned four food security intercession plans are discussed below.

Extension education service: Expanding subsistence farmers' opportunities through improved extension services could increase food security. Extension specialists can work with farmers to identify and solve the issues associated with farm productivity (Roberson, 2013). Agricultural extension specialists can provide agricultural training as well as information to small farmers to increase agricultural production (Kante, *et al.*, 2009) and improve product quality (Roberson, 2013; Kante *et al.*, 2009). In addition, quality extension services can enhance food security by encouraging farmers to better utilize inputs, to utilize improved farming techniques, and to understand and better utilize market systems (Davis, 2006).

Mitigation of environmental deterioration: Agroforestry is receiving renewed interest as a method of mitigating climate change because of its ability to sequester atmospheric carbon dioxide while supporting pastures and field crops (Pam *et al.*, 2004; Verchot *et al.*, 2007; Carbon3markets, 2015; Kalaba, Chirwa, Syampungani, & Ajayi, 2010). Tree planting and agroforestry in less developed nations offer considerable paybacks to rural people, local economies, and increase environmental sustainability (Morton, 2007).

Farm cooperatives: Agricultural cooperatives for women are a possible way to secure gender equity and empowerment of women (Adovor, 2010). Numerous studies report that men and women form agricultural cooperatives purposely to satisfy economic, social and cultural needs and that farm cooperatives decrease poverty, enhance food security, and create employment opportunities for members (Adovor, 2010; IYC, 2012). Furthermore, cooperatives provide economic support to small farmer producers and isolated groups, particularly, women and youth (Adovor, 2010).

Microfinance: Development of opportunities for women through microfinance and farm cooperatives reduces gender inequality and improves women's positions and economic development (Duflo, 2012). Studies suggest that microfinance has the capacity to target the needs of lower-income households and children (Rola *et al.*, 2002). Microfinance encourages disadvantaged farmers

to work together, share what they learn, save, and enhance farm enterprises and households gradually over time (Rola *et al.*, 2002). Many recent studies argue that economic growth is better when women are freed from constraints. Duflo (2012) reported that once women are empowered, poverty drops, opportunities for women increase, and gender quality improves in the household and community. Making microcredits and savings accessible to subsistence farmers enables them to better control their property, participate in decision making, and increase incomes and economic security (Duflo, 2012; Rola *et al.*, 2002).

METHODOLOGY

Theoretical Framework: The researcher used the Theory of Planned Behavior (TPB) (Ajzen, 2005) as a framework to study cultural attitudes, subjective norms, and perceived behavioral control concepts in relation to food security, cultural responsiveness, farm cooperatives, gender roles and microfinance. Ajzen (1988, 1991, 2005) defined the TPB as a theory that predicts the deliberate behavior of individuals and intended plans. Intention is the greatest predictor of attitudes toward the particular behavior, subjective norms and the behavioral control (Ajzen, 2002; 2005). The intention of small farm holders engaging in farming is to sustain their lives and improve their food security. The attitudes of rural communities towards food security lead them to become farmers. Subjective norms support gender inequality and place many restrictions on women, particularly, in rural societies. Microfinance institutions use cultural norms and the perceived behavioral controls (Zoellner *et al.*, 2012) to degrade and belittle women and deny them microloans to finance their farm businesses (Saito *et al.*, 1994). The TPB provides an opportunity for extension specialists to investigate normative beliefs and subjective norms that impact engagement of women farmers in the food security movement in Unity State, South Sudan. Professional agricultural extension specialists seek amicable ways to help small farmers play an equal role in farming activities regardless of their genders (Saito *et al.*, 1994; Petrea, 1996). The use of TPB is appropriate to extract the attitudes of subsistence farmers and women toward food security in rural communities in Unity State.

Research Design: This qualitative research design examined the attitude of farmers toward food security, the role of gender in farming, microfinance, farm cooperatives and extension education. Research

questions for this study were pre-tested using structured interviews. One on one and phone interviews were utilized to understand the effect of conflict, climate variability and gender role on the lives of rural farmers in Unity State, South Sudan. The literature acknowledged participants confidentiality and used purposive sampling to select the number of informants.

