AGRA Extension Support Function Country Reports

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Contents

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Introduction

The Alliance for a Green Revolution in Africa (AGRA) has identified the need for an Extension Support Function (ESF) to contribute to the integration of extension activities within AGRA programs and enhance linkages with national extension systems and other extension initiatives in the countries where they work. AGRA sees these linkages as important to ensure increased awareness and accelerated uptake of farmer-ready green revolution technologies and practices, taking into account the unique needs of women and young farmers. Draft objectives for the ESF include the following:

- Strengthen synergy and collaboration within AGRA programs and with other projects through joint development, resource mobilization, programming and implementation of extension activities.
- Facilitate uptake and up-scaling of farmer ready technology and practices through approaches including farmer groups and farmer organizations.
- Increase smallholder farmers' and particularly female farmers' access to extension services, through strengthening their capacity to demand the services.
- Leverage information and communication technologies (electronic and print media) to enhance access to markets, credit, consumer demand and other factors.
- Monitor uptake of interventions through continuous diagnosis and learning, database building and using feedback for improvements.
- Explore ways of integrating youth and young graduates (particularly female) in activities along the agricultural value chain.

A comprehensive review of the current situation to inform development of the ESF program and work plan has been started within the AGRA programmes, but the situation on the ground in-country remains to be assessed and analysed. Therefore, AGRA commissioned CABI to carry out extension-related studies in their top four priority countries: Ghana, Mali, Mozambique and Tanzania. These studies aim to gain a detailed understanding of the context and extension needs of the chosen breadbasket areas within each of the countries. This information will then be used as a base on which to take decisions on where the funding should be directed and what specific activities would support an improved extension function across the AGRA programmes.

Methods Used

In-country studies were carried out in each of the four countries that focused on the identified breadbasket areas. Methods used to collect information for the study included a desk review of relevant literature, key informant interviews, stakeholder consultations and focus group discussions. Both individual and group interviews were held with key individuals and groups from research and education organizations; ministry departments; international organizations and NGOS; cooperatives; national associations; farmer organizations; input providers including producers, suppliers and processors; agro-dealer program implementers; the media and other stakeholders in the field. A final stakeholder workshop was held in all countries towards the end of the in-country studies to test and strengthen the results of the individual and group discussions. Preliminary results and findings were presented at the workshops and discussed with the participants, including previously interviewed stakeholders as well as others that had not been interviewed. Further analysis was added and conclusions revised in response to the discussions. Full details of the country studies are given below.

Country Backgrounds

Extension services are delivered in the context of the national agricultural policy and institutional landscape. Although there are many commonalities between African countries, there are key differences that will influence in-country activities and require engagement models to be customized to address specific opportunities and overcome unique obstacles. A detailed discussion of country contexts is given in the country studies and table 1 provides an overview of country level indicators for the four AGRA priority 1 countries that are likely to influence implementation at country level:

Table 1 Key Country Statistics

	Ghana	Mali	Mozambique	Tanzania
Population, total (millions) [a]	24.8	13.6	23.9	34.9
Population Density (people per sq. km)	100	10	29	46
Annual Population Growth (%)	2.1	2.4	2.3	2.9
Rural Population (%) [a]	47.8	66.1	60.8	73.1
GDP (US$ millions)	26.17	9.00	9.79	21.62
Agriculture GDP (% of total GDP) [b]	30.9	36.5	20.9	45.3
Agricultural Land (thousand sq. km)	156	401	496	371
Agricultural Land Density (people per sq. km)	153	32	46	118
Literacy Rate (%)	67	26	55	73
Male Adult Literacy (%)	73	35	70	79
Female Adult Literacy (%)	60	18	41	67
Mobile phone subscription (per 100 people) [c]	50	27	20	31
Internet Users (per 100 people)c	4.3	1.6	1.6	1.2
Households with a Radio (%) [d]	73.7	71.4	45 [f]	58.4
Households with a TV (%) [d]	42.9	27.9	8.5 [g]	8.8
Fertilizer Use (metric tons) [e]	28,304	43,851	13,836	57,090

[a] FAOSTAT 2011, [b] 2009 data in FAO Statistical Yearbook 2010, [c] 2008 World Bank data, [d] 2008 ITU ICT Indicator Database, [e] 2008 data in FAO Statistical Yearbook 2010, [f] Poverty and Well-Being Assessment in Mozambique 2004 [g] World Bank data 2004

Agriculture employs about 80% of the population in Mali, Tanzania and Mozambique, with 95% of Mozambican women and 66% of men employed in agriculture and a large rural population of small producers in Mali working in agriculture. In contrast agricultural employment in Ghana is only about 55% of the population with under 50% of the population found in rural areas. Nevertheless, the high contribution to GDP represents the importance the country places on the activity. Ghana also has a much lower rural population than the other three countries at less than 50% of the total population as opposed to over 60% in Mali and Mozambique and 73% in Tanzania. This however is counteracted by the high population density of 100 people per km^2 in Ghana, whereas Tanzania has a density of about half that and Mali's rural population density is only 10% of that found in Ghana. The rural population density is even higher in Ghana at 153 people per km^2 and also high in Tanzania at 118 people. In contrast Mali and Mozambique have relatively low rural population densities at 32 and 46 people per km^2 respectively.

Even though agriculture is the dominant form of employment in all these countries, the contribution to total GDP varies between 20% and 45%. It is lowest in Mozambique at approximately 20% of total

GDP, rising to over 45% in Tanzania. It does however generate over 80% of foreign trade exports in Tanzania and Mozambique and just two products, cotton and livestock contribute about the same amount to Mali's annual exports. However in Ghana the contribution of agriculture to total exports is only approximately 50%, with cocoa on its own contributing about 25% of total GDP.

Agriculture is therefore important to all these countries, both in terms of employment as well as the contribution to the national economy. Effective agricultural extension services are therefore critical to maintaining and increasing production levels and these have to be adapted to the local population in terms of their literacy levels, and access to print and electronic media as ways of delivering broad extension messages. Adult literacy is relatively high in Tanzania at 73% of the population, with male literacy slightly higher at 79% but female rates lower at 67% of the population. The same pattern of male and female literacy is reflected in the other countries, though the overall rates are lower at 67% and 55% in Ghana and Mozambique respectively. In Mali the percentage of the population able to read and write is especially low at only 26% overall, with only 18% of women being literate. This limits the effectiveness of any extension messages that may be delivered through a printed medium.

The use of other media such as radio and TV are increasingly being used to deliver extension messages, but these are limited to the population that has a radio or TV in their home. Radio coverage is relatively high in Ghana and Mali at over 70%, but lower in Tanzania at only 58%. TV coverage is lower, though about 43% of Ghanaian households have a TV, while only 8% of households in Tanzania and Mozambique have a TV therefore limiting the reach of any extension messages that are disseminated through this medium.

Extension messages are also delivered within the existing institutional and policy framework that exists in each country. The Ministry of Agriculture is responsible for extension services in all four countries. In Tanzania one section of the crop development department runs these activities while in Mozambique and Mali a separate department is responsible for extension services in the ministry. In both countries this department links with regional authorities to deliver extension services on the ground, while in Tanzania regional and district governments, who report to the Prime Minister's Office, are responsible for extension delivery and the central government is responsible for policy guidance, standards and monitoring and evaluation.

Considerable changes in agricultural policy have occurred in all the countries recently. Mozambique and Tanzania have a policy of decentralization across government, increasing responsibilities at the local level but creating problems related to capacity at that level, responsibilities, reporting requirements and links to research. There is currently no specific extension policy in Tanzania, but the input subsidy policy has a strong influence on extension delivery. Mali, Mozambique and Ghana also have input subsidy policies that are a key element in increasing agricultural productivity. Inputs subsidies are one of a multitude of other policies and programs that affect extension service delivery in the four countries, not all of which are specifically designed to target the agricultural sector, but influence it anyway.

A summary of some of the broader implications of country contexts is given in the table below:

Country	Country context
Ghana	Ghana has relatively good infrastructure and a thriving emerging private sector. The population is fairly literate, perhaps with the exception of the northern region. Mobile use is widespread. Population density is high (153 people/km^2 agricultural land), with the exception of the northern region where AGRA's investments will focus on in the future. Although government policy has largely supported cash crops and non-agricultural exports, the focus is shifting to food production as the country is now a net importer of food. Rice imports, for example, stand at USD 400 million annually. A nationwide fertilizer voucher-based subsidy scheme has been in place

	since 2008, providing four bags of fertilizer targeting four million smallholder farmers. Availability is enhanced by the expansion of the agro-dealer network with the support of AGRA.
Mali	Mali is sparsely populated with relatively poor infrastructure and literacy levels are particularly low, making knowledge exchange more complex. Fertilizer supply and access are improving. This is partly due to a subsidy program the government put in place in 2009 that focuses largely on rice (irrigated) and the maize (rain-fed) growing regions where AGRA's investments will also focus in the future. The annual target is three million farmers. In 2010, the coverage increased to other crops including sorghum and to other regions. The subsidy is 50% of the cost of two bags of fertilizers. Availability of fertilizers is also improving through an expanded agro-dealer network with the support of AGRA. Access to improved seeds is limited but improving through the emergence of a few seed companies that AGRA has supported. However, legume seed supply is a major constraint since seed companies typically do not prioritize legume seed over cereal seed given that farmers can re-plant legumes over many seasons.
Tanzania	Tanzania has particularly low GDP / capita and is relatively densely populated, although less so in the Southern Highland breadbasket area where AGRA's investments will be targeted in future. Here holdings are relatively large and labor is a constraint leading to inadequate investment in weeding and other crop management practices. Government is promoting an initiative to improve access to simple farm mechanization equipment (e.g., mobile tractors) to address farm labor problems. Legal frameworks, especially for contract farming arrangements, are weak making such arrangements relatively risky. However, there are strong farmers associations, including some that operate savings and credit mechanisms. This helps farmers to access inputs. Although the country is a net exporter of maize, internal markets are not well functioning and farmers producing surpluses cannot easily sell to deficit areas. Government control of grain markets and imposition of export bans can mean that farmers far from national markets lose revenue if they cannot export to neighboring countries that are closer. The governments initiated a voucher-based input subsidy program in 2008 to improve access to fertilizers. This covers 50% of the cost of two bags of fertilizers for smallholder farmers. Awareness of fertilizer use is inadequate in some regions, often leading to inappropriate practices that limit its efficient use. Seed supply is a major challenge, especially for legumes as seed companies don't normally stock them. This is likely to change as the number of seed companies are growing fast in the country with the support of AGRA.
Mozambiq-ue	Population density is low and the highly disperse population especially in the Beira Agricultural Growth Corridor where AGRA's investments will focus in the future. Farmers live far apart and are generally not organized in formal groups. However, commercial farming businesses are growing, especially for cash crops and there is great potential to develop strong out-grower schemes of smallholder farmers linked with these businesses. The legal frameworks to support such schemes however are weak. Labor is a primary constraint and farmers often use only a third of the available land. Farm subsidies for fertilizers and seeds are being piloted in 1-2 districts in the Beira corridor. Seed supply is a major challenge, especially for legumes, not normally stocked by seed companies. This is likely to change though given that the number of seed companies is growing fast in the country with the support of AGRA.

Extension Methods

A variety of extension methods are used in all four countries, the majority of which rely on some form of direct interface between the information provider and the farmer, though other sources of information are becoming more important including the use of ICTs, radio and TV. In all countries field demonstrations, farmer field schools, farmer exchange visits and farmer to farmer extension methods are commonly used. In Tanzania and Mozambique farmer field schools have been taken further with the introduction of Junior Farmer Field and Life Schools that target youth and focus not just on agriculture, but on other social and economic issues as well. Agro-dealers play an important part in the delivery of information to farmers in all countries and in Ghana and Mali they receive training. Print media, such as community newspapers, leaflets and flyers are used in Ghana, Mozambique and Tanzania, though the use varies in Mali, with little use of newspapers or TV but more use of posters and billboards. Generally there is little use of this larger print media in Ghana.

The use of radio, mobile phones and TV is becoming more important and prevalent in all countries. Mobile phone usage to disseminate agriculture information is increasing, especially by market agents who use them to collect product prices across different markets. The use of radio for disseminating broad extension messages and raising general awareness is increasing, and provides a forum to alert farmers in one area of successes in another area, or to provide general information on prices and input availability, as well as current market prices for agricultural products.

The delivery of extension services is changing in all countries with an increasing use of paraprofessionals, promotion of a demand-led service delivery and the use of public-private partnerships. In Tanzania in particular, as well as the other countries, there is a significant focus on training lead farmers, farmer promoters etc. as paraprofessionals to extend the range of extension service delivery. Tanzania has an increased focus on providing extension services for non-traditional cash crops. Outsourcing of extension services to the private sector is being encouraged in all four countries with a strong element of private sector involvement in the delivery. The use of public-private partnerships has increased with the private sector being encouraged to be an active participant in the delivery of extension services. The partnerships can exist between government and NGOs, private input dealers, farmers' organizations, etc. There is a strong focus on ensuring that extension services reach stakeholders in the entire value chain, especially in Mali and Ghana, and on strengthening farmers' organizations in Tanzania.

Agricultural Models

The most common agricultural model found in all four countries is that of farmers' organizations or cooperatives. There appears to be a general consensus that when farmers' are organized they are able to access extension services, buy inputs and sell products more effectively. There were some concerns about this model in Tanzania, where some stakeholders thought they were inefficient and may be more suitable for highly specialized farmers rather than general smallholders.

The second most common model, found in all countries, is the Purchase for Progress scheme of the World Food Program. This links farmers to a guaranteed market but requires farmers to produce to a specific quality and a specific quantity according to the contract they have with the program. Other types of contract farming exist particularly in Mozambique and Ghana, where a specific type of contract farming, block farming occurs.

Warehouse receipts systems are used in Ghana and Tanzania, and other models in Ghana include agri-business centers and nucleus farmers. Tanzania also has models where input dealers create the market and ones where output markets stimulate production. These models do not appear to occur in other countries

Conclusions and Recommendations

A number of conclusions and recommendations were reached that were common across the four countries. In particular there is a need to make use of a variety of extension methods in combination to capitalize on the synergies between them. The involvement of private sector service providers should be encouraged and agricultural value chains should be developed further with continued innovations. Research should adopt a value chain approach and should be participatory involving the end user. Dissemination of research findings should be improved as should the linkages between research, extension workers and farmers.

It was recommended that the fertilizer subsidy scheme should continue in Ghana, and in Mozambique it was thought that this could present an opportunity to train farmers and input suppliers on the efficient use of fertilizers. In Mali and Tanzania further training of extension workers was recommended while in Mozambique terms and conditions of work for extension workers needed improvement and the gender unit needed to be made operational.

In Ghana and Mali a key recommendation was that monitoring and evaluation should be enhanced ensuring that those involved in extension delivery learn lessons from past interventions. In Mozambique it was suggested that any monitoring and evaluation should also be participatory. More use needs to be made of TV, radio and print media in Mali to improve communications, and it was suggested that rural communication should be subsidized. In Tanzania access to information needs to be improved through the strengthening of ward resource centers.

Overall there were a considerable number of recommendations of ways in which extension service delivery to farmers could be improved, both through the use and further development of existing techniques as well as through the promotion and further use of new technologies and media as access to these technologies in the countries increases.

AGRICULTURAL EXTENSION IN GHANA

Report of a study commissioned by the Extension Support Function Program of the Alliance for a Green Revolution in Africa (AGRA)

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Table of Contents

Acronyms

ABC	Agribusiness Centre
ACDEP	Association of Church-Based Development NGOs
ACDI-VOCA	Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance
ADRA	Adventist Development and Relief Agency
ADVANCE	Agricultural Development and Value Chain Enhancement Program
AEA	Agricultural Extension Agent
AfricaRice	Africa Rice Center
AFRRI	African Farm Radio Research Alliance
AGRA	Alliance for a Green Revolution in Africa
CABI	CAB International
CIDA	Canadian International Development Agency
CRI	Crops Research Institute
DANIDA	Danish Aid
DEPSOCOM	Department of Social Communication
ESF	Extension Support Function
FBO	Farmer-based organization
FFS	Farmer field school
FRI	Farm Radio International
GDP	Gross Domestic Product
GoG	Government of Ghana
GRIB	Ghana Rice Inter-Professional Body
ICT	Information communication technology
IFAD	International Fund for Agricultural Development
IFDC	International Centre for Soil Fertility and Agricultural Development
ISFM	Integrated soil fertility management
M&E	Monitoring and evaluation
MiDA	Millennium Development Authority
MFI	Micro-finance institution
MISTOWA	Market Integration Project
MOFA	Ministry of Food and Agriculture
NERICA	New Rice for Africa
NGO	Non-governmental organization
NYC	National Youth Council
R&D	Research and development
RTIMP	Root and Tuber Improvement and Marketing Program
SARI	Savannah Agricultural Research Institute
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WFP	World Food Program

Executive Summary

Extension policy in Ghana favors food security, the value chain approach, information communication technology (ICT) and fertilizer subsidies. Government supports extension, and is now promoting block farms. Public-private collaboration is Government of Ghana (GoG) policy, although there is some ambiguity over what this means and how it should be applied.

Ghana imports much of its rice and some maize, although it is basically self-sufficient in other foodstuffs. The trend is to use more mineral fertilizer, improved seeds, and mechanized plowing, as well as social innovation, including financing for smallholders, farmers groups and linking them to markets. Actors in extension include donors, government, NGOs, media, research, agro-input dealers and farmers.

Extension approaches are diverse and creative, including ICT, especially radio but also TV, videos, mobile phones, and "talking book" recorders. Other approaches include starter packs (with maize, fertilizer and plowing), a web-based platform, training of input dealers, strengthening microfinance organizations and their links with farmers, gathering farmer demand, volunteer consultants, warehouse receipts, written material, and face to face methods (demos, field days etc.).

MOFA and SARI were the most often mentioned sources of information. Information from international agencies was mentioned less often, since it usually reached local organizations through MOFA or SARI. Extension actors are concerned about women and youth, but more could be done to include them. Agribusiness models include ABCs, nucleus farmers and outgrowers, inventory credit, block farming, and the current laissez-faire systems. Some actors use log frames and indicators for M&E, while others carry out little M&E. AFRRI is doing original research on radio.

The main positive drivers of change are decreasing fertilizer prices, increasing grain prices, improved communication technologies, and increasing numbers of trained and organized input dealers. Negative drivers include low government support for MOFA operations, the difficulty faced by community radio stations seeking licenses, and limited facilities for mass multiplication and dissemination of local language, agricultural videos.

M&E needs to be made more perceptive and should focus on which innovations survive beyond the life of the projects. Research advances need to be better communicated to extension workers. Fertilizer subsidies should be continued. The extension community needs to keep simple solutions in mind, not just complex ones.

1 Introduction

1.1 Background

The Alliance for a Green Revolution in Africa (AGRA) has identified the need for an Extension Support Function (ESF) to contribute to the integration of extension activities within AGRA programs and enhance linkages with national extension systems and other extension initiatives in the countries where they work. AGRA sees these linkages as important to ensure increased awareness and accelerated uptake of farmer-ready green revolution technologies and practices, taking into account the unique needs of women and young farmers. Draft objectives for the ESF include the following:

- Strengthen synergy and collaboration within AGRA programs and with other projects through joint development, resource mobilization, programming and implementation of extension activities.
- Facilitate uptake and up-scaling of farmer ready technology and practices through approaches including farmer groups and farmer organizations.
- Increase smallholder farmers' and particularly female farmers' access to extension services, through strengthening their capacity to demand the services.
- Leverage information and communication technologies (electronic and print media) to enhance access to markets, credit, consumer demand and other factors.
- Monitor uptake of interventions through continuous diagnosis and learning, database building and using feedback for improvements.
- Explore ways of integrating youth and young graduates (particularly female) in activities along the agricultural value chain.

