DIRECTORATE OF AGRICULTURAL EXTENSION SERVICES

Agricultural Extension Approaches Being Implemented in Ghana

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1.0 Introduction

In Ghana, majority (60%) of the population lives in rural areas and depends either directly or indirectly on agriculture for their livelihood and survival. Agriculture plays an important role in economic growth, food security, poverty reduction, livelihoods, rural development and the environment (Green et al., 2005). Growth in the agricultural sector stimulates higher rates of growth in the economy through forward linkage activities such as processing and transportation, and backward linkages like the provision of services to the sector, with further growth spurred as a result of spending incomes earned from all these productive activities (MoFA, 2003; UN, 2008; Winter-Nelson and Aggrey-Fynn, 2008).

The traditional subsistence agriculture is gradually been replaced by market-oriented or commercial agriculture. This is probably due to factors including rapid economic growth in both developing and developed countries, introduction of new technologies, market expansion, market liberalization, increased demand for food, decreasing farming population as result of urbanization, liberalized and open economic policies, bilateral and multilateral economic agreements, developed infrastructure facilities in farming areas and government agricultural policies (Mahaliyanaarachchi and Bandara, 2006).

Improvement in general agricultural production, productivity and sustainability will depend on farmers' willingness and access to new technology. Agricultural extension and advisory services play an important role in addressing this challenge. Agricultural extension services play a pivotal role in ensuring that the clientele (farmers) have access to improved and proven technologies and

that their concerns and needs are properly addressed by relevant service providers. Agricultural extension contributes to improving the welfare of farmers and other people living in rural areas as extension advisory services and programs forges to strengthen the farmer's capacity to innovate by providing access to knowledge and information. However, the role of extension today goes beyond technology transfer to facilitation; beyond training to learning, and includes assisting farmer groups to form, dealing with marketing issues, addressing public interest issues in rural areas such as resource conservation, health, monitoring of food security and agricultural production, food safety, nutrition, family education, and youth development and partnering with a broad range of service providers and other agencies (USAID, 2002).

Apart from the "classical" objective of agricultural advisory services to improve agricultural productivity, advisory services can also play an important role to meet the new challenges agriculture is confronted with: changes in the global food and agricultural system, including the rise of supermarkets and the growing importance of standards and labels; growth in non-farm rural employment and agribusiness; constraints imposed by HIV/AIDS, and other health problems that affect rural livelihoods; and the deterioration of the natural resource base and the emerging need to cope with climate change(agric advisory).

Development experiences of the last decades have also revealed that human resources development is essential for food security and market integration. This means that achieving sustainable agricultural development is less based on material inputs (e.g., seeds and fertilizer) than on the people involved in their use. This focus on human resources calls for increased

knowledge and information sharing about agricultural production, as well as on appropriate delivery approaches, channels and tools. When new agricultural technologies are generated by research institutions (universities, private companies) and by the farmers, Agricultural extension services (including traditional extension, consultancy, business development and agricultural information services) are expected to disseminate these technologies amongst their clients. The role of research and extension services is to give adequate, specific and unbiased technical and management information and advice in direct response to the needs of their clients (farmers). However, due to weak extension systems, varied and heavy loads of extension staff, low or non-adoption of new agricultural technologies by farmers, poor farmer access to other resources (credit, land, market etc) and lack of access to and relevant training by both service providers and farmers. In many countries low agricultural production has been attributed, among other factors, to poor linkages between Research-Advisory Service-Farmers and to ineffective technology delivery systems, including poor information packaging, inadequate communication systems and poor methodologies (rural comm. and devt).

Extension services are organized and delivered in a variety of forms, with the ultimate aim of increasing farmers' productivity and income. The question is how can farmers gain access to knowledge, information on improving practices along the value chain to adopt, increase yield and income. The success of extension in achieving this will however depend on the extension approach that is being used to reach or communicate to farmers. The use of innovative approaches and strategies to increase coverage is therefore a concern for all involved in agriculture extension and advisory services. In Ghana a range of approaches to extension delivery (from to-down commodity-based approach to a more participatory approaches) have

been promoted over the years by the various extension service providers, including government (MoFA, the main actors in extension), non-governmental organizations (NGOs: Finatrade, Actionaid, Care, Plan etc), producer organizations (BOPP, TOPP, GREL, COCOBOD) and other farmer organizations. The failure of many of these extension approaches to meet their goals effectively, coupled with inadequate personnel and limited budgets for supporting public extension, has led to continuous modification and experimentation with existing approaches.

However, such modifications has been ongoing for a long time; hence, there is no information on its success to determine their strengths and weaknesses. It is apparent that little is known about the capacity, quality of service, and performance of extensions approaches in Ghana. This type of information is urgently needed to assess the strengths, weaknesses, and performance of extension, and to strengthen it to reduce rural poverty and to improve rural livelihoods. As a result of this MoFA commissioned this study in order to assess the agricultural extension delivery approaches being implemented in Ghana to obtain information that will assist DAES in its role of backstopping extension delivery in the districts. This will help to address the following issues: how effectively are extension approaches being used? Which conditions are best suited for which approach being delivered? What extension delivery approaches are being applied by DADU and are not benefiting from donor assistance? Are delivery approaches of DADU complementary or in conflict with those of NGOs in their districts?

The objective of the study is to evaluate the effectiveness and efficiency of the various agricultural extension delivery approaches being implemented in the country. Specifically to

- Review and categorise the agricultural extension delivery approaches being implemented in the country
- Determine the effectiveness of the identified extension delivery approaches
- Determine the efficiency the identified extension delivery approaches
- Assess farmers' perception of the identified extension delivery approaches
- Make recommendations for improving extension delivery to farmers.

2.0 Review of Agricultural Extension

2.1 Definitions of extension

Agricultural extension can be defined as the entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills, and technologies to improve their livelihoods and well-being (Birner, Davis, Pender, Nkonya, Anandajayasekeram, Ekboir, *et al*., 2006). Extension has been recently defined as systems that facilitate the access of farmers, their organizations and other market actors to knowledge, information and technologies; facilitate their interaction with partners in research, education, agribusiness, and other relevant institutions; and assist them to develop their own technical, organizational and management skills and practices (Christoplos, 2010).However, donors (World Bank) agree that services must be provided in a fundamentally different way than in the past, emphasizing on a framework for agricultural service provision that might be effective under current circumstances in developing countries. This framework puts agricultural extension into a much broader context of a demand-led service market. Hence the term "advisory services" is used instead of "extension", to include the many non-traditional tasks, such as market information, micro-finance, health issues (AIDS), farmers' self-organisation and the like (en-ext)

2.2 Definition of Extension Approach

Agricultural Extension Services in Ghana dates back to the nineteenth century with the aims of increasing agricultural productivity and production. For research to be effective there must be an efficient mechanism whereby its findings can be used by the end users (farmers). The process of making research findings available is the function of extension. Accordingly, research produces innovations which are passed on to extension which in turn passes them to farmers (Mettrick,

1993). Developing a medium to exchange information is vital because it is necessary to integrate information from researchers, farmers and extension agents to be able to develop technologies that work.

According to (extension approaches), confusion arises when talking about different approaches to extension as different authors use different words in explaining the concept (approaches/systems/models). Rivera (1984) used "system", Worth (2002) calls it "approach" Duvel (2004) refers to it as a "model".

Extension approach refers to the doctrine for an organization, which informs, stimulates and guides such aspects of the organization as its structure, mission, vision, leadership, its programs, strategies, its resources and linkages. An extension approach influences the choice of the target audience, the resource requirements and the allocation, their methodologies employed, and the results and impacts of the extension efforts.

The meaning of an approach also differs. Leeuwis (2004), referred to an extension approach as the basic planning philosophy that is being adopted by an agricultural extension organization. This helps extensionists to understand the fundamentals, concepts and functional methods of extension adopted to fulfill its aims, especially in the planning phase.

