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The Future of Extension in Northern Ghana: A Review of the Literature

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THE FUTURE OF EXTENSION IN NORTHERN GHANA: A REVIEW OF THE
LITERATURE

by

Ben Alexander

B.S., Southern Illinois University, 2017

A Research Paper
Submitted in Partial Fulfillment of the Requirements for the
Master of Science

Department of Plant, Soil, and Agriculture Systems
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Approved by:

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TABLE OF CONTENTS

<u>CHAPTER</u>	<u>PAGE</u>
CHAPTERS	
CHAPTER 1 – Introduction.....	1
CHAPTER 2 – Literature Review	7
CHAPTER 3 – Conclusion/Recommendations	23
REFERENCES	27
VITA	31

CHAPTER 1

INTRODUCTION

Agriculture in Africa has a long and complicated history. For much of the continent, the first implementation of a Western style of farming came with missionaries. Following this, many different colonial powers assumed control and forced their methods of agriculture upon African territories in order to benefit the overseeing country. In 2019, these countries were seeking to develop their agriculture sectors to create a stable food supply for both themselves and to export to the world for income (Mukembo and Edwards, 2015).

One such country was Ghana, located on West Africa's Gulf of Guinea. Ghana is a country of 28 million, with many different ethnic groups arranged geographically. After attaining their independence in 1957, Ghana had been able to take advantage of their geographic location and climate to produce cocoa, oil palms, pineapples, and timber for export. At the same time, the country imported many staples in order to feed its growing population (MoFa, 2010).

Farmers in Ghana can be separated into two basic categories, those that were growing crops for sale and possible export, and those that were growing solely to feed themselves and their families. The farmers who grew cash crops to sell typically had access to private extension information and inputs that helped improve their production. These growers were typically based in southern Ghana where climatic conditions and infrastructure were better than the rest of the country (Etwire et al, 2013).

There were still a large number of subsistence farmers in the country, especially in the northern regions of Ghana. While there were areas with excellent growing conditions, there were also many areas in Ghana where soil was poor and access to water was low. Additionally, these subsistence farmers did not have access to the inputs or technology that may have improved their

yields due to a lack of capital as well as governmental support (Fosu-Mensah, Vlek, and MacCarthy, 2012). Most farmers in the country had little to no formal agricultural education and their farming methods were based on the ways that they were taught by older family members since there was not access to information on improved growing practices (Kroma, 2013).

Farmers also lacked adequate storage for produce. These issues led to a danger of starvation conditions at times when production was low, such as a drought (Banson et al, 2015).

Statement of the Problem

Extension, according to Gebremedhin, Hoekstra, and Tegenge is “a knowledge and information transfer service that is based on a specialized field of expertise” (Gebremedhin et al., 2006, p. 24). The system of extension looks good on paper, and does work in many cases. However, there are often scenarios in which this system breaks down and becomes unreliable.

Most people in the urban centers of Ghana have never been to the rural areas and have no communication with the rural areas. The country’s government also does not spend much time or money on these rural areas, due to the low population density and the fact that these were mainly subsistence farmers who do not sell to other regions (Osei-Assibey, 2014). While rural-development and urbanization have led to significant poverty reduction in the south, similar dynamics have been largely insignificant in northern Ghana. While the number of poor declined by 2.5 million between 1992 and 2006 in the south, the figure increased by 900,000 in the north (Osei-Assibey, E.,2014). The farmers in this area were largely under the poverty line, farming simply to subsist. Some farmers in this area had been exposed to extension as a way to improve their yields. There were times when this worked, but at other times, it was found that extension had some key issues both in the planning and implementation stages (Asiedu-Darko, 2013).

Purpose Statement

It is clear that extension was still developing in Ghana (Banson et al, 2015). There had been much research done on issues facing the country, the agriculture sector, and the extension system. This paper sought to identify what the research had found to be the key issues Ghanaian extension efforts were facing through an intensive literature review. Once past and current problems had been identified, this paper sought to utilize past and current research to make some recommendations for moving forward with extension at the farmer, community, national, and international level. This paper also sought to find evidence of successful extension to put into practice. In looking at successful extension, there was some variation in what was defined as successful. Overall, the literature showed that successful extension created change in farmer's practices, with an increase in yield. Particular attention was given to the implementation of Information and Communication Technologies (ICTs).