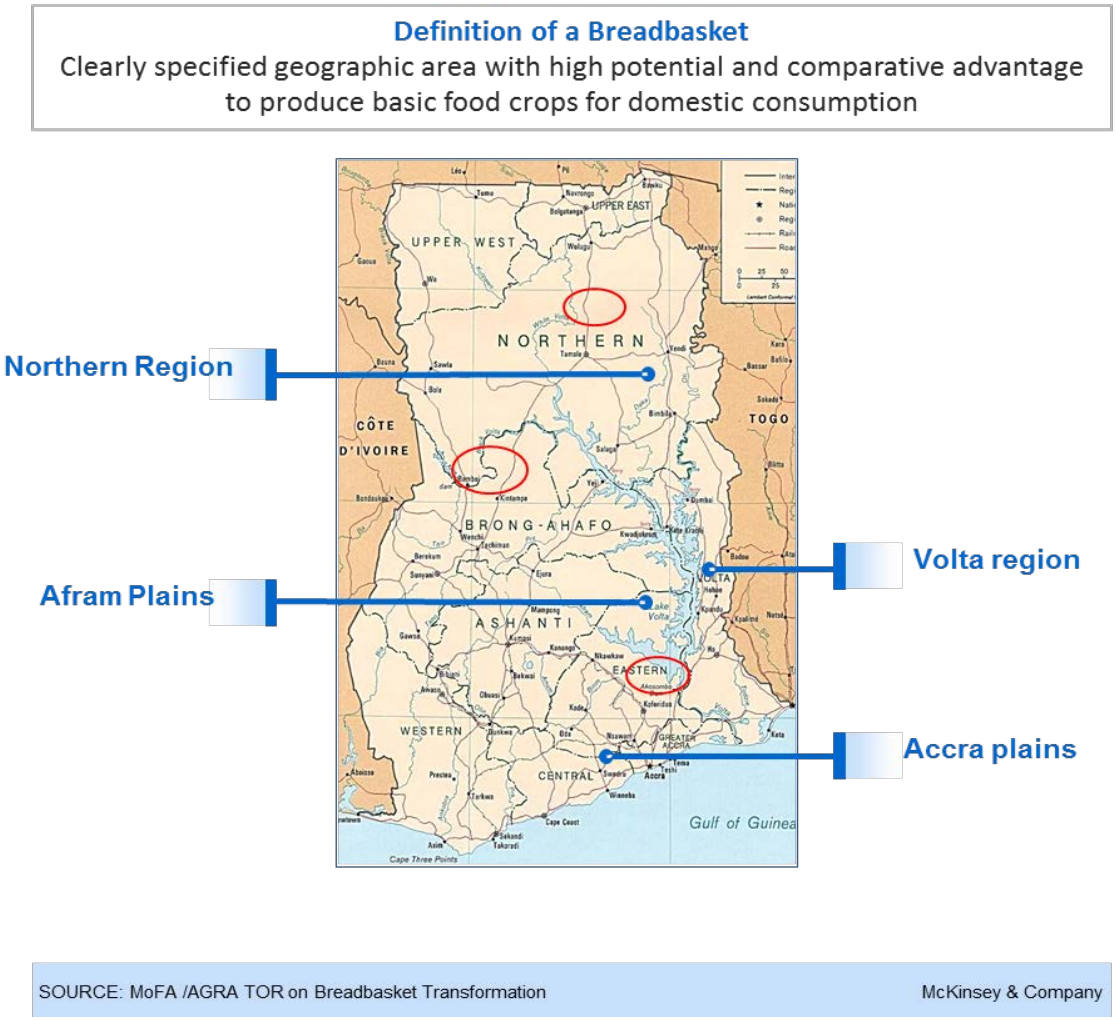
These studies aim to gain a detailed understanding of the context and extension needs of the chosen breadbasket areas within each of the countries. This information will then be used as a base on which to take decisions on where the funding should be directed and what specific activities would support an improved extension function across the AGRA programs. The objectives of the in-country study were to establish the state of extension services, with a focus on the institutional arrangements for delivery of extension; policy directions and their impacts on extension; methods and approaches used; agribusiness models that enhance the delivery of extension, and the targeting of extension to ensure increased and sustainable crop productivity.

1.2 Methods Used

The consultant interviewed key informants and visited research and education organizations; extension and projects; heads of ministry departments; international organizations including international NGOS; cooperatives; national associations; farmer organizations; input providers including producers, suppliers and processors; agro-dealer program implementers; media and other stakeholders as well as some projects in the field. The consultants reviewed the literature and presented the findings of the fieldwork for discussion to stakeholders in a workshop in Tamale, Ghana, modifying some of the conclusions and adding new analysis.

In Ghana the bread-basket initiative will start in the Northern Region and in Brong Ahafo. The consultant visited both of these regions and the capital city of Accra (see map). Some AGRA documents (e.g. MOFA and AGRA 2010) include the Afram plains, Accra plains and the Eastern Region as future breadbasket areas. A one-page handout, called "Breadbasket Areas" provided by AGRA also listed the Northern Region and Brong Ahafo region as breadbasket areas.

Figure 1: Map of breadbasket areas, places visited (circled in red)



2 Country Policy and Institutional Context

2.1 Extension Policy

Ghana is one of the "donor darlings" of Africa, receiving 10% of its GDP from donors (Wolter 2008). Since the mid 1990s doubt has been expressed about how much Ghana's policies are influenced by donors, and how appropriate this is (Aryeetey and Goldstein 1999). However the Government of Ghana (GoG) policies are as follows:

Achieving food security tops the national policy agenda of Ghana's government. This involves agricultural extension, improved seeds, mineral fertilizer.

The value chain approach is Ministry of Food and Agriculture (MOFA) policy (Kwame Ameza, personal communication, Wolter 2008), as well as donor policy. A value chain approach is centered on a commodity produced for market. The approach sees actors from producers to consumers linked together. Projects interventions often focus on the later stages of the value chain, especially the processors, who are generally aware of which products are in demand. Extension agents focus earlier in the chain, reaching farmers and linking them to other actors, providing information on market demands and quality requirements, and helping them to meet those standards. Projects in Ghana have so far paid less attention to actors further up the chain (e.g. retailers and consumers), but they could be included in a value chain approach.

Fertilizer subsidies. In 2009 Ghana experimented with a subsidy system, where extension agents gave fertilizer vouchers to smallholders, that were worth 26 Ghana Cedis (about $18), which is half the price of a 50 kg bag of fertilizer. The Fertilizer Subsidy Program covered 72,795 metric tons of fertilizer. However, transaction costs were high and the program was frustrating for farmers, extensionists and agro-input dealers. Often the fertilizer arrived at the shops but the vouchers did not or the vouchers were available but there was no fertilizer. Similar frustrations with fertilizer vouchers were expressed in the USAID Rice Emergency Initiative project (Bentley et al 2009). The USAID Rice Emergency Initiative project, which included Ghana, distributed 250 metric tons of rice seed to farmers in 25 kg lots. 10,000 households were to benefit in Nigeria, Ghana, Mali and Senegal. The poor and women were targeted, and given vouchers for subsidized or free seed, depending on ability to pay.

In 2010 the government subsidized 100,000 metric tons of fertilizer with an across the board subsidy of 16 Ghana Cedis ($11) for all farmers. This scheme was easier to implement, although it provided smugglers with an opportunity to transport the fertilizer to neighboring countries. The subsidy for 2011 has yet to be determined (MOFA 2010) but there is a goal of subsidizing 150,000 metric tons (Ernest Mallet, personal communication).

GoG is now planning to build a fertilizer factory, in a joint venture with the Government of India, to produce urea and sulfate of ammonia by 2016, fuelled with natural gas from Ghana. This will cut the cost of nitrogen fertilizer by about half, although compound fertilizer will still have to be imported.

Extension agents. The extension division of MOFA has its national headquarters in Accra and a regional directorate in each region. Each district has a director, a staff of extension agents, a monitoring and evaluation (M&E) person and other support staff.

Each district has a MOFA extension office

Although MOFA has a nationwide presence, many people in Ghana comment that there are not enough extension agents. “We only have one extension agent for every 1000 (or 1200, or 1500 or 3000) farmers.” Though there are extension agents in every district, there are insufficient numbers to cover the area required. No new extension positions have been approved since 2005, but MOFA replaced staff that have retired or left to take higher paid jobs in NGOs or commercial agriculture. However there is no shortage of potential agricultural extension agents (AEAs) and MOFA has a file of 2000 CVs of aspiring extension officers. These potential agents have graduated from one of the five agricultural colleges, supported by MOFA, offering two year extension courses to train new AEAs.

MOFA oversees research and extension for all crops except for cocoa, which is handled by a separate agency, the Cocoa Board, whose extension agents work with cocoa farmers.

The most serious problem with MOFA extension is the lack of funding. In 2010 extension was only awarded 60% of the requested budget and received only 75% of that amount. AEAs on the ground ran out of money for everything from motorcycle parts to soap.

In July 2003, Ghana signed the Maputo Declaration on Agriculture and Food Security, which pledges African governments to spend 10% of their budgets on agricultural and rural development policy within five years. The GoG spends at least some of its designated 10% on rural development (e.g. feeder roads) rather than on agriculture.

Block farms. Much of MOFA’s budget has been spent on “block farms” since 2009, where farmers are grouped together, and lent seed, fertilizer, and tractor plowing services. The farmers provide labor and harvesting (in some cases). The farmers pay back their loan in kind at harvest. Grain

collected this way (mostly rice and maize) is stored in "buffer stock" warehouses to be released to schools, hospitals and the World Food Program (WFP) when grain prices rise several months later.

Public-private collaboration is MOFA policy, and is common in practice. Although there are many variations in how the public-private partnerships operate, in general an NGO will start a project, and invite MOFA to participate in the work. The NGO will provide MOFA with an agenda, training, follow up and money for expenses. MOFA provides the NGO with extensionists and contact with the local communities. The NGOs generally work with MOFA at a grassroots levels, e.g. district level or sometimes even with individual extension agents, and usually try to disburse per diems and other money directly to the individual MOFA extension agents or to the district, to keep the chain of bureaucracy as short as possible. However higher officials in MOFA can be frustrated that the NGOs avoid working with MOFA at the national level.

There is also some variation in the number of projects that a single extension agent works on as the concentration of NGOs varies throughout the country. For example in the Northern region some extension agents may be working on up to three projects each, while others e.g. in the Ashanti region may not be working on any.

Information and communication technology (ICTs). Official MOFA policy is open to ICT and is keen to explore more creative ways of using these technologies (see Box 1).

Box 1: Videos on cell phones

MOFA is exploring the use of many ICTs, including videos on mobile phones. As an example Dr. Kwame Ameza (Director of Extension) picked up his own cell phone, which had been loaded with some sports videos, and thrust it in my hand. There was a football video about "Five Great Goals". As I looked at the little screen on the phone I could hear the crowd screaming and see the ball fly into the net, then the triumph on the faces of the athletes. Dr Ameza took it away again and said it would be just as easy to load agricultural videos onto mobile phones for farmers to watch. However one of the authors has observed that mobile phone companies approached so far in Africa have shown little interest in broadcasting agricultural videos. Other ways of showing farm videos on phones without phone company support should therefore be explored.

Challenges and weaknesses of policy. GoG policy is subject to heavy influence from donors, which could potentially conflict with the requirements of and pressures from farmers and other constituents.

Although a value chain approach is government policy, in practice interventions in the value chain tend to focus on the links closest to the farmers, rather than the whole chain.

There have been problems with fertilizer subsidies, especially due to high transaction costs. Recent policy aims to reduce transaction costs with an across-the-board subsidy, but this has a consequential effect of encouraging fertilizer smuggling into neighboring countries.

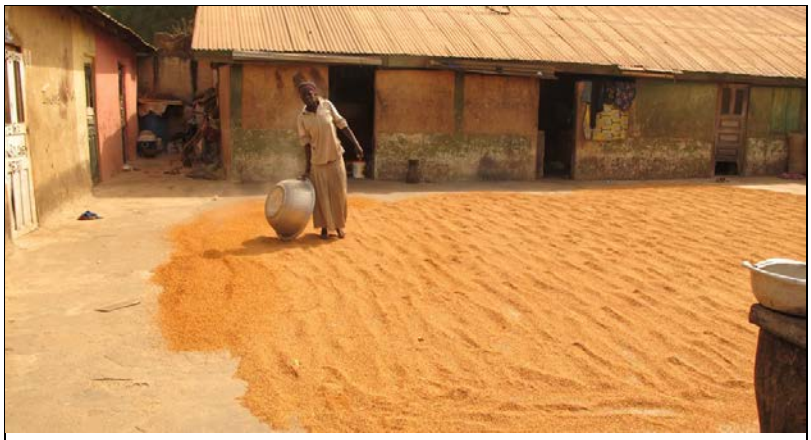
MOFA extension agents are under-paid and are eager to work on donor-funded projects. This however means they become accountable to the project, rather than to the Ministry and has the potential for conflict.

Block farms have high transaction costs and are insufficiently market oriented, and therefore the government buys much of their grain, especially rice, for "buffer stocks". These stocks are sold at a low margin to food programs when grain prices rise.

2.2 Agricultural Economy

Maize and rice. Ghana currently produces 235,000 metric tons of rice, milled equivalent, (about 30% of consumption) and produces about 1,500,000 metric tons of maize, 90% of what it needs (MOFA and AGRA 2010). However demand for rice is increasing rapidly as the population urbanizes and chooses to cook rice rather than many traditional foods that take longer to cook. Local rice earns low prices because of its perceived low quality. In particular consumers complain about finding stones in it. The stones could be easily removed by following good post-harvest practices shown in the rice quality video made by the Africa Rice Center (AfricaRice) or with small de-stoning machines, but appropriate milling equipment is still scarce.

Local maize is readily accepted on the national market although 15% maize has to be imported (MOFA and AGRA 2010). Maize is used to feed people and poultry. Demand for maize for use as poultry feed may rise quickly as consumers gradually become able to afford more eggs and chicken (André Bationo, personal communication). However cheap imports of chicken from Brazil have increased competition faced by Ghanaian poultry producers (MOFA and AGRA 2010).



Freshly parboiled rice being dried on a clean floor. Teaching techniques like this to organized groups of processors will help to make local rice of better quality and more competitive

Other grains, roots and tubers. Supply is approximately balanced with demand. Although there is a roots and tuber program, Root and Tuber Improvement and Marketing Program (RTIMP), the main focus of the formal sector is on maize and rice to try to close the import gap.

Exports. Cocoa, palm oil and other crops are important export commodities, although these are not considered in this paper.

The agricultural sector is growing, but it is unclear whether the growth rate is sufficient to meet the increasing demand.

2.3 Trends in Agricultural Practices

Greater use of mineral fertilizer. The use of mineral fertilizers has been promoted by extension services for years and the lower fertilizer prices and higher grain prices experienced since 2008 have meant that farmers are responding to the extension messages and buying more fertilizer, with input dealers selling out every year.

Other agrochemicals. Extension services have also promoted the use of yield increasing technologies, but have not focused labor-saving developments, even though this has been one of the farmers' greatest demands (Bentley et al. 2010.). Smallholders in Ghana started to use herbicides from about 2005, and use is expanding dramatically, with little official encouragement. Herbicides are one of the cheapest and easiest ways to save labor by eliminating the drudgery of hand weeding (I. Wumpini, personal communication).

The use of insecticides is also increasing. During this consultant's visit, journalists from Classic Radio FM were investigating reports that in the Upper East, 15 people had died from eating tomatoes doused with insecticides.

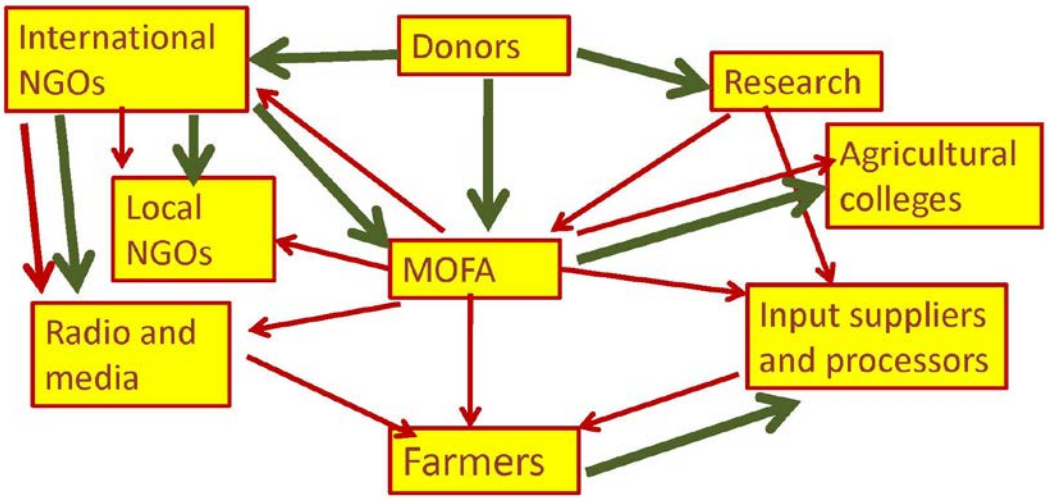
New technology. Much of the promoted technology is straightforward: seeds, fertilizer, some mechanized plowing. One exception is "pegging and lining," where extensionists teach farmers to stretch twine across the field to plant in a razor-straight line. As has been noted elsewhere (Bentley et al. 2010) farmers in Ghana can plant a straight line by eyeball and therefore it is recommended that pegging and lining is one technology that does not need to be promoted any further by extension workers.

Social innovations. More recent innovations are not technical but social and include a focus on marketing, the value chain, group organization and finance.

2.4 Institutional Map

Almost all agricultural institutions interact with MOFA extension agents and there are only a few organizations do not make use of MOFA AEAs.

Figure 2: Simplified Institutional Map



Key: red arrows indicate information. Green arrows are financing. Only major flows are given. Donor funding is focused on NGOs, MOFA and the radio.

MOFA runs five agricultural colleges in Ghana (Ernest Mallet, Human Resources Management, MOFA, personal communication), where students can study agriculture for two-year and earn a certificate. They can then go to a university and in two years earn a degree. Graduates of these programs are later hired by MOFA as extension agents. The research institutions, including universities, conduct formal research for MOFA.

Many NGOs and government agencies work with MOFA on specific projects. For example, two people from MOFA sit on the African Farm Radio Research Alliance's (AFRRI) national advisory committee. MOFA also works with AFRRI at district and regional levels; GRIB is housed in MOFA in Accra; the International Centre for Soil Fertility and Agricultural Development (IFDC) works with MOFA to train agro-dealers; and the Adventist Development and Relief Agency (ADRA) liaises with local MOFA staff on its EU project, where MOFA carries out much of the day-to-day work. MOFA also helped ADRA identify which vulnerable communities to target. SARI carries out on-farm research in concert with MOFA extension agents. SARI also trains extension agents to share ISFM information with farmers while MOFA installs demos for SARI. The Agricultural Development and Value Chain

Enhancement Program (ADVANCE) project also relies on MOFA extension agents. MOFA extension agents collaborate with various radio stations, often visiting the station to speak on the air. CARE is now implementing a DANIDA-funded project with MOFA and MOFA is starting to collaborate with 4-H. 4-H is a youth organization based in the United States, and administered by the United States Department of Agriculture (USDA), with the purpose of youth development. 4-H has over 6.5 million members in the United States in 90,000 clubs. Many other countries also have clubs and related organizations.

Agro-input dealers receive training from IFDC, SARI, NGOs, MOFA, and they deal directly with farmers. They often speak on the air and buy advertising.

The farmers receive training from MOFA, NGOs, and media, and to a lesser extent from agro-dealers. Extension agents visit some farmers at the community level, although many farmers complain that they do not receive visits.

Isahaku Wumpini records a sale he made in his shop. Agro-business dealers are being trained to keep books, manage credit, and about the proper use and storage of their products

Various radio stations, and AFRRI, have contact with universities whom they consult for technical information. For example, when Royal FM in Wenchi has questions about agriculture, the journalists contact the Agricultural Faculty of the Methodist University's agriculture faculty, based in Wenchi, as well as the Wenchi Farm Institute. In addition AFRRI has a university faculty member on its national advisory committee. One of the university radio stations in Ghana is "twinning" (swapping programs) with a station in Nova Scotia, Canada, due to the link of a shared frequency. MOFA extension agents appear on the radio, and AFRRI is training some extensionists in participatory radio production.

3 Extension Approaches

There are currently rapid changes in extension approaches.

3.1 Changes and Trends

ICTs. The extension sector in Ghana is interested in the use of ICTs, especially radio and mobile phones which have only been used since about 2000. Radio, however, has been used for many years, and therefore has a fairly established format. One new trend though, is to try to involve farmers in their programs, and to measure the impact more effectively, e.g. through AFRRI.

The increase in mobile phone use has been exponential. The vast majority of the extensionists have one, as so do the agro-input dealers. By some estimates 60% of the rural population has a mobile phone, with one in every village, if not in every household).

Value chain approach, marketing. "Farming as a business" is the new catch phrase in Ghana and MOFA wants smallholders to understand the value chain, so that they produce what the market demands to the required standard. "They need not be bigger areas. They can produce on half an acre" (E. Mallet personal communication).

