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Influence of Famer Field School's Networks on Empowerment and Sustainability of Post-Graduation Farmer Groups in Rungwe and Kyela Districts in Mbeya Region, Tanzania

Edward Johnson Mwaikali
Faculty of Business and Management Sciences, Ruaha University College,A Constituent College of St. Augustine University of Tanzania (SAUT),P. O Box 774 Iringa, Tanzania
Email: emwaikali@gmail.com

Abstract
The purpose of this study was to determine the influence of Farmer Field Schools (FFS) networks on empowerment and sustainability of Post Graduation Farmer Groups (PGFGs) in Rungwe and Kyela districts in Mbeya region, in Tanzania. The study employed descriptive survey research design with an *ex-post-facto* approach. The sample size of the study was 200 drawn from 4894 members of PGFGs in the two districts. Multistage sampling was used to obtain a random sample of 40 post graduation farmer groups. An equal sample of five members was randomly selected to represent each farmer group. A structured questionnaire was administered to the sampled members. Three Focus Group Discussions FGDs were conducted (two in Rungwe and one in Kyela districts) to determine the networking patterns of these groups. Groups and members who participated in FGDs were purposively selected. The findings of the study revealed that diverse social networks have emerged in developing countries to address rural peoples' livelihoods. The Tanzanian experience shows the emergence of networks of FFS graduates aimed at addressing weak institutional and organizational capacity of PGFGs. These emerging networks play a key role in expanding group membership, building the managerial capacity of local organizations.
Key words: Famer Field School's Networks, Sustainability of PGDGs

1.0 An Overview of the Study

1.1Background of the Study

Tanzania has a well-established extension service and a long history of extension programmes. It has also a well-recognized national research system, and a wealth of social capital evidenced by widespread farmer groups (Gustafson, 2002). In spite of this, the performance of Tanzania's agricultural sector has been declining and thus worsened during the 1990-2010s periods (GoK, 2005). Reasons cited for this decline include the lack of appropriate technologies, inefficient extension delivery systems, past extension delivery systems that did not build the capacity of local farmer organizations and inadequate research extension farmer linkages (Purcell& Anderson, 1997). Sustainable agriculture can be accelerated through the individual and collective activities of farmers and communities in pursuit of strategies to secure their livelihoods. These strategies include patterns of social relationships embodied in adequate institutional arrangements and capacity at the community level (Reijntjes, Haverkort & Waters, 1992). Agricultural extension services play a key role in enhancing the empowerment and sustainability of informal and formal farmer groups by strengthening their capacity to participate in group activities and demand for services from agencies external to the community (Uphoff, 1999; GoK, 2005). Emerging FFS networks represent a form of social organization aimed at addressing the weak institutional and organizational capacity of post graduation farmer groups (PGFGs) in Rungwe and Kyela Districts in Mbeya region in Tanzania.

The Agricultural extension service in Tanzania has in the past two decades used a variety of approaches to disseminate research-based innovations to farmers. These approaches include whole farm, integrated agricultural development, training and visit (T&V), regulatory, advisory, educational and more recently participatory extension approaches (PEAs). The government has now recognized the use of PEAs as part of its national food security strategy (GoK, 2002; GoK, 2005) with the objective of enhancing greater participation of local communities in decision-making during programme design, implementation, monitoring and evaluation. There has been a slow shift from top-down to more participatory and diagnostic approaches to research and extension (Ashby, 1994). Some of these approaches include Farmer Participatory Research (FPR), Participatory Learning and Action (PLA) and more recently the Farmers Field Schools (FFS) *or shamba darasa in Swahili language* and Focal Area Extension Approach (FAEA).

The FFS approach was initiated by the Food and Agriculture Organization's (FAO's) South East Asia integrated pest management (IPM) programme in rice, after it was realized that IPM practices which expect farmers to be expert managers of agro-ecosystems could not be transferred by the Training and Visit (T&V) approach to

extension (Matteson, 1992; Rolling & Van de Fliert, 1994). The success of IPM-FFS in Asia has attracted the attention of many development workers and donors around the world (CIP-UPWARD, 2003). The Farmer Field School (FFS) is a group-based learning process that has been used by a number of governments, NGOs and international agencies to promote Integrated Pest Management (IPM). The first FFS were designed and managed by the UN Food and Agriculture Organisation in Indonesia in 1989 since then more than two million farmers across Asia have participated in this type of learning.

There has been a strong movement to copy and adapt the FFS methodology to other situations beyond the IPM rice fields. A more diverse range of players are using FFS to deal with community-based water management, conservation of plant genetic resources, community forestry, livestock management, H1V/ AIDS awareness creation, soil fertility management and advocacy for marginalized groups (Van de Fliert, 1991; Rollig, 1998). According to Pontius, Dilts and Barhelt (2001), FFS is considered as a platform for social learning and collective action, hence creating capacity for rural people to negotiate with policy makers and service providers, hence empowering farmers to demand that external organizations be more accountable and responsive to the needs of local communities.

The FFS approach was first introduced in Tanzania in 1995 on a pilot basis by the special program for food security (SPFS) of the FAO. In 1999, the global IPM facility launched an East African sub-regional pilot project for FFS for Integrated Production and Pest Management (IPPM) covering the districts of Rungwe, Kyela and Mbozi in Mbeya region in Kenya (Khisa, 2003). The FFS project in the southern highlands was introduced through the public extension service of the Ministry of Agriculture (MoA). In 2001, the Sokoine University of Agriculture, through support from the Rockefeller Foundation initiated the FFS pilot project to upscale soil fertility improving technologies among smallholder farmers in the southern highlands of Tanzania. Both institutions introduced the FFS approach in order to speed up dissemination of technologies among smallholder farmers with the ultimate objective of building the institutional and organizational capacity of local farmers' groups.