Hagmann and Shultz (2000), explained an approach as a way in which different guiding principles are applied in a specific situation to fulfill different purposes and/or target specific development beneficiaries, whereas Bolinger, et al (1994:11), see an approach as consisting of a series of procedures for planning, organizing and managing the extension institution as well as

for implementing practical extension work by staff with technical and methodical qualification and using the necessary and appropriately adapted means.

Types of extension approaches

Several approaches have been tested, and adopted by countries in Africa to improve the technology dissemination process are identified.

There are common characteristics which all extension approaches share:

- All function through non-formal education
- All have content related to agriculture
- All use communication techniques and aids
- All seek to improve the capabilities of rural people.

Many extension approaches currently in use in Ghana and other SSA are combinations of these broad categorization (Table1).

Table 1

Categorization of Extension Approaches

Axinn (1998)	Gêmo et al. (2005)
1. General agriculture	1. Public
2. Commodity	2. Commodity
3. T&V	4. T&V
5. Agricultural participatory approach	3. NGO
6. Project approach	4. Private sector
7. Farming systems research and extension (FSR/E)	5. Farmer field schools (FFS)
8. Cost-sharing	
9. Educational institute approach	

Each of these approaches of these approaches can be characterized by the following dimensions:

- The basic assumptions made by those who established it. This refers to the problems and issues perceived that require a particular strategic approach to solve them. The assuptions are influenced by the views of the nature of the human, technical biological, physical, social, cultural, administrative, political, and diplomatic ecosystem in which extension will function.
- The purposes which it is designed to achieve. "Purpose" refers to the underlying principles of the basis for the approach. It also determines what it is supposed to achieve, the goals.
- The way in which the control of program planning is carried on, and the relations of those who control program planning to those who are the main target audience for the program.
- The nature of the field personnel including such aspects as their density in relation to clientele (ratio of field staff to clientele), levels of training, reward systems, origin, gender and transfers.
- The resources required, and various cost factors, such as the heavy reliance on manpower compared with more use of mass media etc.
- The typical implementation technique used in executing the program.
- The variables or outputs by which the system measures its success. That is, which kinds of criteria are used to determine whether or not the system doing what it was designed to do?

In Ghana approaches of agricultural extension range from the top-down commodity-based approaches of the pre- and post-independence to more participatory approaches. Specifically, the

approaches that are still being used include the World Bank's Training and Visit (T&V), commodity, and participatory approaches and most recently farmer field schools (FFSs) in addition to innovative ICT based approaches which provides advice to farmers on-line and other approaches such as the promotion of mobile phones and community radio stations. These approaches are discussed below.

2.3 Training and Visit (T&V)

T&V is one of the earlier approaches that focused on transfer of technology using a 'top-down, one-size-fits-all approach. This approach was introduced after the department of agricultural extension services (DAES) had been organized under the unified extension systems (UES) concept. It was first adopted by the then Upper regions followed by the Volta region. Existing extension organizations were merged into a single national system. This approach was designed on the assumption that farmers lack technical knowledge for increasing productivity, hence the solution was therefore to provide them with modern technical knowledge. The approach is based on a set of managerial and organizational principles that are of broad applicability and which, when applied together, constitute an extremely powerful managerial tool (Yudelman, 1984).

This approach differs from the general extension by its emphasis on frequent in-service training for staff, regular visit to farmers' farms, promotion of extension/research linkage and improved extension management (Benor et al., 1984). In the process of service delivery, subject matter specialists (SMS) gave training to frontline extension agents on new but relatively simple technical issues, the extension agents then proceed to train farmers and/or farmer groups on the new technologies. The extension agents transfer concentrated standardised extension messages

concerning a selected crop or livestock, input supplies, or credit line, produced research institutions to the farmers. T&V was implemented in developing countries willing to use T&V nation-wide. The hierarchical line of command of the T&V extension system was seemingly fitting the political culture of many countries. This approach uses extension methods including group discussions, seminars and in-service training courses for extension staff and farmers, on-farm demonstrations and farmer field days (en-ext). Specific tools were: contact to a determined number of farmers' groups, handouts and technical fact sheets. T&V had been designed as a cost-efficient extension system. The delivery of messages was considered economic, as large numbers of farmers could be reached fortnightly.

The Bindlish and Evenson (1997) study showed that the T&V approach made extension more effective, led to agricultural growth, and realized high rates of return. In Kenya, Gautam (2000) found some benefits in terms of staff training, increased geographical coverage, and improved linkages with research (ext in ssa). However, due to the relatively high financial outlay required, the T&V approach could not be sustained at the end world bank funding. The approach came under attack in the 1980s due to the cost of financing coupled with criticisms of irrelevance, inefficiency, ineffectiveness, and lack of equity (Rivera, 2001)(ext ssa). It was also criticized due to the passive role allocated to farmers, as well as the failure to factor in the diversity of the socio-economic and institutional environments facing farmers and ultimately in generating behaviour change (Chambers and Ghildyal, 1984; Birner et al., 2006).

2.4 Participatory Approaches

The passive role of farmers in the T&V approach necessitated the promotion of participatory approaches where the need for empowerment of the farmer will be paramount. In this approach the role of the extension agent is to facilitate an in-depth situation analysis by the farmers themselves at the onset of their working relation. Once farmers have become aware of the causes of their problems and have identified the most pressing ones, the extension agent provides technical knowledge and technologies, which may be useful to address the problems identified. For this approach to work well, extension agents need not only agricultural expertise, but also good analytical, pedagogical, and facilitating skills (en-ext). What makes this approach participatory is that farmers are the principal decision-makers in defining goals, planning, implementing, and evaluating development activities. This helps in strengthening farmers' problem-solving abilities from the start. In relation to community development, the existence of a local government and a decentralized administration is a precondition. If the local government is not dominated by elites, then the accountability, effectiveness, and efficiency of local services can be substantially improved. Reality still looks different, but too much political pressure from donors could mean that solutions are imposed, running the risk of being rejected, and subsequently degenerating into a mechanistic application of the instruments.

Moreover, participatory approaches depend strongly on a conducible political and administrative environment. Moreover, for finding appropriate technological answers to farmer questions, researchers must take into account local constraints, risks, and cultural preferences. Therefore, it is best to involve farmers at all stages of the research process, from the definition of research issues, through the planning phase, implementation, and evaluation of research results.

2.5 Farmer Field Schools (FSS)

FFS is a participatory method of learning, technology development, and dissemination based on adult-learning principles such as experiential learning. Farmer field schools (FFS) were introduced into sub- Saharan African in the mid-1990s. They are being used in at least 27 SSA countries (Braun, Jiggins, Roling, van den Berg & Snijders, 2005). FFS originated from Asia, where it was developed to promote integrated pest management (IPM) programs. However, in Ghana FFS are being used for a variety of activities, including food security, animal husbandry, and soil and water conservation.

Farmers meet regularly for the duration of an entire cropping season. They learn by observing what is happening on the field, by discussing in groups what they have observed, and by hands-on management of the field from pre-planting to harvest. Through group interactions, attendees sharpen their decision-making abilities and are empowered by learning leadership, communication and management skills. Some of the participating farmers are selected to receive additional training so as to be qualified as farmer-trainers, who then take up training responsibilities (for some fee, possibly paid by their community) with official backup support such as training materials.

This approach aims to increase the technical competence of farmers concerning a single crop (e.g. rice, cotton, beans) or livestock, and to strengthen the social competence and confidence of farmers. Technical competence of farmers is increased by:

- Hands-on learning about agro-ecosystem concepts;

- Experiential learning in small groups: group members observe the happenings on the field, reflect together, decide together, and observe the results during later meetings;
- Combining farmers' knowledge with scientific ecological knowledge.

Social competences of farmers are fostered by:

- Group discussion and reflection processes;
- Presenting and explaining small group decisions to a larger audience;
- Energising exercises for group building.