Kaplinsky and Morris (2001) define a value chain as "the full range of activities required to bring a product or service from conception, through the different phases of production, transformation and delivery to final consumers and to final disposal after use. A value chain is made up of a series of actors (or stakeholders), from input suppliers, producers and processors, to exporters and buyers, engaged in the activities required to bring a product from its conception to its end use. Value chain

projects in agriculture link farmers with buyers, transporters, processors, and consumers. The new strategy starts with what consumers want (the end product, the standards) and works back to the farmers, preferably organized in community-level groups (FBOs: farmer-based organizations). For example, GRIB uses the value chain approach to link women's rice groups with millers and to introduce rice-destoners and aromatic rice varieties (prized on the market) which do well in Ghana. Most of the value chain approaches observed in Ghana were focused on the farmer-trader; farmer-processor links, and also farmer-input dealer relations. For example, the extensionists help farmers understand the qualities demanded by people who buy farm products (either for processing or resale), as well as organizing farmers to achieve group sales, and introducing farmers to buyers. Extensionists also help form links between the farmers (usually organized as groups) and the people who sell agricultural inputs, besides providing basic training to input dealers. There was less emphasis on work further along the value chain to support other actors such as retailers, exporters, hotels and restaurants and final consumers with the value chain approach being interpreted in Ghana as meaning those actors who have close links to farmers.

A value chain approach is at once a social organization and a marketing device introducing farmers to the other actors in the market and getting them to talk and work together.

Mineral fertilizers, as mentioned above, are being subsidized and the use is increasing.

3.2 Common Extension Methods

Extension in Ghana is creative, as this overview of methods suggests. This section discusses several methods in use that were identified in the survey. These include use of radio (panel discussions, participatory radio, call ins, Farmers' Fone, call outs and spots.), other media methods like mobile phones, television, videos, "talking books" and a web-based platform. Also identified are methods that address market weaknesses (e.g. inputs, capital, harvest) through starter packs, training of input dealers, strengthening micro-finance institutions, gathering farmer demand, enlisting volunteer consultants and using warehouse receipts. Conventional methods are also used, including written material, and face-to-face methods like demos, talks, and field days. For reasons not clear to the consultants, a few methods are conspicuously absent, such as billboards, posters, and public sector advertisements.

3.2.1 Radio Methods

Radio is verbal, in the local language and cheap to receive, making it an ideal medium for smallholders in Ghana. Radio stations use talk shows, participatory radio, call in, call out, private sector ads, but not public sector spots. This paper defines a public sector spot as a short advertisement-like program on radio or TV, on a non-commercial topic, for example, a 60-second spot on avoiding cholera, treating the mentally ill with respect, or on using animal dung as fertilizer. All the local radio stations visited were members of Farm Radio International (FRI), and were all participating in AFRRI studies. These stations are good at developing most of their own programming material, and often adapt scripts made available by FRI. Radio stations use a range of methods to get their messages across.

AFRRI (African Farm Radio Research Initiative). AFRRI has studied radio in five countries since 2008: Ghana, Mali, Tanzania, Uganda and Malawi, to see how radio can support farmers. It is a Bill and Melinda Gates Foundation-funded project coordinated by Farm Radio International (FRI), a Canadian NGO which distributes eight to ten radio scripts every quarter to 63 stations in Ghana and many others elsewhere in Africa. The scripts are dramas of about 15-30 minutes. AFRRI found that some of the stations used the scripts as prepared; others adapted them, and others translated them. AFRRI trained the station staff to produce farm radio programs that allow the listener to have a voice. Radio stations mentioned elsewhere in this report work with AFRRI. AFRRI also studied other ICTs, like mobile phones and MP3 players.

In one published study, AFRRI divided farmers into three types of communities "active learning communities" (helped design the content, made the music, and appeared on the air) "passive learning communities" (only listened to the programs but had no contact with radio staff) and control villages, which did not listen to the shows. One study focused on the use of composted, organic manure in Ghana. Before creating the programs, farmers in the area thought that organic fertilizer, especially barnyard manure, harmed or even killed crops, because some had applied fresh manure, without composting it. Few if any applied manure. After the programs aired, 93% of farmers were found to be using manure in the active learning communities, 94% in the passive listening communities and only 8% in control villages. Local people are now housing their animals to obtain manure and the price is increasing in the communities as people use the manure and sell it to each other. This demonstrates the positive impact radio can have on farmer knowledge and practices (AFRRI 2009, FRI 2010).

Panel discussions. Most radio stations, whether community, public or commercial, produce talk shows or panel discussions on agriculture, because so much of the general public is involved in farming. An expert, usually a MOFA extension agent, is invited to the studio with a journalist and perhaps other guests to discuss a specific problem, such as tomato disease. The guests may be given the topic beforehand to prepare their thoughts. Talk shows can also be sponsored, e.g. by an agro-input dealer, which is often cheaper than paying for advertisements.

Participatory radio involves local communities. "We did a rapid appraisal with AFRRI, and it enlightened us about problems," said Oheneba Appiahgyie, of Classic FM Radio. The journalists work with the villagers recording their voices, editing the stories, and bring experts to the studio. The journalists play the voices and the experts respond on live radio. The journalists may then go to other communities that have usually heard the first program and, so are informed and can add to the debate. Radio Royal FM, a community station in Wenchi, Brong Ahafo, has used this method to stop illegal logging by informing people of their rights. The CEO of Royal FM, Adu Aayarko Pinsang, thought that the radio programs were significant in helping to stop illegal logging. They make agricultural and educational shows in the same way (Box 2).

Box 2: A simple bank account

Royal Radio had a financial education program for smallholder farmers. Instead of recommending complicated financial products, the program told listeners how a savings account worked, and how to go into a bank and open one. Following the program, many farmers who had been afraid to step into a bank opened accounts. The banks gained new customers and did not only offer savings accounts but also loans. "People can get loans from agricultural banks if they come together. This education has to go on the air," said Adu Aayarko Pinsang.

Call ins are often combined with panel discussions. Farmers phone in with questions or comments and generally there is no shortage of farmers wanting to participate. However they can get frustrated when they are kept waiting, and may hang up before they are connected to the studio.

Farmers' Fone. AFRRI is now experimenting with a technique called "Farmers' Fone" that allows the farmers to call and have their statements recorded, so they can be played back later. In one experiment, 4000 listeners left comments for farm programs in three months. Farmers can also listen to previous radio recordings over Farmers' Fone, or get market information. More than 50% of the callers want to access market information.

Call outs. By previous arrangement, the station calls a farmer to comment on the show. This ensures that the person is standing by and the station pays for the call.

Spots. The private sector also uses short spots (e.g. 60 seconds) of talk, music or both to advertise shops or products (herbicides, or sprayers, for example). Spots are expensive however and so although public, non-commercial techniques (e.g. organic fertilizer, planting density) could be broadcast as spots, they are not and MOFA prefers to appear on a talk show as this is free.

Mobile phones. The mobile phone is a huge innovation for people who have never had a phone, e.g. smallholders in Ghana. The use of mobile phones by farmers to access radio programs has been discussed above. In addition the use of mobile phones has allowed these farmers groups, especially those in isolated, rural areas, to continue to work together beyond the end of a donor project. Previous projects that enabled farmers to form groups to market a commodity have often failed as the project ended.

There is a lot of interest in the use of mobile phones to send text messages e.g. to communicate prices in various cities to subscribers, or to announce agricultural programs on the radio by texting a specific person in the community, who then tells her neighbors when to tune in. PlaNet (an international non-profit finance institution) uses mobile phones to send text messages with prices to women's groups who store nuts and sell them when the prices rise. The MACAW project is using mobile phones as a platform for fisherfolk who call the platform or each other for almost free to get weather information (Ben Fianfor, interview). Classic FM sends text messages to key farmers in some communities to tell their neighbors when a key program is to be aired. However Classic FM found, in its research with AFRRI, that fewer than 10% of the farmers could write a text message.

3.2.2 Other Media

Television is a less popular dissemination method for agricultural information because rural people have fewer TV sets and are less inclined to watch programs in English. However there are some TV programs on agriculture. Recommended maize and cocoa production messages, provided by MOFA and the Cocoa Board, are broadcast after the weather report on GTV Prime news at 7:00 daily. To be really effective, TV shows would have to be dubbed into seven or eight languages, which would make them less attractive for nationwide TV stations to broadcast. If local TV stations become more common in the future (e.g. Uganda has many local TV stations broadcasting in local languages), then it might become more feasible to broadcast videos in Ghanaian languages.

Videos used to be more common. Happy Afua, video expert, Extension Services Directorate of MOFA, used to make many videos on agriculture which were broadcast on national TV. This was paid for by a donor project, and once the project ended MOFA was no longer able to fund the videos. It is not clear how much impact videos had, especially since they were all in English.

In Ghana, PlaNet Finance Advisory Services works with two existing micro-finance institutions (MFIs) and has trained them in the use of software to manage production data, as well as linking them with women's groups producing shea butter and other products. PlaNet has six extension agents in the Northern Region. They have made two videos on shea nuts and processing the butter with a local communication company called Department of Social Communication of the Archdiocesan Secretariat (DEPSOCOM) supported by Countrywise of the UK. There are versions in English, Dagbani and Kokumba. The extensionists work with women's groups and with volunteer women extension officers who are members of the groups. The extension agents show the videos, discuss them and demonstrate the techniques. Few of the women in the shea butter groups can read and PlaNet teaches them basic business skills, such as keeping a mental track of prices and volumes.

AfricaRice produced a DVD on rice production with 11 farmer-to-farmer videos but few of the interviewees had seen the videos. There are some copies in Ghana, SARI and DEPSOCOM coordinated the translation of the rice videos into six local languages from the Northern Region, Upper East and Upper West, and MOFA worked on translations into the Ewe and Twi languages. However the DVD could be made more widely known and accessible (e.g. mass multiplication of multi-language DVDs by ensuring each agricultural college is equipped with an audio and video unit and providing each AEA with his/her own copy, etc). Even radio stations can use videos. Journalists can watch the videos and explain the content over the air, invite farmers to come to the studio and watch or buy the DVDs, or use the videos as background information for programs produced by the station. A multi-language DVD will become available shortly.

IFDC staff, including Musa Taylor made a video on the achievements of a local youth group, which could be shown to other youth groups as inspiration. Happy Afua has recently produced a video for RTIMP. MOFA/Tamale has two cinema vans, which can make and show videos, funded by CIDA. It was not clear how effective these are as they were not in operation at the time of the consultant's visit. Further investigation may be warranted.

Although the entertainment video business is booming and DVD players are become increasingly accessible, mass multiplication and dissemination of agricultural videos remains a challenge.

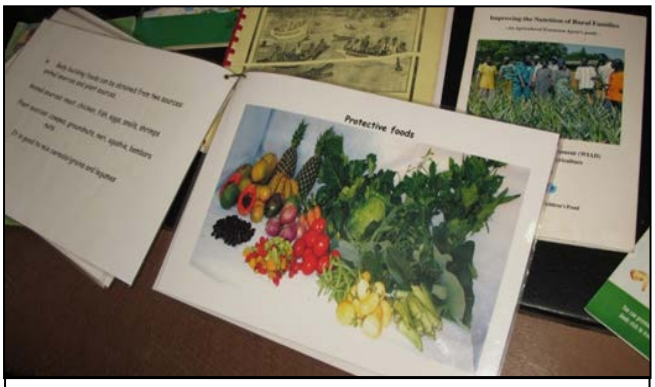
Talking books are portable lightweight recorders. MOFA has trialed them for several years in the Upper West. Women volunteers come into the office and receive the talking book to take back to the village. A message is played to a women's group who discuss the ideas and any questions that the volunteer cannot answer are recorded and relayed back to MOFA.

Extension people in Ghana are highly interested in ICT, and are trying different tools, including this talking book, being tested by MOFA in the Upper West

Web-based platform. This method is aimed directly at the agro-dealers to help them function more efficiently to serve farmers' needs. In 2010 IFDC carried out a survey of the areas of crops to be planted in 2011 by thousands of farmers. This information, together with the farmer's location, was entered into a web-based database. Agro-dealers are able to define their catchment area and the database will calculate the anticipated types and amounts of inputs needed to satisfy the farmers' requirements. Agro-dealers can then order suppliers based on this information. This platform is accessed through mobile phones. It is a creative, though complicated idea and data will need to be entered into the platform by users if it is to become self-sustaining. The platform is not up and running yet but a similar approach used in Cote d'Ivoire for seed folded at the end of the project.

3.2.3 Conventional Methods

Written material. Most written material in Ghana are manuals and photos for extension agents to use with rural communities. They cover a broad range of topics, from human health to nutrition and crop production. No information was available on the impact or amount of material produced. There is less material for farmers to read, perhaps because literacy rates are low.



A photo from a manual for extension agents about the value of fresh fruits and vegetables, and manuals on topics ranging from AIDS prevention to participatory extension.

Demos, talks, field days and other classic, face-to-face methods are still being used, often by MOFA staff. Some tasks, such as processing (parboiling rice, using new machinery etc.) are well suited to demonstrations.

Unused methods. Billboards, posters, and public sector advertisements are not being used to disseminate agricultural messages, even though the method is used for public health messages. The Masara N'Arziki Farmers' Association uses a billboard to advertise itself, but not to advertise public messages. This may be because written material is not effective for a rural

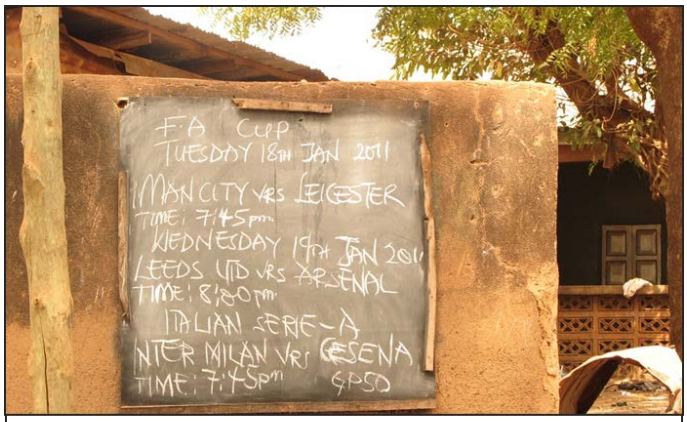
Public mental health: a billboard in downtown Tamale urges citizens to be kind to the mentally ill

population that is not highly literate, even though written material is cheap to produce, permanent and those who are literate can explain it to their friends, neighbors and clients. However in a farm community on the edge of Tamale, in the Northern Region, there was an announcement to watch football games on TV, indicating that written information must reach some customers, or the pub owners would not risk setting out their valuable slate on the street.

3.3 Synergies

Many of the extension methods discussed previously may be used together, including those listed below.

- Inviting extension agents to speak on the radio, where their experience with farmers, local language skills and their university training combine to give them credibility.
- Making videos to use in value chain work, e.g. teaching farmers to make shea butter, with extension agents available to discuss the videos and answer questions.
- Using volunteer consultants to train agro-dealers.
- Using mobile phones to help stakeholders in the value chains to stay in touch once the initial face to face contacts have been made.
- Using mobile phones for radio call in and call out.
- Farmers' Fone uses both radio and mobile phone.
- Announcing the names and phone number of extensionists over the radio, especially when the extension agents appear on radio talk shows, so farmers can call them and ask questions or request a visit.



Football anyone? At least some people in farm communities can understand written messages, especially youth

3.4 Sources of Information

Research and development (R&D). MOFA's Directorate of Crop Services supports linkages between research, extension and farmers. They hold district meetings with farmers to identify their needs and demands. The Directorate of Crop Services then assesses these demands and divides them into those topics that need research and those topics where the Directorate of Crop Services believes there is information and solutions already available that can be disseminated. The research is then assigned to SARI, the Crops Research Institute (CRI) and universities. MOFA tests the research results and techniques with farmers, and provides the extensionists with suitable materials (written or in the form of a short course) so they can also test the methods with farmers. MOFA sees this as both a final stage in adaptive research, and the start of extension. For example, in recent years MOFA used this method to test and release NERICA rice varieties obtained from AfricaRice.

MOFA and SARI were the most common sources of information mentioned by interviewees. SARI is headquartered near Tamale and is responsible for agricultural research for the three northern

regions. They use a farming systems approach and farmer field schools (FFS) to carry out research, believed to be one of the more effective uses of FFS (Bentley 2009). SARI and MOFA are carrying out experiments on soil fertility and Striga weed management, focusing on mineral and organic fertilizer, intercropping legumes and grains, and inoculating soybeans with rhizobia. In 2010 some considered that SARI was slow to produce results, and SARI is now completing the necessary statistical analysis of the 2010 season and will hold a stakeholder's meeting to discuss the results. SARI report that they have an annual meeting that they use to disseminate research results to AEAs and to receive feedback on what research is needed. However it was unclear exactly who attends these meetings and what feedback is actually received. There is criticism that these results are poorly disseminated and one stakeholder wrote that SARI does not share research results with the MOFA extension agents who collaborate on the research. Another wrote simply that "research results rarely reach extension agents."

Technology. The technologies now being promoted are practical measures that have worked consistently including the use of fertilizer (e.g. taking advantage of barnyard manure, applying urea when the soil is moist, how much fertilizer to apply per acre), seeds and tractors. Marketing innovations such as the agribusiness models referred to in Section 3.7 were very varied and have not always been effectively evaluated. Some key informants felt they were prone to failure after the project ended.

Bottlenecks include the lack of money, especially for MOFA's operating expenses (as noted above), and people to facilitate the organization of farmers' groups and projects through a value chain approach. Value chains and farmer based organizations (FBOs) still depend on face-to-face contact with people to become established.

3.5 Preferred Technologies

Warehouse receipt systems are popular but may not be sustainable. For example MOFA reported that a warehouse receipt program in Techiman worked when project staff were present, but when the project ended, the warehouse receipt program collapsed. Block farming is only as sustainable as the government's commitment to funding it.

There may be too much focus on the use of ICTs (e.g. using mobile phones for every kind of text message). Likewise, some projects are interested in complicated financial products such as smart cards (plastic cards with embedded microchips, e.g. for using an ATM) when there are many existing, functional financial products that rural people could already use with a little training, such as simply opening a bank account.

In some cases technologies are driven by projects with funds to support them. As Professor Francis Obeng, of the University for Development Studies, observes, "Many projects look promising when they are being implemented, but a few years later little is left." Badly designed M&E does not help to identify the real impact or success of technologies. The formal sector in general places great emphasis on evaluating projects while they are being conducted, but pays scant attention to projects after they end. People rarely go back to see what remains of a project's achievements two years after it ended. In one example, German and Bolivian foresters worked for 10 years with a rural community in Bolivia, to teach villagers to experiment with forest tree planting. A follow-up study two years after the project ended found that farmers planted a bit more eucalyptus, and would plant tree seedlings if contracted to do so by an organization, but they were not consciously managing the forest land as foresters had intended (see Bentley and Valencia 2003). The lack of follow up after projects end means that the development community is slow to learn from its mistakes.

3.6 Gender and Youth

Many of the interviewees were concerned about reaching women and youth.

Many women are organized into well established self-help groups.

Women's groups are common and accessible. Many or most women are organized into existing women's groups, which are stable and outlive the projects. Women can be contacted through these groups.

Youth groups are less common. Not all youth belong to a club. Most of the clubs that do exist are faith based and not focused on farming or business. The National Youth Council is supposed to coordinate all the youth clubs in Ghana, but it has few resources to work with.

The perception in Ghana is that youth reject agriculture, and see farming as a job for poor people. Young school leavers want to work in an air-conditioned office, not get sweaty and dirty on a small farm. However the rural population is growing albeit at a slower rate than in the cities. A number of key informants believed that youth will be attracted to agriculture if they can make money and there may need to be an increase in donor focus on youth who actually are currently working in agriculture.

The 4-H youth organization takes its name from its four themes of personal development. (Head, Hearts, Hands and Health). 4-H was set up in Ghana in 2000 by Appiah Kwaku Boateng, the district director of the National Youth Council for the New Juaben District, Eastern Region. Forty two 4-H clubs in schools and ten in communities have been established by Boateng and two other staff members with little funding. MOFA is now interested in the organization and is looking to help with further expansion. School children learn to raise small animals or vegetables and sell their produce. They have events where they show their projects to their friends. Teachers advise the clubs and they receive training from 4-H which they then replicate for the youth. The children operate individual projects, which can be quite small, a few laying hens or even three tomato plants. 4-H teaches that agriculture can be a way to make money.

