Assessment of Effectiveness of Agricultural Extension Systems Employed by Farmer Based Organisations in the Central Region of Ghana

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Abstract
The study examined the effectiveness of agricultural extension systems employed by Farmer Based Organisations (FBOs) in the central region of Ghana. In conducting the study, a combination of purposive and convenient sampling methods were employed in selecting FBOs and other key actors in the field. A mixed research approach involving the collection and analysis of both qualitative and quantitative data was employed in the study. Focus group discussions and questionnaire survey were the main methods used in data collection. The quantitative data collected were analysed statistically using the SPSS version 16 software. The findings showed that overall the performance indicators of all the extension systems were scored high by the FBOs. However, the performance indicators of Market Oriented Agriculture System were scored low by the Citrus Growers and Marketers Association (CIGMA). Other performance indicators scored low were research-extension linkages, adoption of technology and farm productivity. There were also differences among the various extension systems on some of the indicators. The performance indicator scores are in consonance with FBOs rating of the effectiveness of their extension systems. Except for the market-oriented agriculture system which was perceived by CIGMA as not effective, the four remaining FBOs rated their extension systems namely commodity based approach, Training and Visit, outgrower scheme and Farmer Field Fora as either very effective or effective.

Keywords: Agricultural Extension Systems, Farmer Based Organisations, Extension Systems Effectiveness

Évaluation de l'efficacité des systèmes de vulgarisation agricole utilisés par des organisations des agricuteurs dans la région Centrale du Ghana

Résumé
L'étude a examiné l'efficacité des systèmes de vulgarisation agricole utilisés par les organisations fondées sur les agriculteurs (FBO en anglais) dans la région centrale du Ghana. Lors de la réalisation de l'étude, une combinaison de méthodes d'échantillonnage proposées et pratiques a été utilisée dans le choix des FBO et d'autres acteurs clés sur le terrain. Une approche de recherche mixte impliquant la collecte et l'analyse de données qualitatives et quantitatives a été utilisée dans l'étude. Les discussions en groupes et les

enquêtes par questionnaire ont été les principales méthodes utilisées pour la collecte de données. Les données quantitatives recueillies ont été analysées statistiquement à l'aide du logiciel SPSS version 16. Les résultats ont montré que, dans l'ensemble, les indicateurs de performance de tous les systèmes de vulgarisation étaient élevés par les FBOs. Cependant, les indicateurs de performance du Système d'agriculture orientée marché ont été marqués faible par l'Association des producteurs et vendeurs d'agrumes (CIGMA). D'autres indicateurs de rendement qui étaient bas est les liens de recherche-vulgarisation, l'adoption de technologie et la productivité agricole. Il existe également des différences entre les différents systèmes de vulgarisation sur certains indicateurs. Les scores des indicateurs de performance sont conformes à la notation des FBOs sur l'efficacité de leurs systèmes de vulgarisation. À l'exception du système agricole axé sur le marché qui a été perçu par CIGMA comme non efficace, les quatre FBO restants ont évalué leurs systèmes de vulgarisation, à savoir l'approche basée sur les produits, la formation et la visite, le programme des entreprises et les forums de terrain des agriculteurs, qui était soit très efficaces, ou efficaces.

Mots-clés: Systèmes de vulgarisation agricole, organisations des agriculteurs, efficacité des systèmes de vulgarisation

Introduction

Ghana, like most other developing countries has about 60% of the population engaged in various forms of agriculture for their livelihoods (ISSER, 2010). However, about 80% of Ghana's total agricultural output is produced by smallholder families such as farmers, processors and traders. Most of the smallholder farmers operate as individuals and therefore lose the opportunities that groups offer like training and information, access to loans and inputs as well as efficient extension-farmer interaction.

According to Christoplos (2010), agricultural extension also known as rural advisory services is identified with activities that provide the information and services needed and demanded by farmers and other actors in rural settings to assist them in developing their own technical, organisational, and management skills and practices so as to improve their livelihoods and well-being. A MOFA-DAES Report (2003), explained that agricultural extension is commonly identified with activity whereby agricultural extension workers interact with and teach farmers improved farming practices, new techniques and more productive or more efficient technologies or packages of technologies. The report also asserts that many of these agricultural extension workers are organised into an agricultural extension system which provides them with a constant supply of useful extension messages, technical and administrative supervision, and logistical support.