The FFS is a participatory approach that uses non-formal education methods based on experimental techniques and participatory training methods (Miagostovich, 1999). According to Dilts (1998), the main principles of FFS include learning as a discovery process, cooperative approaches and learning as an evolutionary process which leads to closer interaction between farmers in an FFS set-up, resulting in interactive social networks beneficial to the farmer and the wider community. The FFS methodology has resulted in the creation of stronger research-extension-farmer linkages, hence maintaining a vital link with modern science (Leeuwis, 1998). These linkages are essential for empowering farmers in order to tackle the socio-cultural and political dimensions of agriculture that require advocacy and lobbying for better policies (Roling,1998). The active participation of farmers in technology development and dissemination has resulted in the emergence of FFS' farmer networks, which have enhanced farmer-to-farmer interactions and concern for rural people's livelihoods at the community level.

According to Chamala (1990), several extension roles can be conceptualised to help rural communities get organized. These include empowerment, community organizing, human resource development and problem solving roles. The empowerment role can be the cornerstone of the new approach to extension. The World Bank (2002) defined empowerment as the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control and hold accountable institutions that affect their lives. Chamala and Mortis (1990) see empowerment as to enable, or to permit and it can be viewed as both self initiated and facilitated by others.

Manalili (1990) indicates that empowerment comes from releasing the latent energy hidden in the community and building collective actions for common good. Empowered farmer organizations can act as convergent points or platforms for solving local problems and mobilizing human and financial resources for sustainable development. Therefore, empowered farmer groups have the ability to make autonomous decisions independent of external agencies. On the other hand, sustainability can be viewed as the ability of farmer groups to continue with activities beneficial to members with minimal assistance from project proponents or external agencies (FAO, 1997; Uphoff, 1999). This leads to self-reliance of post graduation farmer groups. According to Khisa (2000), emerging FFS networks in southern highlands regions of Tanzania operates at four levels i.e. village, ward, division and district levels. At all these levels, the FFS networks have active working committees. These committees enhance the interaction of farmer groups across the four levels, hence making isolated FGs more cosmopolite.

FFS networks were initiated in Rungwe and Kyela districts in order to address the problem of the weak

institutional and organizational capacity of Post Graduation Farmer Groups (MoA, 2002). An important goal of establishing FFS networks was to enhance the establishment of farmer groups which can address the livelihood concerns of rural communities (Banu & Bode, 2002, Khisa, 2003), hence establishing a forum through which FFS alumni can exchange information, seek knowledge, demand for services and establish beneficial linkages with institutions outside the community..

Lessons learnt from Sokoine University of Agriculture (SUA) in southern highlands of Tanzania indicate that most FFS alumni lack clear mechanisms to interact, resulting in weak organizational capacity of PGFGs after graduation (SUA, 2008). Thus, there is need to study and document the influence of emerging FFS networks levels on the empowerment and sustainability of PGFGs. Bunyatta (2004) recommended further research on sustainability issues, cost effectiveness and institutional capacity building of the FFS methodology. Mwangi (2005) recognizes that the FFS methodology is a powerful tool in building cohesive farmer groups. He also recommends the formation of an umbrella organization to cater for the interests of farmers graduating from Farmer Field Schools.

1.2 Statement of the Problem

Diverse social networks have emerged in developing countries to address rural people's livelihoods, access to information, markets, credit and farm inputs (Awimbo, Barrow & Karaba 2004). The Tanzania experience shows the emergence of FFS networks that seek to address the weak organizational capacity of PGFGs and livelihoods of their members (SUA 2008). The Ministry of Agriculture (MoA) respectively facilitated the formation of FFS networks in Rungwe and Kyela districts as a strategy for ensuring the self-reliance of FFS groups after graduation. Farmers later realised the benefits and spontaneously got interested in networking aspect within the local community. However, lessons learnt in the two districts indicate that FFS alumni lack clear mechanisms for interacting after graduation thus causing the farmer groups to be weak and unsustainable. As a consequence farmer groups fail to access knowledge, markets, technologies and institutional services, which are vital for influencing attainment of livelihood outcomes and strengthening of local farmer groups. This study seeks to determine the influence of FFS network levels on the empowerment and sustainability of PGFGs in Rungwe and Kyela districts in Mbeya region, in Tanzania. Analysis of FFS network levels may lead to the development of appropriate strategies for understanding rural people's livelihoods.

1.3 The Purpose of the Study

The purpose of this study was to determine the influence of FFS network levels on the empowerment and sustainability of PGFGs in Rungwe and Kyela districts in Mbeya region, in Tanzania. The study was guided by the following specific objectives: To determine the influence of FFS network levels on the empowerment of post graduation farmer groups in Rungwe and Kyela districts. To determine the influence of FFS network levels on the sustainability of post graduation farmer groups in Rungwe and Kyela districts. To determine the influence of FFS network levels on improving post graduation farmer groups' access to institutional services in Rungwe and Kyela districts.

1.5. Hypotheses of the Study

The following hypotheses were tested in order to operationize the study on the influence of FFs network levels on the empowerment and sustainability of PGFGs in Rungwe and Kyela districts:

- Ho_1 FFS network levels do not significantly influence the empowerment of post graduation farmer groups in Rungwe and Kyela districts.
- Ho_2 FFS network levels do not significantly influence the sustainability of post graduation farmer groups in Rungwe and Kyela districts.
- Ho_3 FFS network levels do not significantly influence post graduation farmer groups access to institutional services in Rungwe and Kyela districts.