Community organizations. While there are few agricultural organizations specifically for youth, young people are often members of larger organizations, including FBOs and block farms, so youth may not be organized as youth, but may still be organized.

3.7 Agribusiness Models

The stakeholders' workshop was held with representatives of the following organizations, many of whom had also been interviewed during the fieldwork (see also Annex 3).

- University
- ADRA
- Royal FM radio
- CARE
- Simli Radio
- Farm Radio International
- MOFA (Techiman)
- Engineers without borders, including ADVANCE project
- ACDEP- (NGO)
- Classic FM
- ACDI-VOCA
- ASI
- Technoserve
- IFDC
- SARI
- AGRA
- CABI
- DAID?
- MOFA (Representative of Director of Agricultural Extension)
- MOFA (Regional Director for Upper E region)
- Agro-dealer (Wumpini – agrochemicals) working with IFDC

Four of those present are current AGRA grantees (I. Wumpini, Cathy Phiri of ACDI-VOCA, Musa Taylor of IFDC and Mathias Fasu of SARI).

Agribusiness models are defined here as: capitalizing on markets to organize farmers and enhance their livelihoods. When the agribusiness models were mentioned in the workshop, the stakeholders had the following queries:

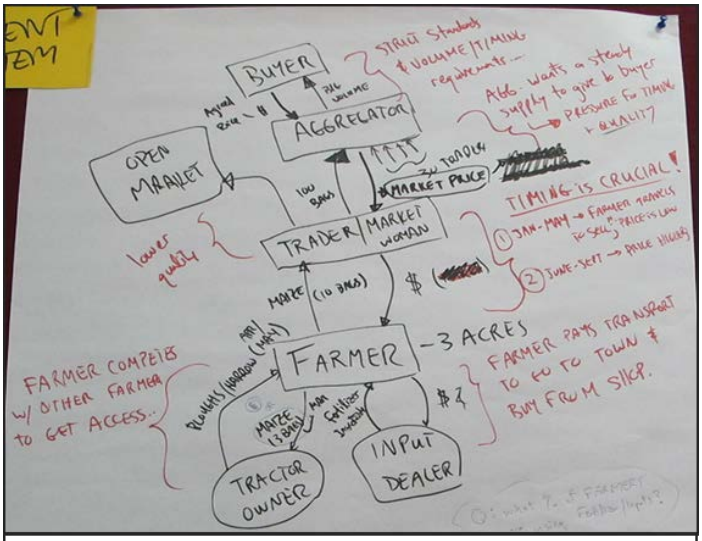
- Do they really work?
- What proportion of farmers are involved?
- What are the costs and benefits?
- Are they sustainable?
- Are models actually being used or are they still a concept?

These crucial questions are beyond the scope of this brief study, but are relevant for the ESF.

One stakeholder wrote:

"I think there is a dangerous emerging trend of too many NGOs working with agri-business which is decreasing entrepreneurship and business driven innovation. Instead they are focusing their energy on writing grant proposals attending workshops and reporting to donors. I hope AGRA doesn't accelerate this."

There is no easy answer to this question, but businesses should respond more to their customers than to an NGO or a donor. Projects should create a low-risk environment for people to explore new linkages and public-private partnerships, and provide training, but they should never prevent businesses from acting as such.



Current system

At the workshop agribusiness models were compared to current practices, which the stakeholders defined as:

Current system (with traders, aggregators etc.). This system has no project or government intervention. Some farmers hire private tractor services and many others till their land by hand. Tractor hire and other services have to be paid for when the service is rendered. They are seldom repaid in grain at harvest time. At harvest the farmers keep enough of the harvest to feed their household, selling the rest to a trader, when the price is usually low. The trader sells the produce on the open market, and tries to get a contract with the buyer.

ABCs (agri-business centers) are a Millennium Development Authority (MiDA) initiative supervised in the Northern Region by IFDC. The ABC is one-stop farm service shop. MiDA finds an investor willing to invest in agriculture, and gives him or her a facility and a physical plant in which to run the business. The investors spend about $50,000 of their own


Representatives of FBOs listen and ask questions at a training session on the ABC

money to pay all the salaries and operating costs of the companies ensuring their commitment to the success of the business. MiDA also invests funds. For example MiDA often pays for building the facility (e.g. a warehouse).

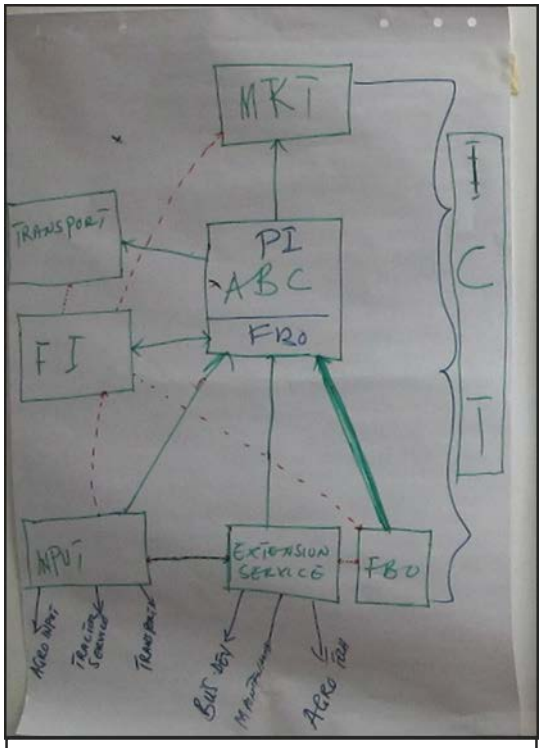
Some investors hire extension agents, like these from Amsig

The investor is organized with about 20 groups of FBOs, each one with about 50 members, who are smallholder farmers. MiDA teaches the investor and the leaders of the FBOs to set up a company with a board of directors, with five members, three chosen by the investor and two elected by the FBOs. It takes four votes of the board to elect their chairman, and at least one member from the FBO must be present to form a quorum and take decisions.

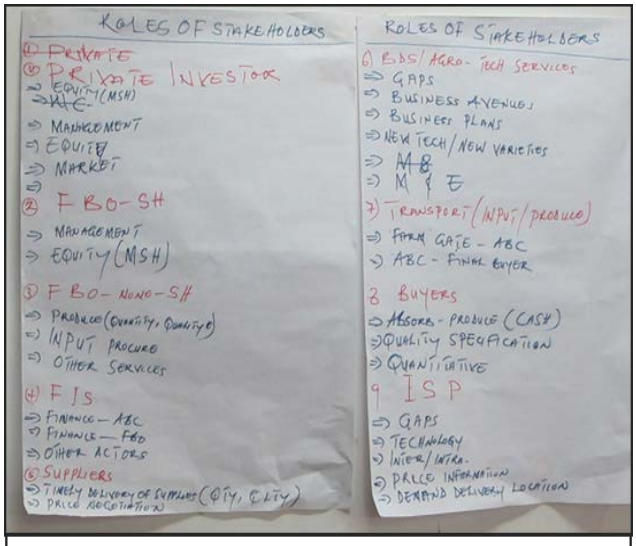
The investor owns 70% and the FBOs own 30% of the shares, which the farmers acquire by buying services from the ABC, having land ploughed, having maize dried or stored or hauled. Inputs, transportation and other services must be paid in cash and as the farmers pay, they acquire shares. The more services they buy, the more shares they own.

All the earnings are placed into an escrow account, held by the project for five years, to ensure that no one absconds with the funds. The ABC will pay dividends and will reinvest the profits. There are still some problems to work out. For example, the investor sets a price with the farmers. This is risky for the investor. If the market price is below this figure, the farmers are happy to sell their product to the ABC, which loses money. If the market price is higher, the farmers sell on the market instead of to the ABC. Farmers have an obligation to sell to the ABC, but the ABC has little means of enforcing the contract if the farmer opts to sell to a higher bidder.

Gina Odarteifio (second from left) is investing in the Nebibiyoona Women's Group, and other FBOs



ABC model drawn in workshop

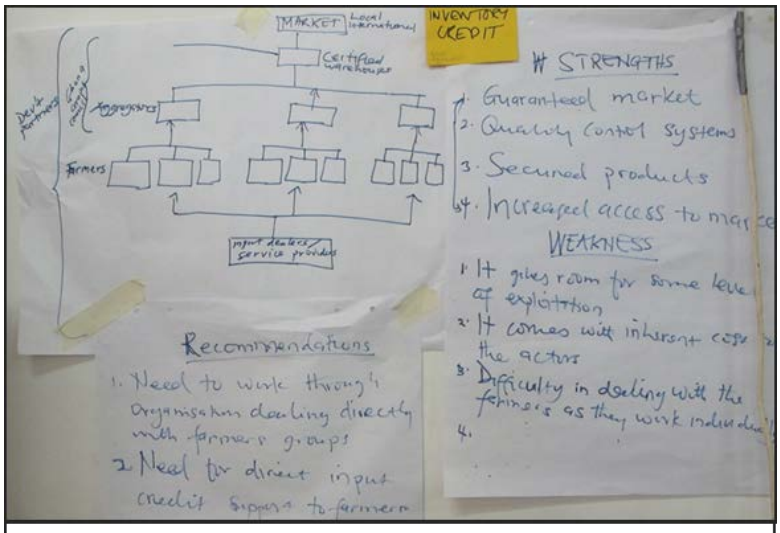


Key to ABC model drawn in workshop

Nucleus farmer-outgrower of ADVANCE. Nucleus farmers are medium to large-scale farmers. The nucleus farmer ploughs for the smallholder farmer (either an individual or an FBO), and loans inputs to them which the outgrowers (or smallholders) repay at the end of the season in produce., The Agriculture Development and Value Chain Enhancement project (ADVANCE) led by ACDI-VOCA, mobilizes the outgrowers around the nucleus farmer. ADVANCE locates the nucleus farmers through the end buyers, in effect building the value chain by making use of existing social networks, i.e. the nucleus farmers are already selling to others, and are already buying from outgrowers.

ADVANCE believes that these nucleus farmers, who are often aggregators (people who buy products from farmers and sell in large amounts to processors or other buyers), are motivated to provide farmers with extension advice so that the farmers will produce more at the buyer's quality standards for the nucleus farmers to buy. There was no evidence to support or contradict this idea.

Inventory credit (warehouse receipts). There are various versions of this theme. Farmers store their grain in a warehouse (to avoid selling at the rock bottom prices at harvest time), receiving an advance at harvest. They sell later in the season after prices rise. ADRA explained one version where farmers work with aggregators, whose warehouses are certified by the Ghana Grains Council. The farmers come together and decide when to sell, and the price is determined by supply and demand.

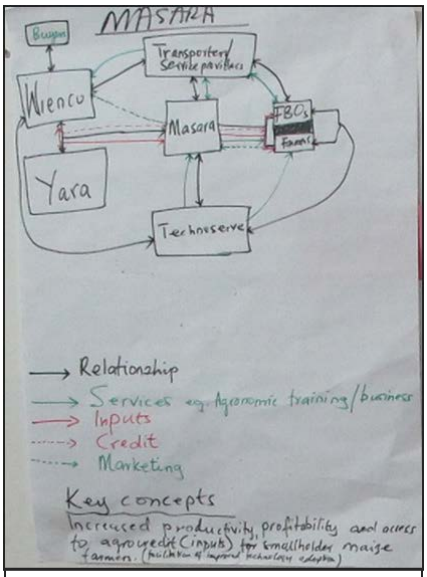


Inventory credit description from workshop

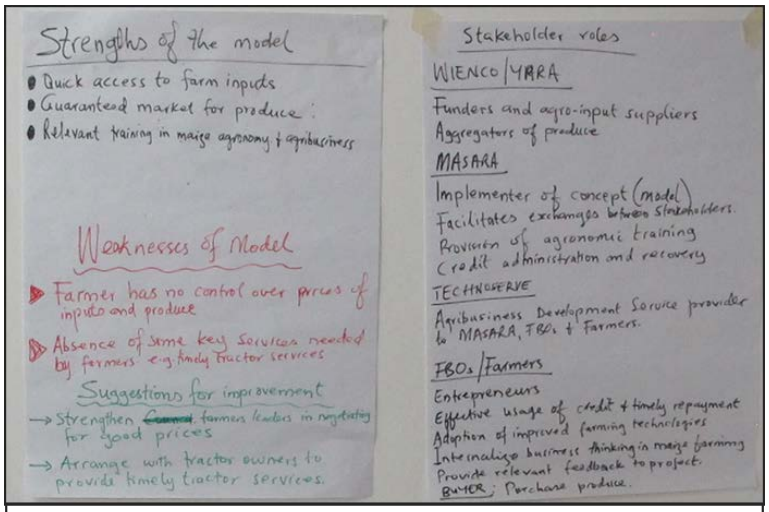
Block farming and buffer stock. The government supplies all the inputs, and enters into contracts with private tractor services, and seed and fertilizer suppliers, who are then connected to farmers (both seed producers and grain growers), organized in groups or "blocks" (which are not necessarily contiguous.) Transporters are arranged to bring fertilizer and herbicides. Farmers engage local labor. Some of the farmers are grain farmers, others are seed producers. The seed growers sell seed to the Ministry, which supplies other farmers. MOFA manages all transactions. If farmers do not repay their loan (and about 40% do not) they are dropped from the program.

Farmers are paid a relatively low price (approx. 31 Cedis ($21) a bag) for the grain received by MOFA and stored in warehouses, It is released later in the season, when prices are high (about 50 Cedis - $35), but is sold at low prices (about 38 Cedis - $ 26) to the WFP, school feeding programs and hospitals. These low prices explain why some farmers are reluctant to participate, and why many do not repay their loan. Some maize farmers prefer to sell all of their maize on the open market (at a higher price than what MOFA offers) and repay MOFA in cash. Rice farmers are more likely to repay their loan in rice, because there are fewer options to sell rice in Ghana, where local rice is perceived to be of low quality.

Masara (similar to block farming). "Masara" means "maize" in Hausa. Technoserve acts as the business advisor, paid by an external donor. Masara N'Arziki (meaning "maize for prosperity" in Hausa) is a farmers' association headquartered in Tamale. Masara is not an NGO but it is made up of FBOs. All of the harvested maize goes to Wienco Ghana, and the fertilizer is supplied by Yara Ghana Ltd., both private companies. Yara and Wienco provide credit for inputs to farmers, which is repaid at harvest. Yara and Wienco provide funds to Masara, which provides extension to member farmers, with technical support from Technoserve.

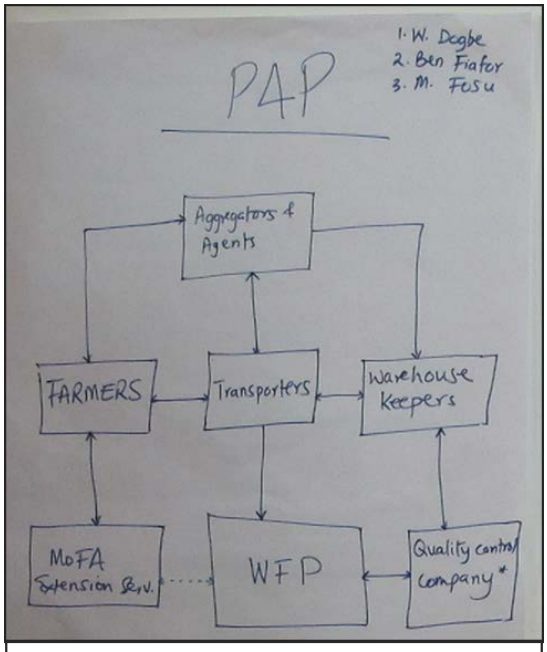


Masara model

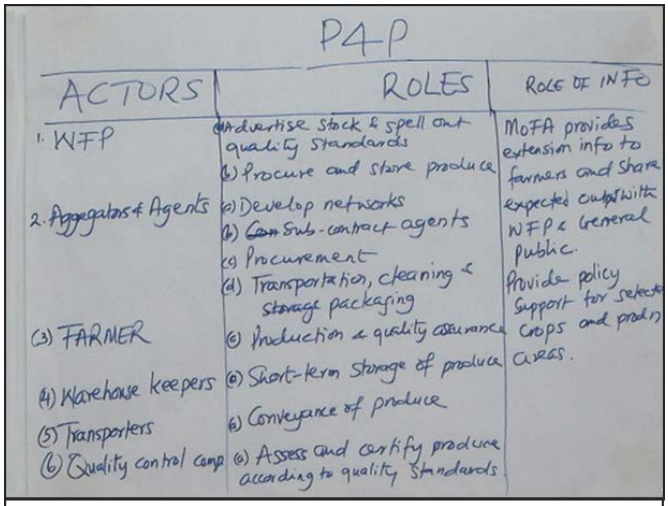


Key to Masara model drawn in workshop

P4P (Purchase for Progress). In some ways this is similar to the buffer stock and to the inventory credit schemes. WFP advertises stock and details the quality standards. It procures and stores products. Aggregators develop networks, sub-contract agents, procure grain, and provide transportation, cleaning and packaging. Farmers produce the grain and agree to follow quality standards. Warehouse keepers provide short term storage. Transporters haul the produce. A quality control company assesses and certifies that the produce meets quality standards. MOFA provides extension information to farmers and facilitates the sale of grain to the WFP.



P4P model drawn in workshop



Key to P4P model drawn in workshop

3.8 Improving Service Delivery

There are now several methods in Ghana which intend to improve service delivery. These include starter packs (of seed and other inputs), training of input dealers (to provide better services to farmers), volunteer consultants (to train agri-business people) and warehouse receipts (to allow farmers to sell at higher prices).

Starter packs involve distributing maize seed and fertilizer for one acre of land, plowing it (either with machinery or by hiring hand labor), and accepting repayment for these inputs in kind. Some version of this is used by various agencies (e.g. ADRA). Block farming is a similar approach, except that it lasts for several years, while the starter pack is meant to be used only once, to give the farmers a start. Starter packs may double or triple maize yields (Isaac Kankam-Boadu, ADRA, personal communication). Farmers love starter packs, but they are limited by the cost. Musa Taylor, of IFDC observes that giving farmers starter packs more than once (or perhaps even one time) makes farmers dependent on handouts. No one mentioned that farmers continued to use the inputs after the starter packs were given, but several mentioned that farmers continued to ask the agency to give them more starter packs.

Training of input dealers. Unlike many countries, in Ghana input dealers are not demonized. IFDC works with MOFA and other agencies in Ghana to give 1400 input dealers training, credit, and to link them with farmers. IFDC teaches basic accounting and how to manage the products (e.g. not to leave them in the sun). IFDC has also published a directory of input dealers in Ghana.

SARI has a project which helped 34 dealers improve their businesses. Fifteen of them have taken out bank loans. They have all improved links with farmers. Once the farmer knows the dealer he consistently buys from that one. The farmer may even phone the dealer and ask to send him inputs in a taxi.

Volunteer consultants. ACDI-VOCA has a volunteer consultants program. They have a database of about 10,000 consultants with special skills. Some are retired professors, some are farmers, and some are marketing professionals. First, ACDI-VOCA identifies the needs of a local group, helps them refine their needs, develops a scope of work and brings in the consultant for two to three weeks. ACDI-VOCA pays the consultant's travel and about $30 a day (depending on location) for meals and expenses. The beneficiary offers local transport and some other costs.

Warehouse receipts. An agency connects farmers to a warehouse, which receives harvested grain and either loans the farmers some of the value of the grain or gives the farmers vouchers which they can take to banks as collateral to get loans. When the price rises at a later date, the warehouse sells the grain and pays the farmers. In theory it is an excellent idea, allowing a warehouse to benefit farmers by storage (reducing losses to rats and weevils) and improving prices. However, a lot of capital is also tied up in the warehouses, and the scheme requires honesty, trust and there are associated transaction costs. District MOFA staff in Techiman, Brong Ahafo, explained that six years ago Technoserve had a warehouse receipts program. "It worked fine when Technoserve was here. When they left, they turned it over to a rural bank, which soon abandoned it, because the bank was short of funds and couldn't handle the warehouse program."

3.9 Monitoring and Evaluation

The stakeholders use various different methods of M&E, including the following.