The FFS addresses the problem of accountability in two ways: (i) The trainers who conduct the field school are bound by a strict timetable of sessions within a pre-specified curriculum, which can be easily verified by supervisors; and (ii) Continuous interaction with a cohesive group of trainees creates accountability to the group, which is enhanced by the participatory nature of the training methods. Accountability is presumed to be even greater when farmer-trainers who are members of the same community administer the training. These features are thus expected to ensure the quality and relevance of the service (knowledge) provided to the farmers.

The main weakness of FFS is its cost, which is likely to raise problems of financial sustainability. The intense training activities are expensive per farmer trained, so the amount of service actually delivered (the number of farmers trained) on a national level would be small. According to Quizon et al. (2004) FFS costs 62 $ USD per farmer trained. Cost-effectiveness and financial sustainability could be improved if farmer-trainers were to become the main trainers, perhaps with significant community funding, and if informal farmer-to-farmer communications were effective in facilitating knowledge diffusion. Others include limited

diffusion of knowledge from FFS-participants to fellow farmers and the concentration on one crop or animal species at a time.

A related concept to FFS is the farmer study circles. Study circles, much more informal than FFS, provide opportunities for group exploration and learning, to gain knowledge on whatever topic members decide. A group of people meet regularly, with no external "expert" (although resource persons may be called in or facilitators may guide the groups). Study circles allow a forum for people to learn and solve their own problems. The Swedish Cooperative Centre focuses on human rights, improved livelihoods, and increased incomes, and has developed at least 68 different study circle guides in SSA for issues ranging from crops to HIV/AIDS (www.sccpor-tal.org).

2.6 The Commodity Approach

This approach is generally organized through parastatal organistions or private sector firms. The basic characteristic of this approach is that the production system is vertically integrated from input supply to the technology adoption and marketing of the produce. Farmers (i.e. outgrowers) produce a certain quantity and quality of a crop, animal species or animal product, and sell it to the company which is partnering them. In return, the company (sometimes also called sponsor or purchaser) provides inputs, credit, as well as extension, quality management (standards) and marketing services. It usually focuses on a single one cash crop (ext approach).

These companies are often private multinational companies, processing plants or government agencies. However, small companies, farmer co-operatives, or individual entrepreneurs can be

running outgrower schemes. In Ghana companies running this scheme include COCOBOD, BOPP, TOPP, GREL, GCCL etc. Under favourable conditions, this approach may provide small farmers with an array of agricultural services to which they otherwise would have no access. This type of arrangement is becoming increasingly relevant as public service delivery to the agricultural sector declines and the involvement of the private sector in providing agricultural services increases. For it to be sustained, there should be an improved two-way communication between management and extension staff and farmers is crucial for making the commercial relationship successful and beneficial to all in the long run.

According (en-ext) to the coordination of production process must involves:

• identifying suitable production areas

• selecting farmers

• forming working groups (farmers)

• providing material inputs

• providing logistical support

• setting and controlling product and production standards

• purchasing the product.

While the provision of extension advice must involves:

• good extension staff (knowledge, communication skills, empathy with farmers)

• providing suitable and profitable technology

• clarifying the timing of production and harvesting activities

• clarifying and checking the standards required

• organising training programmes for extension staff and farmers.

Its advantages include high returns on crops, increasing the income of farmers as well as their technical and managerial skills while reducing farmers' risks and uncertainties. It may also provide small and medium farmers with access to profitable competitive markets to agricultural inputs, technology and advice from which they would be excluded otherwise. One of its disadvantages is that extension content is limited to technical and administrative or commercial aspect of the particular commodity or crop. Farmers become dependent on commodity organisations for advice, inputs and sale of crops.

In order to support contract farming, government should ensure that:

- existing laws do not constrain agribusiness and contract farming development;
- contracts are backed up by law and an efficient legal system (ibid.);
- the necessary infrastructure is in place;
- farmers are protected from purely exploitative relationships with sponsors by
- checking whether or not the financial and managerial capacities of the sponsor are adequate to make contract farming a profitable business for all;
- increasing the negotiating power of the outgrowers (Eaton/Shepherd 2001: 5)

Some potential problems are:

• Farmers do not achieve the product quality demanded by the sponsor;

• Farmers fall into the debt-trap, if they cannot repay inputs and credits due to production losses, financial deductions, or lack of price guarantee by the sponsor;

• Farmers break the contract by selling the produce to a competitor of the sponsor;

• Antagonisms surface between men and women. Most contracts are made with male family heads while women - who do not receive adequate remuneration - often do the bulk of the work;

• Ecological damage is incurred by specific production, e.g. oil palms;

• Smaller farmers become excluded in the course of time from the scheme (efficiency issues) (en-ext).

Other innovative approaches are related to the rapidly expanding information and communications technology sector. Although ICTs are used in extension in countries such as China, India, and Chile, Africa has lagged behind in harnessing ICT potential for extension and other rural development issues. However, some examples exist; for instance, in Kenya and Uganda, mobile phone services provide cheap messages about crop price information via text messaging. In Tanzania, there are "market spies," farmers who visit local markets and remain in contact with the village using mobile phones.

Following the review of the current status of extension in SSA, **Table 2** provides other approaches that are being used in other countries. Some of these approaches not well known in Ghana today include fee for-service extension which is provided for by the public (or another sector) and paid for by the farmers (Anderson & Feder, 2005). Small groups of farmers usually contract the services. This arrangement allows clientele to "vote" on programs and program scale by paying for them (Hanson & Just, 2001). Most of the examples of this model come from developed countries, such as New Zealand, which is completely privatized. Hanson and Just argue that universal paid extension is not in the public interest, but that there is an optimal mix of

public, private, and paid extension. Farmers could be stratified, allowing the commercial farmers to purchase services while smaller, poorer farmers are serviced by public extension.

In Uganda, the government has been implementing the Plan for the Modernization of Agriculture. One component created in 2001 is the NAADS program mentioned above, which has the goal of increasing market-oriented production through empowering farmers to demand and control extension services. NAADS is an innovative public-private extension approach. The main components of NAADS include decentralization, outsourcing, farmer empowerment, market orientation, and cost-recovery (Anderson, 2007).

Table 2

Country	**Current Model(s)**
Angola	Rural Development and Extension Program; FFS
Benin	Participatory management approach; decentralized model; FFS
Burkina Faso	FFS
Cameroon	National Agricultural Extension and Research Program Support Project; FFS
Ethiopia	Model based on SG-2000 approach: Participatory Demonstration and Training Extension System; FFS
Ghana	Unified Extension System (modified T&V); pluralistic with NGOs and private companies part of the national extension system; decentralized; FFS
Kenya	Pluralistic system including public, private, NGOs; FFS; stakeholder approach (NALEP): sector-wide, focal area, demand-driven, group-based approach
Malawi	Pluralistic, demand-driven, decentralized; "one village one product;' FFS
Mali	Modified T&V; both private and parastatal services for cotton; FFS; SG2000
Mozambique	Government-led pluralistic extension; FFS
Nigeria	FFS; participatory; SG-2000
Rwanda	Participative, pluralistic, specialized, bottom-up approach; FFS
Senegal	FFS; government-led demand-driven and pluralistic system; FFS
Tanzania	FFS; group-based approach; SG-2000; modified FSRE from Sokoine. University of Agriculture's Centre for Sustainable Rural Development; private extension; decentralized Participatory District Extension; pluralism
Uganda	Pluralistic; National Agricultural Advisory Services (NAADS) is demand-driven, client-oriented, and farmer-led; SG-2000; FFS
Zambia	Participatory Extension Approach; FFS

2.7 Effectiveness and Efficiency of Extension Approaches

Evaluating the agricultural extension approaches is very complex because a wide range of factors influence agriculture output– including agro-ecological climate, availability and prices of inputs, market access, farm- and farmer-specific variables, and so on. According to Wu et al. (2005), biases inherent in attributing the impact of extension services on agricultural production mean that measured effects might result from pre-existing differences rather than the programme under evaluation.

