



Demand Analysis Report- Republic of Ghana



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Contents

<i>List of Tables and Figures</i>	3
<i>Acronyms</i>	4
<i>1. Ghana: An overview of the Country</i>	5
<i>2. An Overview of Agriculture Sector, Policies, Programmes and Priorities</i>	6
<i>2.1 National Policy</i>	
<i>2.2 Ongoing Agricultural Programmes and Schemes</i>	
<i>3. An over view of Horticulture, Animal husbandry, Fisheries and Sericulture.</i>	8
<i>3.1 Horticulture</i>	
<i>3.2 Livestock and poultry</i>	
<i>3.3 Fisheries</i>	
<i>3.4 Sericulture</i>	
<i>4. Government objectives in agriculture, food and nutrition security</i>	10
<i>4.1 Trends in key policy decisions (2007 to 2014)</i>	
<i>4.1.1 Producer-oriented policy decisions</i>	
<i>4.1.2 Re-introduction of input subsidies</i>	
<i>4.1.3 Launch and expansion of mechanization services</i>	
<i>4.1.4 Introduction of national buffer stocks and minimum guaranteed prices for farmers</i>	
<i>4.1.5 Efforts to increase access to agricultural finance</i>	
<i>4.1.6 Introduction of national buffer stocks and minimum guaranteed prices for farmers</i>	
<i>5. Status of Agricultural Extension and Research system, Public and Private Institutions and their relevance in Agricultural Extension</i>	14
<i>5.1 Public Extension</i>	
<i>5.2 Extension Services by Universities/ Colleges</i>	
<i>5.3 Extension by CSIR Institutes</i>	
<i>5.4 Non- Government Organization (NGOs)</i>	
<i>5.5 Private Sector Extension</i>	
<i>6. Challenges in Agricultural Extension, Marketing, Insurance, Agriculture mechanization, Food processing, Infrastructure and any other relevant issues.</i>	15
<i>7. Present capacity building programmes and potential areas.</i>	17
<i>7. Areas of training priorities of the country</i>	17
<i>8a. Improved water management</i>	
<i>8b. Improved pest and disease management system</i>	
<i>8c. Extension systems</i>	
<i>8.9. Other areas of training</i>	20
<i>References</i>	

List of Tables

Table 1. Important demographic details of Ghana

Table 2. Land Use specific to agriculture

Table 3. Area and production of selected horticultural crops in Ghana

List of Figures

Fig.1. Location of Ghana

Acronyms

<i>AEAs</i>	<i>: Agricultural Extension Agents</i>
<i>AIS</i>	<i>: Agricultural Innovation Systems</i>
<i>AMSECs</i>	<i>: Agriculture Mechanization Services Enterprises Centres</i>
<i>CPF</i>	<i>: Country Programming Framework</i>
<i>DAES</i>	<i>: Directorate of Agricultural Extension Services</i>
<i>FASDEP</i>	<i>: Food and Agriculture Sector Development Policy</i>
<i>FAO</i>	<i>: Food and Agriculture Organization</i>
<i>FBO</i>	<i>: Farmer Based Organization</i>
<i>FM</i>	<i>: Frequency Modulation</i>
<i>GDP</i>	<i>: Gross Domestic Product</i>
<i>GoG</i>	<i>: Government of Ghana</i>
<i>GSGDA</i>	<i>: Ghana Shared Growth and Development Agenda</i>
<i>GSS</i>	<i>: Ghana Statistical Service</i>
<i>HDI</i>	<i>: Human Development Index</i>
<i>ICT</i>	<i>: Information and Communication Technology</i>
<i>IMF</i>	<i>: International Monetary Fund</i>
<i>IVRS</i>	<i>: Interactive Voice Response System</i>
<i>METASIP</i>	<i>: Medium Term Agriculture Sector Investment Plan</i>
<i>MoEST</i>	<i>: Ministry of Environment Science and Technology</i>
<i>MoFA</i>	<i>: Ministry of Food and Agriculture</i>
<i>MoLGRD</i>	<i>: Ministry of Local Government and Rural Development</i>
<i>NAFCO</i>	<i>: National Food Buffer Stock Company</i>
<i>NSPS</i>	<i>: National Social Protection Strategy</i>
<i>NGO</i>	<i>: Non-Governmental Organization</i>
<i>PFAG</i>	<i>: Peasant Farmers Association of Ghana</i>
<i>SRID</i>	<i>: Statistics, Research and Information Directorate</i>
<i>UNDP</i>	<i>: United Nations Development Programme</i>

