

# Present and Future Agricultural Extension System and International Cooperation Systems for Agricultural Technologies in Ghana\*

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## Abstract

The purpose of this study is to explore the present and future agricultural extension system and international cooperation systems for agricultural technologies in Ghana. The role of agricultural extension in the next decade should be quite different from what it was 10 years ago or even now. Its role as a facilitator of agricultural knowledge system would only increase as more participants from private sector would get involved in extension. The public sector extension would still continue to be the major extension provider in most parts of the country as the private sector alone would not be able to

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meet even partially the varied needs of farmers. Internal reforms are thus going to be the greatest challenge for the Ghana Extension System.

The cooperation systems work in partnership with other stakeholder to provide agricultural extension and advisory services to farmers. Innovations (information/knowledge) emerging from the seed industry may be seen as dynamic and systemic process which can emerge from many sources. KAFECT's interventions must be flexible to accommodate such changes if the need arises in subsequent years (year 2 & 3). The framework and tools for technology transfer and dissemination is developed on "innovation platform" where a group of stakeholders/collaborators with diverse social and economic backgrounds, work towards a common objective or challenge.

Key words: Agricultural Extension, Ghana

## 1. INTRODUCTION

Many good agricultural technologies remain unused by farmers to improve crop yield and income due to ignorance and perception to change. The rate of technology transfer and/or adoption has not been as intense as expected. The unsatisfactory rate of adoption has led to various forms of technology transfer approaches over the years. Many programmes of conventional agricultural extension and research strategies and methods that attempted to focus specifically on farmers have therefore been undertaken in the past (Purcell, & Anderson, 1995).

The process of experimentation with various extension approaches lingered through the 1980s either as independent and not properly

coordinated pilot programmes and/or as part of the wider agricultural and rural development projects. Although successive (Nationalist) governments of Ghana attempted to improve rural and agricultural situation by improving agricultural extension services, yet the trend had always been towards failure.

With the implementation of the Economic Recovery Programme in 1983, by the Government of Ghana, a ten - year (1991-2000) Medium Term Agricultural Development Programme (MTADP), was proposed. The programme called for the re-structuring of the Department of Agricultural Extension Services and the proposal of the National Agricultural Extension Programme (NAEP). The strategy adopted to achieve the objectives of agricultural extension in the MTADP was modification or adoption of the prominent experiences of the pilot programmes in the 1980s. Among the strategies was the improvement of efficiency in the management and delivery of extension services (MOA, 1990).

The re-organisation had minimal effect on the required objectives. The Extension programmes were mainly involved slight change at the top of the organizational structure and had no effects whatsoever on the extension practice at the grass root level. The approach was viewed as a top-down and pro-urban, and was believed to pay more attention to progressive farmers, while totally neglecting poorer small farmers and women. The lack of coordination amongst various departments within the Ministry of Food and Agriculture (MOFA) and the poor management of the general extension approach coupled with the lack of well-trained extension workers and the poor quality of infrastructures, called for a reform of the system (Okorley, 2007).

In response to criticisms and external pressure from the World Bank, The government of Ghana reformed the general extension system and adopted a new nationwide agricultural extension approach called the Unified Extension System (UES) that came together with the training and visit (T&V) extension management system approach. The purpose of this study is to explore the present and future agricultural extension system and international cooperation systems for agricultural technologies in Ghana.

## 2. EXTENSION APPROACHES

**The Unified Extension/T&V system:** It was one of the earlier approaches that focused on transfer of technology using a top down, one- size- fit - all approach. This approach was introduced after the Department of Agric. Extension Service (DAES) had been organized under the unified extension systems (UES) concept.

The approach emphasized on frequent in-service training for staff, regular visit to farmer's farms, promotion of extension/research linkage and improved extension management. In the process of service delivery, subject matter specialist (SMS) gave training to Front Line Extension Agent on new and relatively technical issues (van den Ban & Hawkins, 1996). The extension agent then trains farmers and or farmer groups on the new technologies. This approach used extension methods such as discussions, seminars, field tours in-service training courses for extension staff and farmers, on farm demonstrations and farmer field

days (Hayward, 1990). The delivery of messages was considered economic, as large numbers of farmers could be reached fortnightly.

The 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 was based on a set of managerial and organizational principles that were of broad applicability and which, when applied together, constituted an powerful managerial tool.

### **Participatory Technology Dissemination Approaches**

The passive role of farmers in the T&V approach necessitated the promotion of participatory approaches like Farmer Field Schools, Farmer Field Fora, Participatory Action Learning and Participatory Action Research. The empowerment of farmers was paramount. In participatory approaches, the role of the extension agent was to facilitate an in-depth situation analysis by the farmers at the onset of their working relation (White, Nair, & Ascroft, 1994). 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. Extension agents had to be knowledgeable, agricultural expertise, good analytical, and facilitator. What makes this approach participatory was that farmers were the principal decision-makers in defining goals, planning, implementing, and evaluating development activities. The participatory approaches helped in strengthening farmers' problem-solving abilities.