The concept of agricultural extension has been explained by different authors in different ways. While Duvel (2004) used the word "model", Worth (2002) named it as "approach" and Rivera (1984) called it “system”. In this study, the concept of extension system means the same as extension approach or extension model. Leeuwis (2004) referred to an extension system as the fundamental planning idea adopted by agricultural extension organisations to aid them appreciate the basic principle and methods of extension to achieve its aim. Extension systems influence the type of

beneficiaries, resources required and their allocation; the extension methods employed as well as effects of extension efforts on beneficiaries (MoFA-DAES, 2010).

Various countries and donors when planning and implementing extension service delivery, use different extension systems. In Ghana, the major extension systems that have been used by the public sector and to a smaller extent, the private sector include, the General Agricultural Extension Approach, Training and Visit (T&V) System, Decentralized Extension System and participatory approaches (e.g. Farmer Field Schools -FFSs) in addition to innovative ICT-based approaches which provide advice to farmers on-line (MOFA-DAES Report, 2003). These systems have varied from top-down to participatory approaches.

According to Onumah *et al*. (2007), farmers in most African countries have the history of performing certain agricultural tasks as a group rather than as individuals. This group action happens when individuals are expected to harness their efforts for an expected outcome (Ostrom, 2010). In Ghana for instance, informal labour groupings and customary arrangements provide reciprocal labour exchange for farm work, which is often called *nnoboa* (Salifu and Funk, 2012). The late 1980s witnessed the formation of farmers' self-help organisations which are commonly referred to as Farmer Based Organisations (FBOs). By 2010, the number of FBOs in Ghana was estimated to be around 10,000 (Salifu *et al.,* 2010). FBOs serve as a medium for external support (MoFA, 2009) and provide an opportunity to influence policy decisions to their benefit through advocacy and lobbying (Hosain *et al*., 2003) among others. The Ghana National Association of Farmers and Fishermen (GNAFF) for example is responsible for negotiating producer prices of cocoa and coffee. FBOs are also important in technology dissemination process through farmer to farmer extension thus contribute towards solving the problems of inadequate funding and low extension-farmer ratio.

Kusek and Rist (2004) and other researchers have emphasised the difficulty in assessing the effectiveness of agricultural extension systems due to lack of evaluative criteria or agreed-on outcome measures. However, researchers have used extension effectiveness indicators to measure the extent of effectiveness of extension systems (Saravanan and Veerabhadraiah, 2007; Sulaiman and Sadamate, 2000). Such indicators may be used as pointers which help to measure the extension system effectiveness. In Ghana, performance indicator scores have been used as a measurement of extension systems effectiveness (MOFA-DAES Report, 2003).

The public sector agriculture extension providers (MoFA), NGOs, and commercial companies provide extension services to farmer groups/FBOs in Ghana. These service providers have implemented different extension systems to communicate improved technologies and other information to farmers. However there have been criticisms about service providers especially the public service providers for utilising extension systems that are ineffective in meeting farmers' needs (MoFA, 2002; Ameza and Hesse, 2004). According to Asibey-Bonsu (2012), there is limited information on FBOs activities, and performance in Ghana and concludes that the sector seems less vibrant than expected. Farmer Based Organisations (FBOs) in the Central Region of Ghana have benefitted from different service providers who have used different extension systems to meet farmers' needs. However there is limited information on the effectiveness of extension

systems used by FBOs in the Central Region.

Methodology

The study was conducted in five administrative jurisdictions (one Municipal and four Districts) in the Central Region, Ghana. These include Effutu Municipal and Abura-Asebu-Kwamankese, Asikuma- Odoben-Brakwa, Gomoa East and Twifo-Hemang-Lower-Denkyira Districts.

The strategy employed for this study is the mixed methods. It involved the collection, analysis and integration of quantitative (e.g. surveys) and qualitative (e.g., focus groups) *data*. The target population included all farmers identified with the selected FBOs in the five administrative jurisdictions.

The study employed two main non-probability sampling techniques namely the purposive and the convenience sampling techniques. First, the purposive sampling technique was employed in selecting the study areas (five administrative jurisdictions). This was to ensure that the selected municipality/districts have active FBOs operating in them. Secondly, five active FBOs were also purposively selected based on the fact that, they identified with extension service providers. Finally, the convenience sampling technique was employed to select 177 members of the FBOs during their respective meeting schedules. The selection method ensured quick and easy access to the FBO members.

The study used two main instruments to collect primary data from each of the five FBOs. First, there was a structured questionnaire designed to collect quantitative information from at least 30 representatives from each FBO. This was followed by 15 focus group discussions (3 per study area) with 5-10 representatives from each FBO to collect qualitative information. Focus Group Discussions (FGDs) were conducted during meeting periods. Analysis of the data was done using both quantitative and qualitative analytical techniques. Quantitative data were analysed using descriptive statistics such as frequency counts, percentages and presented in tables. Interview scripts were transcribed and crossed checked at the end of each day and presented in quotes.

