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EFFECTIVENESS OF THE FARMER-TO-FARMER EXTENSION MODEL IN INCREASING TECHNOLOGY UPTAKE IN MASAKA AND TORORO DISTRICTS OF UGANDA

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ABSTRACT

An effective extension model focuses strongly on the dissemination and facilitation of the adoption of recommended technologies and practices to achieve its objectives. The farmer-to-farmer extension model has proved a success in Latin America (Kruger, 1995; Simpson and Owens, 2002; Hellin, Rodriguez and Coello, 2002), the Far East (Farrington and Martin, 1993) and a number of African countries in sub-Saharan Africa (Muok, Kimondo and Atshusi, 2001). In recent years, the model has been introduced in Uganda following the perceived ineffectiveness of the public extension models.

However, the success of the new model has not been tested or established. This study was, therefore designed to provide evidence of its performance.

The objectives of the study, which was conducted in two districts of Uganda (Masaka and Tororo), were to:
a) identify the key players in the farmer-to-farmer extension approach;
b) explain the nature and characteristics of the major players;
c) examine the roles played by key players in the communities;
d) determine appropriate communication channels in the communities; and
e) identify the determinants of the effectiveness of the farmer-to-farmer extension model

The effectiveness of the farmer-to-farmer extension approach was measured by:
i) increased technology uptake;
ii) increased production;
iii) increased food availability;
iv) the multiplier effect in information-sharing; and
v) increased sales of commodities.

The results were compared to those in areas where the farmer-to-farmer approach was not applied but with all other conditions remaining the same.

The effectiveness of the model was found to depend on facilitators in terms of:

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a) their socio-economic closeness to the beneficiaries;
b) their multiple community roles which boosted communication networks;
c) their role in enhanced information flow among individuals of similar social status;
d) better interaction and information-sharing among beneficiaries;
e) their being community-based they devoted more time to their fellow beneficiaries;
f) their use of demonstration facilities for experiential learning.

The model can be applicable in a wide range of development fields where beneficiaries assume roles of development facilitators in their own communities

1. INTRODUCTION

An extension model is the general statement of the intellectual, infrastructural and political framework within which the extension service will be performed (Donkoh, Albert, Hesse, & Amoakoh, 1999).

An important way of grouping extension models is, among other criteria, according to the degree of participation by the beneficiaries. Three broad strategies can be distinguished, namely

i) the transfer of technology or the transfer of advice, information, knowledge and skills to farmers. This strategy has been widely applied by the traditional extension services and is characterised by bureaucratic management structures;
ii) advisory services, which comprise a cadre of experts whom farmers use as a source of advice in relation to specific problems they have identified. This strategy features prominently in the Uganda National Agricultural Advisory Services (NAADS) where specialised advice is given on selected enterprises.
iii) the participatory approach, where farmers or other beneficiaries identify their own problems and develop their own solutions. This strategy is widely applied by non-government organisations (NGOs) and is a characteristic of the farmer-to-farmer extension service. In this model beneficiaries are fully involved in identifying problems, suggesting solutions and disseminating technologies and practices. (Nalukwago 2004).

1.1 The philosophical basis and assumptions of the strategies

The first strategy was based on the philosophy that the information to develop and the assumption that technologies were sourced from research and that it was the duty of the public extension agent to transfer knowledge about the technologies to the farmers. Farmers were viewed as objects of technology and that they played no part in generating and/or disseminating it. The public extension services providers were generally non practitioners and were not closely related to their clients in the communities. In public extension, it is not easy to ensure both technical and financial accountability.

The second strategy was based on the assumption that farmers had specific technology needs which required specialised expertise. The experts were to be hired according to the special needs groups depending on the enterprises selected and the experts would offer advisory services. Advisory services are offered by contracted extension services providers over a limited time. This strategy does not ensure

continued contact of experts with the beneficiaries since contract for services are for short periods.

The third strategy was based on the assumption that an extension service is a participatory process, whereby the beneficiaries are involved in technology generation and dissemination. The services providers are located in the communities and continuously interact with the beneficiaries about the production value chain. The approach philosophically believes in starting small, utilise all available resources to the maximum and always innovate. The process operates on the basis of agro-ecology, where organic farming is encouraged as opposed to agro-industrial process, where industrial chemicals are widely used. The third strategy ensures accountability and commitment of the extension services providers.