1.6 Significance of the Study

Little attention has been made to generate information regarding farmer networks in Tanzania. This study may therefore assist in making recommendations to help enhance the role PGFGs play in sustainable agriculture and rural development. The results of this study may be used to develop better extension delivery systems. It may also help design appropriate extension-training activities for the diverse farming communities in Tanzania. The study may also give feedback to organizations promoting use of FFS as an extension methodology on its performance in building institutional capacity of farmer groups at the community level. Besides, the study may be a basis for dialogue between policy makers and stakeholders on the role of networking in enhancing the empowerment and sustainability of community based farmer groups, which play a vital role in improving rural peoples' livelihoods.

2.0 Literature Review of the Study

2.1 Introduction

This chapter summarizes review of literature related to the importance of extension services in Tanzania. It also examines the various extension approaches that have been traditionally used in the provision of extension services. The chapter further gives details on participatory approaches to extension, networking among rural communities, farmer field schools networks, farmer empowerment, sustainability of farmer groups, FFS networking experience in Tanzania, performance of farmer groups, rationale for formation of farmer groups, and the theoretical framework of the study.

2.2 Tanzania's Rural Economy and Extension Services

Tanzania has approximately 25 million smallholder farmers whose average family farm is less than two hectares (IMF, 2010; World Bank, 2011). These farmers depend on both public and private extension services to acquire knowledge and skills necessary for improving productivity at the farm level. The performance of the agricultural sector has been declining over the last 20 years therefore, is a good indicator of how the national rural economy has fared on over the same period. It may also show the effectiveness of extension because, as Wanga (1999) indicated, extension is a vital catalyst for rural development and a powerful tool for empowerment and support of a community's livelihoods.

Agricultural extension is a two way communication process involving adult learners whose aim is to improve their knowledge; change attitude or behaviour; lead to adoption of new technologies; and improve skills for both the farmers and extension workers with a view of increasing and improving farmers' incomes and productivity (MOARD, 2001). Extension plays a crucial role in attempting to assist rural communities improve their living standards through rational decision making at the household level. (Bradfield, 1971; Purcell & Anderson (1997) define agricultural extension as the process of introducing farmers to technologies that can improve their production, income and welfare. According to MOARD (2001), the role of extension is to provide information to extension clientele in order to allow them better use of available resources by increasing technological options and organizational skills that allow them take greater advantage of production and market opportunities.

2.3 Participatory Extension Approaches

Participatory extension approaches (PEAs) emerged in the late 1980s after it was realized that technologies developed by researchers were inappropriate for smallholder farmers (Jorgen, Chuma, and Muriwira & Connolly 2000). Past extension approaches were structured and operated on the assumption that farmers were passive recipients of technologies. In participatory extension, farmers take part in design, determine management conditions, implement, and evaluate their experiments (Chambers, Pacey & Tropp, 1989). According to Jorgen *et al* (2000), PEAs have the following characteristics: integrate community mobilization for planning and action with rural people; promote equal partnership between farmers, researchers and extension agents; aim to strengthen rural peoples' problems-solving, planning and management abilities; recognize that communities are not homogenous but consist of various social groups with conflicts and differences in interests, power and capabilities. Farrington and Martin (1998), indicate that the purpose of PEAs is the empowerment of disadvantaged groups.

2.4 Establishing Self Reliant Farmer Groups

The process of establishing self-reliant groups at the local level must be an organic one and so should not be forced nor done too quickly (Roling, 1998). Pretty (1995) describes four elements of any self-supporting farmers' organization. These include: a developed financial capacity with resources of their own, the major part of which are directly or indirectly from the membership; a developed structure for electing farmer representatives; a recognition as a legitimate voice of farmers and developed self-reliance for planning for management and for the provision of effective services. He further advocates for support for local groups for community action, which he attributes to the breakdown of social and economic structures in rural communities. The principal current constraints relate to the lack of local institutions and groups that help to ensure regular contacts between farmers and farmers, and farmers with other sectors of society especially service providers from outside the community. Keregero (1995) observes that farmers associations have maintained themselves in rural areas and progressed institutionally in order to address their livelihoods and seek for more information and linkages outside the community.

Ian, Gartmann, Rees and Van (2004) and Jerry, Norman and Freyerberge (2004), observe that farmer groups have become very popular in agricultural related achievements in both low and high-income countries. These have been both formal and informal in nature. Many factors have motivated the formation of groups, including

an efficient means for obtaining and passing information, sharing information; identifying and evaluating relevant technologies, improving on-farm/off-farm linkages and encouraging empowerment of farmers.

2.5 Rationale for Formation of Farmer Groups

Successful farmer groups (FGs) build mutual empowerment among members hence the rationale for their formation include providing support for each other especially when planning for change in a group set up and to obtain, impart, and exchange information. The importance of sharing information has been noted by other researchers since current agricultural problems are human challenges that require more than just technology for their resolution (Hersterman & Thorburn, 1994). (Eberle & Shroyer, 1997) emphasize that working with clusters of farmers is much more effective than working with a single farmer to multiply impacts. FGs also create opportunities that would not be available if farmers operated independently; examples include collective purchase of inputs and collective marketing of produce (Groverman, Cook & Thomas, 1994).

Furthermore, FGs leverage institutional resources hence encouraging members take collective action and demand for representation and services from external agencies. Such action in-turn makes farmers to believe in themselves and in their ability to control their own destinies. Consequently, solutions are not likely to be mechanistic or recipe driven but rather evolve after exclusive thinking and consultation with stakeholders (Coston, 1999).

