



FARMERS' PERCEPTION OF THE EFFECTIVENESS OF FARMER-TO-FARMER EXTENSION APPROACH IN SOUTHERN BORNO STATE, NIGERIA

¹Mohammed, F. A., ¹Gwary, M. M., ²Madugu, A. J. and ¹Nuhu, S. H.

¹Department of Agricultural Extension Services, University of Maiduguri, Borno State

²Department of Agricultural Economics and Extension, Adamawa State University, Mubi

Corresponding Authors' E-mail: famohammed@unimaid.edu.ng **Tel.:** 08035321975

ABSTRACT

This study assessed farmer's perception of the effectiveness of farmer-to-farmer extension approach to dissemination of crop and livestock technologies in southern Borno State, Nigeria. FtFE Approach focuses on farmers rather than the extension agents as the principal agents of change in their community. Three-stage sampling technique was used to select 150 respondents. Data were collected with the aid of questionnaire and analyzed using descriptive (frequency, percentage and mean score) and inferential statistics. The analyzed data revealed age, sex, marital status and educational qualification determined the dissemination of improved crop and livestock technologies in the communities. Overall effectiveness scores showed high effectiveness for increased uptake of technology ($\bar{x} = 3.8$) and increased contact ($\bar{x} = 3.7$), respectively. The study concludes that dissemination of information on improved crop and livestock technologies through the FtFE have great potentials in improving agricultural extension delivery in the area. The study recommends the encouragement of more educational campaigns, capacity development trainings, supervision and monitoring of FtFE processes by the policy makers and stakeholder in order to sustain the approach.

Keywords: Effectiveness, Crop and Livestock Technology, Dissemination, Farmer-to-Farmer Extension (FtFE).

INTRODUCTION

Several agricultural extension approaches such as the Training and Visit (T&V) and the Unified Agricultural Extension System (UAES) have been tried to meet the challenges of agricultural production in Nigeria. In spite of these different extension approaches, some technology designed for farmers were reported to have failed to meet their goals due to insufficient and inappropriate agricultural technologies for farmers and dis-proportionate extension-farmer ratio (Agbamu, 2005).

The Promoting Sustainable Agriculture in Borno State program (PROSAB) was implemented through participatory research and extension approach (PREA) and also to promote farmer-to-farmer extension (FtFE) approach implemented in southern Borno state during the year 2004-2009. The project was introduced and launched by the International Institute of Tropical Agriculture (IITA), funded by the Canadian International Development Agency (CIDA) to improve the livelihood of small holder farmers and their income generating capabilities (PROSAB, 2009).

Most farmers in Southern Borno State are smallholder farmers that depend mostly on agricultural production as their means of income and livelihoods, hence assessing the effectiveness of FtFE on crop and livestock technologies in the area will assist in guiding farmers and stakeholders to make informed decision on how to promote effective transfer of technology through FtFE.



FtFE is an effective approach that facilitates generation, transfer and acceptance of improved agricultural technologies. It has been a practice since the 1980s (Rhoades and Booth, 1982). The FtFE approach relies on capacity of experienced farmers to partner with extension agents to disseminate innovation and information on improved agricultural technologies and practices to other farmers. These usually happen when farmers do not have access to formal extension and use information from fellow farmers to enhance their productivity. Farmers support each other to learn and adopt improved agricultural practices. FtFE is more cost effective as agricultural messages can reach more farmers within limited time and resources. FtFE is based on the principle that farmers learn from practical experience and better from their peers and that the best educators of farmers have been found to be other farmers (Jintrawet *et al.*, 1987). Farmers learn best and better from their peers (Feeder and Savastano, 2006).

The FtFE approach helps in building effective farmer-centered extension system of disseminating improved technology, enhance learning, increases farmer's capacity to adopt, innovate and train other farmers. It also has the potential to spread innovation to many farmers within their communities (Karuhanga, Kiptot and Franzel, 2012). The role of extension agents in FtFE is to serve as catalysts and facilitators, helping in mobilizing, guiding and training the experienced farmers disseminate information for increased production. FtFE therefore empower farmers with knowledge, skills and expertise that can increase sustainable agricultural outcome, income generating activities and help in developing leadership ability of families and communities.