1.2 Determinants of effectiveness of the extension service

For any extension model to be deemed effective it should be able to improve production and productivity (Rivera and Carry, 1998), and at the same time be readily available and accessible (Chambers, 1990). Past extension services models lacked both these vital requirements and thus proved ineffective. The farmer-to-farmer extension approach is meant to address these weaknesses.

1.3 Attributes of an Effective Extension Model

A number of attributes combine to constitute an effective extension model and include:

a) A clear and inclusive philosophy
b) Knowledge and commitment of the extension providers
c) Social proximity of extension services providers and beneficiaries
d) Involvement of the beneficiaries in the process of technology generation and dissemination
e) Availability of the services
f) Improving productivity of enterprises
g) Presence of supportive policies, institutions, programmes and related enabling processes

A clear and inclusive philosophy of the model will address both the technical content of the technology plus the management processes and mechanisms of implementation. It should aim at high yields or production and quality plus leadership and organization of beneficiaries in order to maximise outputs and outcomes. It would also address the entire value chain of the enterprise. The public extension services generally aim at addressing the efficacy of technology and do little to address the supportive processes.

Knowledge and commitment of the extension providers is the key to the effectiveness of the model. Knowledge of the technical content in addition to practical application are vital for ensuring the effectiveness of the model. The public extension services providers are highly trained in theoretical aspects but generally lack practical experiences and commitment to the service. The farmer-to-farmer extension providers are not highly technically trained but have practical experiences being practising farmers and are committed to serving their peers.

Social proximity, which is sharing similar socio-economic characteristics and behaviour, is the key to information sharing. Public extension services models are managed by agents of different socio-economic backgrounds from those of the beneficiaries and thus find it difficult to interact with them.

Involvement of the beneficiaries in the process of technology generation and dissemination enhances the effectiveness of the extension model since it builds ownership of the intervention. Public extension services involve beneficiaries at the levels technology transfer only but not in generation and dissemination. However, the farmer-to-farmer extension involves beneficiaries in all relevant processes.

Availability of the services to beneficiaries at all times contributes to the effectiveness of the model. Public extension services are normally extended at the beginning of the planting seasons and at limited periods. The farmer-to-farmer extension is however available all the time.

Improving productivity of enterprises is the utmost aim of any extension model. However, increased productivity does not depend on the efficacy of the technology as is generally viewed. It will in addition depend on the management processes of the technology throughout the entire value chain. The farmer-to-farmer extension model covers the entire needs of the value chain unlike the public extension model, which only covers parts.

Finally, effectiveness of any extension model will depend on the supportive policies covering fiscal and political dimensions. It will also depend on the effective operation of line institutions such as government ministries and programmes plus sportive implementation processes.

Referring to the farmer-to-farmer extension approach, Kruger (1995) explained that it was effective as it addressed the limiting factors that inhibit peasants' food production, including soil, water and organic matter. Clearly for the approach to be deemed effective must achieve the set objectives. Generally, the set objectives include increased production and eradication of poverty (Rivera & Amanor, 1991). The major reason why new approaches are being sought was due to failure of the existing or past approaches to achieve the intended objectives (Swanson & Samy, 2002). For an approach to be effective it should also have a clear and inclusive working philosophy. The failure of the progressive farmers' approach and most approaches modelled on the training-and-visit approach was blamed on the fact that it emphasised only the hardcore technical philosophy in disregard of other aspects necessary for effective dissemination of technologies, such as communication processes, leadership and institutional organisation (Nagel, 1997).

The wide scope of the farmer-to-farmer extension model was also pointed out by Kruger (1995) when explaining the nature and operation of the farmer-to-farmer extension approach. He emphasized that it was an approach to sustainable development resting firmly on the principles of respect for traditional knowledge from the existing farmers; it also emphasised farmer experimentation, sharing of knowledge and innovations. Similarly, Duveskog, Mburu & Critchley (2002) asserted that there were indications of a higher level of adoption when new technology options were introduced by fellow farmers than by external agents. Often when technologies were

demonstrated in the communities by external agents, the focus was on the technology mainly, with scanty attention being paid to other aspects, such as finding a market for the produce or controlling diseases.