Research Questions

Some guiding questions to be addressed were:

1. What extension systems have been tried in the country?
2. What do the farmers see as the current issues?
3. Is extension supported in the country and where is the support for extension coming from?
4. Which extension methods have shown positive results in the country?
5. How can we best address farmers' needs in the country?
6. What support does extension need moving forward?

Significance of the Problem

Ghana had a Gross Domestic Product (GDP) of 42 billion dollars, with 20 percent coming from agriculture. Since agricultural products accounted for this large portion of Ghana's GDP, it was striking to see the low amount of financial support that the agricultural sector received. Ghana's expenditure on agriculture as a percentage of total expenditure (%) in 2006 was only 0.8, when the average of African nations was 6%. The goal for African nations was to reach 10% by 2008 (Fan and Saurkar, 2008). Government spending on agriculture had only risen to roughly 3% by 2019. This low proportion of expenditure showed that agriculture was not a high priority of the Ghanaian government, even though 44% of Ghanaians were employed directly in the agriculture sector (PwC Ghana, 2017). Given that government spending on the agricultural sector had been so low, it was unlikely that there were substantial funds for extension effort. This made it almost impossible for extension agents to train farmers and help implement best practices.

Osei-Assibey states "Over 70% of people whose incomes are below the poverty line can be found in the northern/Savannah areas. While the absolute number of poor declined sharply in the South between 1992 and 2006 (2.5 million fewer poor), it increased in the North (0.9 million more poor)" (Osei-Assibey, 2014, p. 3). This extreme level of poverty was just one representation of the struggles facing inhabitants of Ghana's Northern Region. Many farmers in the northern rural areas of Ghana depended on daily farming for their only food source and as a result, their survival. It was key that they be educated on sustainable agriculture practices so that they could avoid food insecurity during years of drought. It was also vital that existing extension systems utilize the most effective models that could create the most positive change in farmers' productivity.

Limitations and Delimitations

In this paper there were a number of limitations to be addressed. First, this study utilized only currently available research. Based on the prohibitive cost of travel, this paper relied mainly on peer reviewed publications available both online and through the SIUC library network. While valuable data may exist, particularly in the hands of extension agents and in libraries in West Africa, this was not widely available and was not be included in this paper.

There were a number of delimitations addressed as well. The first is that this paper will sought limit the scope of the study to focus on extension as a method to improve the agricultural system in Ghana. While improvements in seed, technology or growing techniques may improve the overall agricultural system, this paper was limited to extension as a method of improvement.

This paper limited the scope of the research to include only information on studies that had been completed in Africa, with a particular focus in Ghana. As the culture and systems in agriculture vary so greatly from continent to continent, this paper sought to utilize the body of literature that focused on Africa.

Definition of Terms

To the goal of making this study as clear as possible, it was necessary to define several terms. The following terms were used and the reader should interpret their meaning using the following definitions.

- *Extension agent*: Refers to persons employed to apply scientific research and new knowledge to agricultural practices through farmer education.
- *Digital extension models*: Refers to extension models where the primary mode of communication is via digital means, primarily mobile phones and computers.

- *Northern Region of Ghana*: The *Northern Region* is bordered on the north by the Upper West region and the Upper East region, on the east by the eastern Ghana-Togo international border, on the south by the Black Volta River and the Volta region, and on the north-west by the Upper West region and Burkina Faso, and on the west by the western Ghana-Ivory Coast international border.
- *Subsistence farmers*: Refers to any farmers who focus on growing enough food to feed themselves and their families. Their output is mostly for local requirements with little or no surplus trade.

CHAPTER 2

LITERATURE REVIEW

Ghanaian agriculture has been the recipient of a good amount of development efforts, with varying success. The body of literature on Ghanaian agriculture extension efforts was sizable. The literature covered information from the largest overarching policy to one-on-one interactions between farmers. The literature provided research on both problems that have developed in the system as well as possible solutions. To accomplish the purpose of identifying the key issues Ghanaian extension efforts were facing, this literature review addressed research in the following areas: problems in extension, extension agent constraints, alternatives to public extension, farmer perceptions, agent perceptions, recommendations for improvement of extension, inclusion of farmers, extension agent's role, promising approaches to extension, and the development of information and communication technologies (ICTs) in extension.