The effectiveness of the extension approach in enhancing capacity building, technological adoption and ultimately improved agricultural output depends on key factors relating to the extension method used, the governance, capacity and management structures of the extension approach, as well as underlying contextual factors such as the policy environment, market access, characteristics of beneficiary communities and weather conditions. As noted in Birner et al. (2006), the reasons for effective service delivery will be diverse, including the appropriateness of the advisory methods, the capacity and numbers of extension staff, and the management and governance structures of the organisations delivering the services. And as highlighted by participatory models in particular, effectiveness may be also influenced by the degree of feedback (indicated by the dashed arrows in Figure 1) and the mechanisms of delivery of information from farmers to the research and extension system, and thus the role of farmers in formulating demand and their ability to exercise voice. This may depend in turn on the degree of decentralisation, the ratio of extensionists to farmers, a responsive management approach, and indeed the use of participatory advisory methods (ibid.). The policy environment determines the overall orientation of the advisory service, the degree of resources devoted to it and the types of

farmers targeted. Characteristics of local communities, such as heterogeneity in terms of land- and asset-holdings, ethnicity, education, gender roles and the degree of social exclusion, will determine the ability of the extension services to penetrate communities and reach the disadvantaged, and the degree of farmer-to-farmer diffusion. Finally, all of these factors, together with market access and weather conditions will determine the degree of adoption of techniques and final outcomes such as yields (for example, production per unit of land), income and empowerment (impact of ext).

The review will aim to synthesize quantitative estimates of effectiveness of extension interventions relating to intermediate outcome s such as knowledge acquisition, adoption and diffusion of technology, and final outcomes such as agricultural yields, household income and poverty status. Because of the diversity of local agro-ecological conditions and farming systems across, and even within, developing countries, the specific technology, crops and management techniques recommended by extension programs will be different depending on the local context and needs of the farmers. Therefore, the focus of the review will be on extension as a *mechanism or tool* for improving farmers' knowledge and management practices in a way that leads to improved agricultural productivity, income and welfare for farm households.

3.0 Results and Discussions

3.1 Demographic Characteristics of Farmers

The demographic characteristics of respondents play an important role especially in the field of agriculture. The results in Table 3 shows that the majority of the respondents were males (73.5%) and the remaining (26.6%) being females. 65% of the respondents belong to the middle age category (35-50 years) followed by 23.7% and 11.3% of the respondents fall in the young (up to 30 years) and old (above 50 years) age category respectively. Education of the respondents also plays a significant role in the acquisition and use of information, hence technology adoption. It could also be from Table that most of the respondents 71.5% have had some form of formal education. This is a reflection of the quality of labour. The mean of years spent in school was 6.8 years and the maximum years spent in school was 16. The implication of over 70% of the respondents having had formal education is that adoption of innovation in farming could be high, since education plays a vital role in adoption and use of new agricultural innovations. The mean number of years of farming experience of the farmers was 11 years. The minimum and maximum are 4, and 40 years respectively. About 47% of the respondents have been into agriculture (crop or animal or both) for the past 15 to 30 years. The minimum and maximum values indicate that the farmers have some experience in agriculture and are not entirely new to the enterprise.

Table 3 Distribution of Respondents according to their Demographic Characteristics

Factor	Category	frequency	Percentage
Gender	Males	682	73.5
	Females	246	26.5
	Total	**928**	
Age	Young (≤ 35 years)	220	23.7
	Middle aged (35-50 years)	603	65
	Old (50 years and above)	104	11.3
	Total		
Education	Formal education		
	No formal education		
Farming experience	Up to 10 years	288	34.3
	10-30 years	399	47.4
	>30 years	154	18.3
Farmers contact with ext.	MoFA	673	79.33
	PROJECTS	38	
	MoFA NGO	47	
	Cocoa ext	24	
	GREL ext	20	
	BOPP ext	20	
	total	760	
	No extension contact	158	20.67
Background	Rural	770	83
	Urban	158	17

A total of 928 respondents were used for study. Out of this, 841 were farmers and the remaining are extension staffs. Results on the background of the respondents also show that an overwhelming majority (83%) of the respondents dwell in rural areas while only 17% of them dwell in the urban areas. This is not surprising as it a known fact that agriculture in Ghana is rural based. Out of the 928 respondents, 760 have benefitted from extension services representing 79.33%. This indicates that majority of Ghanaian farmers benefit from extension for various reasons including technical advice to improve production, new technologies, improve income and livelihood among others.

3.2 Categories of Farmers that Extension Delivery Providers Deal With

All the extension service providers indicated that their main beneficiaries are farmers of all categories which include crop, livestock, small-scale, medium-scale and commercial farmers. The cocoa extension, GREL and BOPP also mentioned that their main beneficiaries are crop plantation farmers producing rubber, cocoa and oil palm respectively, which are organised through FBOs. Extension services are provided on general agricultural crop production services such as cultural practices, pest and disease management, post-harvest technology, land and water management, storage and processing, animal production and health. The extension staffs perform these tasks through field demonstration either to groups of farmers or individuals. They also help in the development of Farmer Based Organisations (FBOs), which is a starting point for information dissemination for a wider target group. Aside these, cocoa extension, GREL and BOPP extension provide input credit to their clients and buy their produce.

	MoFA	MoFA/Project	MoFA-NGO	COCOBOD	GREL	BOPP
FBOs	x	x	x	X	x	x
Crop farmers	x	x	x			
All farmers	x	x	x	X	x	x
Food processors	x	x	x			x
Livestock farmers	x	x				x
Small/medium scale farmers	x	x	x	X	x	x
Women farmers	x	x	x	X	x	x
Rubber farmers						
Oil palm farmers	x	x	x			x
Cocoa farmers	x	x		X	x	

3.3 Review and Categorisation of extension delivery approaches in Ghana

The intent of this review is to highlight certain fundamental notions in order to promote a better understanding of agricultural extension approaches and to suggest the utility of comparison, in particular for the Directorate of the Extension Services Department of the Ministry of Food and Agriculture. This will also provide to those (policy makers) concern with changing these systems to better understand where changes are needed and where resources might best be allocated. This review of extension systems is useful for effective and efficient extension delivery and will also provide an intellectual insight and the basis for practical action.

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. Large numbers of these agricultural extension workers are organized into an agricultural extension system which provides them with a constant supply of useful extension messages, technical and administrative supervision, and logistical support.

Each extension organization is a reflection of a particular purpose in its own setting. There are many different types of agricultural systems. For the purpose of the paper, agricultural extension is broadly defined to include any non-formal education system whose clientele are rural people, and whose content is primarily agricultural (including crops, fisheries, livestock production and marketing). The different approaches found in the various extension systems, use a variety of strategies and a large array of methods and techniques. **Table 4** provides the summary of the

characteristics, institutional arrangements, strengths, weaknesses and recommendations of the four main approaches being used in Ghana.