GHANA

1. An overview of country

A multicultural nation, Ghana, a west African country has a population of approximately 27 million, spanning a variety of ethnic, linguistic and religious groups. Its diverse geography and ecology ranges from coastal savannahs to tropical jungles. Ghana is one of the world's largest gold and diamond producers, and is projected to be the largest producer of Cocoa the world as of 2015. Has adult literacy of 71.5% and people below poverty line is 28.6%. The GDP Per capita income \$3,638.47 and Human Development Index 0.558 (2012).



Table 1. Important demographic details of Ghana

Capital	: Accra (5°33'N 0°12'W)
Regions	: Ten
Population	:24.2 million (2010 census) (45 th place in the world)
Density	: 101.5/km ² (258.8/sq miles) (103 rd place in the world)
Area	: Total 238,535 km ² (92,099 sq miles)-(82 nd place in the world)
Water (%)	: 4.61
Official language	: English
Major Ethnic Groups	: Ashanti, Dagbani,Ewe and Ga-adangbe
Life expectancy	: 57 years (men), 61 years (women)
Currency	: Ghana cedi
GDP (PPP)	: Total \$121.222 billion; Per capita : \$4,396
GDP (nominal)	: Total \$42.295 billion; Per capita \$1,533
HDI (2014)	: 0.579[(140 th)
Neighboring countries	: Ivory Coast, Burkina Faso, Togo

Sources: GSS (2012) IMF (2015); UNDP (2015)

2. An over view of Agriculture sector, policies, programmes and priorities.

Agriculture is a major sector in the Ghanaian economy, with 39 percent of Gross Domestic Product, approximately 50 percent of the labour force and around 35 percent of foreign exchange earnings. Agriculture GDP has grown at an annual rate of more than 10 percent (in real terms) since 2000, providing a strong input to economic growth and poverty reduction.

The agriculture resource base is characterized by an abundance of land and diverse agro-ecological conditions. Of the 13.7 million hectares of agricultural land, only 7.85 million hectares (58 percent) are under cultivation. Owing to the diversity of agro-ecological conditions, crop production ranges from millet and sorghum in the semi-arid north, to maize, cassava, and other root crops in central Ghana, and cocoa, plantain, palm oil, and rubber in the forest zones of the south. These conditions also facilitate surplus production of most crops. Livestock production is of lesser importance, representing 7.5 percent of agricultural GDP (including cocoa).

Table 2. Land Use specific to agriculture

Type of Land use	Hectares	Percentage (%)
Total Land Area (T.L.A.)	23,853,800	100%
Agric. Land Area (A.L.A.)	13,628,179	57.1
2.1 Area under cultivation (2009)	7,311,500	53.6
2.2 Total area under irrigation (2009)	29,804	0.2
2.3 Area not under cultivation (2009)	6,316,679	46.4
3.0 Area under inland waters*	1,100,000	8.0
Others (forest, woodlands, cities & towns, etc)	9,125,721	38.3

Agriculture in Ghana Facts and Figures 2010, MoFA, 2010

The high proportion of unused agricultural land also highlights some of the major constraints that the sector faces: low levels of mechanization, low soil fertility, and limited access to water for irrigation. Roughly 90 percent of farms in Ghana are small (< 2 ha) and rely on manual labor or animal traction. Much of the land in the north and center of Ghana (approximately two-thirds of the total land area) consists of highly weathered soils with low fertility and low water-holding capacity. Only 30,000 hectares are irrigated, equivalent to 0.2

percent of total agricultural land. These constraints limit the ability to raise output and increase vulnerability to drought. Three commodities dominate production: cocoa, with 24 percent of total area, maize with 15 percent, and cassava at 13 percent. The remaining land is planted to more than 40 other food and cash crops, with yams, oil palm, groundnuts, vegetables, and plantain the most important.

2.1 National Policy: The government of Ghana has developed a comprehensive midterm (2011- 15) national agricultural policy called the Medium Term Agriculture Sector Investment Plan (METASIP).