2.6. Theoretical Framework

The framework for this study was based on Scoones' (1998) sustainable livelihoods framework which is a framework that helps understand rural peoples' livelihoods. The framework promotes more holistic and less sectoral thinking, which is at the core of both food and environmental security (Scoones, 1998). According to Chambers and Conway (1992) and Farrington (1999), the current concept of sustainable livelihood accurately describes what is going on in IPM-FFS training programmes, in which participatory approaches including farmer-to-farmer training, action research and policy dialogue transform natural, human, financial and social capital into a number of livelihood outcomes.

3.0 Research Methodology of the Study

3.1 Research Design of the Study

The study employed descriptive survey research design with ex-post facto approach in which the researcher examined retrospectively the effects of a naturalistically occurring treatment on a subsequent outcome (Cohen & Manion, 2000; Kathuri & Pals, 1993). According to Wiersma (1995), a survey involves studying a situation, as it is in an attempt to explain why the situation is the way it is. Surveys, according to Kathuri & Pals (1993) and Frankel & Wallen (2000) are important in research and have been found to be useful in describing the characteristics of a population under study.

3.2 Sampling Procedures and Sample Size

The sampling unit in this study was the post graduation farmer groups (PGFGs) in Rungwe and Kyela districts. Multistage sampling procedure was used to determine the desired sample size. The districts and divisions were purposively selected. Proportionate random sampling was used to select a sample of 40 groups drawn from 200 PGFG s. An equal random sample of five members was selected from each of the forty PGFGs resulting in a total sample of 200 members who were interviewed.

In this study, the researcher was interested in taking small samples per group whose responses were compounded into indices for sustainability and empowerment for each PGFG. According to Gall and Borg (2003) proportionate sampling ensures that no sub-group is omitted from the sample and avoids overloading in certain sub-populations. Simple random sampling gives each sub-group an equal chance of representation in the study. Table 1 below shows the respective sample sizes per district.

Table 1: Sample sizes per district

District	Division	Number of PGFGs	Proportion	No. of groups sampled
Rungwe	Busokelo	35	0.23	7
	Pakati	48	0.31	10
	Ukukwe	28	0.18	6
	Tukuyu	42	0.28	9
		153	**0.77**	**31**
Kyela	Ntebela	26	0.55	6
	Unyakyusa	21	0.45	4
		47	**0.24**	**10**
		200	**1**	**40**

3.4. Instrumentation

Two instruments were used in this study namely; a structured questionnaire, and FGDs. These instruments are described here below:

3.4.1. Structured Questionnaire:

According to Fraenkel and Wallen (2000), the questionnaire was ideal for survey research because it is typically more economical, efficient and applicable when handling large samples. The questionnaire was structured to capture information on FFS network characteristics and institutional factors, and how they influence the ability of FFS groups to make autonomous decisions and continue with activities beneficial to members after graduation.

3.4.2 Focus Group Discussions

FGDs consisting of 8-10 members per PGFG were conducted to establish the networking patterns of the PGFGs. Participants in FGDs were purposively recruited to capture differences in PGFGs based on their activities and gender. According to Burdge (1987), FGDs allow a researcher to get deeper insight into a situation or phenomenon. Socio-grams were used to focus the discussions. According to Hayllar (1996), socio-metric analysis enables a researcher measure the social interactions between individuals and within groups. The network analysis model used in socio-metric studies involves "mapping" the interactions among a set of people, organization or groups.

Euson (1994) indicates that a socio-gram analysis allows researchers discover, analyse, and display sets of relationships. Researchers find that identifying these networks helps them to understand the structure of complex social relationships within a group.

3.5 Data Analysis

Data obtained from the field was coded, cleaned, and entered into the computer for analysis using the SPSS. The data was summarized in order to see emerging trends and issues around specific themes, which are dependent on the variables and objectives. The researcher then compounded scores from indicators for empowerment and sustainability to obtain the FGSI and FGEI respectively. These indices were obtained for each PGFG. According to Parveen and Leonhauser (2004) the compounding of scores from various indicators into indices is based on an integration of both qualitative and quantitative methods depending on collected data. Nine indicators for empowerment and seven indicators of sustainability of PGFGs were comprehensively measured on a four point scale. The scores obtained from all indicators of empowerment and sustainability was compounded into FGEI and FGSI using the formulae shown below:

$FGEI= w_i(x_1.x_2.x_3.----------.x_n)^{1/n}$

$FGSI= w_i(y_1.y_2.y_3.----------.y_n)^{1/n}$

Where x_1----------x_n are the scores obtained from indicators for empowerment, y_1----------y_n are the scores obtained from indicators for sustainability, $^{1/n}$ is the nth root of the total number of indicators for empowerment and sustainability and $_{wi}$ is the weighted factor which can be assumed to be uniform for all contributing factors or intuitively allocated based on perceived factor contribution to empowerment or sustainability.

The compounded indices obtained ranged from 1-4, Where 1 is the lowest and 4 the highest levels of empowerment or sustainability. This enabled the researcher make further comparisons. Information from the FGEP, FGSP and sociograms was compounded to come up with FGEI, FGSI and SNI for each group. To test the difference in sustainability and empowerment between farmer groups or between divisions, ANOVA coupled

with multiple comparisons i.e. post hoc was used. This is because the use of ANOVA coupled with LSD technique offers an opportunity to rank the various indices. Multiple linear regressions were done to test the influence of FFS network characteristics on the levels of sustainability and empowerment of PGFGs.

Parveen and Leonhauser (2004) followed the same procedure to measure women empowerment in Bangladesh by developing a cumulative empowerment index (CEI), while Maxwell (1995) followed the same procedure to measure food insecurity by developing a cumulative food security index (CFSI).