The effectiveness of FtFE approach in this study was measured in terms of some indicators namely: capacity building, increased uptake of technology, relevance/appropriateness of technology, information flow, improved (production, income, and food availability), increased access to agricultural inputs, multiplier effect (reaching more farmers) and contact with other farmer. The objectives of this study were to:

- i. describe the socio-economic characteristics of the smallholder crop and livestock farmers in the study area;
- ii. determine the perceived benefits of FtFE;
- iii. assess the effectiveness of FtFE extension;
- iv. examine factors influencing effectiveness of the FtFE in the study area.

MATERIALS AND METHODS

The Study Area

The study was conducted in two Local Government Areas (LGAs) of Southern Borno State where FtFE was promoted by PROSAB. The study area lies between latitude 10° 10' N and 10°40'N and longitude 11°50' E and 12°35' E of the equator. The total population of the study area is 176,814. The study area shares border with Adamawa state to the south. The study area is characterized by a warm climate ranging between 17°C and 34°C, the annual precipitation ranges from 1100 – 1400mm in the Southern Guinea Savanna (SGS) of southern Borno state and 800 - 1100 mm in the Northern Guinea Savanna (NGS) with the rainfall however varying from year to year (Amaza *et al.*, 2004). It is the suitability of this climate that support massive agricultural activities in the area which calls for the promotion of FtFE, which crop and livestock production activities are practiced.

Sampling Procedure

The data for the study were obtained by the use of structured questionnaire. A 3-stage sampling technique was employed for the study. The first stage involved purposive selection



of two LGAs (Hawul and Kwaya-Kusar) out of four LGAs where PROSAB promoted PREA through use of FtFE between 2004 and 2009. The second stage involved the random sampling of four communities (giving a total of eight (8) communities) from each of the two LGAs. Marama, Yimirshika, Shaffa and Kukurupu in Hawul LGA and Kwaya, Peita, Wandali and Guwal in Kwaya-Kusar LGA were sampled for this study. The third stage involved proportionate selection of 150 crop and livestock farmers as sample size from the sampling frame of farmers who had benefited from the PROSAB programme. The selection of the 150 respondents was derived by sampling 31% of the total numbers of farmers in each of the sampled communities.

Table 1: Sample Size Selection Plan for the Study

LGA	Communities	Sample Frame	Sample Size
Kwaya Kusar	Kwaya	80	25
	Peta	34	10
	Wandali	100	32
	Guwal	65	21
Hawul	Marama	60	19
	Yimirshika	49	15
	Shaffa	50	16
	Kurukurupu	38	12
Total		476	150

Source: Field work (2016)

Analytical Technique

Descriptive and Inferential statistics were used for the analysis of data. Descriptive statistics such as mean, frequency distribution and percentage were used to describe the socio-economic characteristics of farmers and perceived benefits. Four (4)-point Likert type rating scale was used to determine the effectiveness of FtFE as perceived by the farmers. Regression analysis was used as the inferential statistics. Respondents' perception of effectiveness was based on several FtFE effectiveness indicators as used by Gwary *et al.* (2009). The indicators include: Capacity building, relevance and appropriateness of information on technology disseminated; access to inputs; increased uptake of improved technologies, increased production (output), increased income, Information flow on technology, improved food availability, increased contact with farmers and multiplier effect (coverage).

Likert scale for farmers' assessment of perception of the Level of effectiveness of FtFE

Farmers were asked to indicate their perception of how effective the indicators of FtFE were, using 4 point Likert type rating scale. A total score was obtained for each respondent as indicated. The mean score was computed by summing the values for highly effective = 4, effective = 3 less effective = 2 and in-effective = 1. A mean score of 2.5 indicate the mean bench mark of effectiveness, greater than 2.5 indicate highly effective, less than 2.5 is considered less effective and ≤ 1 indicate in-effective.