Participants' Confidentiality: The Institutional Review Board at Virginia Polytechnic Institute and State University reviewed and approved this study. Subsequently, the researcher began to recruit informants by phone and e-mail. A recruitment letter was e-mailed to informants via e-mail. In this pre-notice letter, the researcher introduced himself and explained to the informants that this study is part of the requirements for completion of a doctoral degree at Virginia Polytechnic Institute and State University in Blacksburg, Virginia, United States. The researcher informed the informants that participation is voluntary in nature, and the importance of the research study was explained. Contact information of the principal investigators was included in the pre-notice. In due course, in the recruitment letter, informants were made aware that they are free to withdraw from the study at any time. In the end, the interviewer used pseudonym to conceal the identity of the participants.

Informants' Sample Size: Purposive sampling techniques were utilized to identify knowledgeable informants who know more about rural farmers who specialize in maize, sorghum, and rice production. The researcher used his experience and knowledge to select a sample of informants that he believes can provide the relevance information about the food security and marketing issues affecting subsistence farmers in the selected counties in Unity State. Ary et al. (2009) stated that there are no rules for sample size in qualitative study. The accuracy of qualitative study depends on what the researcher wants to know and the purpose of study. Increasing the correctness of data collection is more significant than increasing the number of participants (Patton, 2002). The use of purposeful sampling in data collection process helped the researcher understand in depth the causes of food security issues in Guit, Koch, Leer, Panyijar and Rubkona Counties in Unity State.

Data collection: The researcher developed 20 interview questions, recruited 30 participants, and interviewed 19 key informants. This research utilized both primary and

secondary data collection sources. The primary data were collected from the face to face and telephone interviews, and email surveys. Structured interview questions were developed and used to collect data from men and women farmers; representatives of the South Sudan Ministry of Agriculture, FAO, and the University of Juba College of Natural Resources and Environment; international agriculture researchers; and extension and gender development specialists. Only open-ended questionnaires were used in interviews.

Secondary data were collected from books, reports, peer review journals, internet articles, and working papers. In addition, the researcher used conference papers focusing on food security and agriculture in South Sudan and in Sub-Saharan Africa. The study focused on Guit, Koch, Leer, Panyijar, and Rubkona counties in Unity State, South Sudan.

Data Analysis: Interviews with individuals of the Nuer ethnic group were conducted in the Nuer language, taped recorded, and then translated into English. Nuer is the dominate language in the study area. All other recorded information in English was transcribed verbatim, coded using a semi-open coding scheme, and analyzed to discover themes. Before transcribing, the transcriber transferred the tape and audio-recorded information from the recording device into transcribing software and then manually transcribed the interviews.

RESULTS

In what ways are smallholders farming communities' food secure or insecure in Unity State, South Sudan?

Informants indicated that barriers to market access, climate variation, low agricultural production and political instability were the main food security challenges.

Conflict: Informants revealed that violence has displaced many people. Conflict has also blocked humanitarian aid to those in need of assistance. Three informant aid workers reported witnessing hundreds of thousands of people leaving their homes in search of safety and that these displaced civilians were suffering from malnutrition and food insecurity. Seven participants from Human Rights Watch and the United Nations have reported that the South Sudan army had looted cattle, burned houses, rape young and older women in Guit, Leer, Koch and Rubkona Counties in Unity State. The informant interview results indicated that there was a rapid loss of children in Rubkona County due to deaths from malnutrition, poor hygiene,

and lack of clean water. The findings were reflected in the following interview quotes:

“Unstable Political conditions deteriorated farming and schooling in Unity State.”

“Civilians are being killed brutally and in discriminately in Rubkona County.”

“Our houses were burned to ashes and livestock were looted.”

“We eat unhealthy food and do not get better healthcare due to the conflict.”

“Some farmers have never been able to farm again after being displaced because some of the agricultural lands had been contaminated with the landmines.

Climate Variation: The finding indicated that climate changeability leads to inconsistent rainfall, which causes floods in one extreme and droughts in the other. Land degradation, drought, famine, deforestation, lack of water and soil erosion were identified as main constraints to agricultural productivity and food security. Some organization informants suggested that clearing of woodland, overgrazing and burning of forests is threatening the environment and decreasing infiltration. Many farmers mentioned that lack of rainfall, climate variability, deforestation, and wetlands drainage leads to decreased agricultural productivity. Informant quotes included:

“Environmental calamities and exhaustion of soil are the greatest elements that deteriorate agricultural development.”

“The agricultural land exhausted due to mono-cropping.”

“Crops die as a result of a decrease in rainfall.”

“New plants dried out when the rain stops raining.”

“Acids on the soil do not allow plants to grow healthier.”

“Exploration of oil and mining of natural resources leads to the large scale of permanent damage to agricultural land and deteriorates people’s health.”