Log frame plus indicators. Projects plan their activities at the start of the work as a table called a "logical framework" (log frame), a structure that states what a project plans to achieve and how, and gives indicators to show how it is achieving its commitments. International NGOs, USAID projects and some other formal sector organizations use this approach. It provides numbers, but is also time-consuming. In practice, log frame evaluations tend to focus on quantitative measures (example, explaining that 9,876 families tried a new crop variety), but less qualitative analysis of what they thought of it or how the innovations fit into the cropping system. MOFA collects some numbers on farmers reached, noting that there is a "double counting" when NGOs record the same numbers. For example if an NGO sponsors a MOFA extension agent to distribute cassava cuttings to 200 farmers, the NGO and MOFA both list it as one of their achievements.

Some extension stakeholders simply forgo M&E, especially smaller ones, or those using their own money. For example until recently the radio stations, operating with no outside funding and with small staff numbers, did little M&E of their agricultural programs. Now with support from AFRRI, some stations are evaluating some of their work.

4 Drivers of Success and Constraints

4.1 Positive Drivers

As mentioned above, positive drivers of change include low fertilizer prices as a result of government subsidies, increasing grain prices, and improved communication technology. The input dealers are more or less well connected with other actors (see Box 3).

Box 3: Wumpini Agrochemicals

Isahaku Wumpini's narrow shop is on a crowded market street in Tamale. There was nothing fancy about it, but all the products were neatly organized by type. All the vegetable seeds were together. There was an herbicide section, and others for insecticide, fungicides and spraying machines and all the labels were facing out. Wumpini's two young sons hopped in and out, asking their father for a few coins to buy some plastic toys at a nearby shop. Customers strolled in and out, buying bags and bottles.

This is far from being a small business. It once was. Eight years ago, Wumpini was a young man with a simple market stall. His business has grown and he now has a large warehouse that sells wholesale products to other retailers in the region. He still keeps this shop as it gives him contact with his customers. He carefully writes down the purchase and the cash received. That is a skill he learned from IFDC as part of their AGRA project.

He also visits farmers on their farms to make sure they are applying the correct dose. He works with SARI on their trials with farmers. He has had IFAD training and does think it benefitted him and that he can be an extension agent because of the technical knowledge he gains from MOFA and NGOs.

There are problems though. For example some retailers come and buy products on credit. One took almost 50,000 Cedis on credit and at the end of the season come back with a story instead of the money. These were people he trusted; who had dealt with him for years as pick and pay customers, but Wumpini is learning the hard way why wholesalers do not extend credit.

Demand for seed and fertilizer is strong and increasing every year and Wumpini is unable keep up with it. Every year there are farmers who cannot buy what they require, because he has sold out or has a limited supply. The lower fertilizer prices and higher demand for grain are a strong stimulus to increase production.

There is some smuggling of fertilizer. The police may stop it or they may help it. If you haven't eaten all day and someone offers you 500 Cedis (to let a truck of fertilizer leave the country) what would you do?

4.2 Negative Drivers

There are also some negative drivers, stifling change. For example, it is difficult for community radio stations to get a license. Since radio stations, especially community ones, do carry effective agricultural extension messages (see section on AFRRI and on participatory radio above) and should be encouraged. Another issue is the low pay and support of AEAs in MOFA (see Box 4).

Box 4: Fuel allowances

Duut Babtuaka, Simli Radio, explained that the MOFA staff love being on the radio's agricultural program. They are willing to do it just for a fuel allowance, but without that they are unable to get to the villages or even come to the station. "He may come to the community and you don't give him any fuel allowance. So the next time he will say he is busy."

4.3 Effective Methods

All of the old methods "work," in that they communicate ideas but some methods are more appropriate for different kinds of message. For example, visual methods (e.g. video) may be better for sharing ideas about crop disease symptoms. It is difficult for a specialist to diagnose crop diseases

over the radio. However, radio can announce the day's commodity prices for different cities and rural areas or send simple messages rapidly to a large audience. Only mass media can do that.

The actual impact of the different extension methods is hard to judge in this study. Some perceptions and views were expressed by key informants during the interviews and at the workshop. During the workshop, the participants argued about whether the main limitation to technology adoption was knowledge or capital. Arguably, both have an influence, but at least in the case of mineral fertilizer, there is a near consensus that farmers appreciate its value, and will use more of it if it is cheaper.

One study was mentioned where farmers were given 300 Cedis and researchers found that they spent the money on consumer goods, not on fertilizer. It is difficult to judge the merits of this study based on an anecdote, but human experiments with windfall lumps of cash may not be the best way to observe how people buy fertilizer in the real world.

The stakeholders also queried the effectiveness of radio and agro-dealer training. Quantitative studies with quasi-experimental methods take time, though AFRRI is now undertaking such as study for radio, and is facing some problems. For example, finding a control group is especially challenging to test the effectiveness of a medium that is broadcast over a wide area (AFRRI 2009).

The effectiveness of agro-dealer training has not been quantified. The obvious challenge is that agro-dealers have to sell products to make a living. Agro-dealers may be under-motivated to recommend techniques such as barnyard manure, cover crops or crop rotation or others that do not include a purchased input. The logical approach in agriculture is to train agro-dealers, to work with them, to encourage them to sell appropriate products to keep long-term customers, even at the risk of making the occasional small sale or no sale. Some argue that there is a conflict of interest in Agro-dealer, with agro-dealers selling farmers products even knowing they are not needed. However, not all agro-dealers will sell anything just to make money. While the consultant was visiting Wumpini Agrochemicals, a man came in and asked for something in the Dagbani language. He left without buying anything. Wumpini said he was asking for endosulfan for fishing but Wumpini refused to sell it to him. This example suggests that agrodealers can become aware of some of the negative issues of pesticides and that farmers may use whatever product is available for whatever it can do, ignoring risks and hazards.

Women and youth. Radio and groups are believed to be well-suited to women and youth, especially since women are already organized into groups, and radios are ideal for reaching isolated audiences in native languages. The youth that many programs want to attract (entrepreneurs with some investment capital) are more likely than other farmers to be literate and English-speaking, so the internet may be one way of reaching them. 4-H clubs are also promising. There are also five agricultural colleges training young people to become extension agents. More emphasis could be placed on encouraging them to actually farm as a business, instead of just telling others to do it.

Women need more mobile phones as rural women are less likely than men to have mobile phones. However women who have a mobile phone are less likely to use their money for credit or to call a radio (based on AfricaRice preliminary findings).

5 Conclusions and Recommendations

Some donor-funded projects (AFRRI may be an exception) put too much emphasis on completing activities without really understanding their impact at the beneficiary level. If an NGO or other agency agrees to deliver seed and fertilizer to X number of households, they will strive to do that, and demos may be the easiest way of ensuring that each beneficiary understands and receives the inputs. The agency may be reluctant to venture into new partnerships or try out new opportunities (e.g. public video screenings, radio talk shows, etc.) if these are not written into the projects. Project

staff comply with what is written on paper. Projects could stimulate more creativity by rewarding innovation or by including experiments in the log frame.

What needs to be done?

Better, swifter, easier, bolder M&E is needed. As mentioned above, development people around the world (not just in Ghana) are failing to learn from failure. There is no assessment beyond the life of the project to assess the long term result of the intervention after two to five years and the reasons for the successes or failures. For example an earlier USAID project, MISTOWA taught government agents in various West African countries to use computers and provided computers and internet access. The project has ended, but one account reports that the computers were never used. The reasons are unclear, but they may have been too complicated, may have been used for other purposes or were not actually needed by the governments. The development community needs to confront these experiences and learn from them.

However some projects are successful in the long term. In Ghana community radio stations continue to function even after the projects that started them have ended. In 13 years, none of the eight community radio stations in Ghana have shut or changed hands.

MOFA, NGOs and development partners need to convene occasionally to discuss successes and failures and to revisit projects two years or five years after they have ended, to assess what change has been achieved. Universities would be well placed to do this, with students visiting communities to document the medium and long-term impact of projects.

Extension in Ghana is now bustling with innovation. Promising trends include ABC, radios, lower fertilizer prices, SARI's use of the FFS as a research tool, and FBOs linked into value chains. Mobile phones are one of the more promising tools, but will probably be used mainly for talking rather than texting. They may be much more effective than previous efforts in organizing farmers for marketing their produce and help to improve the efficiency of the value chain. The following additional recommendations and observations are made.

- Research in other African countries has showed the value of video in cross-cultural learning (Van Mele et al 2010b). Although local language versions have helped to build capacities in many organizations and rural communities, more efforts will be needed to mass multiply and disseminate the videos and integrate better with other methods.
- More radio licenses are needed, especially for community radio.
- Ensure innovation continues within agribusinesses and value chains, but carry out monitoring and evaluation to learn how these activities can become sustainable in the long term and how some of the donor supported agribusiness models influence entrepreneurial practice.
- Continue to provide fertilizer subsidies, but seek ways of preventing fertilizer from being smuggled out of Ghana.
- Encourage the GoG to provide more support for MOFA extension. Earlier World Bank projects failed as national governments became complacent, expecting donors to pay for national extension.
- Research labor-saving technologies as well as yield-increasing ones. For example maize shellers, rice de-stoners, and other small-scale machinery.
- Do not overlook simple solutions. Some formal sector programs favor complicated or untried financial products. A proposal for the Rural and Agricultural Finance Program, a loan from IFAD to the GoG proposed new ICT-

Simple financial services, such as opening a bank account should be encouraged

based products for banking, from smart cards, and mobile phone banking to hand-held devices for loan officers. In reality, farmers in Ghana are not using the financial products already available to them, such as bank accounts, but with a little encouragement and information farmers can learn to use bank accounts (IFAD 2008).

- Capitalize on synergies between various methods by using a combination of them. To paraphrase American psychologist Abraham Maslow, when your only tool is a hammer, everything starts to look like a nail.
- SARI annual meetings could be improved to ensure research is properly disseminated to AEAs and that feedback provided by the AEAs as to their research needs is properly received.

Who should ESF work with?

It is suggested that ESF works with the following groups or organizations.

- 4-H, because they work with existing structures (e.g. schools, teachers, schoolchildren). They appear to have a practical approach, and offer children a chance to do interesting and rewarding work. Youngsters learn by doing that they can make money by producing high-value agricultural projects, and that they can start on a very small scale.
- Radio, possibly at the local level, but it might be more productive for ESF to work with FRI, allowing them to expand their membership and build more capacity in Ghana (and in other Priority-1 countries).
- Communication companies with an interest in agriculture. Developing content for extension can profit from a regional approach and would require support to internationally operating communication companies.
- MOFA and their extension agents as they are already involved in many if not most agricultural projects in Ghana. Their staff are university-educated, live in the districts and speak the local languages.
- Selected NGOs, because they have the experience, are interested in having a lasting impact and they are generally good at accounting for funds entrusted to them.
- Input dealers, through their professional bodies, e.g. Ghana Agri-Input Dealers Association (GAIDA), CropLife Ghana, Seed Producers Association of Ghana (SEEDPAG), the Ghana Agricultural Associations Business & Information Centre (GAABIC) and others.
- Bodies like GRIB, or other multi-stakeholder platforms. These often need donor support, especially in the initial stages. Support should be provided to enhance cross-fertilization, collaboration, and fund innovative scaling up initiatives.

Farmer associations or federations at national level should also be supported, e.g. the Farmers Organizations Network of Ghana (FONG), or at the regional level, e.g. ROPPA (Network of Farmers' and Agricultural Producers' Organizations of West Africa). There is a real cost related to aggregating knowledge and sharing it between farmer organizations and this could be partly supported by AGRA (e.g. for annual meetings and workshops and communication equipment).

However block farming should remain within the public sector. A considerable effort has already been made, and certain problems (e.g. low pay-back rates) have been identified that mean it may not be sustainable without continued government support.

Comment on ESF Priorities.

The ESF priorities can be summarized as:

1. Strengthen synergy and collaboration within AGRA programs and with other projects.
2. Facilitate uptake of farmer ready technology.
3. Increase smallholder farmers' and particularly female farmers' access to extension.
4. Leverage information and communication technologies.
5. Monitor uptake of interventions.
6. Explore ways of integrating youth in the agricultural value chain.

They all seem appropriate. In brief, they can be enhanced by:

- Developing quality extension material at the regional or global level. Many countries face the same problems and have similar opportunities and extension material could be developed to address these similarities. For example radio scripts developed by FRI; AfricaRice videos.
- Strengthen agricultural and rural development policy at the national level to make media more inclusive of agriculture (e.g. more agricultural programming, more rural participation in producing content).
- Longer term, more thoughtful evaluations, not simply recording project achievements as a project ends, but assessing the impact on the ground after the projects leave.

Acknowledgements

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Appendix 2 People Interviewed

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Appendix 3 Itinerary

5 January, arrive in Nairobi

6-7 January, meetings with CABI and AGRA, Nairobi

8-9 January, rest

10 January, Nairobi, preparation, getting visa, Nairobi

11 January, travel to Accra, interviews, meetings with AGRA

12 January, Accra, interviews

13 January, travel to Tamale, see training of FBOs for an ABC, interviews

14-15 January, interviews, Tamale

16 January, write, travel to Techiman

17 January, interviews, Techiman and Wenchi, travel to Tamale

18-19 January, interviews, Tamale

20 January, meet with Dannie Romney and Laetitia Kima, prepare for workshop

21 January, stakeholders' workshop, Tamale

22 January, travel to Accra, interviews

23 January, write

24 January, interviews, leave Ghana

27-28 January, write

Appendix 4 Attendees at Stakeholders Workshop, Tamale, 21 Jan 2011

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28	Paschal B. Dere	MOFA- N/R	deregh@yahoo.com	244202566
29	André Bationo	AGRA		
30	Laetitia Kima	AGRA		
31	Dannie Romney	CABI		

Table prepared by Mary Tekyi-Ansah Yaodze.

AGRICULTURAL EXTENSION IN TANZANIA

Report of a study commissioned by the Extension Support Function Program of the Alliance for a Green Revolution in Africa (AGRA)

Paul Kibwika

March 2011

Table of Contents

Acronyms

ADP	Agricultural Development Program
AGRA	Alliance for a Green Revolution in Africa
CAADP	The Comprehensive Africa Agricultural Development Program
CNFA	Citizens Network for Foreign Affairs
CRDB	Cooperative and Rural Development Bank
DADP	District Agricultural Development Plan
DADS	District Agricultural Development Support
DAEO	District Agriculture Extension Officer
DALDO	District Agriculture and Livestock Officer
DANIDA	Danish International Development Agency
ESF	Extension Support Function
FAO	Food and Agriculture Organization of the United Nations
FEW	Field Extension Worker
FFS	Farmer Field School
FFLS	Farmer Field and Life School
GDP	Gross Domestic Product
JFFLS	Junior Farmer Field and Life School
MAFC	Ministry of Agriculture, Food Security and Cooperatives
MATI	Ministry of Agriculture Training Institute
MoU	Memorandum of Understanding
M&E	Monitoring and Evaluation
NGRA	National Grain Reserve Agency
NGO	Non-Government Organization
NMFB	National Microfinance Bank
NVIWATA	Mtandao wa Vikundi vya Wakulima Tanzania (National Farmers' Association)
PELUM	Participatory Ecological Land Use Management
PMO	Prime Minister's Office
PPP	Public-Private Partnership
P4P	Purchase for Progress
RUDI	Rural and Urban Development Initiative
SUA	Sokoine University of Agriculture
TAGMARK	Tanzania Agricultural Market Development Trust
TAMISEMI	Tawale za Mioa na Sevikali za Mifoa (Prime Minister's Office)
TAP	Tanzanian Agricultural Partnership
VAEO	Village Agriculture Extension Officer
WFP	World Food Program of the United Nations
WRC	Ward Resource Centers
ZEILU	Zonal Extension and Information Liaison Unit

Executive Summary

Background

The Alliance for a Green Revolution in Africa (AGRA) has identified the need for an Extension Support Function (ESF) to integrate its extension activities with the national extension systems to ensure; increased awareness and accelerated uptake of farmer-ready green revolution technologies and practices, taking into account the unique needs of women and young farmers. The objective of the study was to establish the state of extension services with respect to institutional arrangements, policy directions and their impacts, methods and approaches used, agribusiness models, and targeting to ensure increased and sustainable crop productivity.

This report presents the findings of the in-country study for Tanzania. The study focused on Mbeya region in the Southern Highlands. Interviews were conducted with groups and individuals based in Mbeya and Mbozi districts and Dar es Salaam city. A wide range of stakeholders from the public extension system, non-government organizations (NGOs), the private agribusiness sector, training institutions, farmer organizations, finance institutions, research institutions (public and private) and international agencies were involved. The interviews were followed by a one-day feedback workshop in Dar es Salaam.

Agriculture is a major pillar of the economy and a source of livelihood for over 80% of Tanzanians. The majority of farmers at a subsistence level due to inadequate access and use of productivity enhancing inputs, limited support services including extension, and inappropriate technologies.

Delivery of extension

The institutional and structural arrangements for delivery of agricultural services continues to evolve The Ministry of Agriculture, Food Security and Cooperatives (MAFC) comprises of six departments namely; research development, crop development, policy and planning, training, mechanization and irrigation. Extension is a section in the Crop Development Department. Within the extension section, there are various units dealing with farmer education, methodology, linkages, and procurement and finance. Under the decentralized system, the delivery of extension service is a responsibility of the local governments with the main roles of MAFC being policy guidance, ensuring standards, and monitoring and evaluation.

The technical relationships for supervision of extension between MAFC, regional government and the local governments need clarification and strengthening as there is a disconnection in terms of responsibilities and authorities for guidance and supervision between the regional and district staff. The effectiveness of extension is limited by weak linkages to research. The functions of the Zonal Extension and Information Liaison Unit (ZEILU), which is intended to strengthen links between research and extension are curtailed by inadequate resources and staffing and its roles are yet to be internalized by both researchers and extension agents.

Under the decentralized arrangement, the districts are responsible for delivery of social services including extension in accordance with the District Agricultural Development Plans (DADPs). DADPs are a bottom-up consolidation of plans and priorities from the village to district level. Given the limitations of resources at the district level, some aspects of extension, for example the retraining of staff are less likely to emerge as top priorities in the DADPs.

Agricultural economy and Institutional context

The 25% contribution of agriculture to GDP despite the fact that it employs about 80% of the population is indicative of low productivity and low value of agricultural products. The drivers to exploitation of that potential include access to better and reliable markets and enhancing public-private partnerships for investment in agriculture. Extension is key to full exploitation of the agricultural potential but this will require policy attention. Some of the policies that affect extension services delivery include:

- Decentralization.
- Unified extension services.
- Inconsistent and unpredictable policies.
- Extension policy.
- Input subsidy policy and the Fertilizer Act.

There are both positive and negative drivers of success of extension. The positive drivers include the government policy to subsidize agricultural inputs, the space and support for pluralistic service provision including public private partnerships for delivery of extension services and initiatives for creating internal markets for agricultural produce. Some of the negative drivers include the reducing government support for agricultural education, and inadequate support to extension system.

Recent trends in agricultural extension practice

Constraints related to insufficient technical and human resources, and the increasing role of the private sector have led to the emergence of new patterns and trends in the extension provision. Such trends include:

- Increasing use of paraprofessionals.
- Towards demand led service delivery.
- Towards Public-Private Partnerships (PPP) in extension delivery.
- Emerging non-traditional cash crops.

Extension approaches

Several extension approaches are being used by various organizations. The trend in choice of approaches is towards participatory approaches, which empower the people to make informed decisions and to take action proactively to solve their own problems. Most of the approaches used rely on direct interaction with the clientele. These include:

- Farmer-to-farmer extension.
- Demonstrations used by nearly all extension service providers.
- Farmer Field Schools (FSS), Farmer Field and Life Schools (FFLS) that includes training on social and economic issues, and Junior Farmer Field and Life Schools (JFFLS) that have a youth focus.
- On-farm trials.
- Community resource centers.
- Television and radio.
- Farmer exchange visits.
- Farmer training centers.

The overall goal of extension systems is reflected in the uptake and utilization of knowledge and technologies for improved livelihood of farmers. A combination of appropriate methods, each one applied where they are most effective in the adoption process is likely to produce the best results. Effective methods need to focus on strengthening farmer organizations; utilizing the visual impact to influence behavioral change; farmer learning and experimentation; broadening the scope of extension advice beyond production and productivity to cover the entire value chain; possession of relevant technical content and facilitation skills; and being able to properly use of extension methods.

There is some gender awareness in extension service delivery but there is a debate whether women should be organized separately. However, nearly all organizations consulted (except FAO) do not specifically target youth. This poses a great risk for future food security.