Inferential statistics

Multiple regression analysis was the inferential statistical tool used to determine the socioeconomic factors influencing farmers' perception of the effectiveness of FtFE. Dependent variable is the level of effectiveness of FtFE while the independent variable include socio-economic (age, marital status, farm size, experience and educational level) institutional variables (contact between farmers, access to credit, and membership in social group). Furthermore data collected to address objective iv was analyzed using multiple regression to determine the factors that influence effective FtFE. The best fit was the double log function; the model specification in its implicit form is given by:

$$Y = f(X_1, X_2, X_3, X_4, X_5, \dots, X_n) \cdot U \quad \dots(1)$$

The model is explicitly specified as the form as:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7 + b_8 X_8 + U \quad \dots(2)$$

where;

Y = farmers perception of the effectiveness of FtFE

X₁ = sex (male = 1, female = 2).

X₂ = age (years).

X₃ = educational level (number of years of schooling).

X₄ = household size (numbers).

X₅ = Farm size (hectares).

X₆ = Experience (years).

X₇ = Access to extension (Contact/ visit between farmers).

X₈ = Membership of Association (Member = 1, otherwise = 2).

b₁– b₈ = Regression coefficient.

a = constant.

U = error term.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

The results in Table 2 reveals that majority (66.7%) of the respondents were male. This indicates that male dominates and participated more in FtFE activities in the study area than the female. This might be due to the fact that men have relatively more freedom of movement, can travel freely from one place to another and can also participates/attends trainings, meetings, visits and dissemination of activities to fellow farmers than their female counterparts. Majority (59.3%) of the respondents were between the age range of 31-40 years while only few (4.6%) greater or equal to 61 years. The mean age of the respondents as depicted in Table 2 was 40 years. The implication of this finding is that the farmers are still in their economically active or productive ages and can therefore efficiently be engaged in FtFE activities especially as it involves movement from place to place to disseminate, transfer and share improved crop and livestock technology. The major age group of 31-40 years emanating from the findings could also strengthen or influences farmer willingness to adopt improved technology as young farmers are less conservative than their older ones. This conforms with the view of Tadesse (2008) that young farmers are keen to get knowledge and information than the older farmers.



Table 2: Socio-economic Characteristics of the Respondents

Variables	Frequency	Percentage	Mean (\bar{x})
Sex			
Male	100	66.7	
Female	50	33.3	
Age categories (years)			
≤ 20	1	0.7	
21-30	22	14.7	
31-40	89	59.3	
41-50	22	14.7	
51-60	9	6.0	
>61	7	4.6	40
Marital status			
Married	141	94.0	
Single	9	6.0	
Educational level (years)			
Primary education	36	24.0	
Secondary education	50	33.3	
Tertiary education	43	28.7	
No education	21	14.0	12
Farming experience (years)			
1-5	3	2.0	
6-10	40	26.7	
11-15	42	28.0	
16-20	43	28.7	
>20	22	14.6	15
Household size (number)			
≤3	12	8.0	
4-6	35	23.3	
7-9	54	36.0	
10-12	44	29.3	
≥13	5	3.3	7
Farm size (Ha)			
1-2	48	32.0	
2.1-3	33	22.0	
3.1-4	27	18.0	
4.1-5	28	18.7	
≥6	14	9.3	1.7

Source: Field Survey, 2016

Most (33.3%) of respondents had secondary education, 28.7% tertiary, 24% had primary education while only 14% had no formal educational attainments. This shows that most of the respondents in the study areas had some form of education. Educational attainment could enhance decision making ability among farmers, therefore, since majority of the farmers are educated, they are expected to be receptive to improved crop and livestock technologies,



and be more willing to share and transfer knowledge of improved practices. Educational attainment can therefore be suggested to be a stimulating factor to effectiveness of FtFE. As reported by Asiabaka (2002) that education opens gate way to interact and share experience with people outside one’s immediate environment, thereby motivating one to accept new ideas and practices brought to him by an outsider. These findings revealed that majority (71.3%) of the respondents have between 11 years to more than 20 years farming experience with a mean experience of 15 years. This indicates that most of the respondents have gained reasonable wealth of knowledge and experiences on crop and livestock production. According to Karuhanga *et al.* (2012), farmers with 15 years of experience have a valuable experience that can make them to be able to train and handle fellow farmers for improved knowledge and technology transfer. Therefore, the level of experience can lead to basic intelligence, better interaction and capability to disseminating knowledge of improved crops and livestock technologies among the farmers using the FtFE. Umoh and Kenan (2015) also confirmed that 15 years of farming experience could serve as vital source of information on sustainable farming practices to other farmers. The mean household size of respondents was 7 persons; this can be termed as relatively large household. The implication of the findings is that, family with relatively large household size can participate more in farmer-to-farmer (FtFE) dissemination of improved crops and livestock technologies and can strengthen social network through the expansion of FtFE linkages. The relatively large size of the family can also provide enough members that can help in the transfer, sharing and dissemination of improved technologies within and outside their communities.