### **Farmer Field Schools (FSS)**

FSS is a participatory method of learning, technology development, and dissemination based on adult-learning principles such as experiential learning. Farmers meet regularly for the duration of an entire cropping season for a particular commodity/crop. 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, participants sharpen their decision-making abilities. They 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. Trained farmers take up training responsibilities (for some fee, possibly paid by the community or development agency). They are supported with training materials.

This approach aims at increasing the technical competence of farmers concerning a single crop (e.g. rice, cotton, beans, yam, and cassava) 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;
- Energizing 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 had been the high cost of running, which raises the issue of financial sustainability. In addition, the intense training activities are expensive per farmer trained. The amount of service actually delivered (the number of farmers trained) at a national level is therefore small.

### **The Commodity Approach**

This approach is generally organized through parasternal organizations

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. out-growers) 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 called sponsor or purchaser) provides inputs, credit, as well as extension services, quality management (standards) and marketing services. It usually focuses on a single cash crop.

Such companies are often private multinational companies or government agencies. Small companies, farmer co-operatives or individual entrepreneurs are given the opportunity of running out-grower schemes.

In Ghana companies running such schemes include COCOBOD, BOPP, TOPP, GREL and GCCL. Under favorable conditions, the approach may provide small farmers with a number of agricultural services which they otherwise would have no access. This 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 the system to be sustained there should be an improved communication among management, extension staff and farmers, making the commercial relationship successful and beneficial to all in the long run.



### 3. Common Features of Extension Approaches in Ghana

Agricultural Extension approaches practiced in Ghana like other Africa countries to improve technology dissemination process had common characteristics of:

- Functioning through non formal education
- Having content related to agriculture
- Using communication techniques and aids
- Seeking to improve the capabilities of rural people.

The participatory models and methods of extension approaches used in Ghana in the twentieth century to disseminate technologies were also characterized by:

#### 3.1. People-Centered - “Transformation Participation”

The people-centered approach to participation unlike the traditional approach focused on issues of power and control. The main concern was about the nature of the society in which the programmes and projects were developed, than the technical and managerial aspects of organisation and participation.

#### 3.2. Access and Control of Resources - Local People’s Participation

In theory, advocates of people-centered approach to participation

believed that 'ordinary people were capable of critical reflection, analysis, and that their knowledge was relevant and necessary'. In practice however, local people were inadequately informed by realistic assessment of power relations inherent in the process of development. Development interventions (the key aspects of the process of development programmes or projects) were therefore left to external control (Outside structures)

The challenges facing development agencies/workers still remain: to

- empower without being paternalistic,
- enable without being top-down,
- eliminate structural constraints along with patterns of passivity,
- find realistic options and to organize practical action'.

### 3.3. Providing Knowledge for Decision Making

Conscious efforts were made to get the real situation and brought to life (aspects which local people were likely to encounter in real life set-up). This enabled the local people to build up a picture of the situation where and how decisions could be made.

The picture created was then used as the basis for developing learning and action exercises. This provided practice in decision-making and skills.

### 3.4. Enhancing Awareness and Empowerment

The participatory models and methods aimed at enhancing awareness, building confidence for action and committed in a way to empowerment. The models were used as a vehicle for the people to have a voice. The Participatory Rural Appraisal (PRA) model, for instance, involved the rural communities in their own needs assessment, problem identification and prioritization. People's participation was recognized as a means through which the people became creators of their own solutions.

## 4. Dissemination Situation of Agricultural Technologies

Efforts have been devoted to Agricultural Research and Extension (technology dissemination) with particular reference to improving the lots of farm families. However, all these efforts have resulted in the poor performance of "technical packages" that are supposed to generate agricultural growth and higher standard of living for the farm household.

The poor performance of the 'technological packages' has called for a new developmental focus and withdrawal of financial support by donors in agricultural development. Major policy statements by International Agencies, Bilateral aid Donors, and National Governments have therefore spelt out a new commitment to the development of agriculture.

Government and Non-Governmental Agencies (NGOs) have taken

the view that increased agricultural production should no longer be the prime objective of research and extension. These agencies have reduced funding and initiated extensive re-organisation of research and extension efforts in agriculture. The research and extension sectors have been enjoined to:

become more commercially oriented and privatise in order to offset the effects of the cuts.

#### 4.1. Demands for Appropriate Agricultural Technologies

In Ghana, small holder farmers who form the bulk producers of these crops usually register low yields. This has been partly attributed to inadequate improved crop management technologies, inaccessibility to research proven improved crop and water management technologies, lack of quality planting material, poor post harvesting and marketing strategies deprived our small holder farmers from exploiting the full potential of the tropical fruit crops. The government seeks to increase production, utilization, profitability of target crops and through development and dissemination of appropriate technologies to small holder farmers.

#### 4.2. Main Cultivation Technologies or Practices Released to Farmers and Other Agricultural Stakeholders

National Agricultural Research System Scientists have developed new technologies as well as improvement of already existing ones.

The technologies include: improved varieties of crops, and fishes, new practice for cropping, soil and water management, crop protection, designing new agricultural equipment, and formulating and determining feed levels for livestock and fishes.