In completing an exhaustive literature review, the phrases “agriculture extension in Ghana” “success of agriculture extension programs in Africa” and “subsistence farmers in Ghana” were thoroughly researched until articles became repetitive to a high degree. Literature was selected based on relevance to the paper topic and the inclusion of clear methods and relevant data.

Problems in Extension

Agriculture extension in Ghana was still developing. The needs of farmers were still being assessed and addressed in many regions of the country, with many different methods and procedures being tested. There have been many bumps in the road for extension in Ghana, and studies have identified different constraints facing the country. Chowa, Garforth and Cardey (2013) found that in a pluralistic agriculture extension system, farmers appreciate having access

to a variety of sources of technical advice and specific technologies. One identified constraint was that many agents and service providers did not take into account farmers' demands, and instead pushed what they felt farmers needed. Additionally, agents did not push farmers to work collaboratively. Poor coordination between providers such as the Ghanaian government and NGOs also limited opportunities for potential synergies amongst services.

Banson et al (2015) found that the lack of knowledge on exactly how many farmers are operating in certain regions in Ghana had reduced extension effectiveness, as the government had not provided enough agents to meet all farmers' needs. The study found that agricultural extension services could make a significant contribution to the success of young farmers, but the design of extension services was still being tested, with no overall system showing to be effective in all cases.

Feder, et al (2010) found that in community-based extension systems, the rather few cases where performance had been relatively carefully studied, elite capture was identified as a major constraint. This had been a problem because most farmers who lack significant capital did not benefit from the services. Other challenges that the study found included a limited availability of competent service providers, and deep-seated cultural attitudes that prevent an effective empowerment of farmers.

Mbo'o-Tchouawou and Colverson (2014) found that extension services were generally lacking for women farmers in particular. The authors recommended training agents in providing gender equitable services in order to address this gap in extension.

Asiedu-Darko (2013) surveyed extension agents in Ghana and found that there was a need to actively involve farmers in the extension delivery. It was also found that extension agents needed to have the required competence to enable them to deliver on their given roles as far as

agricultural development was concerned. The study identified several problems that were affecting the extension system in Ghana. These problems ranged from perception that the technology was expensive to basic competence of extension agents. The study concluded that there was an urgent need to address these problems in order to ensure farmers had the correct information and competencies needed to boost agriculture production.

Akudugu, Guo, and Dadzie (2012) found that adoption of agricultural technology of farmers served by extension was generally low. Farm size and the expected benefits were the only significant economic factors that influenced the decisions of farm households in the Bawku West District of the Upper East Region of Ghana to adopt modern agricultural production technologies. The social factors that influenced probability of adoption of modern agricultural production technologies by farm households include age, level of education and gender. The study concluded that farm households' agricultural technology adoption decisions depended on their socio-economic circumstances along with institutional effectiveness.

Extension Agent Constraints

Anderson et al (2006) found that issues of scale, inadequate interaction with the agricultural research systems, inability to attribute benefits, weak accountability, and lack of political support tended to lead to incentive problems among staff and managers of extension. This, in addition to limited budgetary resources, ultimately led to reduced implementation of Teach and Visit (T&V). Teach and Visit was an extension system in which farmers gathered together to listen to an extension agent teach agricultural concepts. Then, the farmers would go home and implement what they had learned, and the extension agents visited to critique and correct the new practices as needed. The main cause of the T&V system's disappearance was

attributed to the incompatibility of its high recurring costs with the limited budgets available, leading to financial unsustainability.

Anderson and Feder (2004) found that extension had been typically underfunded by governments who did not see solid data supporting outcomes from extension. On the other hand, extension had received a large amount of support from Non-Governmental Organizations (NGOs) as it was relatively easy to design an extension service to help in impoverished areas. The author emphasized the efficiency gains that could come from locally decentralized delivery and incentive structures based on largely private support.

Petros et al. (2017) found that within extension, farmers indicated that practically demonstrated strategies were trusted and practiced. However, the current dissemination strategies were simply based on theoretical judgments rather than their practical impacts. Though there were institutional and resource related problems, low adoption of agricultural technologies was partly due to technical inefficiency of development agents. The data obtained from qualitative sources indicated that development agents were not technically equipped to demonstrate the new technologies and also unable to create sustained interaction with clients. According to only 39.2% of the sample respondent farmers in study areas, development agents were reported to be qualified in terms of giving the needed services to their clients.