Analysis of the Respondents’ Perception Level of Effectiveness of FtFE

The distribution of respondents based on their perception of the effectiveness of the FtFE as compared to previous extension approaches such as the T&V were presented in Table 3. The assessment of the different indicators revealed that majority (59.3%) perceived increase uptake of improved practices having a mean score of 3.8 as highly effective, followed by increased contact with farmers (44.7%) with mean score of 3.7.

Table 3: Respondents’ Perception Level of Effectiveness of FtFE

Indicators	Highly Effective		Effective		Less Effective		Ineffective		Mean
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	
Information flow	76	50.7	45	30.0	13	8.7	16	10.7	3.5
improved uptake	89	59.3	32	21.3	15	10.0	14	9.3	3.8
Capacity building	45	30.0	76	50.7	23	15.3	6	4.0	3.2
Access to inputs	56	37.3	65	43.3	14	9.3	15	10.0	3.5
Relevance/appropriateness of technologies	31	20.7	52	34.7	13	8.7	54	36.0	2.5
Increased production	78	52.0	54	36.0	18	12.0	0	0.0	3.6
Increased income	65	43.3	54	36.0	13	8.7	18	12.0	3.3
Increase contact with farmers	67	44.7	62	41.3	15	10.0	23	15.3	3.7
Multiplier effect	45	30.0	67	44.7	15	10.0	23	15.3	3.4
Grand total									3.4

Source: Field Survey, 2016



The main finding in this section is that based on the criteria for measurements of the effectiveness of FtFE where a mean score of 2.5 or greater than the value is considered as highly effective, all the ten assessed determinants for effectiveness in Table 3 fall within the range of highly effective. Moreover, the grand mean of the determinants was also found to be more than the bench mark of 2.5 which also suggests that all the determinants were highly effective.

The implication of the findings is that FtFE resulted in more uptake of the improved technologies, food availability, capacity building, access to inputs such as seeds, fertilizer and multiplier effect among the farmers are all effective.

Perceived Benefits of Farmer-to-farmer Extension Services

The result in Table 4 revealed that majority of the respondents’ reaped economic, social and capacity building. For instance, under the economic benefits, very high percentages (95.3%) of farmers benefited from increased production and (88.0%) earn income from selling of seeds. Under the social benefits, majority (94%) of the respondents improved their social status and also increases their social networks. With these findings, the farmers are expected to be motivated and share the information/technology with their friends, neighbors and family members so that the benefits can also accrue to their close associates. This can help create social and economic networks among the farmers through making of new friends, gaining exposure and conversant to different technologies and different places. This is in line with the study of Karuhanga *et al.* (2012) which revealed that farmers had increased financial and social benefits, gets financial benefit in selling of seeds seedlings/grafted plants, pasture and seed multiplication, generate income from private investors when they provide them with services or advice on the establishment of farms through FtFE.

Table 4: Respondent’s Perceived Benefits of Farmer-to-farmer Extension Activities

Benefits of FtFE	*Frequency	Percentage
Economic benefit		
Earn income from selling seeds	132	88.0
Seed multiplication and marketing	98	65.3
Increased production	143	95.3
Social benefit		
Improved social status	141	94
Increased social network	136	90.7
Gain exposure	111	74.0
Capacity building		
Improved business skills	121	80.7
Gain knowledge	112	74.7

*Multiple responses allowed.