Scientists, Farmers and extension agents have develop and disseminate environmentally-sound technologies for high and sustainable food and industrial crop production to enhance the attainment of food security and poverty alleviation in Ghana. The following are some of the releases:

〈Table 1〉 Presents Improved Released Varieties in Ghana

Commodity	Improved Varieties Released
Maize	27
Rice	7
Cowpea	10
Soybean	4
Groundnut	4
Cassava	18
Yam	3
Cocoyam	3
Sweetpotato	8
Pepper	2

Currently the research focus is on the following crops:

- Cereals (maize, millet, sorghum and rice)
- Legumes (cowpea, soybean, groundnut, bambara groundnut)
- Roots and Tubers (yam, cocoyam, cassava, taro and sweetpotato)

- Vegetables (pepper, garden eggs, tomato, onion, leafy vegetables)
- Plantain and banana
- Tropical fruits (citrus, mango, avocado, pineapple, cashew, pawpaw)

#### Other Released Technologies

- Split corm technology for plantain
- Mini-sett Technology for yams
- Agronomic practices for crop/seed production
- Post Harvest Technology'
- Vine technology for seed yam production
- Integrated Pest Management technologies for groundnut production
- Two local soaps, "Alata and Amonkye" for the control of diseases (groundnut foliar disease& rosette viral disease)
- Improved Herbicide Spray Shield
- Fabrication of Groundnut Sheller
- Introduction of Sawah Technology
- Legume cover crops for soil fertility improvement and weed suppression
- No-till with glyphosate
- Jab planter for planting legume and maize

Although there have been a number of improved crop varieties, production and post harvest technologies that are developed and disseminated to farmers to increase their yields and improve their living standards, yet the expected results have not been achieved. Considering the situation in the Atwima Kwanwoma Agricultural District (Proposed study area), there is still much to be achieved.

Table 6 below indicates gaps between the average national crop yields and the average yields of target crops in the district.

〈Table 2〉 Average national agricultural outputs/production (Mt) for major food crops compared to the average yields in the Atwima Kwanwoma District

CROPS	PRODUCTION (MT)	PRODUCTION AREA (HA)	District Crop Yields (MT/HA)	National Crop Yields (MT/HA)
<b>Maize</b>	<b>7,558</b>	<b>2,906</b>	<b>1.30</b>	<b>1.7</b>
Cassava	30,121	2,738	11.0	13.00
Yam	4,200	350	12.0	15.30
Plantain	26,924	2,747	9.8	11.00
Cocoyam	2,640	550	4.8	6.7
Rice	195	78	2.5	2.4
Ginger	1000	80	12.5	-
Oil palm		1,250		-
Citrus		1,050		-

Source: MOFA office, Foase - 2009

**Note:** The table indicates yields that have been achieved in cases where more effective extension and use of recommended technologies have occurred. The dashes indicate crops for which no on-farm research findings were available as far as potential yields were concerned. Data on achievable yields have been revised in line with new findings by the Crop Research Institute.

Most farmers in the area lack storage facilities to store food crops after harvest. The high levels of post harvest losses in the project area due to lack of village/private storage facilities have negative impact on household economy.

## **5. Some Challenges affecting the dissemination and adoption of agricultural Technologies (including the project area)**

Some of the challenges facing the dissemination and adoption of agricultural Technologies (including the project area) are:

### 5.1. Low production/productivity:

Most of the operators/farmers heavily rely on the traditional and obsolete farming methods. Only a few percentages of farmers use modern, improved farming technology.

The reason being that:

- Farmers have poor attitude to the improved methods of farming.
- High cost of labour/inputs
- Over dependence on government for the supply of inputs and
- Ageing farmers.

### 5.2. Over - dependence on rain-fed agriculture:

Agricultural activities in the project area are tied to rainfall. The rainfall regime therefore affects the production levels. The unreliable rainfall distribution as a result of climate change is a major cause of fluctuation in crop production. In addition, rivers and streams are seasonal and irrigation equipment is expensive.



### 5.3. Limited access to credit:

Almost all the farmers in the area, especially food crop farming, have no access to credit but depend on their own resources to operate. This causes the farmers to sell their crops at low prices (soon after harvest), to the market women who sometimes finance their activities. The other sources of credit to the farmers include private moneylenders and financial institutions whose demands (high interest rates) the farmers cannot afford.

### 5.4. Lack of storage facilities:

Storage facilities are not available in the district to store food crops after harvest resulting in high post harvest losses which have negative impact on the economy.

### 5.5. Inadequate number of Agriculture Extension Agents (AEAs):

The extension officer - farmer ratio in the project area is 1:5,030 compared to the expected national standard of 1:300. The inadequate number of AEAs deprives farmers' access to improved technologies, market and infrastructural back-up.

### 5.6. Poor road network/Limited Markets:

Even though the district is close to Kumasi, the regional capital, the

poor nature of the roads, the unprocessed nature of the crops and market restrictions prevent the farmers from taking advantage of proximity to the regional and metro markets.

### 5.7. High cost of farming inputs:

The low income levels of farmers in the agriculture sector as a result of low production have prevented the farmers from being able to purchase farming inputs at high cost.