During the last decade FBO-based extension has found strong policy support from the agricultural policy documents of Ghana. MoFA, NGOs and projects emphasized forming FBOs. Estimates indicated that there are 10 000 FBOs in Ghana (Salifu et al. 2010). However, many were inactive after the project period and many of them only were formed for the objective of receiving project grants. Salifu et al. (2012) indicated less than 40 percent of FBOs were involved in economic activities such as production, marketing and processing. Very few are self- sustainable or continued managing funds after the project period to remain active. FBOs need to be encouraged to participate in agricultural technology development and dissemination and trained on better networking and innovative revenue generation skills along with project formulation skills to seek funding from diverse sources.

Similarly, MoFA is implementing a policy of encouraging e-Extension approach. However, MoFA is not equipped with the capacity (skilled human resource to develop and maintain ICT/ e-Extension unit, infrastructure, content etc) to implement an e-Extension program.

Matching FAO's expertise to Ghana's development priorities FAO assistance in Ghana is guided by the Country Programming Framework (CPF) 2013-2016. The Framework sets out three priorities for Ghana;

Food and nutrition security: strengthening extension services, promoting good agricultural practices and improved nutrition, and facilitating expansion of irrigation agriculture to increase productivity and production. Also providing technical assistance and supporting capacity building. Gender and the role of women are crucial in each respect.

Environment and sustainable natural resource management: centring on sustainable resource use, environmental governance, and climate change adaption and mitigation. The role of women is prioritized in specification and delivery of activities.

Rural development and resilient livelihoods: concentrating on generating decent employment, and livelihoods diversification in rural areas to benefit agriculture communities.

Working closely with relevant institutions and partnerships to develop skills especially among rural youth and women (<http://www.fao.org/3/a-az484e.pdf>).

2.2 Ongoing Agricultural Programmes and Schemes

Projects

- Nerica Rice Dissemination Project
- Exporting Marketing & Awareness
- Inland Rice Development Project
- Rice Sector Support Project
- Ghana Commercial Agriculture Project

Programmes

- Ghana Agricultural Sector Investment Programme
- Youth in Agriculture Programme
- Northern Rural Growth Programme
- Programme For the Promotion of Perennial Crops in Ghana
- Ghana Agricultural Insurance Programme

3. An over view of Horticulture, Animal husbandry, Fisheries and Sericulture.

3.1 Horticulture Sector:

The horticulture industry is export-oriented and statistics on domestic production and trade are scanty. Only a small percentage of horticultural crop farmers are engaged in production for export. There is need to improve on productivity and reduction of postharvest losses through improved harvesting and post-harvest handling practices of horticultural crops. Consistent promotion of the regular consumption of adequate amounts of varieties of fruits and vegetables would also improve nutrition and income generation. There is need to improve on productivity and reduction of postharvest losses through improved harvesting and post-harvest handling practices of horticultural crops. Consistent promotion of the regular consumption of adequate amounts of varieties of fruits and vegetables would also improve nutrition and income generation.

Table 3. Area and production of selected horticultural crops in Ghana

Crop	Cropped Area (Ha)	Estimated Production (Mt)	Crop Yield (Mt/Ha)
Tomato	16,130	284,000	17.6
Pepper	9,570	134,000	14.0

Okra	2,330	46,600	20.0
Garden Eggs	3,870	38,700	10.0
Citrus	15,700	550,000	35.0
Mango	6,360	70,000	11.0
Pineapple	8,000	400,000	50.0
Pawpaw	880	40,000	45.0

Source: MOFA (SRID), 2009

Cocoa & Oil palm: Cocoa accounts for the largest area and the bulk of agriculture export earnings. Most oil palm fruit is sold for processing for the domestic market. Four large-scale, privately owned, corporate farming and processing entities meet the domestic demand for refined oil. Considerable area under cashew is also in cultivation.