Source: Field Survey, 2016

Factors Influencing Farmers’ Perception of the Effectiveness of FtFE

Multiple regressions were used to test the relationship between the perception of effectiveness of FtFE and respondent’s socio-economic characteristics. The result of the analysis is depicted in Table 5. The results showed that there is significant relationship between the factors and effectiveness of FtFE. The results shows that age, educational level, household



size, income level and farming experience were positively related to effective FtFE in the area. The relationship was statistically significant at 1% level of significant. This implies that the more educated the farmers, the higher level of effectiveness of FtFE because this will enable them disseminate and pass information on improved technologies to fellows across their communities. Findings of Asiabaka (2002) opined that educational level of farmers opens gate way to interact and share experience with people outside one’s immediate environment, who could affect dissemination and transfer of improved technologies.

The years of farming experience also contribute to effectiveness of FtFE, this is because as farmers’ increases in years of farming, they will gained reasonable wealth of knowledge and experiences on crop production and livestock. They will enhance effective FtFE. The accumulation of knowledge and skills (experience) will help them become active in disseminating improved information and technologies of crop and livestock to fellow farmers within and outside their community. This confirmed with the findings of Karuhanga *et al.* (2012) who reported that farmers with up to 15years of experience are said to have a valuable experience that can make them to be able to train and handle fellow farmers for improved knowledge and technology transfer.

On the other hand, house hold size (number of people) will influence FtFE because as the number of household increases, there will be increase networking and dissemination of technology for increased uptake in the community, advancement in age may lead to lack of interest in FtFE as it involves distance travelling to contact farmer, but economically active/ productive ages can efficiently be engaged in FtFE activities especially as it involves movement from place to place to disseminate, transfer and share improved crop and livestock technology. Furthermore, the farm size, access to extension and membership in social group were also positively related to effective FtFE in the area. The relationship was statistically significant at 5% level of significant. This implies that the more they participate in FtFE activities the more effective the FtFE.

Table 5: Factors Influencing Perception of the Effectiveness of Farmer-to-farmer Extension

Variables	Coefficient	Std. Err.	T-value
Constant	0.06455724	0.1274629	5.06***
Sex	0.0302429	0.040118	0.75
Age	0.705449	0.0056167	12.56***
No. of years of Education	0.2403079	0.039166	6.14***
Household size	0.7732932	0.0426161	18.15***
Annual income	0.0413213	0.0031878	12.96***
Farm size	0.0247604	0.0106476	2.33**
Extension access	0.0118489	0.0045988	2.58**
Membership of farmer Association	0.0219569	0.0086838	2.53**
Farm experience	0.0252926	0.0048868	5.18***
R ²	0.98		

Note: ** and *** are significant at 5% and 1%, respectively

Source: Field Survey, 2016



CONCLUSION AND RECOMMENDATIONS

The analysis clearly indicated that the farmers are engaged in different FtFE activities. Overall the respondents perceived that FtFE in the study area was highly effective. This entails that dissemination information on improved crop and livestock technologies through the FtFE have great potentials in improving agricultural extension delivery in the area. Farmer's capacity was build, a number of benefits were obtained and it also showed that FtFE interaction have effectively conveyed agricultural technologies and the respondents have effectively utilized the FtF extension in the area. There are potentials of ensuring more rapid and wide spread of agricultural knowledge diffusion in a more cost effective manner through use of the FtFE approach. Based on the results of the research, the following recommendations are proffered:

1. To improve overall effectiveness of FtFE systems, the policy makers and other stakeholders should mount educational enlightenment campaigns through multi-media on the significance of FtFE so as to reach more farmers. to they should be encouraged to build their technical capacity and learn skills/knowledge for the purpose of increasing productivity.
2. There is need for capacity building of extension staff and farmers on the effective use of FtFE as mechanism of technology transfer especially for extension service providers such as BOSADP. It is also essential to increase and strengthen supervision and monitoring of lead farmer's activities to improve the dissemination of crop and livestock technologies in the area and to encourage them participate more in FtFE activities. Lead farmers are responsible for training of other farmers on FtFE.
3. Encouragement of farmer networking through membership of farmer associations and cooperative societies. This is based on the fact that membership in social groups was found to be positively related to effective FtFE in the study area. Use of information and Communication Technologies (ICTs) to build friendships, networks and share information are essential tools for improving effectiveness of FTFE.

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