Agribusiness models that enhance extension delivery

Understanding of agribusiness models varies with context. Five relevant models were discussed in the workshop. These are the cooperatives model; contract/outgrower model, input market-led extension model; output market-led model, and the warehouse receipt model. The cooperative model is well known but considered a failed model based on past experience. The input market led model is driven by the agro-input dealers as a way of creating demand for their inputs. The output market led model focuses on accessing and creating produce markets as an incentive for higher productivity and consequently inducing demand for extension. In the warehouse receipt system farmers bulk their produce to access better markets/prices. The warehouse receipt system encourages service providers including extension services to enhance production, quality management, value addition and marketing.

Conclusions

Based on information generated in this study, the following conclusions are made:

1. Tanzania is pursuing initiatives to revitalize extension as exemplified by stepping-up training programs for FEWs at MATIs, and countrywide establishment of WRCs. However there is a systemic challenge embedded in the structural arrangement supervision and monitoring of extension. The weak linkage between research and extension is another major drawback.
2. A variety of extension methods are used to deliver extension service, with the most dominant one being Farmer Field School (FFS). The front-line implementers of these methods seem to lack adequate orientation and expertise to use them properly. Inadequate resources for FEWs means the methods are less effective than they should be.
3. The role of the private sector in the provision of extension is increasingly significant. There are emerging vital public-private partnerships (PPP), which have the potential to enhance extension service delivery if the roles and responsibilities of the partners are made clearer.
4. Extension is very critical in providing the necessary production and market information and supporting the application of technology to modernize and commercialize agriculture. Without strengthening the extension function, the agricultural potential of Tanzania will remain latent.
5. Agriculture related policies and government structures for delivery of extension are continuously changing but rather often in an erratic way that does not allow a smooth transition.
6. Conventionally, extension has been associated with production/productivity aspects. Today, it is realized that the most limiting factors are in market access, agricultural finance provision, and value addition but such areas are not served by extension.
7. The disconnections in the institutional arrangements for delivery of extension constrain technical supervision. It is therefore difficult to put in place an effective performance based monitoring and evaluation system. This could be partly blamed on the lack of an extension policy and/or guidelines that clearly articulate the strategic goals, mandates and mechanisms for delivery of extension.

Recommendations

A green revolution is unattainable without a functional extension system. A collective effort between government, development partners including AGRA, and the private sector is essential to address the complex challenges of extension service delivery. The following recommendations are proposed:

1. MAFC should fast track the development and ratification of extension guidelines within agricultural policy to direct implementation of extension in the context of pluralistic service provision and public-private partnerships.

2. Develop and pilot a collaborative and integrated extension system in the breadbasket area, ensuring it involves the key service providers and that extension is mainstreamed in the entire value chain.
3. A comprehensive program is needed for retraining extension agents in both the technical content and proper use of extension methods.
4. Develop a performance based incentive system that attracts and retains competent extension agents to work with rural and remote communities. This needs to be accompanied by close supervision and a performance oriented monitoring and evaluation system.
5. Strengthen the training of front-line extension workers at the MATIs to address the critical shortage of FEWs. This demands improved training facilities, increased numbers of trainers, and reorienting the staff in new approaches to training such as the competence based learning.
6. Operationalize, equip and strengthen the WRCs as information/knowledge management centers to increase access to relevant information by different stakeholders.
7. Pursue and support business focused farmer organization development to take advantage of economies of scale and to enhance information dissemination from the small number of FEWs to the large numbers of farmers.

1 Introduction

1.1 Background

The Alliance for a Green Revolution in Africa (AGRA) has identified the need for an Extension Support Function (ESF) to contribute to the integration of extension activities within AGRA programs and enhance linkages with national extension systems and other extension initiatives in the countries where they work. AGRA sees these linkages as important to ensure increased awareness and accelerated uptake of farmer-ready green revolution technologies and practices, taking into account the unique needs of women and young farmers. Draft objectives for the ESF include the following:

- Strengthen synergy and collaboration within AGRA programs and with other projects through joint development, resource mobilization, programming and implementation of extension activities.
- Facilitate uptake and up-scaling of farmer ready technology and practices through approaches including farmer groups and farmer organizations.
- Increase smallholder farmers' and particularly female farmers' access to extension services, through strengthening their capacity to demand the services.
- Leverage information and communication technologies (electronic and print media) to enhance access to markets, credit, consumer demand and other factors.
- Monitor uptake of interventions through continuous diagnosis and learning, database building and using feedback for improvements.
- Explore ways of integrating youth and young graduates (particularly female) in activities along the agricultural value chain.

A comprehensive review of the current situation to inform development of the ESF program and work plan has been started within the AGRA programmes, but the situation on the ground in-country remains to be assessed and analysed. Therefore, AGRA commissioned CABI to carry out extension-related studies in their top four priority countries: Ghana, Mali, Mozambique and Tanzania with a focus on the breadbasket areas.

These studies aim to gain a detailed understanding of the context and extension needs of the chosen breadbasket areas within each of the countries. This information will then be used as a base on which to take decisions on where the funding should be directed and what specific activities would support an improved extension function across the AGRA programmes. The objectives of the in-country study were to establish the state of extension services, with a focus on the institutional arrangements for delivery of extension; policy directions and their impacts on extension; methods and approaches used; agribusiness models that enhance the delivery of extension, and the targeting of extension to ensure increased and sustainable crop productivity.

1.2 Methods Used

This report presents the findings of the in-country study for the United Republic of Tanzania. The study targeted the Southern Highlands, specifically Mbeya region, which is part of the breadbasket area of Tanzania. Mbeya region comprises of seven districts namely: Chunya, Mbeya, Ilejje, Kyela, Rungwe, Mbarali and Mbozi. However the breadbasket area extends to other regions in the Southern Highlands including Morogoro region. This study was limited to interviews of groups and individuals based in Mbeya district, Mbozi district and Dar es Salaam city. The interviews involved a

wide range of stakeholders from the public extension system, non-government organizations (NGOs), the private agribusiness sector, training institutions, farmer organizations, finance institutions, research institutions (public and private) and international agencies (see Annex IIa). In addition to the interviews, a one-day workshop attended by 19 participants (see Annex IIb) representing a wide range of stakeholders was organized in Dar es Salaam to validate the findings from the interviews and to provide additional information.

2. Country Policy and Institutional Context

Agriculture occupies a very important place in the lives of Tanzanians as well as in the national economy (MAFC & FAO, 2008). This is consistently reflected in national development slogans over the years which put agriculture at the forefront of the national development agenda. Such slogans include:

- *"Siasa ni Kilimo"* meaning that politics is agriculture. This was to promote the Iringa declaration (1971) which sought to increase agricultural production and productivity through irrigation.
- *"Kilimo cha kufa na kupona"* meaning that farming is a matter of life and death (1974). This followed a wide-spread and severe famine in Tanzania.
- *"Kilimo Kwanza"* meaning agriculture first (2008/9). This is a comprehensive and ongoing program for revitalizing the agricultural sector.

Due to inadequate access and use of productivity enhancing inputs or capital, limited support services including extension, and inadequate access to appropriate technologies, the majority of farmers in Tanzania are compelled to produce at a subsistence level (MAFC & FAO, *ibid*). AGRA is currently supporting some key aspects of research in soil health and plant breeding as well as supporting input delivery systems to enhance productivity. However extension, which facilitates interaction between research and producers (farmers) remains weak. It is for this reason that AGRA seeks to consolidate and strengthen extension support within its initiatives to accelerate the achievement of the green revolution. As one of the respondents in this study emphatically put it: *"Without extension, there can never be a green revolution"*.

2.1 Institutional structure for delivery of public extension services in Tanzania

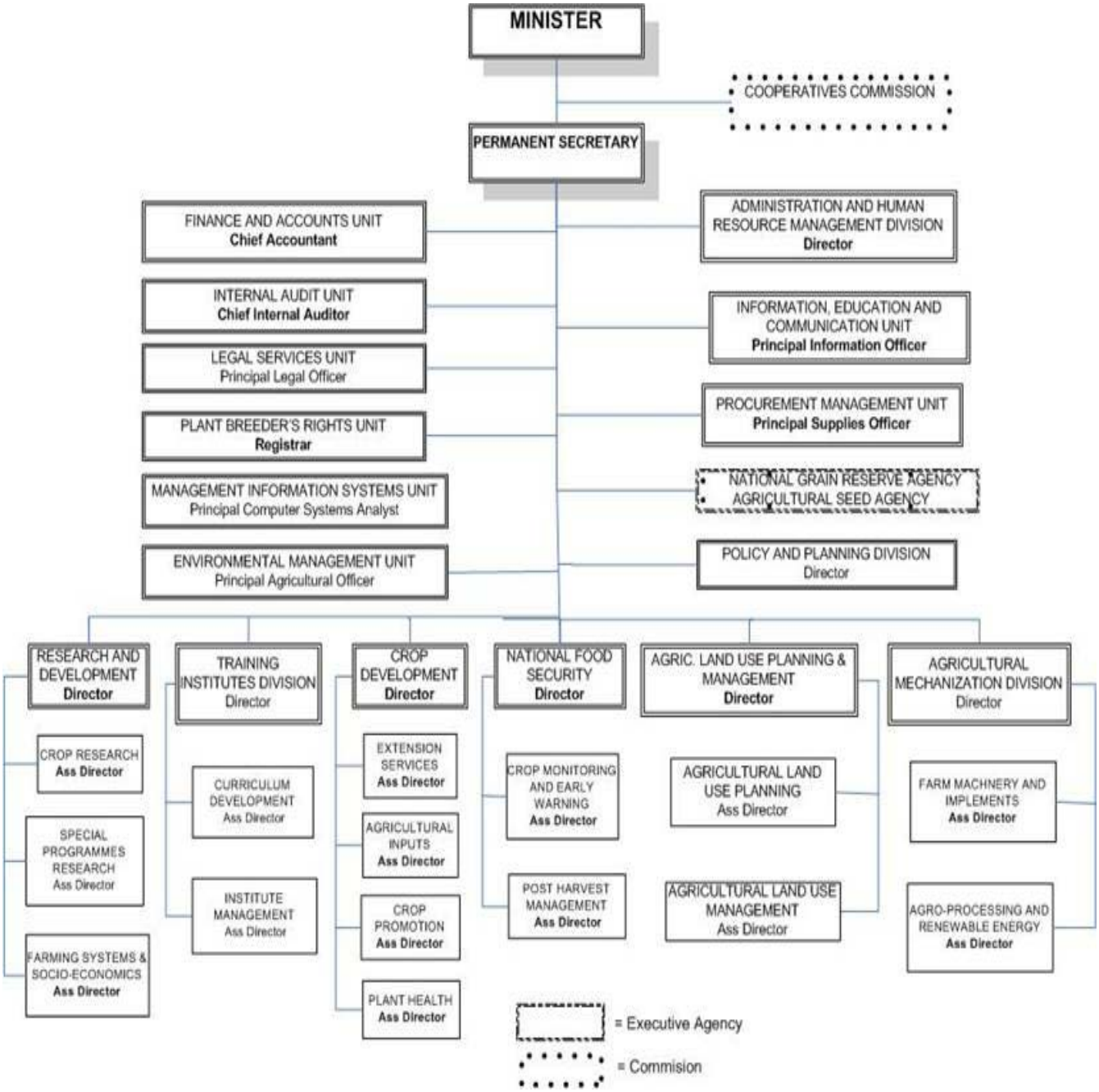
The organizational arrangement for delivery of agricultural services continues to evolve with the deepening of decentralization from the region to district and village levels as well as changes in the national institutional arrangements. For example, there have been changes in the structures of the government ministries recently, with Livestock and Fisheries forming a separate ministry to Agriculture. At the same time Irrigation, which used to be under the ministry responsible for water has now moved to Ministry of Agriculture, Food Security and Cooperatives (MAFC).

MAFC has six departments namely;

- Research Development Department
- Crop Development Department
- Policy and Planning Department
- Training Department
- Mechanization Department
- Irrigation Department

Extension is a section of the Crop Development Department. The other sections in the same department are crop promotion, plant health and input supply. Within the extension section, there are various units dealing with farmer education, methodology, linkages and procurement and finance. Under the decentralized system, the delivery of extension services has been a local government responsibility since 1998/9. The main roles of MAFC with regard to extension are policy guidance, ensuring standards, providing guidelines, and monitoring and evaluation.

Figure 1: Organizational Structure for MAFC



Regional & district level

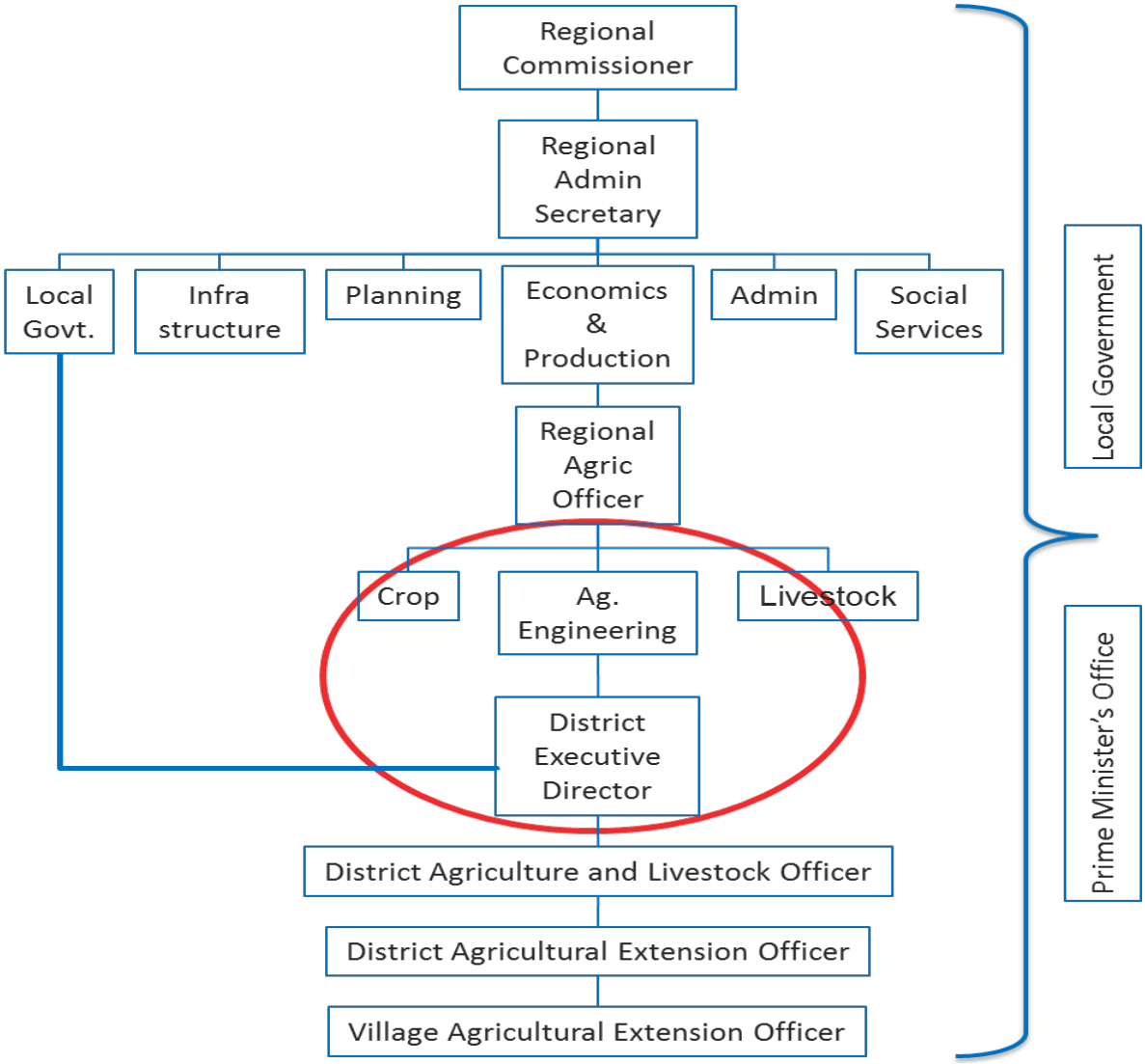


Figure 1 above illustrates the organizational structure for delivery of extension services. Administratively, the regional and local governments are under the Prime Minister's Office (PMO) commonly referred to as *Tawale za Mikoa na Sevikali za Mifoa* (TAMISEMI). The technical relationships between the MAFC, regional government and the local governments need clarification and strengthening. For example, there are regional staff in charge of livestock, crop and fisheries but their relationship between the district staff and MAFC is not clearly defined. There is a disconnection in terms of responsibility and authority for guidance and supervision between the regional staff and the district staff (see ring in Figure 1). At the time of this study a working committee was reviewing the regional staffing with a view to clarifying its functions and strengthening the relationship with MAFC and district local governments. It is proposed that regional level staffing is expanded to comprise of:

- Agricultural Officer (4)
- Agro-engineers (2)
- Cooperative Officers (2)
- Marketing Officer (1)
- Livestock Officer (2)
- Veterinary Officer (1)
- Fisheries Officer (1)

It is recognized that uptake of improved production technologies and practices requires good and functional linkages and collaboration between research and extension. For this reason, the Zonal Extension and Information Liaison Unit (ZEILU) was created to link research and extension. The functions of ZEILU are however curtailed by inadequate resources and staffing. Ideally ZEILU should have 3-5 staff (2 extension, 1 crop, 1 livestock and 1 information officer who is also the overall overseer) but for example one person staffs the ZEILU in Mbeya. In addition to servicing the linkages between research and extension, ZEILU is also expected to provide the Farmers Education Unit with materials for wider dissemination through mass media. The ZEILU officer reports directly to the Assistant Director for Extension. Specific the functions of ZEILU are to:

- Gather research results, interpret and disseminate them to the extension agents
- Train extension staff and farmers
- Organize and conduct field days, exchange visits, on-farm trials in collaboration with district staff and researchers
- Present radio and TV programs, produce publicity materials (e.g. leaflets, brochures) and publish articles on success stories
- Link the ministerial and zonal level administration of extension
- Participate in national agricultural events

These roles need to be clarified with researchers and district extension staff. Stakeholder interviews suggest that ZEILUs are perceived as the communications arm of research rather than a coordination unit between extension and research focusing on creating interactions between extension and research.

The major problem for ZEILU is funding and this problem is related to its position within the structural arrangement. When it was created in 1998, the unit was within the extension section but it was transferred to the research section in 2002. ZEILU's source of funding was clear when it was in the extension unit. However since 2002, the funding has been apportioned as 60% and 40% from the research and extension units respectively. The 60% contribution from research is further apportioned between agriculture and livestock. This type of arrangement complicates the funding mechanisms for ZEILUs and creates an administrative challenge in terms of authority and reporting. The fact that funding comes from different units, implies that ZEILUs have to be accountable to all those sources of funding.

The district level is the center of action for service delivery including extension and this is where the planning and actual delivery takes place. Agricultural staff at this level and below are controlled by the district local government. There are many service providers for extension including NGOs and private input supply companies who collaborate with the district agricultural office and in many cases share staff and exchange reports. All NGOs are supposed to provide their plans and reports to the District Agricultural and Livestock Development Officer (DALDO) to ensure harmonization of service delivery and monitoring and evaluation (M&E). This is part of the arrangements for operationalizing Public-Private Partnerships (PPP) (see Section 2.3).

2.2 Policies and Practices Influencing Extension Service Delivery

Existing policies are broad in nature and their direct and indirect effects are usually far reaching. Some of the policies that affect the agricultural sector, and the delivery of extension services in particular, are outside the agriculture sector. There are also practices, which influence the organization and delivery of agricultural extension. These policies and practices are discussed together. In addition the agricultural economy is also discussed with a focus on the agricultural potential for food security and exports; some of the trends in practices for enhancing delivery of extension services; and the interaction of agricultural extension service providers.

Decentralization

Decentralization is a crosscutting governance policy aimed at bringing accountability nearer to the grassroots and enhancing the participation of citizens in making decisions that affect their social, economic and political wellbeing. In terms of service delivery, a decentralization policy strengthens the demand side (in this case, farmers) in articulating their needs and priorities. Service providers are expected to address these expressed needs and priorities. The decentralization policy therefore tasks local governments to be responsible for service delivery at the grassroots level.