But if the farmer introduces the technology he/she will be within the community and get concerned about what follows later, including the possible risks. By empowering farmers in terms of knowledge and innovations leading to better production, the work of extension workers can be improved. Roling (1995) explains that good farmers generate good extension agents, in contrast to the common belief that good extensionists produce good farmers, since the good farmers will always demanded for staff that will deliver better services. It follows therefore, that an approach which empowers farmers is likely to sustain a good and effective extension service. He concludes that the best way to increase the effectiveness of the extension service is not by giving staff more cars, training and so on but especially increasing the countervailing power of farmers to influence and control field extension workers.

The farmer-to-farmer extension approach is based on two social theories, namely the 'Social Interaction' Theory, specifically its 'Structural Function Model', and the 'Social Learning Theory'. The first theory points to 'value consensus', which is the agreement of community residents about their goals and the appropriate way of achieving those goals (Hess, Markson and Stein 2000:16).

The second theory highlights the need for individuals to meet and discuss problems, identify solutions and access mutual support from group members (Forsyth 2006:25). Use of community facilitators based on the farmer-to-farmer model can be applied to the various professions engaged in community development activities to boost the process. Where professionals have had an involvement in projects, their attitudes towards, and relationships with, members of the community, can demonstrate a radical change: they testify to a deeper understanding of, and greater respect for community perspectives – and a commitment to continue or upscale the process (Daniel, Surridge and Thomas, 2003)

1.4 Role of professionals in the farmer-to-farmer extension model

The roles of the professionals in the new model have included the following:

a) Technical training of the services providers
b) Participative generation of the needed technologies
c) Institutional building
d) Overall policy formulation and implementation

Technical training of the farmer-to-farmer extension model is provided by qualified professionals through training of trainers. The process of identifying and selecting of the trainees is facilitated by professionals. Here a multidisciplinary team of professionals is involved since the training covers a wide range of courses.

Participative generation of needed technologies is another crucial role of the professionals. Applied research is carried out on identified topics in selected technology needs, by qualified professionals.

Community based institutional building is facilitated by professionals who offer training on leadership and organizational management. Such institutions are vital in sustaining the services

Overall policy formulation and implementation is carried out by the professionals. This covers both administrative and technical policy aspects.

1.5 Extension services in Uganda

For over a century, public agricultural extension in Uganda has been offering the vital service of advising and educating the farmers on agricultural productivity and production (Opio-Odongo 2002; MAAIF, 1998).

In doing this the public agriculture extension system has applied a number of models including

(i) extension by compulsion;
(ii) progressive farmer-based extension;
(iii) education-led extension;
(iv) extension based on projects; and
(v) the unified extension strategy (Nalugooti 2005). Starting from 2000, the farmer-led, privately delivered and public- funded advisory service was established under the National Agricultural Advisory Services (NAADS) programme (MAAIF 2001).

Up to the 1980s, public agricultural extension as an implementing agency of government policies aimed at improving agricultural production and productivity, and enjoyed both fiscal and political support. However, during the 1990s, the increasing costs of running the public extension service and its failure to increase production resulted in less fiscal and political support leading, to downsizing of its staff. The total staff strength was reduced from 15000 down to 5000. The diminishing role of the public extension service gave way to farmer-led extension services promoted mainly by non-government organisations (NGOs) (Simpson and Owens, 2002).

1.6 Farmer-led extension services

Farmer-to-farmer extension proved to be very successful in Guatemala and the surrounding states in South America. It is based on a paradigm shift aimed at targeting communities instead of individuals' development. This is probably the most common form of farmer-led extension service. The farmer extension facilitators (FEFs) are selected from and vetted by the community. They receive comprehensive training from an external agent in government or an NGO; they may receive remuneration from farmers or an external agent for their work. In Uganda the farmer-to-farmer extension is widely applied by NGOs and has been found effective in promoting sustainable production. Kulika Charitable Trust Uganda (KCT), the Uganda Farmers Federation (UNFFE) and the World Vision (WV) have adopted the approach across the country. The farmer extension facilitators are comprehensively trained in production technologies, sustainable production and value addition.

2. STATEMENT OF THE PROBLEM

The declining role of the public extension service created a delivery gap necessitating emergence of new extension services providers (Rivera & Amanor, 1991, Swanson & Samy, 2002). Swanson and Samy (2002) further explain that, with the decline in government expenditures, public extension systems are not able to provide adequate educational and technical extension programmes for all groups of farmers. Furthermore, public extension has been less effective in responding to the basic educational needs of small scale, marginal farmers due to insufficient resources and the lack of a continuing flow of appropriate technology. Therefore, alternative organisations, especially NGOs, have emerged to fill the gap in developing countries Swanson and Samy (2002).