Farmer Perceptions

Brown, Llewellyn and Nuberg (2018) found that farmers had information gaps regarding conservation agriculture and that these information gaps were not because they had no interest in the topic, but that there was an unavailability and inaccessibility of learning opportunities. The study found that the farmers did not seek out the information, and that they were guided mostly

by financial motives. The researchers recommended that more inclusive extension methods be implemented, including demand-driven extension.

Moore, Ferguson and Lolig (2015) found that extension in Ghana has several limitations that need to be addressed. They found that farmers were not always consulted on what their needs were. They recommended that the government should enable greater opportunities for farmers to participate in district-level agricultural agenda-setting and planning. Additionally, interaction between NGOs and the MOFA were lacking. Actions to improve interaction between NGO-led extension efforts and MOFA are recommended. Also, the researchers found that across the three regions assessed, respondents described how graduates of agricultural colleges lacked skills in key aspects of modern extension. By assessing and identifying these skill gaps through comprehensive research, training institutions could be approached with specific curriculum recommendations in priority areas.

Agent Perceptions

Bentley, Van Mele, and Acheampong (2010) found that extension agents in Ghana had the farmers' best interests at heart, but did not always act in the best interests of the farmers. The research found that extension agents were not receptive to farmers' ideas or the ways that farmers uniquely implemented the crop production methods taught by the extension agents. The study found that the farmers did experiment with methods, and were generally more productive when given techniques to begin the process of experimentation. The authors suggest that researchers work more closely with farmers to get their input and experience in developing new technologies.

Baah, Anchirinah, and Badu-Yeboah (2009) found that most extension agents in the Eastern Region of Ghana have been trained at the various agricultural colleges (81%) and also in

various husbandry practices thereafter. However, the agents felt that further training in areas such as needs analysis and extension approaches would improve their performance. The study found that the majority did not feel motivated because of low remuneration, lack of transportation and absence of basic teaching aids. The study concluded that policy makers cannot afford to ignore the concerns of extension agents if farmers are to benefit from them. The researchers recommended that the basic needs of extension staff should be met if they were to interact effectively with farmers and provide needed information, a critical ingredient for higher productivity.

Asuming-Brempong, Sarpong and Asante (2006) found that many difficult problems confront the staff of MOFA at the community level, which negatively affected their work and performance. They found a lack of opportunity in rural areas to enhance income through engagement of spouses in income-generating activities as well as a lack of adequate social services, especially schools and health centers. Additionally, some agents see very rural postings lacking opportunity for advancement. The authors recommend that more effort should be made to provide extra cash incentives to staff in remote areas to compensate for lack of opportunities to make extra income; and scholarships to wards to enable them to attend nearby schools.

Alternatives to Public Extension

Feder, Birner, and Anderson (2011) found that while private sector participation could overcome some of the deficiencies of public extension systems, there were challenges still; including, misuse of public funds, insufficient accountability to farmers, inequitable provision of service, inadequate quality, and limited coverage of the wide range of farmers' needs.

Implementation of extension by private sector companies alone was not a cure-all. Government

programs still needed to provide services to smaller scale, less commercial farmers. Additionally, government oversight of private sector extension has been seen as necessary.

Baudi, Anaman, and Kwarteng (2013) found that farmers generally perceived the extension services of NGOs to be relevant to their operations. However, the respondents had differing opinions concerning these services with respect to their adequacy, availability, and their timeliness of supply. Farmers were generally content with the agriculture information communicated by these services, but the availability of credit was cited as a weak point of the services provided.

Improvement of Extension

At the same time that research has been done to expose some problems facing extension, an equal amount of literature exists that identifies and recommends practices or policies that have shown to be effective in Ghana and elsewhere. Bellamare (2010) found that the number of visits by agents compared with actual yield was economically significant, with an elasticity of yield with respect to the number of visits that were between 1.34 and 1.67, depending on the specification considered. Additionally, it was found that agricultural extension had been more effective for growers who have completed fewer years of education, indicating that agents should visit these growers more often.