The KAFACI Project on Enhancement of National Extension Services for National Food Security aims at promoting the role of public sector in spreading good seeds and appropriate cultivation practices to farmers, ultimately to increasing the productivity for food security of the member countries.

Main project components are as follows:

- Good seeds
- Appropriate technologies or practices for the newly released seeds
- One or two pilot villages to demonstrate good seeds and appropriate technologies
- A local extension agent to catalyze new technology adoption of target farmers
- Demonstration field to show differences between indigenous and innovative technologies to farmers
- Farmers organization (group) to facilitate cooperative buying (input purchase), product selling and production

activities.

- Training materials (text and aids) development (by Extension and Research Institution working together) to enhance effectively delivery of good practices to farmers.
- Total project fund for three years will be \$120,000 USD for each country.

The KAFACI Research and Development interventions will go a long way to address most of the challenges facing participating countries (in agricultural technology generation, transfer and utilization).

## **6. Agricultural Technology Cooperation**

### **6.1. International Cooperation System for Agricultural Technologies**

There are a number of International Cooperation Systems for Agricultural Technologies in Ghana. The systems have been supporting governments and farmers in the production, processing and marketing of agricultural commodities. The cooperation systems work in partnership with other stakeholder to provide agricultural extension and advisory services to farmers. Some of the cooperate systems working directly in the agricultural sector and local extension services include: Africare, CARE International, Christian Relief Service, HarvestPlus, Presbyterian Agricultural Services, Temale, Finatrade, Action Aid, Care Gulf Agriculture and natural Resources

(CGGANR), Abrono Organic farming Project (ABOFAP).

## 6.2 ODA Donors of Agricultural Technology Cooperation

〈Table 3〉 Summary of Investment Trend & Financial Sources

Period	Programmes /Projects	USD (Millions)	Focus
1991-1999	NAES/NARS	-	Infrastructure, Training, Institutional Management/collaboration
2000-2007	AgSSIP I	74(23 + 20)	Education & Training, Tech. gene. & diffusion & Institutional Strengthening (RELC established - CARGS introduced)
2008-2010	AgSSIP II	25	Revised Food & Agric Sector Dev. Program Frame work for harmonization of donor funding
2007-2012	WAAPP I	200/yr	Support modernization of agric.
2013-2017	WAAPP II	15	Dev. Marketing of root & tuber Crops (Cassava, yam, sweetpotato & cocoyam)

Source : [www.kafaci.org](http://www.kafaci.org)

### 6.3. A Case of Successful Technology Dissemination and Cooperation by ODA (The Root and Tuber Improvement and Marketing Programme - RTIMP)

The Root and Tuber Improvement and Marketing Programme (RTIMP) are a follow-up to the Root and Tuber Improvement Programme (RTIP). RTIMP is being funded by the International Fund for Agricultural Development (IFAD) and the Government of Ghana (GoG) for a period of 8 years (2006-2014). The programme is in its sixth year of implementation.

The Goal of the Programme is to enhance income and food security

in order to improve livelihoods of the rural poor. The main purpose of the intervention is to build a competitive market-based Root and Tuber Commodity Chain (RTCC) supported by relevant, effective and sustainable services that are available to the rural poor.

RTIMP works with a wide cross section of stakeholders in order to achieve maximum economic and social impact at all stages of the R&T commodity chains. The intervention focuses especially on improving the outputs, incomes and hence living standards of small-scale R&T farmers, processors and traders, particularly women.

RTIMP is being implemented through four (4) Components as follows:

- Support to Increased Commodity Chain Linkages.
- Support to Root and Tuber Production.
- Upgrading of Root and Tuber Processing, Business and Marketing skills
- Programme Coordination, Monitoring and Evaluation.

The programme is being implemented across 90 districts. For planting materials multiplication and distribution, 16 additional districts have been covered for continuation and enhancement of output delivery and results achievement.

The Programme has made steady progress in consolidating the establishment and functioning of the various entry points and learning platforms of District Stakeholder Fora (DSF), Good Practices Centres (GPCs) and Farmer Field Fora (FFF).

The number of actors involved in the commodity chains being

developed by the programme totalled of 7,662 actors as against programme year 8 target of 10,500 (73% achievement)

From the commencement of implementation till June, 2012, the Programme had equally done remarkably well in terms of training and building the capacities of beneficiaries. Out of the Programme year 8 target of 6000, a total of 4,180 processors had been trained and equipped with business development and entrepreneurship skills (representing 83% achievement level).

For entrepreneurs who have accessed Micro Credit Fund being provided by the programme, some 1,170 of the target of 1,800 processors (a percentage achievement of 65%) had benefited.

RTIMP adopted technologies are being promoted through information, education and communication campaign. The project also created platform for knowledge sharing among stakeholders

The general public has been well informed and educated on RTIMP adopted technologies in relation to the Programme's products and the socio-economic benefits to the Programme beneficiaries and the Country at large. A total of 70,873 promotional materials have been developed in several areas of R&T crop development and are being distributed across the country. The areas include rapid multiplication of planting material (Cassava and Yam), pest and disease control. Documentaries on the technologies have been telecast on 3 Television networks of the Country. One (1) website has also been established and fully operational. The DSFs have become popular with stakeholders

The awareness programmes and advertisements have helped in

educating and providing technical information to a wide range of stakeholders in the R&T industry. The various stakeholders or players along the value chain of R & T are fully aware of potential business opportunities within the chain.