Many of the new extension service providers, particularly NGOs, such as Kulika Charitable Trust (KCT), the World Vision (WV), and Uganda National Farmers Federation (UNFFE), employed the FFE model whose modes of operation and effectiveness were not well understood. It is not clear to what extent the model has been successful and, it is even less clear what factors have led to its perceived success. The study was therefore designed to answer these and other related questions.

Key questions for the study were: a) How are the major players characterised and how do they operate? b) To what extent has the model resulted in more production and creation of a multiplier effect? c) What are the factors that influence the effectiveness of the approach? d) What are the farmers' perceptions of the approach?

3. OBJECTIVES OF THE STUDY

The objectives of the study were to:
a) Identify the key players in the farmer-to-farmer extension model
b) Explain the nature and characteristics of the major players
c) Examine the roles played by key players in the communities
d) Determine appropriate communication channels in the communities; and,
e) Identify the determinants of the effectiveness of the farmer-to-farmer extension model.

4. THE CONCEPTUAL FRAMEWORK FOR THE STUDY

The conceptual frame work (Figure 1) was based on a four-factor model including: a) the initial social economic status of the farmers; b) the intervention of the farmer-to-farmer extension approach; c) the institutional support by NGOs; and d) the farmers' institutional networks. It envisaged the initial status of the farmers in terms of the social economic characteristics, knowledge and skills; various interventions including the new extension approach, the institutional frameworks which supported the interventions; the farmers' social networks supporting communication and the subsequent outcomes, in terms of increased farmer involvement and increased uptake of recommended technologies. The framework also illustrated the independent variables consisting of the extension approach, methods and techniques used. The farmers' social economic characteristics such as age, education status, marital status, size of farms among others, also form part of the independent variables. The dependent variables indicating the effects arising from the extension efforts applied in

the areas under study. These include levels of participation, knowledge and skills, adoption of recommended farming practices, non-traditional technologies adopted, productivity, levels of income, and levels of food sufficiency. Effective use of the farmer-to-farmer extension approach is to improve the levels of knowledge and skills and thereby improve production.