TYPE	HOW IT IS USED (CHARACTERISTICS)	WHO USES IT	LOCATION	STRENGTHS	WEAKNESS	INSTITUTIONAL ARRANGMENT	HOW TO IMPROVE
Farmer field school/IPM	1.Technology is transferred through experiential learning 2. it covers the entire season of the commodity 3. farmer centered extension 4.Facilitator must be knowledgeable and confident 5. use of TOT 6. use of farmer groups 7. Aspects of FSR&E incorporated	MOFA Projects (RTIP & SPFS), NGOs, FAO, COCOBOD	Cocoa growing areas, RTIP Districts	1.Participatory and hands - on 2. Result oriented 3. enhances technology adoption 4. joint decision making 5. creation and sharing of knowledge 6. builds confidence of participants 7.competence in crop health 8. Extension officers get trained	1. It's expensive 2. difficulty in assembling participants at all times 3. Implementation of approach is limited due to inter-personal differences 4. Not suitable for commodities with long gestation periods 5.	1. Facilitating entity in place 2.Adequate logistics should be provided 3.Demonstration sites in place	1. sensitized participants to fully participate 2. cost reduction 3. Gov't should provide funding
T&V (Training and Visit)	1.It requires a large number of staff 2.Regular staff training 3.Interaction between farmers – research-extension must exist 4. Focuses on training technical staff for training farmers 5. It relied on Transfer of Technologies 6. Emphasis on single line command 7. Activities are time bound 8. Fixed visiting schedules 9. use of TOT 10. use of farmer groups 11. Aspects of FSR&E incorporated	MOFA under various projects (URADEP, VORADEP, NAEP)	Countrywide	1. Capacity building of staff and farmers 2. Increased extension coverage 3. Adequate logistics for extension delivery 4. Adequate monitoring and supervision 5. Reporting was automated and regular for decision making 6. Field demos widely spread	1. Rigid in terms of framework 2. High cost dependent 3.highly dependent on research knowledge	1. Single line of command 2. Monthly training 3. Fortnightly staff meeting 4. bi-monthly technical review meeting 5. RELC planning and review sessions 6. Subject matter specialist	1.T&V should be modified for adoption (provision of adequate transport, fuel and other logistics to enhance supervision) 2. RELC should be strengthened 3. SMS centers should be revived 4. improve staff strength 5. redesign demos for use

Participatory Approaches (PRA,PTD&E, PID, FTD, PLA & SLA)	1.emphasize on client ownership 2. client centered 3. knowledge base is indigenous 4. it's usually a bottom up approach 5. it requires very good moderation or facilitation 6. use of farmer groups 7. relies on TOT for facilitation 8. Aspects of FSR&E incorporated	1. NGOs, 2. Projects (SPFS) eg.Tolon Kumbungu, Tamale Municipal, Sandama, Wa West, Sissala East, Sissala West, Brong Ahafo. Land and water managemen t District	1. Beneficiary project district 2.	1. Client empowerment 2. enhances sustainability 3. enhances adoption of technologies 4. more judicious use of resources 5. Mutually supportive relationship 6. improve farmer to farmer technology transfer 7. it enhances communication among members	1. it's time consuming 2. it can conflict with client's time for other activities 3.	1. Linking up with local leadership for mobilization of clients 2. stakeholder fora/networking 3.	1. Adequate sensitization 2. there should be well laid down monitoring and reporting systems
Commodity based, Nucleus farmer out-grower and Focus and concentrate	1. target specific commodities (Cocoa, Oil Palm, Rubber & Cotton) 2. covers relatively small beneficiaries 3. provides embedded services (land preparation ,inputs, credit, farmer training and marketing) 4. highly technology dependent 5. profit oriented 6. highly skilled personnel 7. deals with the entire value chain 8. Aspects of FSR&E incorporated	COCOBOD,TOPP, BOPP, GREL, GCCL, Farmapine	Three Northern regions and the forest zones	1. high use of technologies 2. ready market for produce 3. Availability of other services (credit, inputs etc) 4.	1. inputs may not be used for the purposes intended 2. service provider can dictate all the contractual agreement 3. it ignores non target commodities	1. Contract farming for the companies 2.Intensive monitoring system and supervision 3. Nucleus farmer /Organization provides funding	1.There must be a strong FBO to negotiate 2.Extension SP should extend services to other enterprises of clientele to minimize diversion of inputs and produce 3.

3.4 Farmer Needs and Extension Service

It was seen from the analysis that farmers do recognize and appreciate the services of extension for their production through to marketing of their produce. According to the farmers, extension services is helping in training in group formation, disease and pest control, credit and financial support, input supply, livestock management, general agronomic practices, chemical application storage of grains, tractor and implement supply, and marketing.

Table 5 Distribution of Farmers' Needs

Farmers needs	**Frequency of farmers**	**Percentage**
Training/group formation	225	26.7
Disease and pest control	112	13.3
Credit/financial support	125	14.8
Demonstration	20	2.3
Input supply	151	17.9
Livestock management	44	5.2
Storage services	28	3.3
General agronomic practices	15	1.7
Tractor and implement supply services	60	7.1
Others	98	11.4
Total	841	100

However, there are some other challenges/problems that farmers want extension to address, and emphasis laid on some of the aforementioned services depending on the priorities of farmers. From Table 5 out of the 841 farmers, majority (26.7%) of them indicated that they have demanded and demand training/group formation service from the extension staff. This is because, the group formation help in strengthening farmers' bargaining power with traders, reducing transaction costs for inputs supplies and output buyers, economies of scale and facilitating savings and access to credit from financial institutions rather than on an individual basis, foster unity among members and also bargain for better deals (on the input/output market).

The least service demanded was general agronomic practices (1.7%) however; this seems to be the most offered service by extension that farmers need not to demand before they are offered. This means that extension is offering what farmers do not necessarily need. From this analysis and the contemporary views of extension services regarding value chain analysis, business plan development, commercialization of agriculture, contract signing etc, it is imperative for extension to offer such services that would help farmers approach farming as a business. It is possible that either farmers are not aware of such services or think that the extension staffs do not have what it takes (human resources in terms quantity and quality) to deliver such services. Farmers also feel they are most not involved in the development of extension packages, and this eventually leads to extension offering services that are not of priority to farmers.

3.5 Effectiveness of the Identified Extension Approaches

3.5.1 Frequency of use of extension methods

Here district directors and supervisors were asked to indicate the frequency with which staffs in their districts use the various extension methods. The approach that is mostly used by extension to contact farmers as indicated by the largest number of respondents is the T&V (farm/home visit). From a total of 106 district directors and supervisors (from MoFA) that were interviewed, 81 of them indicated that their districts always use field/farm/home visit while 35 and 38 indicated that their districts never used print media and broadcast media respectively. This was confirmed by 717 respondents (farmers) out of 841 who said that they have had at least one home/farm visit from extension in 2009. This result seems quite strange in the current era of ICT revolution, as it was expected that more of ICT related methods (mobile phones, radio broadcast, internet etc.)

would have been in use by now. This might probably be due to logistical needs, money and time on the part of both the farmers and extension staff.

Table 6 Frequency with which extension service providers use the various extension approaches

Extension service provider	**Frequency of use of the extension methods**				
	Always	**Often**	**Seldom**	**Never**	**Total**
	Group method				
MoFA	81	22	2	1	106
PROJECTS	6	1	1	0	8
MoFA - NGO	5	1	0	0	6
Cocoa Ext	1	2	0	0	3
GREL Ext					
BOPP Ext					
Total	93	26	3	1	123
	Contact farmers				
MoFA	66	30	7	3	106
PROJECTS	3	2	3	0	8
MoFA - NGO	5	1	0	0	6
Cocoa Ext	1	2	0	0	3
GREL Ext					
BOPP Ext					
Total	75	34	10	3	123
	Print media				
MoFA	4	21	54	27	106
PROJECTS	1	3	3	1	8
MoFA - NGO	0	3	2	1	6
Cocoa Ext	1	2	0	0	3
GREL Ext					
BOPP Ext					
Total	6	29	59	29	123
	Audio visual				
MoFA	2	18	51	35	106
PROJECTS	2	4	2	0	8
MoFA - NGO	0	0	5	1	6
Cocoa Ext	1	2	0	0	3
GREL Ext					
BOPP Ext					
Total	4	21	58	33	123
	Broadcast media				
MoFA	6	27	48	38	106

PROJECTS	3	1	2	2	8
MoFA – NGO	0	0	4	2	6
Cocoa Ext	0	3	0	0	3
GREL Ext					
BOPP Ext					
Total	9	31	54	21	123

3.5.2 Performance indicator score

Table 7 shows the frequency/number and percentage of the nine composite performance indicators. Overall, farmers (of all categories) asserted that extension performance irrespective of approach was low. In general, there were no significant differences among the four extension approaches, there were however differences among the various extension approaches on some of the indicators.