4.0 Research Findings of the Study

4.1 Influence of Farmer Field School Network Level on Empowerment of Post Graduation Farmer Groups in Rungwe and Kyela Districts

The first specific objective of the study was to determine the influence of FFS network levels on the empowerment of post graduation farmer groups in the two neighboring districts. In the research question, there has been need for the researcher to find out if the emerging FFS network enhancing PGFG access to a wider choice of stakeholders in Rungwe and Kyela districts. In this case the stakeholders include the officers who offer government extension services, private extension services, government research institutions like SUA, micro finance institutions, NGO extension services, government credit services, farm input dealers, milk processors, marketing agencies, private artificial insemination services, and lastly, location, division and district FFS network.

Table 4.1 and table 4.2 show the frequencies and percentages of farmers either accepting or denying their participation in a particular FFS decision making activity. The tables show also the percentages of farmers being consulted or not consulted on decisions of particular decisions and as to whether they make decisions as individuals or as FFS group. The groups make decisions which comprise of choosing network officials, planning for the group activities, deciding on the rate for membership fees, deciding on what to grow in the farm, deciding on the market for the produce from farmers, deciding on how to share group benefits, deciding on the technology to demonstrate as a group, deciding on markets for produce and lastly, identifying the type of income generating activity. It is evident that in terms of planning for group activities, at a village level, out of 35 farmers 14% are not involved and 15% of 56 and 159 farmers at a division and district level respectively are not involved in decision making. It also emerges that out of 7 farmers at the village level, 8 farmers at the division level and 33 farmers at the district level, none of them is consulted about deciding on the market of the produce from their farms but an average of 26% at all network levels participate in decision making concerning choosing of network officials.

Table 4.3, illustrates the outcome of students t-test performed on farmers to determine if there is any difference in the number of farmers who are not consulted and those consulted in decision making and those who participate in group activities at all network levels. Also from table 4.3, the p-values read 0.0036 at the location level, 0.0021 at the division level and 0.0091 at the district level whereby none of the readings exceed 0.05. Therefore, we reject the null hypothesis and conclude that there is a significant difference between farmers not involved in decision making and those actively involved. At $\alpha = 5\%$, more farmers are actively involved in decision making process at all network levels.

Table 4.4 represents the logit model fitted from the data. Just as an overview, the LR chi2(d.f) is referred to as the likelihood ratio chi square test is an equivalent of an F test and is a test statistic to help an experimenter to either reject or accept what is being experimented. It can be used in place of p-value. The Prob > chi2 is the p value and it is a test statistic. It is compared against the level of significance for instance 5%. The Pseudo-R2 is an equivalent of adjusted-R2. When multiplied by 100, it shows the overall percentage in which the independent variables contribute to the variability of reason for a farmer group to either join an FFS network or not. This helps to measure the strength of other factors left out in the model or those in the model. The Constant is on a log odds scale and when converted into a probability then it is used to give a percentage chance of a farmer group to join the FFS network. But this only happens when the independent variables of the model in question are equivalent to zero. The confidence interval is the confidence intervals for the coefficients in a logistic regression. Coefficients vary within the range.

4.2 Influence of FFS network levels on the sustainability of post graduation farmer groups in Rungwe and Kyela districts.

This is the second objective whereby the researcher by using the indicators has illustrated the degree to which the positive changes of a project will be maintained after external support has terminated. The researcher tried to

show the ability of PGFG's to continue with activities perceived to be beneficial to members after the project ends with minimal or no external financial support.

Table 4.5 shows the type of income generating activities that the farmers are currently undertaking. At a village level, 23 (55 percent) and 6 (14 percent) farmers out of 42 farmers are engaged in maize production and purchase and sale of farm inputs respectively. At a division level, 33 (34 percent) and 38 (39 percent) farmers out of 97 farmers are engaged in maize production and horticultural crop production respectively. However, at a district level, 105 (37 percent) and 144 (50 percent) farmers out of 287 farmers are engaged in maize production and horticultural crop production respectively.

Table 4.6 shows how farmers obtain their group savings at all network levels. It is illustrated that at all network levels, members obtain an average of 50 percent of their group savings from personal contribution. In addition, an average of 40 percent of farmers says that they obtain their group savings from sales of farm produce. It is also coming out that farmers have not adopted the issue of obtaining finances from micro finance institutions since an average of 3 percent of farmers at all network levels obtain this service from micro financial institutions.

4.3 Levels of Networking

In this study, there were focus group discussion and participants were asked to rate their individual group performance in terms of empowerment indicators such as participation of members in major group decisions, participation in group activities, access to institutional services, group members ability to demand for extension services, access to technologies, internal monitoring systems, linkages with stakeholders, access to markets, benefits of participating in FFS network, access to agricultural information, collective actions, provision of services to members and the sharing of information among members. Figure 4.1 represents the responses given by the participants in the focus group discussions.

From figure 4.2, out of the 6 focus group discussions, 86 percent of members do agree that after joining the network, they have received highest achievement in access to agricultural information. In addition, 71 percent of members also point out that they have achieved highly the platform at which they share information among members. However, 14 percent of group members admit that they have not achieved in provision of services for members and 71 percent say that they have very low achievements in terms of access to markets.

5.0 Conclusion of the Study

5.1 Summary and conclusion of the Study

From this study there are various recommendations that all the stakeholders have to make in order to see the impact of agricultural extension services to farmer groups.