#### 6.3.1. Commodity chain linkages developed for smallholder farmers and processors

The Programme has supported the development of several commodity value chains in the country. RTIMP chain facilitation, is focused on 4 key chains namely: Gari, High Quality Cassava Flour, Bonding cassava flour for plywood industry, and fresh Yam. Notable among them is the cassava flour as glue extender for plywood manufacture (Cassava plywood chain). A total of 3,146 actors made up of 2,731 farmers, 359 processors and 56 transporters are involved in the 4 commodity chain development.

One instrument of the technology used to provide the structures for linkage activities is the Esoko platform for market information. The Esoko platform is an ICT platform designed primarily to help actors in the value chain to access and share market information, communicate with other actors, establish business relationships and manage the flow of goods and services among them.

Over eighty six (86) Facilitators and Administrators have been trained in the use of the platform and Zonal Coordinators given special rights to manage their Zones (In putting market information). Some 1,005 actors are currently exchanging information on the platform

Enterprise Records Books have been developed in association with National Board for Small Scale Industries (NBSSI)/BACs and

introduced to all actors with emphasis on the farmers and processors in an effort to mainstream financial analysis and record keeping in the value chain business.

### 6.3.2. Planting Material Multiplied and Distributed

RTIMP has multiplied and distributed improved disease and pest - free planting material of root and tuber crops to farmers (through public and private extension agents) in all 10 regions in Ghana. The multiplication of planting material has been accelerated at a pace faster than what was envisaged initially. This is because of the increased request for supply of cassava roots from processors. A total of 144,929 tertiary farmers (90,463 males and 54,466 females out of programme year 8 target of 174,400 farmers representing 82.7% achievement) have been supplied with improved planting materials of recommended R&T crop varieties.

### 6.3.3. Farmer Field Fora (FFF)

RTIMP has instituted the Farmer Field Fora (FFF) as a platform for innovation and sharing of knowledge and experience by farmers, researchers and extension workers. The farmers involved in the FFF are learning to improve the productivity of their farms. In all, 411 FFFs out of a programme year 8 target of 500 have been established and 256 FFF facilitators trained.

A total of 12,146 farmers (5,998 males and 6,148 females) have been reached and are participating in the Farmer Field Fora (FFF) to improve their capacity to innovate and to enhance adoption of



improved technologies. Cumulative achievement of farmers trained in crop production technology stood at 12,146 out of a programme year 8 targets of 17,639 representing 68.8% achievement).

#### 6.3.4. Bioagents for control of cassava pests produced and released

A total of 1,353,642 actives of *Typhlodromalus manihoti* mass have been produced and released and 1,371, 211 actives of *Teretrius nigrescens* was also mass produced and released. Biological control of pests ensures that chemical usage is avoided.

#### **Transfer of relevant processing technologies initiated**

The Programme has promoted technologies for processing and storage through Prototype testing.

Manufacturing /fabrication, facilitating acquisition of equipment and training towards the production of high quality products and enhancement of sanitation and hygiene as well as process flow.

Twenty Four (24) new and more efficient and cost-effective equipment (prototype) for the processing of R & T crops have been made available and being promoted for adoption. One hundred and ninety seven (197) local artisans have been trained and equipped with the skills required to fabricate and maintain / repair / processing equipment for MSE processors.

#### 6.3.5. Rural Enterprises Upgraded to Serve as Good Practice Centres

Nineteen (19) processing centres have been upgraded to Good Practices Centres (GPCs). These GPCs have served as learning

centres for small-scale processors to acquire knowledge and skills on the use and benefits of improved processing technologies. The GPCs have also served as focal points for linkage activities and have served as useful markets for fresh produce. They have also stimulated actors along the cassava value chain and created employment in the various localities.

#### 6.3.6. Exposure Visits

RTIMP has collaborated with the National Board for Small Scale Industries (NBSSI) and has involved BACs for providing business skills to participants during the exposure visits. The participants are exposed to accepted standards of equipment, hygiene and good practices in the industry. A total of 136 exposure visits had been embarked on involving 2,730 (700 males and 2,030 females) small scale processors and farmers. Some of the visitors have adopted and acquired new technologies at GPCs and have acquired them through MEF.

#### 6.3.7. Stakeholders Trained in Business Development and Marketing

In the area of technology transfer, training consultants and BACs /local trainers have equipped 4,180 beneficiaries (1,599 males and 2,581 females) with business development and marketing skills of the programme year 8 target of 6,000 representing 83% achievement level.

The entrepreneurs have been equipped with knowledge and skills in Business development and marketing skills including quality packaging and labelling and the use of financial tools in all aspects of business operations has been initiated through the implementation of the

Enterprise Record Book. This has enhanced the quality of their products (e. g. more attractive packaging - Mack & B-Face, Harii Farms, Jenefal, etc).

