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Extension is basis of Smallholder Agriculture Development in South Sudan

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ABSTRACT

This research has been undertaken with the purpose of increasing understanding of extension work in relation to smallholder agriculture development. Extension work is about dissemination of information and advice on improved technology from research to smallholder farmers in order to increase production in achieving food security and reducing poverty. Various extension methods are used in dissemination of improved technologies. South Sudan is a country with abundant natural resources where the majority of its population dependent on smallholder agriculture. Extension is observed to play a key role in the development of smallholder agriculture for self-reliance in food production. Investment in extension can therefore be seen as an important factor in agricultural development. However, budgetary allocation to the sector is low in contrast to the importance of agriculture as the backbone of the economy of South Sudan. However, the conclusion is that extension is basis of agricultural development. Further research is still possible to determine the strength of association between extension work and agricultural development. This is for confirmation of the extent extension is basis of smallholder agricultural development.

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This research has been undertaken with the purpose of increasing understanding of extension work in relation to smallholder agriculture development. Extension work is about dissemination of information and advice on improved technology from research to smallholder farmers in order to increase production in achieving food security and reducing poverty. Various extension methods are used in dissemination of improved technologies. South Sudan is a country with abundant natural resources where the majority of its population dependent on smallholder agriculture. Extension is observed to play a key role in the development of smallholder agriculture for self-reliance in food production. Investment in extension can therefore be seen as an important factor in agricultural development. However, budgetary allocation to the sector is low in contrast to the importance of agriculture as the backbone of the economy of South Sudan. However, the conclusion is that extension is basis of agricultural development. Further research is still possible to determine the strength of association between extension work and agricultural development. This is for confirmation of the extent extension is basis of smallholder agricultural development.

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I. INTRODUCTION

Three quarters of the world's poorest billion people live in rural areas where the vast majority depends on agriculture and the growth of the agricultural sector is one of the most effective ways of tackling poverty and reducing hunger (Davis et al., eds. 2012). According to Davis et al., smallholder farmers produce 50 – 80 percent of staple foods consumed in developing countries but many are inadequately served by research and extension. In South Sudan the economy is based on agriculture where about 85 percent of the population live in the rural areas and cultivate the land for food (Ministry of Agriculture and Forestry, 2012). However, according to the Ministry of Agriculture and Forestry, South Sudan experiences low yields due poor productivity because of lack production support services in form of extension. This seems to suggest that there has to be improvement in extension services to realize high productivity.

South Sudan has an immense potential for sustainable agricultural development with abundant land and arable agro-ecological conditions (Ministry of Agriculture and Forestry, 2012). This suggests that the promotion of agricultural development is crucial, particularly in situations where the bulk of the population is dependent on agriculture for livelihoods. However, it is viewed that agriculture in Africa suffers from low productivity partly due to lack of technology (Singh, 2013, pp.59 – 75). In view of low agricultural productivity in South Sudan, the major focus is on improvement of the efficiency and quality of extension services because a well functioning extension system is necessary for effective transfer of improved technology to

farmers (Ministry of Agriculture and Forestry, 2012).

II. RESEARCH METHODOLOGY

It would have been ideal to have this study divided into two parts, a desktop review of existing literature on the factors influencing adoption of improved agricultural technology and gathering data from a sample of respondents (Guo et al., 2016). However, this study is a desk research where it is mainly literature review for qualitative data. The need for qualitative enquiry is rooted in the question of how the practice of rural development can be made more effective by reviewing the diversity of activities (Moris and Copestake, 1993). This is in contrast to a questionnaire survey for empirical data. Gathering data may also involve face-to-face interviews using semi-structured questionnaires supplemented by key informant interviews and focus group discussions (Guo et al., 2016). Nevertheless, as already noted above, this study is desk research where literature is reviewed for answers to questions on extension and smallholder agriculture development.

2.1 Purpose of the research

The purpose of the research is as follows:

1. To establish the link between extension and smallholder agriculture development,
2. To determine the importance of extension to improvement of agricultural production, and
3. To increase knowledge and understanding of smallholder agriculture development in the achievement of food security.

2.2 Smallholder agriculture development

No nation is completely immune from concerns regarding the management of its agricultural base and agricultural development ranks as one of the most important goals of government (Watts, 1984, pp.20 – 39). Policy makers in Africa have long recognized the importance of the agricultural sector to development (Maxwell, 2001, pp.32 – 66). In South Sudan it is mostly smallholder agriculture that dominates and despite abundant

land resources cultivated area per household is less than one hectare (Ministry of Agriculture and Forestry, 2012). This suggests that increases in yields can be realized through modernization of the smallholder agriculture which is subsistence farming in the context of South Sudan. This can be done through the adoption of improved technologies. It is to mitigate threat to subsistence farming from population growth, land scarcity and worsening ecological degradation as a result of climate change (Cheru et al., 2013, pp. 15 – 37).