Table 7 Performance of extension approaches in Ghana

Indicators	**Extension delivery organisations**							
	T&V		**FFS**		**Participatory**		**Commodity based**	
	No.	%	No.	%	No.	%	No.	%
Activities awareness		19.6		22.3		27.7		30.4
Activities schedule awareness		7.4		30.7		23.3		38.6
Research-extension linkage		29.3		25.2		24.8		20.7
Two-way communication		23.6		27.8		31.1		17.7
Farmer participation /client centred		10.1		42.1		31.0		17.8
Adoption of technology		20.8		33.9		31.3		14.0
Continuance/ availability		37.8		21.7		19.5		21.0
Support services		8.7		25.8		18.6		46.9
Productivity		35.6		20.4		22.5		21.5

Interviews with respondents indicate that farm and home visits, Farmer Field Schools (FFs) and Demonstrations were the major extension approaches used extension staffs in their respective

localities. It was also revealed that farmers' contacts with extension staff per year was minimal, revealing that many farmers were left out of reach of extension services, and those few who had access to services were superficially served. It was realized that extension methods that attract attention and stimulate desire for further information such as farmers' field days, agricultural shows, folk media, and video, cinema or film shows and brochures/leaflets distribution were not commonly used by extension staffs in most of the study areas. With exception of few indices variation, based on activity schedule awareness, farmer participation and support services, the study results generally show that the effectiveness of extension approaches based on these indicators was not much different. The percentages were high for commodity based, FFS and T&V in terms of activity schedule awareness and support services, farmer participation and, productivity and continuance respectively. The commodity based approach was not common to most of the respondents due to its small targeted clientele. Though the FFSs and participatory approaches obtained higher scores in most of the indicators, they have limitations and challenges due to availability, continuance or sustainability and therefore, T&V tends to be the only approach of extension used by extension when contacting farmers.

The results in Table 6 and 7 show the effectiveness of extension delivery approaches based on developed indices which were obtained by combining some individual variables. The variables in Table 6 were based on the frequency of use of the various extension methods by extension staff. Whereas the variables in Table 7 were collected based on the characteristics extension approaches and also from literature. The finding from the study (base on the results from Table 6 and 7) show that there were no significant difference on effectiveness of extension approach,

however on the basis of availability and sustainability, T&V seems to be the most effective of the four.

3.5.3 Assessment of Farmers' Perception of Identified Extension Delivery Approaches in Ghana

Agricultural activities aim at improving the livelihood of farmers and their families most whom reside in rural areas especially the smallholders. Extension field staff use various extension approaches for disseminating agricultural knowledge and skills to farmers. In Ghana the common ones being used are T&V, FFS, participatory and commodity based approaches. The respondents were asked for their perception about the extension approaches being used by the extension staff in reaching them. Likert-type perception scale, ranging from 1 to 5 was used. High perception scores show more acceptance or effectiveness of the approach.

Table 8 Perception of Extension Approach

Extension approach	**Responses**									
	Very poor (1)		**Poor (2)**		**Average (2)**		**Good (4)**		**Very good (5)**	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
T&V		1.1		2.2		5.4		41.9		49.5
FFS		4.3		9.7		17.2		47.3		21.5
Participatory		6.5		1.1		5.4		37.6		49.5
Commodity based		12.9		11.8		28.0		28.0		19.4

Perception scale ranged from 1, "very poor" to 5, "very good". Results from **Table 8** reveals that T&V or the home and farm visit were rated very good, good and average as indicated by 49.5%, 41.9% and 5.4 of the respondents, participatory was rated very good, good, very poor and average as indicated by 49.5%, 37.6% and 6.5% of the respondents. While the perception about FFS were good, very good and average in view of 47.3%, 21.5% and 17.2% of the respondents

respectively. The farmers' perception commodity approaches were rated good, average and very good as reported by 28.0%, 28.0% and 19.4% of the respondents respectively. The summation of the three best ratings put the approaches T&V (96.8%), participatory (93.6%), FFS (86.0%) and commodity based (75.4) as 1st, 2nd, 3rd and 4th respectively. The analysis could be misleading because one would have expected the commodity based approach to have ranked better by farmers. This could be due to the low coverage of farmers under the system.

4.0 Way Forward

The public being coordinated by the Ministry of Food and Agriculture has a mission to "to provide efficient and effective based extension services to all categories of farmers to enable them to optimize their use of resources in order to promote sustainable agricultural and socio-economic development".

To strengthen the Agricultural Extension, the Government of Ghana adopted a new Agricultural Extension Project (NAEP) in the year (1992) with the objective of empowering farmers and its clientele with relevant information. NAEP helped an effective public extension system which resulted in increased awareness adoption of selected production, processing and marketing practices.

NAEP was followed by the Agricultural Sub-Sector Investment Program (AgSSIP). Under this program extension efforts were on capacity building of extension workers and farmers, farmer empowerment through FBO Development and promotion of private sector participation in extension delivery. A lot of improvement was achieved under the FBO component because extension messages were combined with the supply of inputs to farmer groups. Contracts were given to private firms to deliver extension in selected outlandish districts. While the visits to farmers by private sector providers, under this scheme were better than those of the public sector extension workers, who are sometimes saddled with many non-extension chores, the cost of the private sectors was very high compared to the public sector extension.

Besides MOFA, other government and non-government organizations are providing extension service in the country. These include NGOs (Care International, Action Aid, World Vision,

ADRA), private companies (BOPP, TOPP, OPRI, Ghana Cotton Company, GREL, etc) and government agengies (COCOBOD, Forestry Department). Methodology used to disseminate the extension message to the farming community by all these agencies includes but not limited to: program planning, home visits, demonstration and field days, farmers training, farmer meetings, farmers field schools (FFS) and the use of mass media. These services however, need to be improved and well-coordinated to better serve the farmers.

Improving extension should be seen in terms of decentralization, demand lead extension, development of highly motivated client groups capable of providing services to members, strong institutional linkages, well trained and motivated staff, linkages to other support services. All these need to be coordinated as an integrated whole: the notion "integrated extension".

The point here is that future extension thrust should be on providing information along the whole value chain including marketing extension, farmer empowerment, facilitating formation of self-motivated farmer's groups, private extension services and environmental extension for sustainability. Pluralism of institutions and identifying new funding mechanisms for extension need to be explored.

4.1 The Face of a New Extension System

The call is for the extension system to be reformed to become more pluralistic in nature to enable it to become more cost effective. The new extension system should include the application of information technology in extension processes, improving communication process placing emphasis on the participation of farmers, empowerment of rural women, training of extension personnel, involving research institutes in extension activities as well as involving farmers and

extension workers in adaptive research. Extension today, must be pluralistic and inclusive (involve various players using knowledge, skills and various tools) to able to react to the needs of agricultural industry.

4.2 Guiding Principle

In order to develop the integrated pluralistic system, the following needs to be done.

- The concept and process of the integrated approach should be developed and disseminated to help change mind sets
- Proper information and data base of service providers as well as farmers and FBOs should be developed
- To improve the efficiency of extension services, continuous training of extension agents and evaluation of the impact of training should receive a high priority
- Community based organizations and Self Help Groups (SHCs) should be popularized to help empower farmers and to encourage farmer-farmer extension
- Institutional pluralism and linkages in extension should be encouraged to use synergy among institutions as a way of dealing with the limitations of individual organizations.
- More emphasis should be played on participatory approaches to agriculture extension and development
- Human Resource Development Management Directorate(HRDM) should be given due importance to different sections of extension system
- Due importance should be given to the specialized and privatized extension system
- Decentralize the planning process in agricultural extension and prepare independent/flexible plans of action for the local level. This includes the preparation of

realistic short and long term human capital development plan anticipating both pre-and in-service education and training needs, opportunities and facilities in agriculture research, agriculture extension and agriculture education areas

- Adopt extension methods that can provide accurate and fast information to a large number of farmers even in the face of dwindling financial resources (network, radio, television, cyber or e-extension)
- Establish stakeholder platforms at various level to facilitate interaction and learning among stakeholders (services providers forum, research and extension linkage arrangements).