The study by Eicher (2006) found that the development of an effective extension system in Africa would be both costly and take time. The author estimated that it will take fifteen to thirty years and over one billion US dollars to train and implement an effective extension system.

Duo and Bruening (2007) found that extension staff and supervisors view program implementation and program planning competence to be of great significance to the extension service in Ghana. They found that overall, supervisors ranked their extension agents as generally

good, just as the extension agents did themselves. The implication was that extension staff increased their level of confidence and understanding of various job requirements as a result of participating in the extension degree program.

Manuh (1988) found that initial and regular on-the-job training should be designed into the extension services, to equip extension officers with the skills and abilities to meet the needs and expectations of owner-managers and to reflect their values. The researcher recommended that extension services should be linked to private industry when possible in order to be most effective and demand driven.

Etwire et al. (2013) found that number of years in school, access to production credit and agricultural extension service was factors that significantly determined farmers' participation in agricultural projects in the Saboba and Chereponi districts of northern Ghana. It found that farmers' interest in agricultural projects could be permanently sustained by providing them with tangible benefits; such as, production credit and agricultural extension services. The study found that farmers who had access to credit were about fifteen percent more likely to participate in an agricultural project, and a farmer who had access to agricultural extension service was also about fourteen times more likely to participate in an agricultural project. The study recommended that agricultural projects should endeavor to provide farmers with credit. Also, these agricultural projects should not fail to deliver extension services to farmers participating in their projects. Extension services could be in the form of on-farm demonstrations or technical trainings among others.

Eicher (2003) found that over time, it had been NGO support that had sustained agriculture extension in Africa. Increasingly, support for extension in areas other than agriculture had been the focus of NGO extension efforts. The author suggested that because of this,

governments should refocus their effort in supporting the development of agriculture extension practices.

Oladele, Koyoma, and Sakagami (2004) found that there was no one extension system in place in Africa that was compatible to be used across the entire continent. The authors recommended including all stakeholders in developing a unique, widely compatible system . They explained that effort should therefore be generated towards an extension system that would be sustainable and responsive to the socio-cultural conditions of African farmers and economic productive capacities.

Fosu-Mensah, Vlek, and MacCarthy (2012) recommended that the government of Ghana ensure that terms for credit facilities are flexible to enhance farmers' access to credit. The authors recognized that the extension services in the region were inadequate, and suggested that the training of more extension personnel and improving the knowledge and skills of existing extension personnel on climate change and adaptation strategies should be of high priority. The authors recommended increasing the extension worker:farmer ratio, and making the extension services more accessible to farmers.

Davis (2008) found that there was no “best practice” for modifying extension programs or a magic model that could be standardized and implemented everywhere. However, there were many good models with useful features that, when implemented in a flexible and sustainable way that met the unique frame conditions of different countries and farming systems, could lead to improved extension performance and positive impacts. Because of the diversity of approaches (which mirrors the diversity in rural areas), extension agents will need special skills that go beyond the basic technical skills. The author recommended that agents would need skills in group dynamics, marketing, and ICTs.

Mukembo and Edwards (2015) recommended that governments should not underestimate what impact the use of extension agents to enforce unpopular government policies in the past may have had on the successes or failures of past extension services and programs. They recommended that national governments should guide and monitor activities of the various extension organizations to ensure harmony and avoid gratuitous use or waste of scarce resources. The researchers conclude that a need exists for countries to move toward more demand driven approaches to extension, especially with farmer participation and empowerment.

Inclusion of Farmers

Boateng (2006) found that in order to inform farmers' decisions regarding improved technologies or new ways of farming, agricultural extension experts should adopt the circular knowledge management model as it reflected both tacit and explicit forms of knowledge. They also found that farmers are more likely to be motivated in adopting technologies from agricultural experts once they realize that their own inputs were incorporated in the design and development of such technologies.

Kroma (2003) found that for Ghanaian farmers, the opportunity to participate in an active, rather than passive, way in a process in which their own powers of observation and cognitive capacities were clearly valued, increased motivation for participation in the innovative process. The study showed that small group forums for joint analyses and farmer-to-farmer exchange of knowledge were significant factors in sustaining motivation for participation. The study found that these socializing learning processes fostered important synergies between youths and institutional partners, and in the broader community that learners were embedded in.