There are three main levels of governance which influence delivery of services; the central government represented by MAFC, who are responsible for the technical guidance on agricultural services; the regional government; and the district local government who are in charge of execution of those services. This institutional arrangement creates a disconnection between MAFC and the regional agricultural staff, and between the regional agricultural staff and the district agricultural staff, with respect to the chain of command for supervision of extension services, as illustrated in Figure 1. There is a further disconnection between research and extension at the functional level as research activities remain in MAFC. The vital links between research and extension are weakened by these institutional arrangements. Dissemination of agricultural knowledge, technologies and practices generated by research, and obtaining feedback from the knowledge and technology users is constrained by the weak collaboration between research and extension. The national farmers' organization, NVIWATA provided an example of a rice variety promoted by researchers for its high yield but, due to its lack of taste, consumers do not buy it. The high yield is counter-balanced by the low price making the low yielding and tasty varieties more profitable because they fetch a higher price. Such examples point to the weak interaction between technology developers and technology users, a role which is mediated by extension. A good research-extension linkage facilitates important feedback needed to make research more relevant.

To ensure effective delivery of research and extension services to the community, the relationships between MAFC and TAMISEMI needs to be harmonized to allow continuous technical supervision of extension as well as collaboration with other vital departments such as research. The researchers for example, are concerned that when they seek the services of field extension workers (FEWs), they are expected to enable the FEWs including paying their allowances. In other words, the FEWs think they are assisting the researchers to do their (the researchers') job. Joint responsibility between extension and research needs to be mainstreamed in the planning and budgeting processes. One of the suggestions for the research-extension linkages is to set-up an extension-research forum for joint planning and review of collective efforts.

The problem of collaboration occurs not only across ministries, but also within the same ministry, as coordination and collaboration between departments is problematic. For example research and training used to be in the same department and then it was easy for researchers to participate in training at the Ministry of Agriculture Training Institutes (MATIs) on a part-time basis. Research and training are now under separate departments.

Decentralization encourages a bottom-up planning process with priorities generated at the village level and consolidated at the ward and district levels. The District Agricultural Development Plans (DADPs), of which extension is an integral part, emerge out of this process, and service providers including research and extension are then expected to respond to the priorities articulated in these plans. The planning is facilitated by teams comprising representatives from the planning, agriculture and community development departments at the district level.

Inconsistent and unpredictable policies

Some government policies are too inconsistent and unpredictable to allow meaningful long-term planning. Two policies are cited as examples. The first one relates to the ban on the export or cross-border sale of agricultural produce and the other example relates to the training of extension professionals at the MATIs.

One year ago sale of maize and beans across the border was banned. It is unclear whether this is government policy or not due to the lack of documentation. These reactions from government supposedly emanate from the lack of reliable early warning systems and yield predictions, which can send the government into speculation and panic about the food security situation. The action is based on political pronouncements, which are translated and enforced as government policies. There is uncertainty as to whether this restriction has been lifted or is still in effect. Traders are required to obtain permits for selling produce across borders, something that is only possible for large-scale exporters. The border districts in the breadbasket region have better markets for agricultural produce across the borders, but the restrictions on selling produce across the border removes that market leading to a drastic price drop and consequently there is little incentive for farmers to increase production or productivity. This reduced motivation to increase production and productivity consequently reduces the demand for new knowledge and production practices.

MATIs are the major source of front-line extension workers (FEWs) with diploma and certificate qualifications. The MATIs are the main source of agricultural extension agents at the ward and village levels. To match the unified extension approach, the government instructed colleges to offer a general diploma and certificate, with a target of training 8,100 graduates by 2012 to fill the gap in extension staffing countrywide. This target is difficult to meet however, as many of the graduates find employment elsewhere or choose to continue with further studies. Ideally after the certificate, the graduates are expected to work for at least two years before enrolling for a diploma and it was anticipated that those with diplomas would also work for some years before enrolling for a degree. However most of the diploma and certificate graduates chose to enroll in further training without working first. The difficulty of retaining FEWs in the villages lies in low remuneration and lack of facilitation of the FEWs as compared to their colleagues who get employment in research This year, the government suspended the diploma program to try and stop this exodus of the field extension workers and concentrate on building a critical mass of certified graduates employed at the village level. The diploma programs are in abeyance and the institute is now threatening to withdraw accreditation for the diploma programs if it is not permitted to run them. It is not clear how long the diploma program will remain suspended. Such inconsistent and unpredictable policy changes leave the training institution in a dilemma about the future of its training programs. Box 1 below provides a brief description of the situation at the MATI at Uyole based on the transcript of an interview during this study.

Box 1: MATI-Uyole Case Study

MATI-Uyole offers diplomas in crop production, nutrition, food production and livestock; and certificates in agriculture and livestock. Each of the programs covers modules on extension in addition to the specialty subject matter. The institute also offers tailor made short courses for extension workers and farmers on demand. NGOs, the private sector and sometimes the government identify their training needs and request the institute to design short training courses ranging from one week to three months in duration.

It is acknowledged that knowledge and approaches in extension and rural development in general are continuously changing implying that the institute needs to regularly review its curricula, but there is no effective mechanism for obtaining feedback from the alumni regarding their professional needs. The institute does not have funds to conduct tracer studies to inform the curricula review. With the support of a Canadian institute, a comprehensive tracer study is planned.

Some of the challenges of the institute include:

Staff shortages especially in the livestock discipline. This is aggravated by the fact that the college is in the MAFC while responsibility for livestock lies with a different ministry. It is difficult for staff to transfer from one ministry to another as each ministry offers different career development opportunities and remuneration levels. In addition the separation of research and training into different departments within the Ministry of Agriculture has severely affected the collaboration between the training institute and the Uyole research institute, even though they are on the same campus. It is more difficult to get researchers to participate in teaching now.

Shortage of training facilities and equipment to match the number of students. The enrolment of students is increasing every year due to the government plan to raise a critical mass of extension workers, with 200 students currently in each year of the certificate program. The facilities are overstretched and this compromises the quality of training especially relating to critical practical work. Due to the suspension of the diploma programs, the demand for the certificate program is very high as potential diploma candidates opt for the certificate course. This academic year, the institute received 5,000 applications and only 201 were admitted.

To improve on the relevance of graduate skills to training, the institute is changing from a knowledge based approach to a competence based approach to learning. The tutors have had three short training courses to reorient them to a competence based learning approach. This change is not easy and there is some resistance from the tutors, as they are themselves a product of a knowledge based learning approach and so are most comfortable with this approach.

Unified extension services

Although the ministries responsible for agriculture and livestock are separate, at the village level, a single FEW provides extension services for both crops and livestock regardless of their training specialty, providing a unified extension approach. The unified approach maximizes utilization of the few available FEWs, but it also compromises the quality of services and complicates coordination of capacity building for the FEWs. Professional biases, perceptions and allegiance to different ministries complicate effective delivery of livestock and crop extension by a single FEW. By the very nature of their specialized training, it is not easy to reorient the FEWs to provide extension for both crops and livestock effectively. A unified approach to extension at the grassroots level cannot work well when the ministries responsible for crops and livestock are not unified themselves. There is an ongoing initiative to move from a unified extension approach to separate livestock and crop extension by July 2011.

To complement the unified extension approach, the MATIs changed from offering specialized training to general diploma and certificate courses that integrated training on both crops and

livestock. Separation of crop and livestock extension implies that the MATIs will have to revert to the specialized training and it is unclear where the general diploma and certificate courses will fit.

Extension Policy

There have been efforts to develop an extension policy for several years but these efforts have been futile. There seems to be some fatigue within policy development to which extension policy has fallen victim. The current argument is that as an agriculture policy exists, there may be no need to develop an extension policy, as it would be a policy within a policy. The development of extension guidelines within the agriculture policy is being considered however. A draft extension policy and draft guidelines exist but they are not yet in the public domain. There is also a feeling that MAFC has tended to over-emphasize the biological aspects of agriculture and little attention is given to processes and methodologies, and this could partly explain why an extension policy may not be apriority. Arguably the peripheral treatment of extension is demonstrated by the fact that whereas extension is crosscutting, it is found within the Crop Department.

Input subsidy policy and the Fertilizer Act.

The Fertilizer Act (2009) is the only one of its kind in the Eastern African region. It is intended to regulate the supply, distribution and application of fertilizers in Tanzania. It is critical to the implementation of the input subsidy policy that the government is implementing. The input subsidy policy operates through a voucher system that entitles a farmer or household to sufficient inputs for one acre for one season. The inputs are delivered by private input dealers. The selected farmers in each village present their vouchers to designated input dealers who supply them with the specified inputs. Currently two million households are beneficiaries of the voucher system and this is expected to increase to 4.5 million households in three growing seasons. This policy stimulates production by encouraging farmers to appreciate the value of input use. It is hoped that this will motivate them to purchase inputs in the subsequent seasons, and that this motivation to produce more, or achieve higher productivity will stimulate demand for extension services. However, the effectiveness of the inputs will only be achieved through advice on the appropriate use and application, hence the necessity to strengthen extension services. The input delivery system is still problematic however and there is also concern about the standards and quality control of inputs, especially fertilizers. The subsidized inputs are provided to only a few farmers selected by the village councils. The process of choosing who benefits is not always transparent and may be prone to bias as a female farmer in Ndundu village in Mbeya district narrated (See Box 2).

Box 2: Case of a farmer in Mbeya:

The female farmer lives in Mbeya town but has her garden in Ndunda village about 15 km away. She does not benefit from the government input subsidy but last year she was a beneficiary of inputs from an NGO. This year she did not get the inputs from the NGO. When asked why she does not benefit from the government input subsidy, she narrated:

"To benefit from the government input subsidy, you have to be registered as a resident of the village. Though my garden is in the village, I live in town and the village authorities cannot register me as a resident, so I cannot benefit from the voucher system".

2.3 The Agricultural Economy

Agricultural potential

Agriculture employs about 80% of the population in Tanzania, generates about 85% of the foreign trade but only contributes 45% of the Gross Domestic Product (GDP) (FAO Stats). According to the Kilimo Kwanza resolution, a large proportion of Tanzania's endowment of agricultural land, livestock and marine resources is under-utilized. Given the large proportion of the population engaged in agriculture, the strategy to combat poverty has to focus on, among other things, enhancing

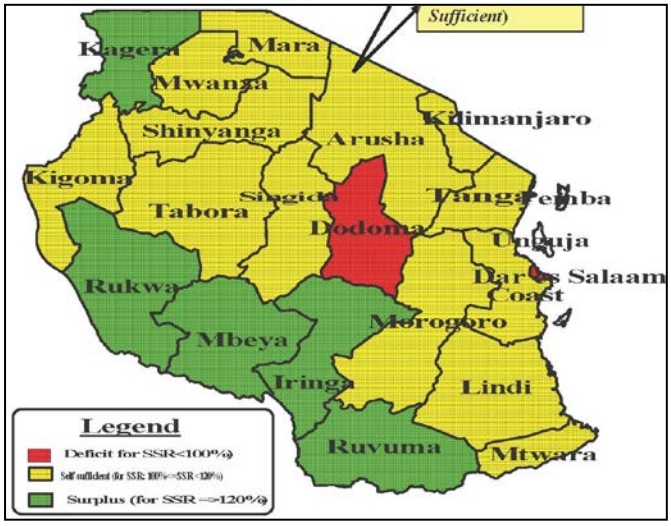
agricultural business. Kilimo Kwanza embraces a comprehensive approach to revitalizing agricultural development with ten pillars:

1. Political will to push agricultural transformation.
2. Enhancing financing for agriculture.
3. Institutional reorganization and management of agriculture.
4. Paradigm shift to strategic agricultural production.
5. Land availability for agriculture.
6. Incentives to stimulate investment in agriculture.
7. Industrialization for agricultural transformation.
8. Science, technology and human resources to support agricultural transformation.
9. Infrastructural development to support agricultural transformation.
10. Mobilization of Tanzanians to support and participate in the implementation of Kilimo Kwanza.

The Southern Highlands is an area of the very high potential which so far, has been grossly under-utilized. The Monitor Group report indicates that some districts operate at less than 2% of their potential production levels. In Mbeya it was reported (based on 2005 records) that maize yields were between 1.5-2.5 metric tons/ha. Through the promotion of improved varieties and agronomic practices the yields have now improved to 3.5 metric tons/ha and it is likely to increase further with the intensification of advisory services and promotion of input use. Zoning is one of the strategies for maximizing utilization of agricultural potential by targeting specific areas with the best-suited crop. The aim is to ensure that farmers concentrate on enterprises in which they have a comparative advantage based on ecological potential. This can be achieved through proper analysis and a good extension service to advise the households.

Even with the current underutilization of its agricultural potential, Tanzania can be self-reliant in food security and has excess for export to other countries. Figure 2 below shows that at the sub-national level, the 2009/10 production was expected to meet food requirement for the 2010/11 marketing year in all the regions except Dar es Salaam and Dodoma. Five regions, namely Rukwa, Ruvuma, Iringa, Mbeya and Kagera will produce a definite surplus, while the other 14 regions produce enough for their own food requirements.

Figure 2: Total food supply forecast 2010/11 marketing year based on 2009/10 food crop production forecast *Source: AGSTATS for food security, Vol.1*



According to the forecasts, overall, Tanzania will have surplus food in the year 2010/11 (to be specific, 112% self-sufficient) as illustrated in table 1 below.

Table 1: The 2009/10 National Level Preliminary Food Crop Production versus Requirement and gap/surplus analysis for 2010/11

Assessment item	Cereals	Non-cereals	Total Food
Production (T)	7,698,193	5,127,013	12,825,205
Requirement (T)	7,268,717	4,146,243	11,414,960
Gap/Surplus (T)	429,476	980,769	1,410,245
SSR (%)	106	124	112

Source: AGSTATS for food security, Vol.1

Increasing productivity within the zones will be enhanced by scientific support. For example, Technoserve, a private company analyzed soil samples in the coffee growing areas in Mbeya region and the results indicate high fixation of some nutrients. This can be rectified by liming and demonstrations have been set up to show the effect of liming on coffee production in those areas.

Drivers of agricultural development

Government strategy is to promote private sector driven agricultural development. Emphasis is placed on a shift from subsistence smallholder to commercial large-scale production systems, encouraging and nurturing PPPs and promoting pluralistic extension service delivery amongst other things. The role of the private sector is becoming more visible in agricultural development. For example, the role of private input supply companies in the provision of extension services is becoming more prominent. The government has encouraged several foreign firms to invest in agriculture but most of them tend to focus on cash crops and probably rice. The food security of the country will continue to rely on the smallholder producers for some years. Agriculture is regarded as a high-risk venture and potential investors are hesitant to invest unless there are government guarantees. In this regard, the government is in the process of setting up an agricultural bank to finance agricultural investment on more favorable terms. The government is also encouraging PPPs in investment and service delivery in the agricultural sector (see section 2.3). Markets are a key driver of agricultural production. Where markets exist, farmers are motivated to produce and hence seek out the relevant information and technologies to enhance their productivity. Value addition is a step within the value chain that ensures and guarantees markets. The emerging non-traditional cash crops are driven by niche markets. In the same way the warehouse system is increasingly becoming a symbol around which farmers organize themselves to be able to access better markets for their produce. The Purchase for Progress (P4P) program of the World Food Program (WFP), the National Grain Reserve Agency (NGRA) and the Mixed Crops Board all aim to increase internal markets for sustaining production by purchasing farmers' produce at competitive prices. For the same reason, some NGOs like MVIWATA have initiatives to construct market places to foster agricultural trade. Without reliable and attractive markets, farmers will continue to produce for subsistence and there will be no incentive for the uptake of new technologies and practices.

2.4 Recent Trends in Agricultural Extension Practices

The constraints in public extension service delivery, especially those related to insufficient human and physical (e.g. transport) resources, and the increasing role of the private sector have led to the emergence of new patterns and trends in extension provision. The trends discussed here include the increasing use of paraprofessionals in extension delivery; a shift towards demand-led extension; public-private partnerships for delivery of extension and private driven extension services for emerging non-traditional cash crops.

Increasing use of paraprofessionals

To cope with the severe shortage of FEWs and to ensure sustainability, there is an increasing use of paraprofessionals in the delivery of extension. Highly performing farmers are identified and trained to provide extension services to their fellow farmers. NGOs, private companies, districts and the Tanzanian Coffee Research Institute were found to be using paraprofessionals. The paraprofessionals are called different names in different organizations such as lead farmers, farmer promoters, pioneer farmers, village animators etc. Some of the DADP funds are used to train the paraprofessionals to facilitate Farmer Field Schools (FFSs).

The paraprofessionals are volunteers, not employees, who are given some incentives to encourage them to serve the community. The incentives vary from one organization to another, but generally they include working gear; training and opportunities for learning through workshops or seminars; provision of a bicycle for transport in some cases; and in recognition of their services, the village council may exempt them from some communal activities. The Tanzanian Coffee Research Institute offers them a token of appreciation of Tsh. 20,000 per month though this is not regularized yet. Paraprofessionals in the private sector may also be motivated by non-formal incentives within their respective sub-sectors. For example, those in livestock usually charge a fee for services such as treatment and meat inspection while those in forestry may be given tokens by timber business dealers.

In addition to being cheap, the use of paraprofessionals is considered to be more sustainable as the farmers remain in the community and are always available and accessible by other farmers. Their use is based on the concept that farmers are very knowledgeable about their enterprises and are better placed to influence their fellow farmers because of their practical approach to learning. The challenges associated with using paraprofessionals include their often low level of education which can make it difficult to grasp some scientific concepts and can limit their ability to utilize written information; and how to enable and motivate them to continue serving other farmers while at the same time concentrating on their farms. The provision of incentives to the paraprofessionals and whether they would continue to provide the service if the incentives were withdrawn, challenges the sustainability of this arrangement. As the paraprofessionals spend more and more of their time helping others, they may demand better incentives to compensate for the time they are unable to work on their own farms.

Towards demand led service delivery

One of the goals of decentralization is to empower communities to plan and determine their own development priorities. At the district level, all agricultural programs are based on DADPs. Resources for the agricultural sector are allocated according to priorities within the DADPs. The plans therefore are an expression of demand from the grassroots level. Without under-estimating the capacity of the community to set their own priorities, it is clear that they can only demand what they know and it is likely they will demand tangible items like inputs in comparison to the intangible ones like knowledge and information.

Beyond responding to local needs and priorities, there is a tendency for the farmers to seek advice from the FEW rather than the FEWs reaching out to farmers. This is reinforced by the fact that there are too few FEWs and they do not have sufficient resources to reach out to all farmers who need their services effectively. In this situation, FEWs would rather wait for the farmers to come and consult them. A female farmer affirmed this practice saying; “if you want advice from the extension worker, you have to look for him and take him to your farm”.

Towards Public-Private Partnerships (PPPs) in extension delivery

The public sector alone is no longer able to provide extension services to all the farmers it used to in the past. The number of famers is growing exponentially and government capacity to provide sufficient resources for extension is declining. The private sector is increasingly gaining interest in

the provision of extension either as a business or on a humanitarian basis. PPPs are a mechanism for enhancing effective collaboration between the public and private sector in delivery of extension services. In recognition of the role of private sector, the government policy is to promote PPPs for agricultural development in general. The PPPs are reflected in the collaboration between the districts, NGOs and private input dealers. However there is a challenge in how to finance such arrangements on a large scale. With a weak private sector, it may be necessary to use public resources to strengthen the private sector but the expectations from the implementers, especially at district level, is that the private sector will support public provision of extension services.

In principle, NGOs and public extension services are supposed to collaborate and harmonize their plans and service delivery but in reality they tend to offer parallel services that sometimes operate in a competitive rather than complementary manner. The difficulties in joint planning and service delivery arise more from a lack of disclosure of available resources by the parties involved. It is not easy to track the financing of NGOs even at the national level. Collaboration between districts and NGOs occurs on a case-by-case basis relying on relationships between individuals. Nevertheless, all NGOs consult with the district authorities and make their plans and reports available to the district for monitoring and evaluation. The most common area of collaboration is in sharing of human resources. Some NGOs such as Caritas have formal agreements with the districts to share the FEWs.

At the national level, the Tanzania Agricultural Partnership (TAP) is one of the projects championing these partnerships with a focus on value addition for maize and rice. To illustrate government commitment to PPPs, the input subsidy voucher system is delivered through private input supply companies. TAP is currently working in 25 districts assisting farmer associations to rehabilitate warehouses for bulk storage of produce and encouraging the establishment of milling plants near the warehouses. The PPPs are not very strong yet but given the trend, there is hope that they will be nurtured to maturity. The major challenge in operationalization of PPPs is clarification of the roles and responsibilities between the public and private agencies in a win-win manner.