3.2 Livestock and poultry sector: The livestock sub-sector is dominated by small scale operators who are mainly crop farmers keeping livestock to supplement their incomes and/or for security purposes. There are few well organized commercial poultry and pig operations. The livestock sub-sector is estimated to account for about 7 percent of the nation's agricultural gross domestic product. Pastoralism is the dominant form of livestock system, especially in the northern part of the country. Swine production is widespread; most pig stock is held at the household level but there is some industrial production in peri-urban areas. The poultry sector is sharply divided between family holdings and small- to large-scale industrial poultry farms (for broilers, layers, and even a few chick or guinea fowl hatcheries). Smallholder production is highest in the forest agro-ecological zone and in northern savannah areas. Nationwide, chicken production (ranging from the extensive village systems to semi-commercial groups) represent between 11 percent and 13 percent of rural household incomes.

3.3 Fisheries in Ghana

The Ghana fishery sector plays an important role as it contributes significantly to the national economic development objectives relatively to employment, livelihood, foreign exchange earnings, food security and poverty reduction. The fish industry, according to the Ministry of Agriculture, employs estimated 10% of the country's population which represents about 2.6 million people.

Fish is a preferred source of animal protein in Ghana where about 75 percent of the total domestic production of fish is consumed locally this, representing about 60 percent of animal protein intake. The Ghana fishery sector increased considerably in the late 1960s, from 105,100 tons of marine fish caught in 1967 to 389,411 tons in 2010 and the per capita

consumption is estimated to be about 25 kg per annum. Fish is the country's most important non-traditional export commodity and the fisheries sub-sector accounts for about 5 percent of the agricultural GDP. The total earnings from fish and fishery products accounted for approximately 62 million US Dollars in 2010.

Fish are generally taken from the marine, inland (freshwater) and aquaculture sectors whilst the Volta Lake, reservoirs, fishponds and coastal lagoons are the main sources of freshwater fish. The fishing operations concern three sub sectors: industrial, semi industrial and artisanal sectors. The latter is responsible for over 70% of the total fish landings and it employs over 60% women and links with other sectors in providing raw materials especially the fish curing activities

3.4 Sericulture in Ghana

The silk industry in Ghana is relatively young. Mulberry sericulture was introduced in Ghana in 1992 by P.K. Ntaanu which led to the establishment of the Silk Farmers Association, and later a silk factory in 2002 with support from Food and Agriculture Organisation (FAO). There was an increase in cocoon production and farmers participation when sericulture started in Ghana. However, this interest dwindled with time due to certain challenges. Among the problems facing the silk industry in Ghana are lack of seeds (certified eggs), functional production centres and locally adapted silkworm strains and mulberry varieties that offer high yielding cocoons of good quality. Thus, silkworm eggs and mulberry stem cuttings were imported from abroad (China, India, Kenya, and Bulgaria). Furthermore, production of raw cocoons in Ghana has been low and inconsistent, with most of them being of inferior quality and not reelable. This has led to a reduction in the number of silk farmers and land area for mulberry cultivation. The young industry has the potential to reduce rural poverty, increase employment and reduce dependence on the depleting forest if the necessary interventions are put in place.

4. Government objectives in agriculture, food and nutrition security

The national economic plan, known as "Ghana Vision 2020" launched in 1995, envisions Ghana as the first African nation to become a developed country between 2020 and 2029 and a newly industrialized country between 2030 and 2039 through the integration of science and technology in governmental programmes, including in the agricultural sector.

The Ghana Shared Growth and Development Agenda (GSGDA 2010-2013) focused on supporting oil and gas development, with investments in infrastructure, energy, housing and agricultural modernization. GSGDA social policy has focused on human development, including health, education and the fight against poverty.

Among the main objectives stated in the Food and Agriculture Sector Development Policy (FASDEP II, 2007) is the modernization of agriculture and increased productivity of Ghanaian farmers. The Medium Term Agriculture Sector Investment Plan (METASIP 2010-2015) is the implementation plan of FASDEP II and comprises six programmes which represent Ghana's priorities, with Food Security and Emergency Preparedness and Increased Growth in Incomes being the major areas for investment.

The National Social Protection Strategy (NSPS, 2008), launched in 2008, aims to manifest the government's vision of creating an inclusive and empowered society through the provision of sustainable mechanisms for the protection of vulnerable people. Its main objective is to meet the basic needs of extremely poor populations through social protection programmes and by improving access to livelihood opportunities.