Results and Discussions

Nature of extension systems identified with FBOs in the Central Region

Information on key characteristics of FBOs and members and types and characteristics of extension systems used by the various FBOs were obtained through structured questionnaire and FGD to facilitate respondents' assessment of the nature of extension systems used by FBOs in the Central Region.

Key characteristics of FBOs and members

The five FBOs studied were Abura-Asiebu-Kwamankese Co-operative Citrus Growers (CIGMA), Breman Asikuma Cocoa Abrabopa Association (CAA), Nsuekyir Wonsom Farmers Association (Wonsom), Buabin Oil Palm Outgrowers Association (OPOA) and Gomoa Amoanda Potato Farmers Association (Potato). The study showed that the FBOs were established between the years 2003 and 2013; with the majority established between 2003 and 2008. The study also indicated that three out of the five FBOs were externally initiated for implementation of donor funded project.

All the FBOs studied were made up of smallholders with land size of one to five (1-5) acres.

It was also observed that all the FBOs are of mixed groupings comprising male and female members. However, majority (3 of 5) are male dominated groups. The male dominated FBOs, according to the study have cash crops; citrus, cocoa and oil palm as their crops of

interest while the female dominated FBOs have food crops such as maize and potato as their crops of interest respectively.

The results showed that majority (4 of 5) of the FBOs had a startup membership of 35-60 with CIGMA having 500 members for a start. All the FBOs are registered with the Registrar General's Department with one out of the five registered with the District Assembly and the Department of Co-operative in addition. Table 1 summarises the key characteristics of selected FBOs and their members.

Types and characteristics of extension systems used by the various FBOs

Table 2.shows the extension systems adopted by the FBOs are Market Oriented Agricultural System (MOAS), Commodity based Approach (CA), Training and Visit (T&V) System, Outgrower Scheme (OS) and Farmer Field Fora (FFF). The study reveals that MOAS is adopted by Citrus Growers and Marketers Association (CIGMA) whose collective activity can be described as production and marketing. The system is characterised by a linkage of citrus producers with a processing industry as well as the provision of training on fruit production to the citrus farmers. The extension service provider is the Ministry of Food and Agriculture (MoFA).Table 2 also shows that the commodity approach is adopted by the Cocoa Abraboba Association (CAA) whose collective activity can be described as production and marketing. The results in Table 2 indicates that the extension service provider is the FBO-Cocoa Abraboba Association. The system entails the provision of credit inputs to cocoa farmers. It is characterised by the provision of sale points to enable farmers market their cocoa at better prices.

Table 2 also indicates that the Training and Visit (T&V) system is adopted by the Wonsom FBO whose collective activity can be described as production. The FBO members reported that the system is supported by the Millennium Development Authority (MIDA). They indicated that they were trained every two weeks by the extension officers of MoFA on "*how to cultivate maize for higher yields".* The outgrower scheme system is associated with the Oil Palm Outgrowers Association (OPOA) whose collective activity can be described as production and marketing FBO (Table 2). The system is described by the service provider (TOPP) as a contract or an agreement signed between farmers, National Investment Bank (NIB) and Twifo Oil Palm Plantation (TOPP). Under the agreement, the farmer provides a four acre land for oil palm cultivation, NIB provides loan to the farmer to develop and maintain the plantation under the instruction and supervision of TOPP. TOPP has the mandate to harvest and buy the Fresh Fruit Bunches (FFB) cultivated by the farmer to feed its mill. The loan disbursed by NIB is for a period of 20 years but the repayment or deduction starts after six years.

Finally the table shows that respondents in Potato have a collective activity as production. Respondents indicated that the extension system they have adopted is the Farmer Field Fora (FFF), provided by MoFA under the Root and Tuber Improvement Programme (RTIMP). This system involves bringing together farmers, researchers and extension staffs to interact and find solutions to identified production constraints of root and tuber crops.

Effectiveness of the extension systems identified with FBOs in the Central Region

Assessment of effectiveness of the extension systems identified with FBOs was measured based on performance indicator scores and farmers' perception of extension approaches.