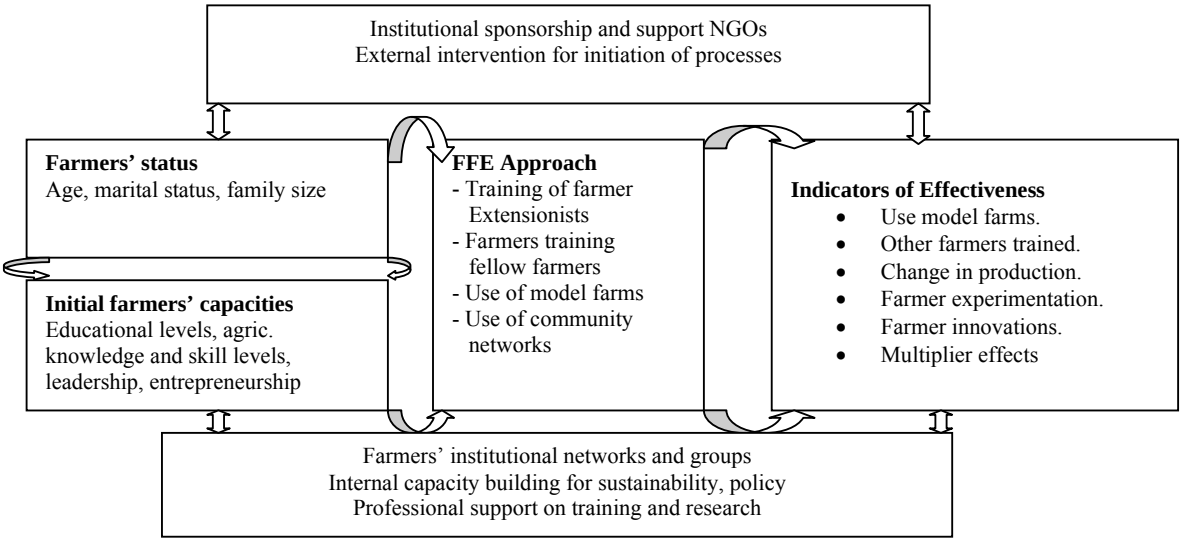

Fig. 1: The conceptual framework schema for the study

5. METHODS

5.1 Study design

The study adopted a cross-sectional comparative survey design meant to collect perceptual data on the effectiveness of the farmer-to-farmer extension approach in Uganda, as practised by Kulika Charitable Trust (KCT), World Vision (WV), Masaka District Farmers Association (MDFA), and Tororo District Farmers Association (TODFA). Comparisons were made between levels of technology uptake and production before and after application of the farmer-to-farmer extension by the farmer extension facilitators (FEFs) and follower farmers (FFs). Also, comparisons were made between the FEFs, FFs and the non-interventional farmers from areas where no application of the farmer-to-farmer extension had taken place.

5.2 The information collected was in the following categories

a) The characterisation of the major players in the model including their age, sex, educational levels, land owned, labour employed and the groups to which they belonged.
b) Data on the uptake of selected technologies of major crops in the ecological zone where the districts under study were located.
c) Information on soil and water conservation and dairy cattle management as cross- cutting activities in both Masaka and Tororo districts.

d) Data on the indicators of success of the model including uptake, production and food sufficiency.
e) Data on the activities of farmer extension facilitators.
f) Data on the sources of information for the farmers.

The major methods of primary data collection were the semi-structured questionnaires, which were administered to the farmers, focus group discussions and key informant interviews. Secondary data was collected from reports and libraries.

5.3 Sampling frame

The sampling frame included follower farmers (FFs), who had benefited from the farmer-to-farmer extension model as practised by the Kulika Charitable Trust, the World Vision and the Uganda National Farmers Federation. Similarly, the farmer extension facilitators formed another part of the sampling frame. Lists of FFs and FEFs were compiled and random selection using a table of random numbers was applied to the FFs but the FEF were purposively selected, to cover geographic spread. The sampling frame for the control groups was two parishes from each of the study district. The parishes were selected from areas that had not been involved in NGO farmer-to-farmer model activities. In both cases farmers' nominal lists were compiled and tables of random numbers were used to select respondents.

Geographical coverage consisted of three sub-counties and eight parishes in Masaka district and nine sub-counties and twenty five parishes in Tororo district. Both sub-counties and parishes were purposively selected to coincide with service delivery by all the three NGOs.

5.4 Sample size

The method of sample proportions was applied in calculating the sample size, n (Cooper and Emory 1996).

$$n = \left(\frac{pq}{\sigma_p^2} \right) + 1$$

where:
n= Sample size
p = Proportion of interest within the district (proportion of FFs in the two districts)
q= 1-p
σ_p = sampling error =0.05/2.58 (precision divided by 90 % confidence that the proportion lies within 2.58σ from the mean).

0.05 = precision (chosen arbitrarily not to be confused with the level of significance).

Therefore, n = (0.80 x 0.20) /[0.05/2.58] ^{2} +1
= 426
A sample size of 456 farmers was targeted for the study, and 30 farmers were added to compensate for non-responses and refusals.

5.5 Sampling procedure

Farmer extension facilitators FEFs were purposively selected for two major reasons:

i) they were not demographically homogeneous and
ii) there was need to cover adequate numbers of trained farmers by including more FEFs. In Masaka district 24 FEFs were selected while in Tororo district 25 were selected.

FFs were randomly selected using a table of random numbers, from the list of all trained farmers in purposively selected parishes where FEFs were deployed. Using the above procedure, 50 trained farmers were targeted from each organisation, making a total of 338 respondents for the two districts. One hundred and eighteen farmers were selected from the non-intervention areas. In all, 456 respondents were interviewed.

Key informants included the District Agricultural Officers of Masaka and Tororo districts; Chief Administrative Officers; the head of World Vision Food Security Project; the Chief Executive Officer in Kulika; The programme officer of World Vision; the programme officer of the Uganda National Farmers Federation; the coordinators of MADFA and TODFA.