How does gender inequality impact food security of smallholder farming communities in Unity State, South Sudan? The preliminary findings include themes of access to infrastructure and capital as well as contributing factors to gender inequality. The presence of subjective norms and perceived behavioral control in rural communities result in discrimination against women. Findings substantiated that women are being systematically discriminated against in relation to obtaining a basic education and civic engagement.

Normative beliefs restrict women from making independent decisions. Women farmers have limited human capital and lack access to farming technology to address environmental challenges that impede production. Traditional norms coupled with lack of finance to file legal claims place many obstacles on South Sudanese women in Unity State who seek justice. Findings showed that a gender specific responsibility makes it more difficult for women to engage in activities outside the household such as community events and politics. The conflict has reduced male involvement in agriculture due to increased involvement in conflict as soldiers. And this increased women’s involvement in agricultural enterprises to provide for family food security.

The findings were drawn from the interview quotes such as the following:

“Girls’ education is devalued and lack of education leads women not to take part in politics.”

“Women in rural areas do not have access to healthcare services.”

“Girls are being married at younger ages.”

“Women in rural communities do not have access to medical doctors.”

“Women sell crops in the markets, but give the money to the men.”

“Men take lead in decision making.”

“Women eat only leftover food from men and children.”

The findings agree with the literature, for example, informants believed that food security and agricultural challenges emerged as consequences of conflict, climate variability, the absence of markets, and gender inequality.

Many participants believed that extension services, farm cooperatives, microfinance, and education should be used to improve food security and agricultural development. Several respondents agreed that the ongoing conflict in Unity State has prevented on the ground research, Aids agencies, and made the study hypothetical in nature.

DISCUSSION

All the rural and subsistence farmer informants from the Unity State counties mentioned that pastoralists move with livestock to swampy areas and water bodies during dry seasons. Every year during the dry seasons, pastoralists travel from one place to another in search of water and good grazing for livestock. When the rain

starts around April, semi-nomadic pastoralists return home to start cultivating. Rural farmers, who do not move during the dry season, dig ponds and wells to provide water for themselves and livestock. Strategies farmers use to deal with flooding include temporary dikes and trenches to drain off and prevent water from damaging crops and other assets. However, these water control practices last only for one rainy season and the farmers must rebuild them the next season.

Some informants were hoping irrigation could help them sustain agricultural productivity in the years to come. However, lack of resources restricts rural and subsistence farmers from utilizing irrigation technology. Most subsistence farmers also reported challenges from birds and pests. Some informants mentioned that birds eat their sorghum before it is ready for harvest. As a result, people in Rubkona County quit planting sorghum although sorghum is a drought-resistant crop. Farmers in Rubkona County grow maize rather than sorghum because it is more resistant to loss from birds. However, people from Leer and Koch counties still plant sorghum. The literature supports the informants' beliefs that the most effective means to diminish susceptibility of farmers to climate variability threats are to utilize agricultural extension services, make microcredit available to farmers, improve agricultural markets, and increase the training of women agriculturalists (Das & Baishya, 2015; IYC, 2012; Thorlakson, 2011). Utilization of extension services is significant in enabling farmers to improve incomes, increase diversification of crops, and enhance the accessibility of farmers to markets (Roberson, 2013). Establishment of agricultural markets was found to be helpful in connecting farmers with external markets and could greatly increase off-farm income (Das & Baishya, 2015; Thorlakson, 2011).

Informant responses indicated that planting of trees was believed to enhance vegetative cover and water infiltration into soils, which resulted in improved crop growth. Literature support participants' thoughts on tree planting to prevent top soil erosion by wind and water. A study conducted in Nyando, Kenya found that tree plantings reduced the effects of floods and droughts (Challinor *et al.*, 2007). Trees reduced soil erosion and runoff and increased the water holding capacity of soils (Challinor *et al.*, 2007). Making microcredits and savings accessible to subsistence farmers could improve their ability to control their property, participate in decision making, and increase income and economic security (Das

& Baishya, 2015). Responses from informants suggested that microfinance could also help in rural development by enabling subsistence farmers to buy insurance to protect their assets. Informants believe that microfinance could help farmers protect their farms, houses and provide healthcare for household members. Literature backed up this informant belief and suggested that it is just and fair to permit women to apply for financial assistant just like men do (Lybbert & Summer, 2010).