4.1 Trends in key policy decisions (2007 to 2014)

4.1.1 Producer-oriented policy decisions

Development of the agriculture sector is a declared priority for the government. Supporting agri-food production and exports has been the leading policy since 2007, with particular emphasis on agricultural modernization and ensuring minimum prices for farmers. Programmes implemented by MOFA at national level include the Fertilizer Subsidy Programme, the Block Farming Programme, Agricultural Mechanization Centers and the Irrigation Development Programme. It is estimated that these programmes together comprise about 85 percent of the ministry's capital budget.

4.1.2 Re-introduction of input subsidies

After nearly twenty years of no large-scale government intervention in the fertilizer sector, a national Fertilizer Subsidy Programme was re-introduced in 2008, as a temporary response to spikes in domestic food and fertilizer prices that year. The programme subsidized all-size crop farmers, covering approximately 50 percent of fertilizer prices, and was distributed in the form of fertilizer-specific and region-specific vouchers. Rather than dismantling the programme after the price crisis, as originally planned, government support to the programme was scaled-up from US\$ 10.8 million in 2008 to US\$ 63 million in 2012, although the overall subsidy was reduced to 21 percent in 2013, due to rising fertilizer prices and budgetary constraints. The programme aims to increase the rate of fertilizer application among farmers, which is one of the lowest in the world. However, even after implementation of the input subsidy programme, fertilizer consumption has remained low.

4.1.3 Launch and expansion of mechanization services

Because of the low level of agricultural mechanization in the country the government launched the ‘Agriculture Mechanization Services Enterprises Centres’ (AMSECs) programme in 2007 as a credit facility, assisting qualified private sector companies in purchasing agricultural machinery at a subsidized price and interest rate which in turn is rented to rural farmers at affordable prices. The programme has been extended and, as of 2015, 89 AMSECs have been established throughout the country. Analyses on the viability of AMSEC enterprises indicate that they do not represent a viable business model attractive to private investors, even with the current level of subsidy. Providing heavy subsidies on large and more costly tractors does not seem to be the most appropriate solution in a country dominated by small-scale farming. Complementary to AMSECs is the ‘Block Farm Programme,’ which was launched in 2009 as a component of the Youth in Agriculture Programme to provide large blocks of arable land for the production of selected commodities, as well as to generate employment for the poor rural youth. The block farms receive a bundle of subsidized mechanization services and inputs, in addition to extension services, which are repaid in-kind by the farmers after the harvest.

4.1.4 Introduction of national buffer stocks and minimum guaranteed prices for farmers

The National Food Buffer Stock Company (NAFCO) was established in 2010, with the aim of reducing post-harvest losses, ensuring price stability and establishing emergency grain reserves. NAFCO is a state-owned enterprise that purchases, stores, sells and distributes excess grains in warehouses across the country. Currently, 73 Licensed Buying Companies (LBCs) are mandated to purchase maize, rice and soya beans from farmers at minimum prices, which include the total cost of production and a 10 percent profit margin for farmers. In early 2014, claims that the government may privatize NAFCO spread, due to the company’s financial constraints and lack of storage facilities in some regions, which undermined the overall efficiency of its operations. According to MOFA, the government is rather seeking private partnership in specific areas of the company’s operations to help alleviate its financial constraints. However, no official action has been taken so far. Analyses on the effectiveness of NAFCO indicate that the positive results expected through the establishment of the system (i.e. higher price stability, reduction in post-harvest losses, lower prices for consumers and higher prices for farmers resulting in increased production) have not been achieved, despite significant investments.

4.1.5 Efforts to increase access to agricultural finance

Access to rural credit for small-scale farmers is constrained by several factors, the most relevant being the lack of collateral security in the form of property and stable employment. There has been improvements recently (albeit very marginally) in the share of agricultural loan in the portfolios of commercial banks, from 4.3 percent in 2008 to 6.1 percent in 2010. Some of the reasons for low levels of investment in agriculture include a history of default on subsidized loans, issues of land tenure, weather risks, and a lack of technical knowledge on risk assessment and management. To increase access to agricultural finance, the government had established the Agricultural Development Bank in the mid-1960s, with lower lending rates to farmers. However, low repayment rates have resulted in a lower lending share to agriculture (only 29 percent in 2010). Despite a steady increase in the number of leasing companies in Ghana since the early 2000s, less than 1 percent of the total leasing value is devoted to agriculture. Mechanisms are being introduced recently to expand access to agricultural finance in Ghana. The government established a Collateral Registry on February 2011, which is subsidized by the Central Bank and charges low fees to its users. The system is meant to provide information about “borrowers’ assets that are registered as collateral” for the purpose of borrowing and to allow financial institutions to “recover assets from defaulters and place them on sale without having to go to court”.