4.3 Key Component of the Approach

E or Cyber Extension: Information and communication technology applications for effective agricultural extension services-Challenges, Opportunities, Issues and Strategies.

Access to information and improved communication is a crucial requirement for sustainable agricultural development. Modern communication technologies when applied to conditions in rural areas can help improve communications, increase participation and disseminate information and sharing of knowledge and skills. The challenge is not only to improve the accessibility communication technology to the rural population but also to improve its relevance to local development.

4.3.1 Use of Radio

Radio is a powerful communication tool. It has potential for extension in terms of reach and relevance local broadcasting can achieve especially if done in a participative way. It however,

require that the policy is elaborated with a focus on the use of FM stations. Presently, most of the district extension plans has no budgetary allocation for development and broadcasting of agricultural messages.

4.3.2 Ensuring Stakeholder Participation

The extension system must be able to help people think about their own problems and find appropriate solutions. The role of the extension worker in this context becomes that of a facilitator for exchange of ideas and information among stakeholders. The participatory extension can be seen as a flow of information from farmer to farmer achieved through exchange visits, training workshops), **farmer- extension-interactions (adaptive trial, participatory evaluation of research results) farmer-market-farmer interactions** (collective supply of inputs, collective marketing of outputs, market information)

4.3.3 Broadening the technical Mandate of Extension

Extension Methods should be broadened to include coverage of topics such as marketing, inputs synchronization and environment. Encouraging bottom –up grassroots extension program planning at the village level and to establish a demand- driven, gender sensitive and holistic, and extension system.

4.3.4 Involving both Public and Private institutions.

We need to include other stakeholder in the planning and delivery of extension services with government performing the functions of national policy guidance, coordination among various

actors, quality control, resource mobilization, manpower development, monitoring, research, evaluation, impact assessment and documentation.

4.3.5 FBO Development

Promotion of village-level and community-based organizations of farmers and special interest and vulnerable groups such as women, youth, rural poor, tribal and nomadic people though formation of village-level and community-based extension planning and implementation communities.

4.3.6 Joint Planning and Monitoring

Establishment of inter- agency/inter-disciplinary coordination, collaboration and linkage mechanisms for promoting joint planning and programming by the AKIS (Agricultural Knowledge and Information System) actors such as extension, research, education and rural indigenous center through measure like formation of public and private stakeholders' extension communities ensuring participation of small farmers at all operations levels.

Establish national Association of Extension provides to service as a think tank to ensure development and application of bottom-up policies and plans, need-based skill oriented curricula and operational strategies attractive service conditions for extension personnel and financing of extension.

4.3.7 Human Resource Development

Development of an extension human resource management plan aimed at reforming pre-service education and in-service training through improvement in curricula and teaching-training

methodologies, development of teaching, learning materials, so as to bring extension education in line with worldwide extension reforms, and inclusion of career development path covering salaries, promotion and training opportunities for extension professionals at par with specialists in other agricultural disciplines like research and education. Development of databases including those involving the application or electronic information technologies in support of extension work (cyber extension).

4.3.8 New Funding Mechanisms

Encouragement of financing of extension services not only by the public sector but also by the private sector. NGOs and producer's associations through public private partnerships, separation of the functions of services delivery from the financing and ensuring satisfactory resource mobilization, allocation, disbursement and utilization.

The public sector has been accused of being inefficiency in extension services delivery especially with regards to the Television and the Farmer Field Scheme funding. Extension to valuable commodities such as cocoa, cotton, oil palm and rubber can be paid for through the marketing arrangement but privatization of extension to resource poor farmers to plant food crops may not be practical. This implies, that companies and agencies that market-oriented commodities can deliver and pay for extension service while the public sector focus on extension on food crops. However, some public-private partnership in extension can be explored.

- Public sector pays and private sector delivery advisory services. In this case, the Ministry can sign a contract with an NGO or private company to deliver extension on specific commodity or to undertake general extension. This was tried under the Ministry's AgSSIP (Extension Development Fund Program). These companies, unlike the

government extension staff who do other menial of activities, focused on extension delivery although the cost of service delivery was higher than the financial commitment on the MOFA extension staff. The question also arises if the government will be committed to paying for contracts on extension delivery, even in the face of diminishing government research.

- Establish service providers' forum. Government provides funds to improve the capacity of private services provider to supplement government efforts at services delivery. The focus here is to cede off some of the extension functions to the private sector (especially at the market extension in which the private sector be driven by profit modules.

5.0 Concluding Remarks

In general, though, problems in extension approaches were due to a combination of a lack of relevant technology, failure by research and extension to understand and involve clientele in problem definition and solving, lack of incentives for extension agents, and weak linkages among extension, research, and farmers.

Moreover, extension and research approaches must be tailored for solving the problems of a unique target group effectively. An approach may become the best one if rural producers use and apply the provided knowledge, technology and services and if the standard of living subsequently improves. Agricultural extension approaches being used by extension staffs of the various providers are the T&V, FFSs, participatory and the commodity based. Different programs have diverse goals and thus differing strengths and weaknesses. For instance, T&V, although financially unsustainable, proved effective in training agents and improving the

management of the overall system. Farmer field school models have proven very effective at strengthening farmers' capacity and empowering rural people. However, looking at the characteristics, weaknesses and strengths of each approach, it is clear that the T&V could be modified and adopted for extension delivery in Ghana. Several extension methods were used by extension staff but those that attract attention and stimulate desire for further information and subsequent adoption such as farmers' field days, agricultural shows, folk media, video, cinema or film shows and brochures/leaflets distribution were not commonly used by extension staffs in their operational area. The T&V approach was also found to be more effective in terms of the indicators used.

Issues that arose from the study are inadequate funds for extension services, lack of transport facilities, inadequate supervision, large number of farmers to contact (high farmer extension ratio), absence of working office and stationeries. Others with respect to extension delivery in Ghana were coordinating the system, assuring quality, and building capacity of service providers (training).

From the experiences of historical approaches to improving agricultural extension delivery, a number of lessons can be drawn to further advise the present extension approach

Based on the strengths, weaknesses and institutional arrangements of the approaches being used in Ghana, the following policy recommendations are made.

1. T&V should be modified for adoption (provision of adequate transport, fuel and other logistics to enhance supervision)
2. Encourage farmers to set the research agenda
3. Training and demonstration (FFS) (Demonstration at AEA level, Livestock demonstration at Regional Level)
4. Adopt methods to reach a larger clientele due to limited resource (mobile phones, internet, FM station, FBOs) **See Appendix1 For List of FM stations in Ghana**
5. Provides some basic tools(GPS, measuring tapes, weather forecasting, laptops, and internet connectivity) for AEAs and supervisors
6. Encourage public private partnership in extension delivery
7. Extension will need a greater focus on facilitation and access to markets through farmer group formation and ICTs, special skills that go beyond the basic technical skills. Agents will need skills in group dynamics, marketing, and ICTs. More than ever, he or she will need to be a skilled technician who also is a broker of sorts, being able to connect farmers in their areas to markets and other institutions that are demanded by farmers.
8. Funding of agricultural extension services can come through decentralization, involvement of farmers' associations and NGOs, contracting-out of extension services, public private partnerships, privatization, and embedding advisory services in other types of contracts.
9. Should the governments be interested in promoting contract farming related to certain agricultural products of high value (e.g. mango, coffee, and organic products), there must be must proper laws to ensure that: Small and medium

farmers gain access to a profitable market, Small and medium farmers receive agricultural inputs, credits and extension advice by agricultural companies; Large plantation production for multinational companies can be substituted by contracting out the production to small resource poor but hardworking farmers.