5.6 Data analysis

Quantitative data, including comparison of the characteristics of the FEs and farmers FFs, the association of independent and dependent variables, and the test for significance, were analysed using STATA statistical package. Qualitative data was analysed by summarising data under themes and sub themes and noting the significance attached to and the emphasis put on the variables. Information on the institutional framework was analysed according to the themes involved, including the administrative and technical linkages between the existing government structures and the NGOs set up. Much of the data concerning farmers included how the farmer extension facilitators were selected, trained and deployed. The differences between the methods used by the different organisations used to train farmer extension facilitators were noted and contrasted. Data on the courses and curriculum were explained. Observations of field activities and focus group discussion results were documented.

6. RESULTS AND DISCUSSIONS

6.1 Introduction

This section presents results and discussions of the study according to its objectives. The section presents and discusses the identification and characterization of the major players of the model, examines the role of the major players, shows the various communication channels and brings out the determinants of the effectiveness of the farmer-to-farmer extension model.

6.2 Characteristics and roles of key players

In this part the socio-economic characteristics of farmer extension facilitators and the follower farmers are discussed.

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Table 1: Socio-economic characteristics and farm data for farmer extension facilitators (FEFs)

Variable	Masaka			Tororo		
	KCT n =24	**W/V** n =21	**MADFA** n =25	**KCT** n=20	**W/V** n = 23	**TODFA** n= 22
	Means	Means	Means	Means	Means	Means
Age in years	45.60	46.80	45.4	51.25	40.13	48.00
Years of schooling	11.30	9.70	10.2	10.30	7.42	12.33
Land owned in acres	22.00	6.02	5.3	9.13	9.94	7.08
Land under use in acres	7.60	3.80	4.1	6.40	2.97	6.50
Total labour force persons	7.30	7.10	6.4	5.13	4.46	8.67
Family labour persons	5.60	5.50	4.3	5.01	3.69	5.17
Hired labour persons	1.33	1.20	2.1	1.01	2.85	3.50
Farm experience in years	21.00	21.00	14.6	32.00	21.05	25.50
% income from farm	86.60	74.00	83.0	91.40	82.30	84.17
Distance from market (km)	5.30	2.50	1.6	4.17	2.31	3.40

Source: Survey data, 2008

The results indicated in Table 1, show that the majority of farmer extension facilitators and benefiting farmers were adults of mean age of 45 years; of approximately seven years of education on average; married; owned small farms on which they used family labour mainly, with minimal hired labour. The great majority held leadership positions in the communities including chairmanship of farming groups, local councils, schools or churches. The leadership positions they held and the interaction that followed ensured information-sharing at various levels, which enhanced communication and discussion of issues concerning the livelihoods of the residents. A large majority also had long experience in farming spanning up to 30 years, and derived over 80 per cent of their income from farming. All farmer extension facilitators were identified and vetted by their communities. All received broad based training in subject matter, leadership and value chain management. All were deployed in their own communities.

The socio-economic characteristics of farmer extension facilitators and the follower farmers are indicated in Tables 1 and 2 and the data shows that the majority of characteristics of the two groups are closely similar.

Table 2: Socio-economic characteristics and farm data for follower farmers (FFs)

Variable	Masaka			Tororo		
	KCT n=52	**WV** n=50	**MADFA** n=46	**KCT** n=41	**WV** n=13	**TODFA** n=44
	Means					
Age in yrs	43.9	48.1	40.7	49.5	40.5	44.5
Years of schooling	6.5	7.4	8.7	9.9	6.2	8.5
Land owned in acres	9.9	3.8	3.9	6.5	7.4	6.7
Land under use in acres	5.7	2.9	3.2	6.3	4.6	5.9
Labour force persons	4.6	5.7	4.3	4.9	5.3	6.6
Family labour persons	2.1	3.2	3.6	4.1	4.3	4.9
Hired labour persons	1.4	0.7	1.1	2.6	2.6	2.8
Farm experience in years	23.1	22.7	17.5	26.7	21.5	24.6
% income from farm	81.6	78.2	79.7	81.3	85.6	81.4
Distance from market (km)	3.1	3.0	3.3	2.7	2.3	3.4

Source: Survey data, 2008

Similar social characteristics of benefiting farmers (Table 2) and farmer extension facilitators (Table 1) leads to the social closeness of members of the two groups. This enhances social interaction and wide information-sharing between the members of the two groups. This contrasts sharply with the public extension supervisors' criteria of putting emphasis on theoretical knowledge and general lack of practical experience. In public extension services the extension agents are not socially close to the beneficiaries because of varying socio-economic characteristics.