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5. Status of Agricultural Extension and Research system, Public and Private Institutions and their relevance in Agricultural Extension.

5.1 Public Extension: Public sector extension is represented by the Ministry of Agriculture (MoFA), the Ministry of Local Government and Rural Development (MoLGRD), the Ministry of Environment Science and Technology (MoEST), several universities and research institutions around the country. These institutes provide extension services through various departments, councils and institutes (WWS, 2013). The primary provider of extension services in Ghana is the MoFA through the Directorate of Agricultural Extension Services (DAES). Ghana is having approximately 4-5 million small holder farmers. MoFA has roughly 3500 agricultural extension agents (AEAs) (3000 may be in the field). Hence extension personnel and farmer ratio may be 2000 to 3000 (Mcnamara *et al.* 2013).

MoFA is promoting a policy of group extension approach (FBO based) and e-extension (however, e-extension initiatives are at a very nascent stage) to supplement the shortage of extension agents. A survey conducted by the Peasant Farmers Association of Ghana (PFAG) reported that only 10percent of farmers are getting extension services. Most of the agricultural extension activities are carried out based on the donor supported development projects.

5.2 Extension Services by Universities/ Colleges: A number of universities and colleges offer agricultural educational program for regular (and also for in-service candidates) and limited in-service training programs. However, their role in information delivery (especially to the farmers) is minimal.

5.3 Extension by CSIR Institutes: Nine CSIR institutes (out of 13) undertake agricultural and allied sector based research, although there are no regular outreach programs. A few farmer training programs and field demonstration are conducted if the budget provision is given in the project itself.

5.4 Non- Government Organization (NGOs): A large number of NGOs depend on donor funding for the projects and activities. Most of the NGOs work with the local champions/ lead farmers (nucleus farmers)/ promoter that work with a group of farmer to promote new techniques/ crop. Lead farmer may be working with existing groups/ FBOs/or create new groups/FBOs. Most of the NGOs use demonstrations, trainings, field days and encourages farmer to farmer communication. In some cases, videos were used and radio proved most popular among farmers causing NGOs to use local FM stations to create awareness. Virtually all NGOs seek to engage the district level Agriculture Extension Agents (AEAs) of MoFA in their projects.

5.5 Private Sector Extension: Private for-profit sector (input, suppliers and agri-business firms) involvement in agricultural extension service provision is increasing in Ghana. Private sector companies provide information and advice (and sometimes technical advice by field visits) of products as an unidentified component of the sales price (Mcnamara *et al.* 2013). Olam International, for example, through a contract farming arrangement provides agro advisory services to the farmers and conduct training on food agricultural practices on 100 demonstration plots on cotton cultivation by hiring 100 extension agents (Mcnamara *et al.* 2013). The farmer organization –Kuapakokoo is a cocoa production union with 65,000 members with its own marketing/ trading business unit which was formed in 1980. The union operates in 57 districts of the five southern regions of Ghana with 32 extension personnel for advisory services. It also conducts some technical and social research and also undertakes capacity building and infrastructure development.

6. Challenges in Agricultural Extension, Marketing, Insurance, Agriculture mechanization, Food processing, Infrastructure and any other relevant issues.

Challenges of agricultural extension:

SWOT Analysis of Ghana

Recently McNamara (2012) and Bentley and Mele (2011) have conducted an exhaustive review of agricultural extension in Ghana and this box summaries the Strength, weakness, opportunities and threats of the Ghana extensionsystem:

Strengths:

- Pluralistic extension service providers are active in Ghana.
- MoFA has largest number of extension staff and has a footprint around the country.
- Subject matter experts are available at district level for the consultation.
- Institutional arrangement for Research-Extension linkage is available.
- Extension actors (MoFA, NGOs, etc) put emphasis on group extension (FBO based).
- Institutional arrangements like FBOs and ICT infrastructure (radio, mobile) is well established.
- Emergence of community based extension models created agricultural leaders in the rural area (Model farmers, community volunteers etc.).
- Existence of public-private partnership among MoFA, NGOs and others.