According to Cheru et al., continued underinvestment by governments in agricultural research, technology and infrastructure further aggravates the productivity decline in African agriculture despite the importance of agriculture to the majority of Africans. This suggests that adoption of improved technology is important to modernize African smallholder agriculture in achieving food security and ending poverty on the continent. Technology has been the main force behind the long-term increases in income in the rich world and today's laggard regions have a reasonable hope of reaping the benefits of technological advance (Sachs, 2005). This clearly seems to suggest that adoption of improved farming methods is likely to increase smallholder productivity and production. The implication is that adoption of modern technology is central to smallholder agriculture development for self-reliance. However, technology will have no impact on agricultural production if it has not reached the farmers (Van den Ban and Hawkins, 1988). This suggests that the farmers must first be aware of the availability of the improved technology and most likely the farmers will be aware of the technology through extension.

2.3 Extension

One of the most important means of accelerating national development in economies with large agricultural sectors is the development, adoption and evaluation of new agricultural technology that can be adopted by smallholder farmers (Johnson and Kellogg, 1984, pp.40 – 55). In the context of agriculture, extension aims to increase efficiency

of the family farm to improve production and raise the standard of living of the farm family (Oakley and Garforth, 1985). According to Oakley and Garforth, extension offers technical advice and information on agriculture to farmers and also supplies farmers with the necessary inputs and services to support agricultural production for self-reliance. Extension workers also supply information about agricultural policies and the reasons for them, and endeavour to stimulate certain developments considered to be desirable (Van den Ban and Hawkins, 1996). In the view of Van den Ban and Hawkins, extension workers encourage farmers to avoid activities which pollute the environment in order to help farmers to develop into modern and efficient producers.

On the environment, farmers may need to know about soil erosion and its consequences. The effects of soil erosion are particularly important on agricultural land where the redistribution of soil within a field, the loss of soil from a field, the breakdown of soil structure and the decline in organic matter result in a reduction of cultivable soil depth and a decline in soil fertility with the resultant low production (Morgan, 1995). This clearly suggests that having knowledge and understanding soil erosion in relation to agricultural production is important. This is because of the effect of soil erosion on soil fertility that may impact yields. Soil fertility management is therefore a basic ecological task of all arable farmers (Phillips-Howard, 1995, pp.187 – 196). The use of extension as a policy instrument embraced by governments in all countries is to encourage good practices with respect to the environment for sustainable production (Roling, 1988).

From the definition of extension, it can be deduced that extension is the basis of smallholder agriculture development. Ministries of Agriculture use extension as one of their instruments to promote agricultural development and agricultural development is often seen as an increase in agricultural production and productivity of land, labour and capital in agriculture (Van den Ban and Hawkins, 1988). It

can be confirmed that extension can play an important role in the improvement of smallholder agriculture in developing countries (Roberts, 1987, pp.75 – 88). In developing countries, the majority of the poor live in rural areas, rely on agriculture for their employment and spend much of their income on food (Farrington et al., 1997, pp.1 – 12). This seems to confirm that with effective extension services, smallholder agriculture can be developed for self-reliance in food production.

Extension has the potential to play a significant role in strengthening the resilience of smallholder farmers (Muhammad et al., 2016, pp.17 – 43). However, extension cannot be effective without improved technology to disseminate to farmers to increase production for the achievement of food security. Improved technologies are generated by research for transfer by extension to farmers (Scoones and Thompson, 1994, pp.1 – 14). With reference to agricultural development, without research extension may become redundant.

2.4 Research

Research can be defined as careful study or investigation especially in order to discover new facts or information (Okali et al., 1994). It has long been accepted that scientists have something worthwhile to give farmers through the transfer of improved technology from research centers (Rhoades, 1989, pp.3 – 8). However, agricultural research findings inform of improved technologies are of little use if they are not adopted by farmers to increase production (Van den Ban and Hawkins, 1988). As an instrument for agricultural development, research is vital in generating improved technologies in the effort to achieve food security. The adoption of improved technologies is often viewed as providing a measure of the success of agricultural development (Gausset, 2013, pp.103 – 112).