Targeting*:* Extension services need to be efficiently targeted to focus on the areas and groups where the marginal impact is likely to be the greatest. This calls for a more flexible system that can identify the gaps between best and average practice and allocate scarce resources more rationally, this scarce resources may be inform of financial assistance with favorable interest rates spread over a reasonably long period of time. Other resources may include increasing the number if extension officers so that their services can reach most people in need of it. The government to avail market information through promoting information communication and technology as stated in vision 2025 where ICT has been made to accelerate the three economic pillars. In addition, the farmers selected for interaction should represent local socioeconomic conditions. There should be various programs on agricultural extension programs over the radio and other forms of mass media to reach out to as many people as possible.

Information systems: Targeting calls for appropriate flows of timely and reliable information hence for monitoring and evaluation. Farmers' demands should be identified, and the extension service tailored to suit local technological and economic circumstances. The government should be at the forefront in assisting the farmers by lowering the cost of farm inputs and making sure that since managing of FFS groups is a complex process then it should not be a letdown by it to ensure that there is not only fertilizers at subsidized rates but also genuine seeds on the market. The government through its diplomatic relations should use its strategies to find markets for local products so that farmers can get an easy time to sell their produce.

Pluralism: The use of a uniform methodology to deliver standard messages limits the system's effectiveness and efficiency. A strategy that exploits low-cost communication methods such as radio, demonstrations, printed media, and partnerships with civil society and the private sector might be more effective for the sustainability of FFS.

Client focus: The system's central focus should be to empower farmers by giving them a voice in the extension delivery system. This can be achieved in a number of ways, such as cost sharing, farmers' organizations, and decentralization. Such alternatives should be an integral part of the delivery mechanism.

5.2 Recommendation for future researchers

This study was only carried out in two districts, that is, Rungwe and Kyela districts in Mbeya region, in Tanzania. The two districts were involved in the study because MOA successfully implemented FFS pilot projects. However, the two districts are only neighboring districts in the region and cannot represent 100 percent of what is likely to occur in other parts of the country despite of our country having diverse weather conditions and different ethnic communities some known only to carryout pastoralist activities like the Maasai community, therefore, the future researcher should find a way that will enable a statistical model that will represent all areas of agriculture. Also, the future researchers should try to balance an equation by choosing study areas that have both FFS projects and those that are without.

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Appendices

Table 4.1: Percentages of farmers' participation in group decision making

Type of FFS Network Activity.	Not involved.			Consulted.			Actively Involved.			Makes the decision myself.		
	Loc.	Div.	Dist.	Loc.	Div.	Dist.	Loc.	Div.	Dist.	Loc.	Div.	Dist.
Choosing of group officials.	14%	13%	11%	29%	25%	27%	12%	12%	12%	0%	0%	0%
Planning for the group activities.	14%	14%	15%	14%	13%	18%	12%	12%	12%	0%	0%	2%
Deciding on rate for membership fee.	11%	13%	11%	14%	13%	3%	12%	12%	12%	0%	0%	2%
Deciding on what to grow in the farm.	9%	7%	6%	14%	13%	12%	10%	10%	11%	21%	24%	14%
Deciding on market for my produce.	9%	4%	8%	0%	0%	0%	5%	6%	5%	79%	76%	75%
Deciding on how to share group benefits.	9%	13%	10%	14%	13%	21%	12%	12%	12%	0%	0%	2%
Decide technology to demonstrate as group.	9%	14%	13%	0%	13%	6%	13%	12%	12%	0%	0%	2%
Deciding on markets for group produce.	14%	11%	15%	0%	0%	0%	13%	13%	12%	0%	0%	2%
Identifying type of income generating activity.	11%	13%	10%	14%	13%	12%	12%	12%	12%	0%	0%	2%

Table 4.2: Students t-test

	Table 4.1			Table 4.2		
Test	**Loc.**	**Div.**	**Dist.**	**Loc.**	**Div.**	**Dist.**
Ha: Diff!=0	0.0036	0.0021	0.0091	0.0026	0.00224	0.0091
t	-3.6271	-4.0069	-3.1807	-3.6271	-4.0069	-3.1807

Table 4.3: Students t-test

General institutional services.		**Loc.**	**Div.**	**Dist.**
Ha: Diff<0	(One tail)	0.0023	0.0012	0.0049
Ha: Diff!=0	(Two tail)	0.0046	0.0025	0.0098
Ha: Diff>0	(One tail)	0.9977	0.9988	0.9951
t	-	-3.6271	-4.0069	-3.1807
degrees of freedom	-	10	10	10
Sources of farm inputs.				
Ha: Diff<0	(One tail)	0.0000	0.0002	0.0000
Ha: Diff!=0	(Two tail)	0.0000	0.0004	0.0000
Ha: Diff>0	(One tail)	1.0000	0.9998	1.0000
t	-	-10.6435	-7.237	-10.9864
degrees of freedom	-	6	6	6
Sources of agricultural credit.				
Ha: Diff<0	(One tail)	0.0002	0.0003	0.0117
Ha: Diff!=0	(Two tail)	0.0004	0.0006	0.0234
Ha: Diff>0	(One tail)	0.9998	0.9997	0.9883
t	-	-7	-6.611	-3.0208
degrees of freedom	-	6	6	6

Table 4.4: Logit Model.

Variable	Coefficients	Standard. Error.	z	P>z	[95% Confidence Interval.]		Observation.	LR chi2(1)	Prob > chi2	Pseudo R2
A	0.00012	0.007762	0.02	0.988	-0.01509	0.015333	24	0.000	0.9876	0.7639
B	-0.03649	0.018265	-2	0.046	-0.07229	-0.00069	12	7.04	0.008	-
C	0.0366	0.018192	2.01	0.044	0.00095	0.072259	12	7.36	0.0067	-
D	-1.01741	0.28705	-3.54	0.000	-1.58002	-0.04548	116	122.8	0.000	-
E	-0.00427	0.003372	-1.22	0.221	-0.01073	0.002482	131	1.51	0.2193	-
Constant.	0.48305	0.221175	2.18	0.029	0.04956	0.916548				

'a'=diversity of income (level of sustainability) 'b'=access to institutional services. 'c'=source of farm inputs. 'd'= extend of participation in group activities. 'e'=number of times the group obtains services from the organization network formation.