#### 6.3.8. Micro-Enterprise Fund disbursed to Agro-processors

Although in the preceding years, access to the MEF was slow due to some bottlenecks that were hampering access to the fund, the disbursement of the fund has witnessed a new turn/improved as a result of enhanced sensitisation and the involvement of the NBSSI BACs in facilitating the process of accessing the fund and refresher training programmes for PFIs and open forums for experience sharing from the two successful Rural Banks (Kwamanman and Naara Rural Banks) on the secret behind recovering 100% of loans disbursed.

A total of 1,170 (702 females and 468 males) beneficiaries of the programme target of 1,800 have benefited from a total amount of GH¢ 531,777.00 to purchase equipment such as cassava graters, roasting pans and other investments within the chain. This brings total disbursement to 87.12%.

#### 6.3.9. What is unique about the Root and Tuber Improvement and Marketing Programme (RTIMP)

The programme adopted the available root and tuber technologies developed by the NARS.

The RTIMP pursued the strategic objective of building competitive and market-based R&T commodity chains supported by relevant, effective, and sustainable services that are easily accessible to the

rural poor and actors along the value chains.

In order to ensure that the demand for services is occasioned by a “market pull”, the programme made efforts at enhancing the market capacity through:

- Increased number of R&T Commodity chains established and functioning
  - % increase in R&T produce that is processed
  - Increased number of MSEs run on formal business lines
  - Increased productivity of R&T-based cropping systems

The programme built the capacity, provided logistic support and equipped both public and private extension agents, for efficient service delivery.

**The key Strategies in the Programme included:**

- District Stakeholder Fora (DSF)
  - Commodity chain linkage activities through Initiative fund (IF)
  - Linking up small-scale producers and processors with larger-scale users of R&T products
  - Planting material multiplication and distribution
  - Farmer Field Fora (FFFs)
  - Technology Transfer for Processors
  - Establishment of Good Practices Centers (GPCs)
  - Exposure visits to Good Practices Centres
  - Business development and marketing skills training
- Rural Financial services through the Micro Enterprise Fund (MEF)

## 7. Future Direction: National Strategy for Agricultural Technology Development

### 7.1. National Development Strategies and Role of Agriculture

Based on the role of agriculture in the national development framework, the objectives for the food and agriculture sector policy are as follows:

- Food security and emergency preparedness
- Improve growth and income
- Increased competitiveness and enhanced integration into domestic and international markets
- Sustainable management of land and environment
- Science and Technology applied in food and agriculture development.
- Improved institutional coordination.

#### 7.1.1. Food Security and Emergency Preparedness.

Food security is defined as good quality nutritious food, hygienically packaged and attractively presented, available in sufficient quantities all year round and emergency preparedness as the ability of the country to provide food assistance to affected persons in times of disaster.

The broad strategy for attaining the objective of food security and emergency preparedness

is to focus on the national and agro-ecological levels on the development of at most five staple crops (maize, rice, yam, cassava

and cowpea). MoFA support for districts food security focuses on two crops. The choice of the crop is based on:

- Comparative advantage, importance of the crops to people.
- Irrigation and sustainable management of land.
- Improved planting materials and
- Appropriate mechanization, to enhance productivity along commodity value chain.

Target for productivity and production growth of selected crop(s) will be set annually. Strategies for food security and emergency preparedness will target the poor to enhance their capacity to cope with production and food insecurity risk (special programmes that will enhance their diversification opportunities, reduce risk and enhance their access to productive resources).

#### 7.1.2. Increased Growth in Incomes and Reduced Income Variability.

The purpose of this intervention is to provide opportunities for diversification into cash crops and livestock, and for value addition for commodities. Enhanced incomes will also reinforced food security through financial access to food. Diversification will be pursued by introduction of new commodities and creation of opportunities for value addition to primary commodities.

Crops such as mango, cashew, oil palm, rubber, plantain and citrus, as well as small ruminants (sheep and goats), poultry and vegetables will be promoted on the basis of comparative and competitive advantage of agro-ecological zones and availability of markets.

Indigenous staples crops and livestock species produced by the poor will be commercialized through linkages to industry. Research on these crops and livestock species to identify genetic material with desired qualities and to improve productivity along the value chain will contribute to poverty reduction. Urban agriculture will be promoted as a sustainable alternative means of livelihood for poor migrants engaged in agriculture.

#### 7.1.3. Increased competitiveness and enhanced integration into domestic and international markets.

Ghana has pursued a demand-led growth based on exports since the mid-1990s as part of the strategy to diversify the country's export base. New opportunities are emerging in the international market and the country has to position itself to compete. The aim is to enhance Ghana's comparative advantage and translate it into competitive advantage in producing the needed volumes of commodity and quality on a timely basis. The potential for expanding domestic markets also exists as the economy expands and incomes grow. The capacity of semi-commercial and commercial smallholders can be enhanced for them to produce for the international and expanding domestic markets, including agro-industry.