An all-encompassing recommendation is to establish an Integrated Extension System that embraces pluralism of practitioners (public, private companies and civil society, FBOs) focusing on commodities and issues of importance to the agricultural industry. Capacity building of service provider, and use of multiplicity of methods to share information, lean and educate all stakeholders along the value chain. The methods to be used include:

Use of farmer Based Organization as contact points for extension delivery. This will allow for the spread of value chain concept and farmer to farmer extension. FBOs can be supported to lead and undertake their own demonstrations. The extension workers become facilitators. This is similar to Farmer Field School.

Establishment of interactive radio programs. Radio can be a powerful tool for extension because of its wide coverage and contextual relevance. The main thrust of this approach is the use of information and Communication Technology (ICT)-extension or use of cyber extension. This can foster access to information and improve communication

APPENDIX 1 FM STATIONS IN GHANA

FM RADIO STATIONS IN THE BRONG AHAFO REGION

NO.	NAME	FREQUENCY (MHZ)	LOCATION	TELEPHONE NO.
1	Radio BAR	93.5	Sunyani	0352027422
2	Sky	96.7	Sunyani	0352027413
3	Space	87.7	Sunyani	0352028333
4	Ark	107.1	Sunyani	0275979174
5	Royals	104.7	Wenchi	0208489473
6	Shalom	100.3	Berekum	0245273126
7	Chris	88.9	Berekum	
8	Adepa	107.3	Techiman	0207424034
9	Dinpa	91.3	Sunyani	
10	Classic	91.9	Techiman	0244820905
11	Jerryson	99.9	Nkoranza	0242209073
12	Omega	102.5	Drobo	0245462008

13	Yankee	95.5	Sampa	0246152033
14	Star		Atebubu	0275378191
15	Success	90.9	Goaso	0242226684
16	Grace		Atebubu	
17	Gift	105.5	Dormaa-Ahenkro	0206460077
18	Agoro	93.1	Berekum	
19	Nananom	92.5	Goaso	
20	Asta		Techiman	
21	Dormaa Community	100.5	Dormaa-Ahenkro	
22	Adars	107.5	Kintampo	0243277270
23	Power	90.7	Duayaw Nkwanta	

FM RADIO STATIONS IN THE EASTERN REGION

NO.	FM STATION	FREQUENCY	LOCATION
1.	Biyac	94.1	Oda
2.	Life FM	98.7	Nkawkaw
3.	HI FM	93.3	Abetifi
4.	Eastern FM	106.7	Koforidua
5.	Sun Rise	105.1	Koforidua
6.	Rap FM	107.7	Donkorkrom
7.	Fawe FM	105.9	Nsawam
8.	Asuogyaman FM	100.7	Atimpoku
9.	Ripe FM	90.1	Somanya

FM RADIO STATIONS IN THE NORTHERN REGION

NO.	FM STATION	LOCATION
1.	Radio Savannah	Tamale
2.	Filla FM	Tamale
3.	North Star FM	Tamale
4.	Radio Justice	Tamale
5.	Diamond FM	Tamale
6.	Bishara Radio	Tamale
7.	Simli Radio	Tolon
8.	Susion Radio	Yendi

FM RADIO STATIONS IN THE UPPER EAST REGION

NO.	FM STATION	FREQUENCY	LOCATION
1.	Mabina FM		Navrongo
2.	Style FM	99.3	Bolgatanga
3.	'A' One Radio	101.10	Bolgatanga
4.	UNA Radio	89.7	Bolgatanga
5.	Builsa Country Radio	106.5	Sandema
6.	Ward FM	88.3	Zuarungu

FM RADIO STATIONS IN THE CENTRAL REGION

NO.	FM STATION	LOCATION
1.	Radio Central	Cape Coast
2.	Nkwan FM	Assin Fosu
3.	Arise FM	Twifo Kraso
4.	Katinka FM	Agona Swedru
5.	Radio Peace	Winneba
6.	Yes FM	Cape Coast
7.	Solar FM	Dunkwa on-Offin
8.	Spark FM	Dunkwa on- Offin
9.	Ahomka FM	Elmina

FM RADIO STATIONS IN THE GREATER ACCRA REGION

NO.	FM STATION	LOCATION	DISTRICT
1.	Joy FM	Kokomlemle	A.M.A
2.	Hitz FM	Asylum Down	A.M.A
3.	Vibe FM	Asylum Down	A.M.A
4.	Happy FM	Asylum Down	A.M.A
5.	Unique FM	Kanda	A.M.A
6.	Choice FM	Roman Ridge	A.M.A
7.	Great FM	Achimota	A.M.A
8.	Y FM	Shiashi	A.M.A
9.	Ada Radio	Big Ada	Dangme East
10.	Obonu FM	Tema	T.M.A
11.	Radio Gold	Latebiokoshie	A.M.A
12.	Peace FM	Tesano	A.M.A
13.	O.K FM	Tesano	A.M.A
14.	Asempa FM	Nima Junction	A/M.A
15.	Atlantic Radio	Asylum Down	A.M.A
16.	Sunny FM	Asylum Down	A.M.A
17.	Channel R	Dzorwulu	A.M.A
18.	Top Radio	Kokomlemle	A.M.A
19.	Oman FM	Madina	Ga-East
20.	Sena Radio	Ashaiman	Ashaiman
21.	Radio Universe	Legon	A.M.A
22.	Adom FM	Teme	T.M.A

LIST OF FM RADIO STATIONS IN THE WESTERN REGION

NO	NAME OF FM STATIONS	FREQUENCY	DISTRICT	LOCATION
1	Ankobra FM	101.9	Ellembele	Axim
2	Best FM	90.5	Bogoso	Bogoso
3	Liberty FM	92.7	Sefwi Akotombra	Sefwi Wiawso
4	Adehye FM		Bibiani	Bibiani
5	Vision FM/ Unique FM		Bia	Debiso and Osei Kojokrom
6	Liberty FM / De Beats FM	92.7	Sefwi Wiawso	Asawinso
7	A.S FM/ Tricky FM		Aowin Suaman	Aowin Suaman Town
8	Rainbow FM	101.1	Juaboso	Juaboso
9	Twin City FM		STMA	Sekondi
10	Velvet V. FM		Amenfi East	Amenfi East
11	Velvet V. FM		Amenfi West	Amenfi West
12	Dynamite FM/ Space FM		Wassa West	Tarkwa
13	Ankobra FM 101.9		Nzema East	Nzema East

LIST OF FM RADIO STATIONS IN THE ASHANTI REGION

NO.	FM STATION	FREQUENCY	LOCATION
1.	Fox FM	97.9	Prempeh Assembly hall, Kumasi
2.	Hello FM	101.5	Kumasi Central Market
3.	Ash FM		Kumasi, Pankrono
4.	New mercury	91.5	Bantama,Kumasi
5.	Angel Fm	96.1	Kumasi,Abrepo Junction
6.	Nhyira Fm	104.5	Kumasi
7.	Nkosoo Radio	96.5	Kumasi
8.	Zuria	88.7	Kumasi
9.	Boss FM	93.7	Kumasi,
10.	Garden City Radio	92.1	Kumasi, Cadbury hall
11.	Luv Fm	99.5	Kumasi
12.	Light Fm	94.9	Kumasi-Stadium
13.	Otec FM	102.9	Kumasi
14.	Kess Radio		Kumasi
15.	Kapital Radio	97.1	Kumasi
16.	New Mighty	91.1	Mampong
17.	Virgin FM		Konongo
18.	Kings FM		Konongo
19.	Shaft FM		Obuasi
20.	K Fm	103.7	Kumasi
21.	Kessben Fm	93.3	Kumasi

22.	Spirit Fm	88.3	Kumasi, Asokwa
23.	Focus Fm	94.3	Kumasi, KNUST
24.	Link Fm	90.5	Kumasi, Polytechnic
25.	Anigye Fm		Kumasi