With the vision of food security for all the people of South Sudan, enjoying improved quality of life and environment (Ministry of Agriculture and Forestry, 2012), research on improvement of

technologies is vital. This is in order to establish the needed technologies for transfer to farmers through extension with the aim of achieving food security and reducing poverty.

2.5 Research-extension-farmer linkage

The functions of exploring and testing new techniques in farming is what is called research, and then sharing information about what works and what doesn't is extension (Axinn, 1997, pp.13 – 22). It can be seen that, with reference to farming, research generates technologies and extension transfers the technologies. Most formal programmes related to extension depend upon a transfer of ideas, information and technology to farmers (Moris, 1987, pp.199 – 224).

With research generating technologies and extension transferring the technologies to farmers, confirms research-extension-farmer linkage with extension acting as a bridge between research and the farmers (Watts, 1984, pp.20 – 39). This suggests that research and extension workers, and the farmers are partners in improving farming towards self-sufficiency in food production. Research and extension systems play a major role in generating and transferring agricultural technologies aiming at enhancing the income of farmers (Srinivas, 2016). Another important component in the improvement of farming is extension training.

2.6 Extension training

In South Sudan one of the major focal areas is improvement of the efficiency and quality of extension services to smallholder farmers through agricultural education and training to bridge gaps in knowledge and skills (Ministry of Agriculture and Forestry, 2012). In training, extension workers need to know and understand that they are change agents who generate ideas, promote new practices, model healthy behavior, draw attention to opportunities and encourage networks to help people move forward in reaching their goals (Peace Corps, 2016). According to Peace Corps, at the end of training session,

extension workers must be skilled communicators, including using different means to communicate and transfer information or skills to their client farmers or the farming community at large. A successful extension organization makes provision for training because extension workers must be trained and up to date to provide the essential link in the technology transfer process between research and farmers (Swanson, 1984, pp.197 – 205). This suggests that extension training is essential for efficient delivery of extension services to farmers in the effort to achieve food security and a high standard of living. As extension training is essential and so does farmer training.

2.7 Farmer training

Farmers with access to technical knowledge on agriculture realize better income compared to others who don't (Shekara et al., 2016). This seems to suggest that farmer training is important because it is likely to impart technical knowledge of agriculture to farmers to increase production. According to Shekara et al., (p.1) farmer training on general conditions for cultivation of crops should include the objectives and the knowledge gained.

The objectives of the training session should be as follows:

- To enhance awareness of farmers on critical factors to selection of crops and cropping patterns,
- To create an understanding of judicious use of natural resources such as soil and water,
- To provide basic knowledge on seed and cropping systems,
- To emphasize the importance of mechanization, and
- To sensitize the farmers on good agricultural practices.

At the end of training session the farmers should have acquired knowledge and understanding of the following:

1. Critical factors in selection of crops and cropping patterns,
2. Judicious use of natural resources such as soil and water,
3. Basic knowledge on seed,
4. Cropping systems
5. Mechanization, and
6. Good agricultural practices

From the objectives set and expected knowledge acquired through farmer training session, it is clear that the farmers who have been trained would have likely acquired the necessary knowledge and skills to increase production for the achievement of food security.

Farmer training can be organized as a farmer field school which takes place in the field and is season long so that it covers all the different developmental stages of the crops and their related management practices (Peace Corps, 2016). This suggests that there are various ways of conducting farmer training in enhancing farmers' technical knowledge of improved farming practices that will increase production for self-reliance.

2.8 Extension methods

There are several extension methods commonly used to help farmers form opinions and make decisions on how to make maximum use of the available resources (Van den Ban and Hawkins, 1996). Extension methods exist from which the extension worker may choose to set up learning situations and to maximize the transfer of information and skills to young and adult farmers (Kang and Song, 1984, pp.130 – 143). At the heart of this is communication where it is the sharing of ideas and information with the aim of influencing the decisions of farmers (Oakley and Garforth, 1985).

According to Oakley and Garforth there are three main extension methods, namely mass, group and individual extension methods. The mass extension method are mass media which are those channels of communication that can expose large

numbers of people to the same information at the same time and they include media which convey information by sound such as radio, moving pictures such as films and print such as posters, newspapers and leaflets. The attraction of mass media to extension services is the high speed and low cost with which information can be communicated to people over a wide area (Oakley and Garforth, 1985). Radio is the most available and accessible mass medium for obtaining agricultural information as 81.01 per cent of the respondents in a survey indicate its availability and accessibility (Okwu and Daudu, 2016). This seems to suggest that radio, as a mass medium in extension may be popular in dissemination of information to farmers. However, it is not clear how radio can be popular in a situation where farmers may be too poor to afford radio sets. The cost of radio may be high, and maintenance and repairs may be expensive and difficult (MacDonald and Hearle, 1984).