The Government will partner with the private sector to increase investments in the sector and build capacity of operators to compete competitively in the global market. Priority commodities will be selected on the basis of regional comparative and competitive advantage in target markets and, where appropriate, cost sharing and

cost-recovery will be pursued in delivery of services and provision of infrastructure to commercial sector.

#### 7.1.4. Sustainable Management of Land and Environment

The Government aims at mainstreaming and supporting the scaling up of sustainable land management (SLM) practices in addressing objectives around both environmental resilience and agricultural productivity in the country's overall development agenda. In addition to addressing issues (barriers or opportunities) of productivity in both agriculture and in environmental services, this will serve as entry point in addressing the interactions between agriculture and climate change and biodiversity loss. Strategic Environmental Assessment of FASDEP II will ensure that the policy is consistent with all regional and sub regional conventions on natural resource management. Inclusiveness and cross-sector interactions will guide the implementation of strategies designed to achieve the objective.

- Mainstream sustainable land and environmental management practices in agricultural sector planning and implementation.
- Create awareness about environmental issues among all stakeholders and develop an effective and efficient framework for collaboration with appropriate agencies to ensure environmental compliance.
- Adopt an integrated approach in dealing with environmental issues, including an inclusive partnership-based, coordinated approach with active and mutual involvement of NGOs and civic organisations, the private sector and the development partners.
- Improve incentive and compulsion measures to encourage users of



the environment to adopt less exploitative and non-degrading practices in agriculture.

- Promote joint planning and implementation of programmes with relevant institutions to address environmental issues in food and agriculture.
- Promote the development of community land use plans and enforce the use, particularly in urban and peri-urban agriculture.
- Improve access of operators in urban agriculture to sustainable land and environmental management practices.
- Stimulate, support and facilitate adaptation and widespread adoption of farming and land use practices which, while in harmony with natural resource resilience, also underpin viable and sustainable production levels.

#### **v) Science and Technology Applied in Food and Agriculture Development**

The vision is for a modernized food and agriculture in which productivity and production improvements are based on science and technology. Prioritization of research on the basis of commodities targeted in FASDEP and public funding of basic research will guide the promotion of science and technology in agriculture development. Demand-driven research implies the activity is motivated from the desires of final users (in the case of information) or beneficiaries (in the case of research).

## **Strategies**

High priority is given to “applied research” with more research initiatives being redirected towards supporting on-farm and off-farm innovations for improved production systems, higher productivity and small/large scale industrialization/processing. MoFA will partner with the national agriculture research system to ensure that research focuses on the development of value chains of commodities targeted for food security, income growth and diversification, external markets, and linkage with industry. Principles of best practices of land and environmental management will be applied.

### **7.1.5. Improved Institutional Coordination**

The public sector has been dominant in the delivery of services in the sector. However, expansion of the sector and its transformation requires greater involvement of the private sector in service delivery, and investment and management of the sector as a whole.

MoFA will lead the improvement of the coordination and harmonisation of activities of MDAs and Development Partners in the sector. Specific strategies are:

- Strengthen the intra-sectoral and inter-ministerial coordination through a platform for joint planning as elaborated in Chapter 5 on implementation.
- Develop and implement a communication strategy to improve coordination.
- Create framework for synergy among projects.
- Strengthen framework for coordinating activities among diverse

stakeholders in the sector.

- MoFA will ensure synergy among projects and mainstream activities of projects into general MOFA activities through the budget process, before projects close.
- Coordinate MOFA's policies, programmes, projects and activities with those of water, health and research.
- MoFA will ensure that its advocacy, collaboration and coordination roles are carried out within the laws and regulations of the country.

## 7.2. Development Policies and Strategies on Agricultural Technology

### 7.2.1. Research Strategies on Agricultural Technologies (R&D)

Information Communication Management and Technology (ICM/T) have been perceived as a general problem in many research institutions, particularly in the developing world.

The Ghana Agricultural Research Information System (AGRIS) Pilot Project (Component of GCP/INT/997/UK) of the Food and Agriculture Organisation (FAO) and Council for Scientific and Industrial Research (CSIR)-Institute for Scientific and Technological Information (INSTI) was established to address this problem.

In 2003, the Government of Ghana produced a policy document, the national Information Communication Technology for Accelerated Development (ICT4AD) ICT within policy, for realizing the vision to transform Ghana into an information-rich, knowledge-based society and economy through developing, deploying and exploiting the

economy and the society.

The priority areas that the policy document identified and seeks to address include:

- Developing scientific and industrial research capacity to promote the attainment of an efficient diversified, technologically progressive, and market-driven industrial sector that is capable of sustainable economic growth; and also encouraging the transformation of the society to become more scientifically based and improve technology for increased productivity in all economic sectors.
- Modernizing agriculture and developing agro-business by encouraging rural development and promoting the establishment of a robust and diversified agricultural sector. This will ensure national food security and adequate supply of raw materials at competitive prices for industrial production.

#### 7.2.2. Extension strategies on agriculture technologies

Pluralism in extension service delivery will continue to be promoted to increase access of different farmer groups.