David and Cobbah (2008) found that implementing demand driven, farmer involved, extension was most effective in extension as many who distributed extension materials were not

understood by farmers. An important contribution made by farmers was their preference for images presented in a sequenced, story context and a cause and effect approach to communicating ideas. Farmers' input also ensured that illustrations provided a holistic presentation of cocoa farming by highlighting the linkage between application of technologies and improved household welfare.

Extension Agent's Role

Issahaku (2014) found that competencies in the area of interpersonal relations, communication, personal qualities and technical knowledge were all rated as very important for extension agents. The researcher recommended that in order for agents to be successful, they should understand the expectations of their job before they begin it. Additionally, the author found that on the job training and continuing education programs were both important in ensuring agent success.

Brooks et al (2013) found that agricultural extension services could make a significant contribution to the success of young farmers, but no one system for extension had proven to be the most effective. The authors suggested that as more and more young people worked in agriculture it was important to identify extension strategies that appeal to them.

Promising Approaches to Extension

The study by Bonye, Alfred and Jasaw (2012) found that increasingly, Community Based Extension Agents (CBEAs) were being implemented in Northern Ghana by various NGOs in order to provide extension services in a cost effective manner. The study found that 92% of their expectations have been met by CBEAs. The researchers found that traditional institutions and beneficiaries were supportive and effectively involved in the implementation of CBEAs. The most dominant extension services delivery carried out by the CBEAs in the study area were: in

crop production, livestock production and bushfire management. The CBEAs were found to be the main link between the community and external agents. The study recognized that there was a need to strengthen the capacity of the CBEAs to provide holistic extension services through cooperation with MOFA.

The study by Simpson and Owens (2002) found that the Farmer Field School (FFS) approach showed that it was capable of being highly responsive to local needs over a wide range of conditions, and with a wide range of crops. A FFS was an approach in which farmers met regularly during the growing season, and received training and do hands on experiments to apply what they have learned. The approach had also made significant strides in providing the opportunity for farmers to acquire an understanding of important concepts and relationships. Farmers participating in the program had proven to be willing and able to communicate new viable technologies to others in their immediate localities and beyond, and in some cases had made significant contributions to local development. The researchers also found that FFSs improved relationships between the farmers and extension agents. The researchers found that FFSs were increasingly being implemented in Ghana.

Anandajayasekeram, Davis, and Workneh (2007) found that FFSs were not an alternative to existing systems in Africa, due to poor infrastructure and lack of evidence for FFSs to be completely effective alone. However, certain principles of FFSs could be picked up and incorporated into various systems, including agricultural extension, research, and even health, to make them more effective at reaching small and marginalized farmers and in alleviating poverty and food insecurity.

Davis et al (2012) found that Farmer Field Schools were effective in increasing agricultural production in the study areas. FFSs were shown to be especially beneficial to

women, people with low literacy levels, and farmers with medium-size land holdings.

Participation in FFSs increased income by sixty-one percent for farmers in the study area, but differences were also seen at the country level. Participation in FFSs led to increased production, productivity, and income in most every case. The most significant change was seen in Kenya for crops (80 percent increase) and in Tanzania for agricultural income (more than 100 percent increase). When disaggregating by gender, however, female-headed households benefited significantly more than male-headed households in Uganda. The study found that reasons for not joining an FFS included lack of time and information.

Development of Information and Communication Technologies (ICTs) in Extension

One particular area of development that had received particular attention was the introduction of digital technologies into extension. Chapman, Blench, and Zakariah (2003) implemented a rural radio program to disseminate information on soil and water conservation to farmers in the Northern region of Ghana. They found that the radio was widely broadcast in Ghana, covering most regions. They designed a drama (translated into six different tribal languages) that covered the struggles of an extension agent convincing farmers of the importance of soil and water conservation, and measured the results. Through surveying farmers, they found that this method of radio extension did improve farmers' knowledge overall, and allowed them to reach a large area for a comparatively lower effort.

A study by Annor-Frempong et al (2006) revealed that extension agents had high and positive demand for ICTs in extension. However, it was found that extension agents needed ICT training and financial resources to enhance the use of ICTs in extension. These could be found in both private and public sources. The study recommended a systems approach involving major

stakeholders; such as, training institutions, internet service providers, research institutions, farmers, and policy makers to collaborate in the use of ICTs for extension.