Table 1: Characteristics of selected FBOs

Description	Name of FBOs				
	CIGMA	CAA	Wonsom	OPOA	Potato
Year Established	2003	2008	2005	2007	20013
Location	Abora Aseibu	Breman Esikuma	Nsuekyir	Jukwa	Gomoa Amoanda
Crop of Interest	Citrus	Cocoa	Maize	Palm Oil	Sweet potato
Start-up Membership	60	35	50	500	40
Current Membership Status	747	151	50	986	40
Gender of Membership	Male dominance (Males=475; Females=272)	Male dominance (Males=97; Females=54)	Female dominance (Males=14; Females=36)	Male dominance (Males=749; Females=237)	Female dominance (Males=9; Females=31)
Purpose	To access opportunities for marketing their citrus which is a major cash crop grown in the district	To gain access to inputs and technical advice	To gain access to improved production techniques To provide mutual help to members	To produce fresh fruits bunches to feed the TOPP oil mill	To gain access to improved technology To provide opportunity for marketing produce
FBO registration	Registered with: District Assembly, 2011; Registrar General's Department, 2011; Department of Co-operatives, 2012	Registered with the Registrar General's Department, 2008	Registered with the Registrar General's Department, 2005	Registered with the Registrar General's Department, 2007	Registered with the Registrar General's Department, 2013
Supporting Agency / Extension Service Provider	MoFA under MOAP Fruitland	Cocoa Abrabopa	MoFA under MIDA	TOPP NIB	MoFA under TRIMP

CIGMA: Citrus Growers and Marketers Association
CAA: Cocoa Abrabopa Association
OPOA: Oil Palm Growers Association

Table 2: Types and characteristics of extension systems used by the various FBOs

FBO	Type of Collective Activity	Type of Extension System in Use	Extension Service Providers	Characteristics of Extension System
CIGMA	Marketing	Market-Oriented System (MOAS)	MoFA under MOAP	• Entails the linkage of citrus producers with Processing Industries • Involves provision of fruit production training • Involves promotion of product certification
CAA	Production and Marketing	Community-Based Approach / System (CA)	CAA	• Entails provision of credit inputs to cocoa farmers • Provision of sale point to farmers for ready market of their cocoa
Wonsom	Production	T&V System	MIDA	• Provision of loans to farmers for the cultivation of maize • Provision of training to maize farmers
OPOA	Production and Marketing	Outgrower Scheme (OS)	NIB and TOPP	• Contractual agreement between farmers, NIB and TOPP that involves provision of loan to farmers to develop and maintain oil palm plantation under supervision of TOPP • Require farmers to sell produce to TOPP
Potato	Production	Farmer Field Fora (FFF)	MoFA under RTIMP	

Performance indicator scores of extension systems used by the various FBOs

Respondents were asked about their perception on selected performance indicators of the various extension systems used by their FBOs. Table 3 presents a summary of performance indicator scores of extension systems used by the various FBOs.

The results presented in Table 3 show that all the extension systems of the five FBOs (89.5% of CIGMA members, 95.2% of CAA members and all members of Wonsom, OPOA and Potato) provided training and workshops to the

Table 3: Performance of extension systems in the Central Region, Ghana

Indicators	FBOs AND EXTENSION SYSTEMS									
	CIGMA (MOAS)		CAA (CA)		WONSOM (T&V)		OPOA (OS)		Potato (PFF)	
	N	%	N	%	N	%	N	%	N	%
Training / Workshop	34	89.5	40	95.2	30	100	31	100	36	100
Research Ext. Linkage	3	7.9	0	0	0	0	25	80.6	20	55.6
Input Provision	15	39.5	40	95.2	30	100	31	100	36	100
Credit Provision	0	0	0	0	0	0	31	100	0	0
Provison of Marketing Outlets	38	100	18	42.9	0	0	31	100	0	0
Provision of Essential Services	34	89.5	40	95.2	30	100	31	100	0	0
Adoption of Technology	15	39.5	40	95.2	11	36.7	31	100	25	69
Farmer Participation	34	89.5	40	95.2	30	100	31	100	36	100
Farm Productivity-yield	15	39.5	42	100	30	100	31	100	36	100