- In addition to the RELCs, identify other participatory methods of extension programming and delivery.
- Integrate gender in extension programming to ensure relevance of information to men and women and equitable access to services.
- Use of mass extension methods will be emphasised e.g. farmer field schools, nucleus-farmer out growers, extension

- fields in districts, mass communication through radio, TV, communication vans, dissemination through farmer groups.
- Build capacity of FBOs and Community-Based Organisations (CBOs) to facilitate delivery of extension services to its members.
  - Enhance quality of extension to operators in urban agriculture, especially in application of good agricultural practices to ensure the safety of produce from the sub-sector.
  - Improve allocation of resources to districts for extension delivery backed by enhanced efficiency and cost-effectiveness.

## **8. Suggestions on KAFACI's Agricultural Technology Cooperation:**

Addressing the needs of resource poor farmers to improve upon their livelihood, require different mechanisms at different stages. The long - term engagement involves different strategies. KAFACI's Research and Development strategies must be long term and dynamic to accommodate the changes experienced in developmental processes.

## Conclusion

The role of agricultural extension in the next decade should be quite different from what it was 10 years ago or even now. Its role as a facilitator of agricultural knowledge system would only increase as more participants from private sector would get involved in extension. It is likely that input related extension (seed, fertiliser, machines and chemicals) would move to private sector in the future. The public sector extension would still continue to be the major extension provider in most parts of the country as the private sector alone would not be able to meet even partially the varied needs of farmers. The ability of the system to perform these roles would entirely depend on the pace of internal reforms, the system would undergo. Experience the world over is that it is easy to change farmers than to change government agencies. Internal reforms are thus going to be the greatest challenge for the Ghana Extension System.

The desire to achieve self - sufficiency in food production in the project district and Ghana at large, will be enhanced if farmers and farmer groups are guided through the use of improved seed/planting materials coupled with the required crop production techniques. Food crop production, especially maize is concentrated in the selected project communities/villages: Foase and Trabuom /Chichibon. Unfortunately, farmers in the area do not have access to the high yielding maize seeds and accompanying production technologies.

There are a number of International Cooperation Systems for Agricultural Technologies in Ghana. The systems have being

supporting governments and farmers in the production, processing and marketing of agricultural commodities. The cooperation systems work in partnership with other stakeholder to provide agricultural extension and advisory services to farmers. Innovations (information/knowledge) emerging from the seed industry may be seen as dynamic and systemic process which can emerge from many sources. KAFECI's interventions must be flexible to accommodate such changes if the need arises in subsequent years (year 2 & 3). The framework and tools for technology transfer and dissemination is developed on "innovation platform" where a group of stakeholders/collaborators with diverse social and economic backgrounds, work towards a common objective or challenge. Supporting the seed industry must be considered as an entry point to develop the commodity value chain. KAFACI's development interventions must therefore be expanded (over time), to cover other stakeholders along the commodity value chain. This will enhance a win - win situation.

■ References ■

- Hayward, J. A. 1990. *Agricultural extension: The World Bank's experience and approaches*. In B. E. Swanson, Report of the global consultation on agricultural extension (pp.115-134). Rome: FAO.
- MOA. 1990. Agriculture in the new millennium: towards pluralistic and demand-driven services in Ghana. Policy document.
- Okorley, E. L. 2007. An operational framework for improving decentralized agricultural extension: A Ghanaian case study. Ph.D Dissertation Massey University.
- Purcell, D. L., & Anderson, J. R. 1995. *Agricultural extension and research: Achievements and problems in national systems*. Washington, DC: The World Bank.
- Van den Ban, A. W., & Hawkins, H. S. 1996. *Agricultural extension*. Cambridge, MA: Blackwell.
- White, S. A., Nair, K. S., & Ascroft, J. 1994. *Participatory communication: Working for change and development*. London, UK: Sage Publications.

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## 가나의 농촌지도사업과 국제협력사업의 현재와 미래

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### 초록

이 연구의 목적은 가나의 농촌지도사업과 농업기술의 국제협력시스템의 현황과 방향을 탐색하는 것이다. 향후 농촌지도사업의 역할은 지금까지 해 오던 것과는 매우 다를 것이다. 농업기술시스템의 촉진자로서의 농촌지도의 역할은 민간부분의 증가와 함께 증가될 것이다. 공공 농촌지도사업은 민간 부분에서는 농민들의 다양한 요구에 부응할 수 없기 때문에 계속적으로 그 중요성이 증가할 것이다. 향후 이러한 변화와 함께, 가나의 농촌지도시스템에서 내적인 개혁은 도전에 직면하게 될 것이다.

국제협력시스템은 외부의 이해당사자와 농촌지도사업의 파트너십을 형성하는데 중요한 역할을 할 것이다. 종자산업으로부터 나타난 혁신은 역동적이고 시스템적인 과정이었다. KAFECI는 그러한 변화가 2-3년안에 일어난다면 이러한 변화를 유연하게 받아들여야 한다. 기술이전과 전파의 도구나 틀은 다양한 사회경제적인 배경속에서 공동의 목적을 향해 도전하는 혁신적인 플랫폼으로서 발전되어야 한다.

**주요어** : 농촌지도, 가나



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