6.3 Social closeness or sharing similar socio-economic characteristics

Social closeness between farmer extension facilitators and those they trained was examined by comparing the socio-economic characteristics. As indicated in Table 3, the test for significance in the differences between the socio-economic characteristics of both groups in the two districts under study did not show any significant differences for most of the characteristics at $p<0.05$. The significant similarity of the socio-economic characteristics such as education, size of labour, size of land, household assets, distances from markets, and farming experiences supported findings of earlier studies, which revealed that socio-economic similarities encourage more interaction (Bandiera & Rasul 2005).

Table 3: Significance test between the social economic characteristics of (FEFs) and (FFs)

Variable	Masaka				Tororo			
	FEF	BF	F-value	P –value	FEF	BF		P –value
	Means				Means			
Age in yrs	45.9	44.2	0.604	0.48	46.7	44.8	.150	0.719
Years of schooling	10.4	7.5	13.021	0.02	10.0	8.2	1.034	0.367
Land owned in acres	11.1	5.9	.813	0.418	8.7	6.9	4.285	0.107
Land under use in acres	5.2	3.9	.668	0.459	5.3	5.6	.060	0.819
Labour force persons	6.9	4.9	16.713	0.015	6.1	5.6	.120	0.746
Family labour persons	5.1	2.9	12.500	0.024	4.6	4.4	.130	0.737
Hired labour persons	1.5	1.1	1.894	0.241	2.5	2.7	.081	0.790
Farm experience in years	18.9	21.1	.639	0.469	26.2	24.3	.297	0.615
% income from farm	81.200	79.8	.124	0.742	85.9	82.8	1.048	0.364
Distance from market (km)	3.1	3.1	1.000	1.000	3.3	2.8	1.617	0.476

Source: Survey data, 2008

Socio-economic closeness ensured sharing of information between farmer extension facilitators and benefiting farmers thereby creating social interaction and promoting social communication networks (Lunkuse 2004).

6.4 Community information sources

Social interaction and communication between farmers and various information sources are indicated in Table 4. On average, farmers accessed information more from farmer extension facilitators followed by radio farming programmes, fellow farmers, NGOs and lastly the government extension agencies. The higher contacts of farmer extension facilitators with benefiting farmers indicated the emphasis that was placed on the intended role of the major players, the farmer extension facilitators. The low interaction between farmers and the government extension agent was due to lack of social and geographical closeness. Most government workers are located far from

the communities they serve, they are non-practitioners and relatively younger than the beneficiaries.

Table 4: Percentage of weekly contacts with information sources

Information source	Masaka			Tororo			
	KCT n= 52	WV n=50	MADFA n=46	KCT n=41	WV n=54	TODFA n=44	Average Percentage
Farmer extension facilitators (FEFs)	53	86	73.9	51.2	69.2	77.3	68
Radio farming programmes	76.9	94	97.8	46.3	23.1	65.9	67
Fellow farmers	51.9	72	76.1	31.7	46.2	61.4	57
NGOs	36.5	64	30.4	17.1	53.8	47.7	41
Government extension agent	11.5	0	4.3	0	0	9.1	4

Source: Survey data, 2008

6.5 The multiplier effect

The study established that a multiplier effect was created when follower farmers passed on the knowledge and skills to fellow farmers in the community, as indicated in Table 5, below. The number of secondary contacts made by follower farmers ranged from 12 to 50 in both Masaka and Tororo districts. This means that each follower farmer contacted between 12 and 50 other farmers and the process continued. This was in line with earlier studies. Simpson and Owens (2002), in their study in Ghana and Mali found that the farmer-to-farmer extension approach encourages communication between farmers at several levels, thereby creating a multiplier effect. Farmer estimates of the number of secondary contacts that they had made outside their immediate family members ranged from ten to 20 and, in the case of an active woman plantain farmer, over 100 such contacts.

Table 5: Farmers trained by farmer extension facilitators and those trained by the follower farmers.