Weakness:

1. Financial support from national ministries are very limited and Extension actors in Ghana heavily dependent on donor agencies and projects.
2. Dysfunctional Research Extension Linkage Committees (due to limited operational budgets)
3. Confusion of decentralization efforts in public sector extension due to unclear roles and responsibilities
4. Public extension personnel: farmer ratio is very high. NGOs, Radio stations, FBOs heavily depend on limited manpower of MoFA.
5. Public-private extension providers heavily depend on projects. Projects are operated in small geographical area for short period (mostly for 2-3 years).
6. Most of the times, project objectives are not farmers need based. After project period, sustainability of project activities is questionable. Created institutional arrangements (FBOs, Lead farmers, Linkages etc) become dormant.
7. Poor rural infrastructure (road connectivity, transport) increases operational cost of extension (time-cost, fuel, maintenance of vehicles, limits number of contacts).
8. More emphasis on dissemination of production technologies by the public extension.

Opportunities:

1. Presence of large number of FBOs, Radio stations, private extension players (Agri-business firms, input supply agencies, etc) gives scope for expanding private extension.
2. Mobile infrastructure and ICT initiatives may give better opportunity for e-Extension approach to reach large number of farmers.
3. Facilitating market led extension and value chain approach can generate more income to farmers.
4. Presence of women groups/ FBOs may facilitate to reach unreached women farmers.

Challenges:

1. Technical human resource recruitment and development is a challenge among extension providers (especially for MoFA, NGOs, Radio stations).
2. Aging MoFA staff (most of them are 50 years old or older) and few or no agricultural technical staff in many of NGOs.
3. Lack of regular in-service training to the MoFA staff makes them less competent in recent advances in agriculture and other skills (limited ICT, networking skills).
4. Public extension faces “brain drain” of its experienced staff to private sector.
5. Getting sufficient operational budget (fuel, transport, extension activities etc.)

6. Competition of among public-private extension agents for the donor funding/projects
(Adopted from the World Bank- Ghana: Agriculture Sector Risk Assessment- Volume II: Risk Management Solutions, 2014)

7. Present capacity building programmes and potential areas.

There is no regular capacity development program for the extension personnel to update knowledge and skill on improved agricultural technologies. There is no regular, time bound, in-service training program for the knowledge and skill up-gradation of the extension personnel.

8. Areas of training priorities of the country.

The World Bank identified three priority areas for agricultural development in Ghana;

a) Improved water management for drought and flood management,

b) Improved pest and disease management system, and

c) Improved agricultural extension system.

8a. Improved water management:

- Soil and water management practices (e.g. contour bunds, grass stripping (vegetative strips), crop residue management, cover cropping, Pit composting, Planting pits (*zai/tassa*), Agro-forestry, alley cropping, enclosures, rainwater harvesting, etc) .
- Flood control measures upstream
- Investments in medium to large scale irrigation and drainage schemes

8b. Improved pest and disease management system: Pest and diseases, endemic and systemic breakout are a big risk for the Ghana agricultural sector, especially for tree crops, with severe consequences for farmers and other stakeholders.

- Early warning systems and surveillance including calamity pest surveillance (e.g. of variegated grasshoppers, African armyworm).
- Improving access of farmers to knowledge about improved pest and disease management through multiple channels (extension, ICT, input dealers, farmer field school, etc).
- Plant health management strategies for the major crops.
- Improving the crop pest diagnostics capacity –(visit to laboratories, equipment etc.) and exposure on data collection, training etc.
- Training on regulatory activities in the pesticide & fertilizer sectors