Table 4.5: The types of income generating activities the farmers are currently involved in.

	Location.		Division.		District.	
	Freq.	**Percent.**	**Freq.**	**Percent.**	**Freq.**	**Percent.**
Poultry rearing.	2	5%	2	2%	2	1%
Maize production.	23	55%	33	34%	105	37%
Posho mill.	2	5%	1	1%	3	1%
Cereal banks.	6	14%	8	8%	10	3%
Joint bulking & marketing produce.	3	7%	5	5%	8	3%
Training other farmers.	0	0%	0	0%	0	0%
Purchase & sale of farm inputs.	6	14%	8	8%	8	3%
Agro-vet services.	0	0%	0	0%	0	0%
Artificial Insemination services.	0	0%	0	0%	0	0%
Fish farming.	0	0%	1	1%	1	0%
Horticultural crop production.	0	0%	38	39%	144	50%
Milk bulking& marketing.	0	0%	1	1%	6	2%
Napier bulking and selling.	0	0%	0	0%	0	0%
Total.	**42**	**100%**	**97**	**100%**	**287**	**100%**

Table 4.6: The type of Income generating activities the farmers practised before and after network formation.

Income generating activity.	Before Network Formation.						After Network Formation.					
	Location.		Division.		District.		Location.		Division.		District.	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Poultry farming.	3	4%	8	10%	43	13%	2	2%	4	4%	8	2%
Maize production.	25	30%	36	43%	132	40%	22	27%	39	36%	121	36%
Posho mill.	28	34%	0	0%	0	0%	0	0%	0	0%	0	0%
Cereal banks.	0	0%	0	0%	0	0%	2	2%	1	1%	3	1%
Joint bulking &marketing of produce.	2	2%	2	2%	3	1%	7	9%	9	8%	13	4%
Training other farmers.	1	1%	2	2%	3	1%	6	7%	6	6%	11	3%
Purchase and sale of farm inputs.	0	0%	0	0%	0	0%	10	12%	10	9%	11	3%
Agro-vet services.	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Artificial Insemination services.	0	0%	0	0%	0	0%	0	0%	0	0%	1	0%
Fish farming.	0	0%	0	0%	0	0%	1	1%	2	2%	2	1%
Horticultural crop production.	24	29%	35	42%	153	46%	31	38%	36	34%	170	50%
Milk bulking& marketing.	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Totals.	**83**	**100 %**	**83**	**100 %**	**334**	**100 %**	**81**	**100 %**	**107**	**100 %**	**340**	**100 %**

Table 4.7: The form in which farmer groups keep their savings

Form	Location.		Division.		District.	
	Freq.	Percent.	Freq.	Percent.	Freq.	Percent.
Money	25	78%	36	73%	184	92%
Assets	2	6%	5	10%	7	3%
M&A	5	16%	8	16%	10	5%
Other	0	0%	0	0%	0	0%
Totals.	**32**	**100%**	**49**	**100%**	**201**	**100%**