( ) Extension system N* multiple number of responses

Table 4: FBOs perception on effectiveness of extension systems

Rating	*CIGMA (%)*	*CAA (%)*	*Wonsom (%)*	*OPOA (%)*	*Potato (%)*
Very Effective	15.8	35.7	50	87.1	19.5
Effective	18.4	59.5	43.3	12.9	80.5
Somehow Effective	23.7	4.8	6.7	0	0
Not Effective	21.1	0	0	0	0
Not Effective at all	21	0	0	0	0

members. In the case of research-extension linkage, the majority of the OPOA (80.6%) and Potato participants (55.6%) agreed the extension systems provide linkage. In contrast, only a few (7.9%) of CIGMA members reported favourably on the provision of linkage on input provision. All participants of Wonsom, OPOA and Potato reported their system provides inputs for members, whereas the majority of CAA (95.2%) and a minority of CIGMA (39.5%) reported their systems ensure input provision. Credit was provided by only OPOA with all FGD participants of the FBO responding positively, while the other FBOs participants responded negatively. Also, none of Wonsom and Potato FGD participants agreed their system ensures provision of market outlets. On the other hand, all of CIGMA and OPOA, and some (42.9%) of the CAA members indicated their systems ensures provision of market outlets. Provision of essential services to members was extensive among all the systems except FFF used by Potato. A minority of 39.5% CIGMA and 36.7% Wonsom participants, respectively indicated their systems ensured adoption of technology whereas majority reported in the other FBOs. Farmer participation was full in all the extension systems. In addition productivity was also improved in all the systems except CIGMA where only 39.5% participants indicated their systems helped improve their productivity.

Assessment of FBOs' perception of identified extension systems

Respondents were asked about their perception of the various extension systems used by their FBOs in reaching members. A five-point Likert-scale in Table 4 was used to rate the extension systems effectiveness. These ranged from "Very effective" (5) to "Not very effective at all" (1). Higher perception scores indicated more acceptance of the effectiveness of the system.

Table 4 indicates that majority (87.1% and 80.6%) of OPOA and Potato respondents perceived their systems as very effective and effective, respectively. However, 23.7% CIGMA respondents perceived their system as somehow effective while 21.1 % and 21% CIGMA respondents perceived their system as not effective and not very effective respectively. The results suggested that four out of the five FBOs namely; OPOA, Potato, CAA and Wonsom were perceived as effective while CIGMA was perceived as not effective. The results are in consonance with FBOs perception on the effectiveness of extension systems. During the FGD, a physically challenged woman with the OPOA group who also happened to be the only woman to attend the meeting indicated that the extension system was very effective. She said that

> *"Though I had the land, I did not have the resources to cultivate it but through this outgrower scheme, I have about ten acres of oil palm that have started fruiting, the proceeds from which I have started petty trading and my children are also being educated".*

A member of the Potato FBO during the FGD explained that,

> *'The FFF has been very effective and beneficial because we acquired knowledge and skills that resulted in yield increase that enhanced our financial status."*

Some negative comments were however made by members of the CIGMA group. A member of the group indicated that,

> *"The* Market Oriented Agricultural System *(MOAS) provided little opportunity for Research-Extension-Farmer Linkages resulting in low adoption of technologies and reduced yield".*

Respondents' remarks were consistent with the quantitative data collected during the survey.

Conclusion

The study revealed that the five FBOs studied were made up of mixed groups of males and females with small holdings of one to five (1-5) acres of land. All the FBOs were found to be registered with the Registrar General's Department with one out of the five registered with the District Assembly and the Department of Co-operative in addition. The study also indicated the use of different extension systems (market-oriented agricultural system, commodity-based approach, training and visit, outgrower scheme and farmer field fora by the five FBOs studied.

Overall, the performance indicators of all the extension systems were scored high by their FBOs. However, the performance indicators of Market Oriented Agriculture System (MOAS) were scored low by the Citrus Growers and Marketers Association (CIGMA).The performance indicators scored low were research-extension linkages, adoption of technology and farm productivity.

There were also differences among the various extension systems on some of the indicators. The performance indicator scores are in consonance with FBOs rating of the effectiveness of their extension systems. Except for the market-oriented agriculture system which was perceived by CIGMA as not effective, the four remaining FBOs rated their extension systems namely Commodity-Based approach, Training and Visit, outgrower scheme and Farmer Field Fora very effective or effective.

Based on the findings, it is concluded that four of the five extension systems effectively enhanced farmers' participation in research and extension linkages, adoption of technologies and farm productivity. Other beneficial effects are the provision of marketing outlets, credit and inputs to farmers. However the study also showed that the market-oriented agriculture system was not effective with low scores in research and extension linkages, adoption of technologies, farm productivity and provision of marketing outlets, credit and farm inputs. These findings were corroborated by the FGDs in which the FBOs indicated among others that improved farm productivity enhanced their financial status enabling them to engage in livelihood activity such as petty trading which helped to educate their children.

The study therefore recommends that extension service providers should strengthen their collaboration with the identified FBOs especially CIGMA which adopted the market-oriented agriculture system. This will help address the issues of access to credit, transfer of improved technologies to FBOs, Research-Extension-Farmer linkages and improved farm productivity.

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