8c. Extension systems

1. **Public and Private Sector Research and Extension Partnership:** RELC meetings need to be conducted regularly. Separate operational budget for the functioning of RELC should be allotted. RELC activities should be conducted at three different levels such as district, regional and national level. Agricultural research and extension planning implementation and evaluation should be carried-out through RELC and eventually a proper working mechanism evolved for sharing of agricultural information, knowledge, technology, infrastructure and other resources among the public-private agricultural research and extension organizations.
2. **Extension Reforms:** Extension reforms should be carried out by formulating national agricultural extension policy. They need to include clear roles and responsibilities of different organizations involved in agricultural research and extension. Common guidelines for developing public- private partnership mechanism should also be prepared with emphasis on gender, Agricultural Innovation Systems (AIS), FBOs, e-Extension strategy, monitoring and evaluation, climate change and risk management issues and market extension *etc.* Extension reforms should also clearly envisage organizational cultural change among institutions for creation for a better organizational environment, better working environment and performance based-incentives, *etc.*
3. **Knowledge Management:** Knowledge Management units with sufficient infrastructure (communication units, print, video recording & editing, ICT Facilities *etc.*) should be established in research and extension institutes for collecting, digitizing, creating databases and linking with the national agricultural knowledge portal.
4. **Integrated e-Extension System:** Integrated e-extension systems should cater to farmer specific advice consisting of farmer database, knowledge portal, dedicated 24x7 call center (IVRS), web based virtual lab, virtual experts and expert support system. Furthermore, the system should facilitate information aggregation and dissemination integrated with ICT and the traditional extension system.
5. **Strengthening the Functioning of the Community Radio/ FM:** The large potential of radio stations needs to be integrated with extension delivery. A working partnership mechanism between MoFA and radio broadcasting stations needs to be established. Additionally, FBOs need to be facilitated and supported to take funds from other developmental partners.

6. **Creating FBOs and strengthening existing ones for Information & Knowledge Facilitation:** A large number of FBOs already created by the different projects or organizations could be revitalized. Successful ones could be facilitated for revenue generation and sustainability with experienced FBO members encouraged to serve as para-extension professionals for facilitation of agricultural information and knowledge. FBO's should be facilitated to run regular training programs and hire their own extension advisors. MoFA should facilitate the development of Agricultural Innovation Systems (AIS) concepts around FBOs.
7. **Agro-Meteorological Network and Weather Information Forecasting:** Research and extension providers need to be encouraged to collaborate and share resources with the Ghana Meteorological Agency to set-up a national network of agro-meteorology and weather forecasting. Regular information packaging of weather information for farmers should be carried-out with the help of agricultural researchers and agro-meteorological experts.
8. **Market Information and Intelligence Network:** A national level dedicated market information and intelligence network should be formed by integrating local, district, regional, national and international market information. Planning and marketing departments of the ministry, universities, market associations, commodity boards, market information analysts, market information providers (Esoko *etc.*) and other stakeholders could be brought onto a single platform to provide market information and also to forecast market conditions.

9. Other areas of training

- Sericulture production
- Oil palm cultivation and processing
- Composite fish and marine fish farming
- Piggery and poultry (Production and health management)
- Farm Mechanization
- Horticulture –processing and value addition

References

- MoFA (2010) *Agriculture in Ghana Facts and Figures 2010*, Ministry of Food and Agriculture, Ghana Retrieved from [:https://www.google.co.in/?gws_rd=ssl#q=Agriculture+in+Ghana+Facts+and+Figures+2009%2C+MoFA%2C+2010](https://www.google.co.in/?gws_rd=ssl#q=Agriculture+in+Ghana+Facts+and+Figures+2009%2C+MoFA%2C+2010)
- FAO (2015) *Socio-economic context and role of Agriculture*. Retrieved from: https://www.google.co.in/?gws_rd=ssl#q=FAO+%282015%29+Socioeconomic+context+and+role+of+Agriculture+Ghana on 30th May, 2016
- Ghana-Population and Housing Census 2010, (2012) Retrieved from: https://www.google.co.in/?gws_rd=ssl#q=ghana+census+2013 on 30th May, 2016
- GSS. (2012) *Population and Housing Census 2010 summary report of the results*. Ghana Statistical Service, Ghana. Retrieved from: https://www.google.co.in/?gws_rd=ssl#q=GSS+%282012%29++ghana
- IMF. (2015) *Ghana, International Monetary Fund*. Retrieved from: MoFA (2016) Ministry of Food and Agriculture Republic of Ghana Accessed from: <http://mofa.gov.gh/site/>
- UNDP - United Nations Development Programme (2015). "Human Development Report 2015: Summary". Retrieved from : <http://hdr.undp.org/en/2015-report/download> on 30th May 2016.