Figure 4.1: Farmer Empowerment group profile

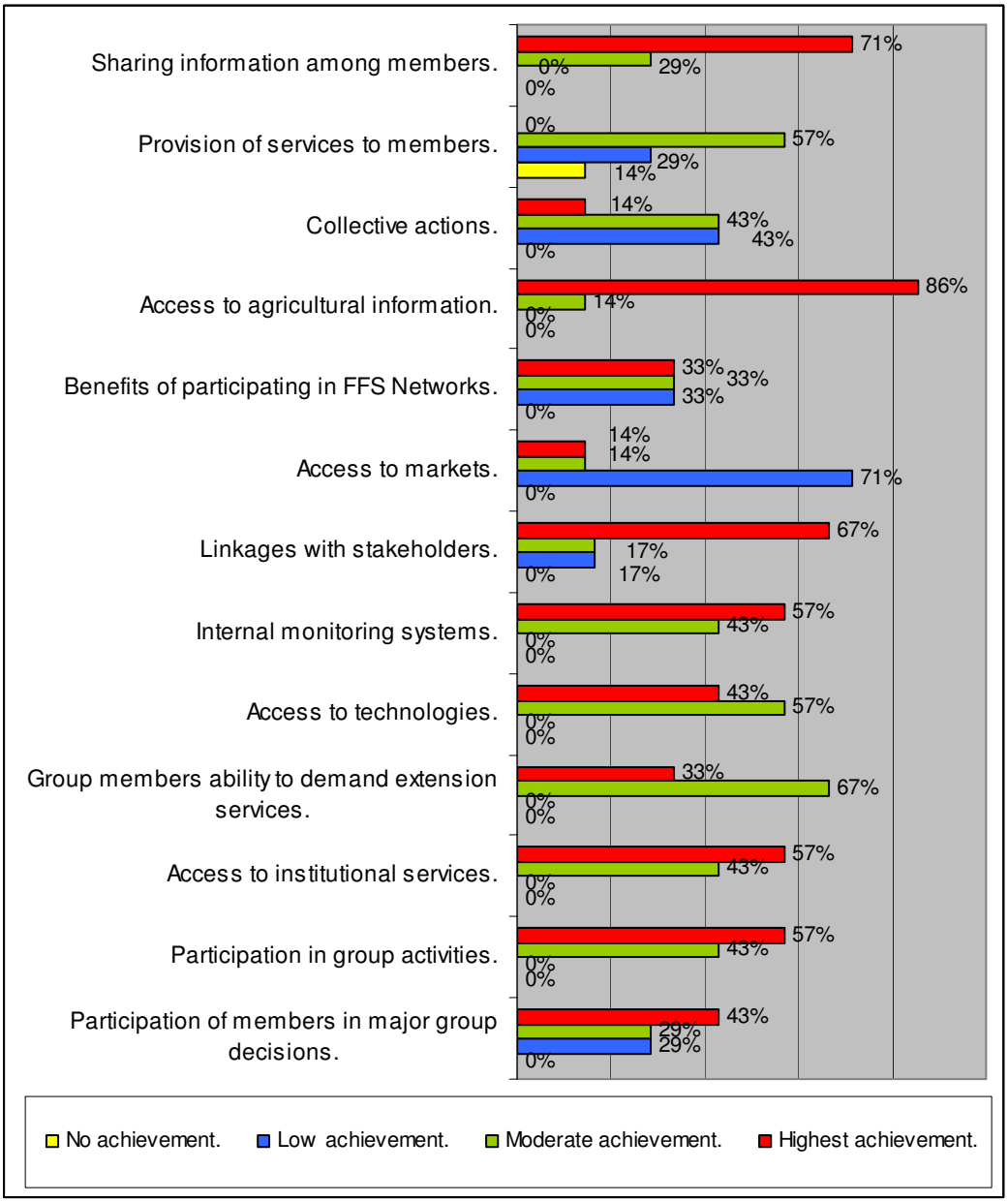
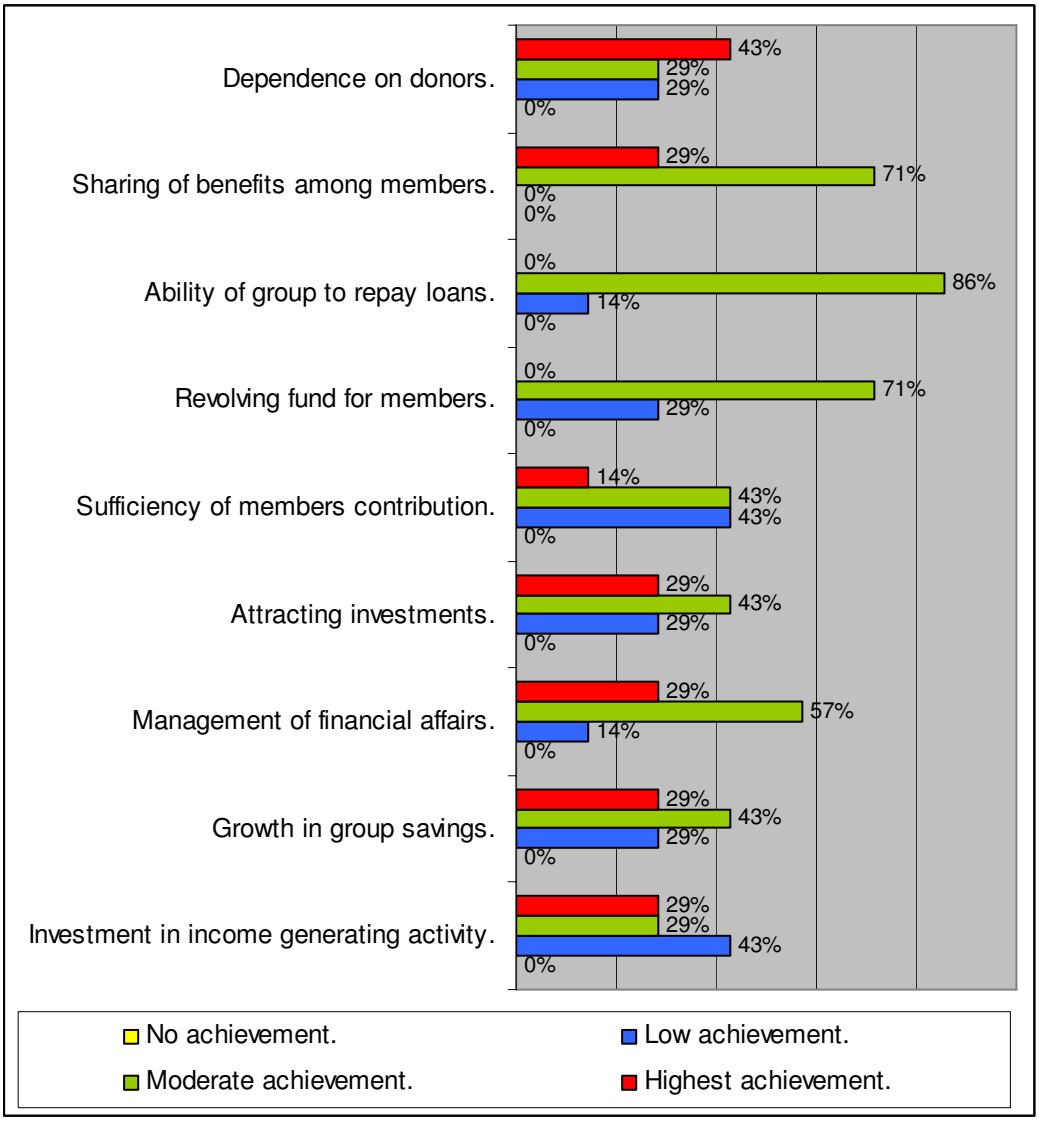


Figure 4.2: Farmer group sustainability profile.



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