The study by Akpotosu (2015) found that the agricultural extension agents (AEAs) in Eastern Region were males with low levels of education who worked in rural areas. AEAs used internet on mobile phones a few hours per week for the previous five years. The AEAs had not received formal training on the use of the internet. AEAs used internet to deliver extension via sending and receiving emails, checking payslips and reading news on agriculture. AEAs have resulted in positive attitudes to internet use, but low to moderate knowledge and skills.

David and Asamoah (2011) examined the effectiveness of video viewing clubs as a training method. Results suggested that the video viewing club was effective at a relatively low cost, and was an interactive training method for providing low literacy populations with skills, information and knowledge on complex technical topics. The researchers found that there was no significant difference between participants and a control group in cocoa yields and implementation of taught practices. The study demonstrated that the training significantly improved farmers' knowledge of most topics covered. The study also found that participants disseminated much of the information to others in the area. The use of local facilitators in the program, which created a sense of ownership and added to the credibility of the technical messages, contributed to farmers' appreciation of the method.

Ahmadpor and Soltani (2012), found that extension workers' attitudes towards e-learning was generally positive. Additionally, extension workers were very positive that e-learning provides new opportunities to learn. The study found that agents who had previous experience with e-learning were more likely to view e-learning positively. The study also found that workers

who were in direct contact were less likely to have previous experience with e-learning, but that younger extension agents were more likely to have had experience.

Etwire et al. (2013) examined the effectiveness of mobile phone extension services in Upper West Ghana. The researchers found that farmers rated the information from the mobile phone service as “very useful”. However, the researchers found that there were many barriers to an effective mobile communication system, including infrastructure and limited farmer knowledge. They also found that the information provided was sometimes out of date or incorrect, reducing farmers’ confidence in the system.

Anaglo, Boateng, and Boateng (2014) found that across the Upper West region, smallholders indicated that they did not use the mobile phone to access agricultural information from agricultural extension agents or e-service providers. Those that did have mobile phones used them mostly for social communication. The study also found that apart from radio where 33% of men and 9% of women had access, there was very little to no access to other ICTs in the study area. The author recommended that more attention should be paid to access information through ICTs by first of all, improving extension advisory services, and then advising farmers on how to access information through the radio, television and mobile phone platforms.

Banya (2014) found that farmers had a positive perception of the messages they received mostly through communication channels; such as, personal contacts with AEAs and mobile phones. The farmers viewed the AEAs and mobile phones as useful channels to receive messages about sustainable land and water management, although the farmers had a preference for the AEAs. Even though the mobile phone was perceived as a viable alternative to personal contact with the AEAs, there were challenges with its use; such as, lack of electricity to charge mobile phone batteries and poor network service.

Overall, it can be seen that agriculture extension in Ghana is facing many problems, ranging from the country wide policy and funding issues to the lack of a clearly defined “best practice” for the country’s extension system. Many recommendations have been made to improve the extension system in Ghana, but there is much more research to be done.

CHAPTER 3

CONCLUSION/RECOMMENDATIONS

In researching the body of literature pertaining to agriculture extension in Ghana, there were many conclusions that could be drawn. The first goal of the paper was to identify what the extension system in Ghana had been and was currently, focusing on answering three of the six guiding questions:

1. What extension systems have been tried in the country?
2. What do the farmers see as the current issues?
3. Is extension supported in the country and where is the support for extension coming from?

It could be concluded that there have been many different extension systems attempted in the past in Ghana, with no one system offering overall success (Banson et al, 2015). From the literature, we saw that Teach and Visit, or T&V, was a very common and widely used extension system that had lost support in the previous two decades. A major criticism was that over time, it had been found to be too high cost while delivering too little (Anderson and Feder, 2004). Community based extension involves training community representatives to support farmers with advice, services and inputs on an on-going basis. This extension system implemented in Ghana was found to run into major constraints with the uneven distribution of extension efforts and inputs, allowing only a few members to truly benefit from the system (Feder et al, 2010).

Currently, extension agents had been shown to be under equipped to provide comprehensive services, with lack of knowledge in communication and education being a major complaint (Petros et al, 2017). However, other research had indicated that in some rural areas, agents had at least some college training in extension and instead suffered more from lack of

teaching aids than training (Baah, Anchirinah, and Badu-Yeboah, 2009). An additional concern was that opportunities in extension in the developing areas were not enticing for many of the most qualified individuals (Asuming-Brempong, Sarpong, and Asante, 2006).