Category of farmers	Masaka			Tororo		
	KCT n =24	**W/V** n =21	**MADFA** n =25	**KCT** 25=8	**W/V** n = 26	**TODFA** n= 22
	Means (Corrected to whole)					
Farmers trained by FEFs	73	44	81	276	14	76
Farmers trained by the FF	12	22.	13	50	7	13

Source: Survey data, 2008

6.6 Increased technology uptake

The effectiveness of the farmer-to-farmer extension resulted into more adoption of technologies and thus better production and increased food availability. Table 6 indicates the significance test between the number of technologies adopted by the farmers who benefited from the farmer-to-farmer approach and those who did not. In

Masaka, out of the 32 technologies and practices promoted, 30 were adopted by beneficiaries of the new extension approach giving 94 per cent, while non-beneficiaries adopted only 20 out of 32, which was 62 per cent. The same trend was observed in Tororo district, where the adoption rate was 52 and 27 for beneficiaries and non-beneficiaries respectively.

Table 6: Significance test of differences in technologies practiced between interventional and non-intervention farmers in Masaka and Tororo districts

Masaka district	**Mean number of and % technologies up-taken**	**F**	**P**
Farmer type			
Intervention n=62	30 out of 32 = 94 per cent	80.9	.001
Non-interventional n=55	20 out of 32 = 62 per cent	F	P
Tororo district	**Mean number of technologies up-taken**		
Farmer type			
Intervention n=53	16 out of 30 = 52 per cent	10.8	.001
Non intervention n=55	8 out of 30 = 27 per cent		

Source: Survey data, 2008

6.7 Increased food production

Increased technology adoption was followed by increased production and improved food availability as indicated in Table 7 below. The same trend was recorded in Tororo district.

Table 7: Crop production and sales per season before and after training with FF extension by follower (FF) in Masaka district

Crop		**KCT**		**WV**		**MADFA**	
		Mean	St. Error	Mean	St. Error	Mean	St. Error
Matoke (Bunches)	produced before FFE	22.8	3.286	22.87	4.35	34.3	3.77
	produced after	128.5	16.31	33.2	5.14	69.6	7.31
	Sold before	15.6	3.60	9.6	3.21	12.7	1.71
	Sold after	65.9	8.52	15.6	3.27	37.7	3.95
Sweet/p (sacks)	produced before FFE	3.1	.882	2.2	.410	2.9	.378
	produced after	8.11	4.65	3.4	.632	4.9	.606
	Sold before	1.86	.952	0.8	.292	0.9	.22
	Sold after	4.2	2.34	1.9	.512	2.5	.406

Source: Survey 2008 (Sack = 100 kg: Matoke Bunch = 10 kg)

The increase in production was quite significant, as indicated in Table 8 below. Two crops, namely banana and sweet potatoes, have been picked for this purpose but the same happened for other enterprises.

Table 8: Test for significance of change in production before and after intervention for Masaka district

Masaka	Mean	Std. Error	P
Matoke produced before with FEE	35.43	5.27	.001
Matokeproduced after training with FEE	77.98	12.17	
Sweet potatoes produced before FEE	2.75	1.3588	.001
Sweet potatoes produced after FEE	5.54	1.6545	

Source: Survey Data 2008

7. CONCLUSIONS

The study revealed that: a) the major players in the farmer-to-farmer extension were farmer extension facilitators (FEF) b) the major players had similar socio-economic characteristics; including age, years of schooling, sizes of farms and experiences in farming; c) many key players had community roles, including farming and leadership that enhanced social communication networks; d) information flow was more effective among individuals of equal socio-economic status and engaged in similar socio-economic activities; e) there was more interaction between farmers than between any other individuals and extension agencies; f) farmer extension facilitators, the radio, fellow farmers, NGOs and lastly the government agents were the main channels of communication; g) measures of effectiveness included: i) increased uptake of technologies; ii) increased food production and sales and iii) the multiplier effect that ensured more information flow.

8. RECOMMENDATIONS

It was therefore recommended that: a) selection of farmer extension facilitators should consider social closeness as a criterion for identifying the correct individuals; b) individuals with more community social roles should be considered for selection as farmer extension facilitators since they have more chances of interacting with the farmers; c) communities should be involved in the selection of farmer extension facilitators to ensure accountability of the farmer extension facilitators; d) to avoid social exclusion, farmer extension facilitators should be appropriately trained to handle farmers of different social status. Where resource-poor small-scale farmers were involved there may be a tendency to exclude the relatively large farmers. However, the study revealed that farmer extension facilitators were comprehensively trained and developed their model farms sufficiently to even cater for the needs of the more progressive farmers in the communities

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