A group method of extension is one approach an extension worker uses with farmers. The group method offers the possibility of greater extension coverage and is therefore more cost effective (Oakley and Garforth, 1985). Groups extension methods have an advantage over mass media because of better feedback which makes it possible to reduce some of the misunderstandings that may develop between an extension worker and a farmer, and there also is greater interaction between an extension worker and a farmer, and in addition there is greater interaction between the farmers themselves (Van den Ban and Hawkins, 1996). The group extension methods seem to encourage mutual understanding between extension workers and farmers. Also, it seems to help the farmers to share experiences that may be of advantage to others thereby promoting cooperation among farmers and between farmers and extension workers for common interest. In a research group demonstrations are the most cost effective extension methods with the least constraints (Ali-Olubandura et al., 2016, pp.129 – 135).

Individual or face to face methods are probably the most used extension methods in the world where the extension worker meets the farmer either at home or on the farm and discusses issues of mutual interest, giving the farmer both information and advice (Oakley and Garforth, 1985). Mutual discussion sometimes referred to as dialogue or one-on-one discussion is the most important method for individual extension (Van den Ban and Hawkins, 1996). Individual visit by an extension worker allows him or her to concentrate on one family's specific problems and to build up a good friendship with the family (MacDonald and Hearle, 1984). However, according to MacDonald and Hearle, the extension worker's time is limited and he or she can only visit a few people who are too often the richer people with whom the extension worker may generally have more empathy and this can lead to jealousy in the community. This suggests that individual extension method can be expensive to use with only few farmers getting access to information and advice while the majority may not have access.

III. SMALLHOLDER AGRICULTURE DEVELOPMENT

Agriculture matters because it produces the food that feeds people and provides most of the jobs and incomes on which the world's most vulnerable people depend, and above all smallholder agriculture matters because it is the base of survival for the poor and a key part of overcoming poverty (Madeley, 2002). As noted earlier in the introduction, the economy of South Sudan is based on agriculture where about 85 per cent of the population cultivate the land for food on an average farmland of less than one hectare. Smallholder agriculture development is therefore important to prosperity in South Sudan. However, smallholder agriculture development is unlikely to take place without investment in the agricultural sector for prosperity to be realized. There should be development initiatives that enable the people concerned to grow more food and/or create wealth for prosperity (Ashley, 2016). It is necessary to invest in interventions that address

food insecurity and poverty (FAO, IFAD, UNICEF, WFP and WHO, 2017). This seems to suggest that without investment in extension upon which smallholder agriculture depends for dissemination of improved technology for development, there will hardly be any improvement in production which is likely to reflect in the lack of smallholder agriculture development.

IV. RESULTS AND DISCUSSION

Extension is important for development of smallholder agriculture in achieving food security. This is because through the various extension methods improved technologies can be disseminated to farmers to increase production for self-reliance. However, without resources availed to extension in order to facilitate extension workers to reach farmers with messages of improved farming practices, it is unlikely that smallholder agriculture can be developed as expected. About 10 per cent of the total budget allocated to the agricultural sector may be adequate for development of the sector.

The budget to the agricultural sector should be up to 20 per cent of the total budget (Maxwell, 2001, pp.32 – 66). In contrast, figures in budgetary allocation show that the agricultural sector in South Sudan seems to get less than one per cent of the total budget (Ministry of Finance and Planning, 2018). This suggests that the agricultural sector is poorly resourced. This may explain why South Sudan is in a perpetual situation of food insecurity and poverty.

V. CONCLUSION

The research has indicated that extension can play a bigger role in smallholder agriculture development. This is because through the various extension methods improved agricultural technologies are likely to be disseminated to farmers to increase production in developing smallholder agriculture.

In conclusion, the research seems to confirm that extension is basis of smallholder agriculture development.

VI. RECOMMENDATIONS FOR FURTHER RESEARCH

This research is not absolutely conclusive. An empirical research is recommended to determine the extent of strength of association between extension work and smallholder agriculture development in South Sudan. Quantitative research is recommended in order to have a conclusion with a high degree of confidence that extension is basis of smallholder agriculture development.

Conflict of interests

It can be confirmed that there are no conflict of interests in this research.

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