Additionally, we saw that farmers and extension agents were aware of several issues facing the current systems. One major issue cited multiple times in the current system of agriculture extension was that extension agents did not take farmers' demands into account (Chowa, Garforth and Cardey, 2013; Moore, Ferguson and Lolig, 2015; Asiedu-Darko, 2013). This reduced the overall effectiveness of extension as farmers were less likely to adopt new practices if they do not feel that their input was valued (Bentley, Van Mele, and Acheampong, 2010; Boateng, 2006).

Support for extension was a vital issue. From the current body of literature we saw that extension had support from both the Ghanaian government and many NGOs. However, these two groups had worked mostly independent of one another and their lack of coordination had been cited as an issue (Moore, Ferguson and Lolig, 2015; Eicher, 2003). This lack of coordination had led to both over serving certain areas and under serving others. Additionally, opportunities to synergize their efforts had been missed (Chowa, Garforth and Cardey, 2013).

The second goal of this paper was to identify recommendations for the extension system in Ghana moving forward, answering the remaining three questions:

1. What extension systems have shown positive results in the country?
2. How can we best address farmers' needs in the country?
3. What support does extension need moving forward?

Particular attention was shown to the implementation of ICTs. In looking at the most promising extension systems currently, there were several conclusions that could be drawn.

The needs of farmers should be the first thought for extension agents. In examining the literature, it was seen that this was not always the case. First and foremost in the literature, it was seen that extension had been most effective when extension agents took farmers own ideas into account when planning extension (Kroma 2003). This left farmers feeling valued and more open to extension, which led to greater adoption of the techniques taught (Boateng, 2006). This demand driven extension system had been shown to be very effective (David and Cobbah 2008; Mukembo and Edwards 2015).

The inclusion of offering credit in an extension system had also been shown to provide a boost in production that allowed farmers a chance to expand their operations or to purchase inputs to boost their production (Fosu-Mensah, Vlek, and MacCarthy 2012). With both credit and educational extension services, farmers were more likely to improve their production.

In our increasingly connected world, the implementation of digital extension models and extension, including mobile and long distance communication, was becoming ever more possible. The implementation of ICTs for extension had been supported by extension agents in both the private and public sector (Annor-Frempong et al, 2006; Ahmadpor and Soltani, 2012). Extension agents would benefit from training in the use of internet and ICTs for extension (Akpotosu, 2015). Farmers also believed that information from mobile phones could be very effective in providing agricultural knowledge (Banya, 2014; Etwire et al, 2013), although farmers needed training on how to effectively use the online services (Anaglo, Boateng, and Boateng, 2014).

Extension agents are the front line of extension, and they are under-funded and under-trained (Issahaku, 2014). It has been shown that additional training will benefit extension agents (Duo and Bruening, 2007; Manuh, 1988). The Ghanaian government should allot more money to

specifically fund extension services. More funding would result in a higher number of qualified individuals working in extension (Asuming-Brempong, Sarpong and Asante, 2006).

One extension model that has shown promise in Ghana was the Farmer Field School method. This method of extension was shown to improve communication between extension agents and farmers and has made significant impacts in local development and production (Simpson and Owens, 2002; Davis et al, 2012). While this has been shown to be effective, it is not a system that can work well alone due to lack of infrastructure (Anandajayasekeram, Davis, and Workneh, 2007).

More research should be done to determine which methods work best for Ghanaians in the rural areas, as no one extension model will work for all of Africa (Oladele, Koyoma, and Sakagami, 2004; Davis, 2008). The implementation of further research in the area is sure to identify some effective methods of extension. This research should consider the implementation of FFS, ICTs and a demand driven extension model.

Overall, it can be seen that extension is continuing to evolve in Ghana. It is key that the further development of extension is guided by the available literature. The implementation of further extension models with a particular focus in models that include the farmers input at each step in development is recommended. In addition, the continuation of funding, the implementation of policies to support extension, and the inclusion of ICTs in future extension models is recommended. It is recommended that further targeted research be done on subsistence farmers in Northern Ghana in order to identify what farmers see as the key components of an effective extension model.

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