CONCLUSIONS

This study investigated food security conditions in Unity State, South Sudan. Based on the Theory of Planned Behavior, a semi-structured questionnaire was used to interview key informants to understand their experiences regarding conflict, extension education, environmental calamities, gender roles, the formation of farm cooperatives, and microfinance in Unity State. The deterioration of the environment in Unity State, South Sudan is exacerbated by globalization and an economy dependent on the unsustainable export of natural resources to other parts of the world without replenishing the land.

Semi-structured one on one interviews in qualitative research design were utilized to help understand participants experiences with conflict, extension education, environmental calamities, gender roles, the formation of farm cooperatives, and microfinance in Unity State. Farmers, university faculty, and international development specialists were interviewed. The use of TPB helped to understand the experiences, the attitudes, and behavioral beliefs of the participants toward food security and agricultural development in Unity State.

Moreover, the factors that affect subsistence farmers' food security and agricultural development were explored. Some food security intervention strategies that may help smallholders overcome food shortages were proposed. Recommendations were developed from informant interviews and a review of the literature. Explanations of the results of the study and their correlations with other literature pertaining to the objectives of study being investigated were provided. Informants believed that food security and agricultural challenges emerged as consequences of conflict, climate variability, the absence of markets, and gender inequality. Many participants believed that extension services, farm cooperatives, microfinance, and education should be used to improve food security and agricultural development.

RECOMMENDATIONS

Findings suggest establishment of sustainable food intervention approaches to improve the food security of subsistence farmers, particularly, women in Unity State, South Sudan. The study was hypothetical because the ongoing conflict in Unity State has prevented on the ground research. The study results suggest starting points for more research and implementation activities to improve food security and gender equality when the country becomes more stable. Based on the findings, the following recommendations are made:

Cultural responsiveness: To encourage subsistence farmers in rural communities to accept new technology, the extension specialist must be aware of the cultural norms practiced in the community. Extension expert must work collaboratively with the people of the community to improve their living standards without disruptive changes to their culture. Agricultural extension specialists that work in a culturally oriented community must first build a strong relationship with the community to gain respect. For instance, possessing a small plot for farming within the village where the specialist can initially demonstrate the new technologies on his or her own farmstead can exhibit how the new technology can be applied. Subsequently, the extension specialist may start to inspire the utilization of new technology by other small holders. By accepting and interacting with small farm holders in their customary way of living, the extension specialist can influence the normative beliefs of subsistence farmers to work towards the interest of the community. This collaboration might enhance food security and agricultural development.

Agricultural extension education and training: To achieve food security and gender equality, community participatory learning and agricultural training must include women. The community must be encouraged to provide land and labor to build schools, meeting and activities centers. Children and youth educational curriculums should incorporate agriculture, trade, business, and other disciplines to realize food security. Adults should be recruited and enrolled in vocational training classes. Adult education programs should include basic English, math, and agriculture. To support community participatory approaches and collaborations, adults ought to be encouraged to form organizations to address community-related problems.

Farm cooperatives: Value chains for small farm holders are required to create markets for their commodities, add value, and support their ability to make decisions. Agricultural extension specialists should work collaboratively with small farm holders to fully comprehend the procedures for creating and running cooperatives. With the utilization of participatory approaches, the extension specialist may help identify the type of agricultural cooperatives the small farm holders want to form and what they hope to gain from them. The agricultural extension specialist can then provide technical support to small farm holders to develop guidelines and plans for the desired cooperative. Lastly, it is recommended that extension specialist must connect cooperative farm members with buyers who may have an interest in their commodities.

Microfinance: Women farmers do not have equal access to capital to sustain their farm enterprises. To make microfinance more available to women farmers, the extension specialist should provide workable microcredit information. The extension specialists have to make sure that the microloans have appropriate interest rates to enable women farmers save money and pay back their loans. The microcredit and saving institutions should not seek collateral as a qualification for awarding microloans. Rural women farmers do not have appropriate assets the microfinance institution would be interested in. Women farmers who are interested in microfinance loans and saving must be trained so they understand their business plans, budgeting, management processes, and the intended purpose of the loans before the loans are awarded.

Sociocultural life: Diversity in cultures, languages, and literacy make effective communication between small farm holders and extension specialists challenging in the Unity State, South Sudan. The gender roles are specified and this categorization of duties based on gender may affect the development of agriculture. For instance, in the Unity State, South Sudan, men usually leave farm work for women to become soldiers or find non-farm jobs. Hence, it is recommended that agricultural extension specialists focus on the needs of women farmers. The cultural differences and varied resources of women farmers may delay the implementation of new practices. Rural women farmers are only capable of adopting low-cost technologies that they have the time and resources to adopt.

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