Emerging non-traditional cash crops

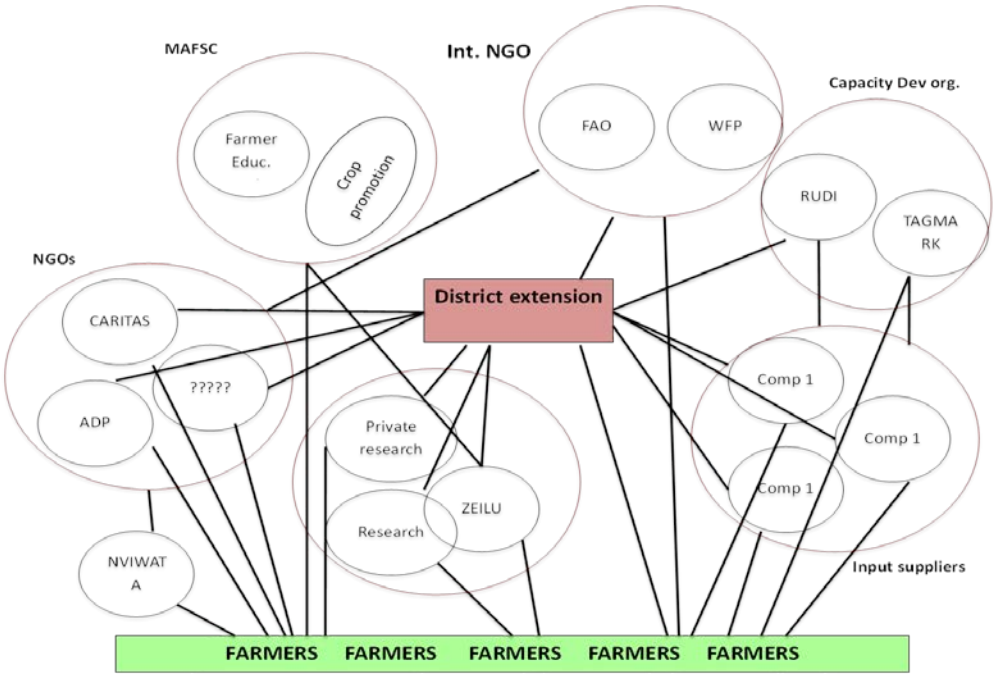
There are several emerging non-traditional cash crops, mainly oil crops and horticultural crops. These crops create a demand for extension. Oil crops such as sunflower and sesame are not necessarily new, but have gained more commercial value recently and more farmers are producing them. In Mbozi district for example it was reported that sesame may be second only to rice in commercial value. This has been driven by the emergence of a good market and the presence of investors processing oil crops.

Horticultural crops such as mangoes and spices are reported to be gaining importance as income crops as well. Farmers are organized to produce for different markets including export markets. This in turn has stimulated research on these crops including on variety development, and the accompanying advisory services. Other crops that are said to have gained more importance due to efforts by the Crop Promotion Unit include pyrethrum, sugarcane, cotton, tea, sorghum, rice and cassava.

2.5 Extension Service Providers

There are many providers of extension services all targeting the same farmers. The existence of several service providers is due to the fact that none of them can meet all the needs of all farmers, hence a complementary approach would be more beneficial to the providers and recipients of the services. Service providers interact in situations of mutual benefit. Figure 3 below presents a simplified illustration of the current interactions between extension service providers.

Figure 3: Service providers and their interaction



The district extension service remains central to the delivery of agricultural advisory services. Nearly all organizations providing extension services make an effort to contact and collaborate with the district extension service for three reasons. First, it is a requirement that the district is aware of the activities of any organization operating in that area regardless of the services they offer. Second, the district offers easy to use expertise whose performance can be quickly enhanced through reorientation, short training courses and provision of resources. Third, the district extension service has a permanent presence in the community, so for purposes of continuity and sustainability it is still worth collaborating with the district extension services. Most organizations working with farmers utilize the district extension staff. Indeed some organizations such as Caritas have agreements with the districts in which FEWs are attached to Caritas's programs. Figure 3 however clearly illustrates that there is limited interaction amongst the service providers, making harmonization and implementation of programs difficult. In addition, with exception of the district extension service, all the other service providers operate in a project mode concentrating in rather small geographical areas for specified period of time.

3. Extension Approaches

3.1 Extension Approaches in Use

Several extension approaches[1] are being used by various organizations. Overall, the trend in choice of approaches is towards participatory approaches, which empower people to make informed decisions and to take action proactively to solve their own problems. This trend is globally influenced by the principle of democratization and giving equal opportunities to all categories of people to participate in making decisions that affect them. It is within this principle that policies such as decentralization are derived to enhance people's participation in their governance and to ensure the relevance of services rendered. Therefore delivery of extension services is no longer a preserve of those professionally trained in colleges and universities. Farmers are increasingly being engaged in delivering extension services to their fellow farmers.

[1] The term approach is loosely used to encompass a wide range of practices

Group approaches are preferred for the purposes of efficiency and effectiveness, given that farming in Sub-Saharan Africa is dominated by smallholder and resource poor farmers. With the majority of the population engaged in production agriculture, providing advisory services to them is more effective if they are organized in groups. The methods and practices presented below are not exhaustive and neither are they used exclusively. In many cases they are used in combination, even within the same organization. Most of the approaches used rely on direct interaction with the farmers rather than any virtual interaction due to a lack of the necessary infrastructure and low literacy levels among farmers. Whereas electronic communication e.g. internet and mobile phones are increasingly gaining importance in other sectors, in the communication of agricultural information they are only being used to relay market price type of information. The approaches described here and how they are being used in practice include: farmer-to-farmer extension, demonstrations, farmer field schools, on-farm trials, community resource centers, television and radio, farmer exchange visits, farmer training, print media, and exhibitions and shows.

Farmer-to-farmer extension approach

Caritas is a faith-based organization (NGO) targeting the vulnerable and poor and it prefers to use the Farmer-to-Farmer extension approach where the 'pilot' farmers are trained so that they train others. This approach was adopted after realizing that the demonstrations set-up by extension workers were not having the expected impact because the farmers did not perceive extension workers as being representative of farmers. A demonstration set-up and managed by a fellow farmer influences more farmers than one run by extension workers. This approach is reported to be easy and cost-effective, in addition to the assumption that it is more sustainable since the farmer remains in the community even when the project ends.

The farmer-to-farmer approach requires patience, as it takes some time to train enough good pilot farmers to have a reasonable impact at the village level. It is also expensive to facilitate so many groups and pilot farmers. It takes at least two growing seasons to assess the effectiveness of a pilot farmer, and training sufficient numbers of pilot farmers to have visible impact at the village level using this approach would take about two years. How to motivate the pilot farmers in the long term to ensure the sustainability of the approach remains a challenge.

Box 3: The case of Caritas

One of Caritas' programs focuses on agriculture and rural development and promotes sustainable agriculture and market access in 18 villages selected from three districts of Mbeya region. Nine villages are from Mbeya district, four from Mbozi district and five from Chunya district. Caritas signs a Memorandum of Understanding (MoU) with the village council spelling out the expectations and responsibilities of the parties. Generally Caritas uses participatory approaches that target organized groups of farmers to increase its effectiveness and efficiency. Therefore it collaborates with the district agricultural offices and other agencies such as MVIWATA, a national farmers' association, to access farmer groups. Its focus on vulnerable groups includes women and indeed, some of the groups are purely for women and others are for youth. Pilot farmers are nominated by farmer groups. After nomination, Caritas assesses their training needs and organizes training for the pilot farmers. The pilot farmers and the groups are provided with some inputs to set-up the demonstrations.

Although Caritas has some staff, they rely a lot on government FEWs in the districts to deliver extension services. Some of the government staff are attached to Caritas while others are engaged on a temporary basis. With the consent of the district authorities, Caritas signs a contract with attached and temporary government staff for three years and one year respectively. There is a feeling that some of the government staff are not committed and knowledgeable, so Caritas selects those that are committed and are knowledgeable about the services to be offered. Due to the meager salaries paid to government extension staff, Caritas tops-up and pays their allowances and also provides them with transport and other work equipment. It is recognized that these staff tend to be overworked as they have to comply with strict work schedules and reporting for Caritas, while at the same time carrying out some assignments from their district supervisors and the government FEWs are not used to tight schedules.

Generally, Caritas organizes training for staff every month in which gender issues are mainstreamed. A gender specialist works with the extension workers to ensure that gender issues are addressed appropriately. They also sponsor their staff to attend short-term training courses organized by other agencies.

Market access is a crosscutting program that supports the entire value chain. Caritas has identified this as a critical gap area especially for commercial crops such as sesame and sunflower. Funds have been reserved to support farmers' access to markets, having recognized that no other agency was addressing market issues in the areas they operate.

Demonstrations

Demonstration is a common method used by nearly all extension providers including NGOs, agro-input dealers, researchers and government extension agents. The farmer-to-farmer approach and FFS (as practiced in public extension) for example, inherently use demonstrations as a key extension method. The major advantage of demonstrations is that people are able to see and appreciate what is being demonstrated in a real-life situation. This is powerful in convincing the target audience to try or experiment on their own farms. However, it can only reach those who are able to come to the demonstration site, limiting the number of people it reaches. Although demonstrations can create awareness, they are more effective where there is some awareness already and the farmers need to be convinced to take the next step to try out a practice or technology.

Demonstrations conducted in the study area are criticized for being too small to be appreciated by farmers. Researchers especially, use small size plots (3 lines) for example to demonstrate the performance of different varieties of a crop. Farmers cannot easily relate this to their large field, thereby creating the impression that the results do not apply on a large scale. Some stakeholders recommended an appropriate demonstration to be at least ¼ acre. It is important to note that demonstration is not an end in itself, but it is intended for dissemination of technologies for wider adoption. However, there seems to be a general lack of good knowledge among the extension providers on how to use demonstrations as an extension method appropriately.

Farmer Field Schools

The public extension service in Tanzania has been instructed by MAFC to use FFSs as the main method for extension service delivery. The method has been used countrywide for about seven years, since establishment of the District Agricultural Development Support (DADS) project funded by DANIDA. The wide scale use of the approach is reportedly based on its successes in various parts of the country. FFS is a departure from the linear delivery of research innovations through extension to farmers. It embraces a people-centered demand driven and participatory approach, which empowers farmers to take production decisions through joint learning. However, the application of FFSs deviates considerably from the typical FFS and the way FFSs are conducted by the public extension service cannot be easily differentiated the demonstration approach.

Box 4: The Key Principles of Farmer Field Schools

1. What is relevant and meaningful is decided by the learner, and must be discovered by the learner. Learning flourishes in a situation in which teaching is seen as a facilitating process that assists people to explore and discover the personal meaning of events for them.
2. Learning is a consequence of experience. People become responsible when they have assumed responsibility and experienced success.
3. Co-operative approaches are enabling. As people invest in collaborative group approaches, they develop a better sense of their own worth.
4. Learning is an evolutionary process, and is characterised by free and open communication, confrontation, acceptance, respect and the right to make mistakes
5. Each person's experience of reality is unique. As they become more aware of how they learn and solve problems, they can refine and modify their own styles of learning and action.

Jules N. Pretty, Regenerating Agriculture, p. 256

In practice, farmers are organized in groups of 20-30 members. Each group is provided TSh. 400-500 to purchase inputs to establish a group demonstration garden where the group members and other farmers in the village come to learn. The groups are usually mixed men and women but each FFS tends to focus on either crops or livestock. The role of the village agricultural extension officer (VAEO) is to provide the technical knowledge and technologies. It is expected that each farmer will experiment using the knowledge learnt from the group demonstration plot.

Box 5: The main features of FFS are:

- Field is primary resource;
- Participatory discovery learning process where farmer participation is enhanced;
- Hands-on experience sharing i.e. experience forms and is the basis for learning;
- Capacity building and empowerment;
- Stakeholder ownership on the process, content and knowledge derived;
- Covers entire production cycle or key steps in the management practices of the crop or livestock systems;
- Can handle multiple technologies and support services simultaneously;
- It is group-based, with in-built flexibility;
- Curriculum is dictated by the specific production system, priority problems and the local conditions of the farmer groups.
- If properly implemented, enhances farmer to farmer
- Extension of technologies and information.

Source: Anandajayasekeram et al (2001)

The approach, which is also used by some NGOs such as Caritas and MVIWATA is preferred for strengthening groups and making it easier for the few extension workers to provide information to larger numbers. Caritas for example has a success story of using FFS in paddy rice seed multiplication (Annex II). The challenge is that applying FFS using basic principles and sustaining them, requires the farmers to have the intrinsic motivation to remain in groups for the purpose of learning.

As more FFS groups are established, the FEWs get overwhelmed by the volume of work. To address this constraint, some good farmers are identified and trained, with funding from districts, for periods ranging from 1-3 months to become facilitators. The farmer facilitators are provided with kits to use and some inputs for their own plots as an incentive. It is generally accepted that the districts were not well prepared or equipped to set-up and manage good FFSs. There is a feeling that FFSs were universally recommended by politicians and introduced in a top-down manner without a thorough analysis of the method in terms of where it works or does not work, and what is required to make it work. Although it is the recommended approach for government extension, some grassroots implementers remain doubtful of the suitability and effectiveness of FFS. MVIWATA, the national farmers' association, however thinks that if the farmer facilitators are sufficiently trained, and are given some incentives, then FFS can be effective.

Box 6: Moving from FFS to FFLS and JFFLS by FAO

FAO can be regarded as the main promoter of FFS worldwide. The FFS has a participatory learning approach with systematic and rigorous procedures based on the principles of learning and experimentation. The school is a joint learning facility, as each farmer experiments in their own fields and brings those experiences to the school and vice versa.

FAO has modified the FFS approach to integrate social, economic and environmental aspects. The modified approach is called Farmer Field and Life Schools (FFLS). FFLS are based on the same learning approaches of FFS. In an FFLS, adult farmers discuss the problems that threaten their livelihoods, identify the root causes of those problems and make informed decisions about what actions they should take to overcome them. Issues addressed in FFLS include poverty, HIV/AIDS, landlessness, domestic violence and children's school attendance. The FFLS have been adapted to the needs and situations of vulnerable children to create Junior Farmer Field and Life Schools (JFFLS). JFFLS are based on experiential learning whereby children learn good agricultural practices through observing, drawing conclusions and making informed decisions.

Unlike FAO, other organizations using FFSs do not specifically target youth as an interest group, but do target groups such as the elderly and those affected by HIV/AIDS. It is argued that the youth do not join FFSs because they are more interested in business, they are mobile and not always available for the group meetings.

On-farm trials

Researchers use on-farm trials to demonstrate potentially beneficial technologies to farmers and to evaluate these technologies under farm conditions. 'On-farm trial' is a term used by researchers but essentially they are similar to demonstrations and sometimes the two terms are used interchangeably. Most biological research projects have a provision for on-farm trials to demonstrate technologies and practices to the communities. Usually researchers work with extension workers to set-up and manage on-farm trials. Often, FEWs identify the sites for the trials and explain to the farmers the observations at the different stages, but sometimes the researchers work directly with farmers without the involvement of FEWs. It was reported that there is increased adoption of maize and bean varieties (developed at Uyole Research Institute) as a result of on-farm

trials though it is also acknowledged that only a few farmers access the on-farm trials. On-farm trials are conducted at a limited scale because the technologies and practices are still under test.

Field days are organized at the on-farm trials to encourage farmers to visit the site to learn about the technologies or participate in their evaluation. Researchers tend to be in charge of explanations during the field days and often their explanations tend to be too technical for the farmers. Like demonstrations, on-farm trials need follow-up. However, because of the weak research extension linkages, this is follow up is not very effective and therefore feedback from the farmers is missed. The ZEILUs)should develop these linkages but as discussed earlier these units are not sufficiently equipped for their purpose. Generally on-farm trials are limited by coverage and they are also expensive as the trials have to be closely supervised by the researchers.

Community resource centers

To enhance access to information by the community, all districts are in the process of constructing Ward Resource Centers (WRC) as part of the implementation of DADPs. It is not clear how the WRCs will be run yet but it is expected that they will have a training/conference room that will be equipped with modern e-technology and communication facilities. MAFC is currently developing guidelines for the operationalization of WRCs for use by key stakeholders in the community. The Actions for Development Programs (ADP), an NGO has piloted the concept of community resource centers ahead of the WRCs. The centers work as the information hub in the community, with a staff member, provided by ADP, available at the center as a resource person. Information packs such as leaflets, booklets, and posters are made available at the center. Other dissemination practices such as demonstrations are established around the center for the farmers to benefit from multiple sources of information when they visit. ADP also uses notice boards located strategically around the community to display commodity prices from various markets. The price displays help farmers avoid being cheated by middlemen who may take advantage of their lack of knowledge of market prices. MVIWATA also uses the same model of village notice boards to provide market information via text messages (SMS). The WRCs, which are likely to be widely distributed, present an opportunity to utilize electronic communication devices like computers and the internet if they are well equipped with the necessary facilities.

Box 7: The case of Agricultural Development Program (ADP) in Mbozi district

ADP is an NGO with the main aim of building farmers' capacity in sustainable agriculture for food security and income. The operations target the lowlands, which are usually the most food insecure. In addition to production, the NGO also focuses on access to markets related to beans, sesame, pepper, honey and chicken. Improved market access is achieved through developing the value chain by bringing together the different actors in the chain.

Existing or new groups are facilitated to register in order to function as business entities. The groups are trained in group management, conflict management, record keeping and business management. The NGO also sensitizes groups and other civil society organizations in good governance and more specifically in public expenditure tracking to enforce accountability. Because the NGO has limited staff, it trains farmers nominated by the groups to facilitate demonstrations and disseminate information as paraprofessionals. These village animators are trained for two weeks and thereafter are provided with kits, a bicycle and the relevant materials for use in their work.

Demonstration is the main method used to disseminate information and technologies. The other important facility for dissemination of information is a village resource center, which is supplied with a variety of different information leaflets. The NGO staff member lives in the community and sets up demonstrations at the resource center. Demonstrations are preferred because they enable people to see and understand the information being presented. The challenge with demonstrations is that few people access them and they are expensive to set-up and manage. In addition to the resource center, each village has a price board where they display commodity prices on a daily basis. The prices are relayed via mobile phones and a contact person writes the prices of the key commodities on the board. The NGO has a focal person in the major markets who communicates the prices of commodities to the secretary at the organization headquarters. The secretary in turn calls the contact people in the villages to communicate the prices. The NGO also presents a TV program, *kilimo cha kisasa* where they disseminate information on various issues. It was reported that some farmers who listen to the program call or come to their offices to get more information on issues of their interest.

An affirmative action approach was used initially to mobilize and target women groups but later it was realized that men were making the major decisions. Now, mixed groups are encouraged. The youth have not been deliberately targeted but there are plans to involve them in demonstrations.

The internet is not commonly used in disseminating information to farmers but MVIWATA is starting to use this method to provide market information. A farmer or trader, using their computer, can log in and request prices of any commodity from various markets in Tanzania. The software can be used by anyone by sending a text message *Bei zao [crop] and send to 0654555884*. Currently this only works for produce prices but there are intentions to expand this service to input prices. There is also a possibility of using the same software to provide information to traders on the quantities of produce available in different markets. The challenge is obtaining reliable information on the amount of produce available in different places.

Farmer exchange visits

This is where an organized group of farmers visit more successful farmers in another area with the purpose of learning from each other. MVIWATA for example uses the farmer exchange visits as one of the methods of enabling farmer access to new information, allowing them to share experiences and practices and hence enhance adoption of best practices. MVIWATA invite the FEWs to participate in the visits for their own information as well as enabling them to follow-up on any issues raised and continue to support the farmers to practice what they have learnt from their colleagues. This method is expensive and can only reach a few farmers. The most appropriate target groups are probably the lead farmers or paraprofessionals who are able to utilize their experiences and lessons

to influence other farmers. It is however, a powerful method that facilitates farmers to interact and learn from others.

Farmer training

Farmer training is where farmers are brought to a central place to learn about specific aspects identified to be important. A trainer facilitates the learning using professional training techniques with a structured content. MAFC has four farmer training centers (e.g. at Mkinda) that can host residential training for farmers, but farmer training is also conducted at other facilities in the district and at MATIs. The subject matter area is usually determined by the sponsoring organization but the training is conducted by the training institution or organizations that specialize in farmer capacity building. Such training may be focused on providing knowledge, creating awareness or developing the skills needed to perform a task. This approach requires the farmers to have a reasonable literacy level. It is difficult to apply this method on a large scale, and so farmer leaders and promoters are usually targeted.

Television/radio

These mass media channels are not commonly used for the transmission of agricultural information by extension service providers, other than for advertising. This is probably because of the cost and accessibility. Airtime on both TV and radio has to be paid for and most rural people may not be able to access television. Radio is more accessible even in the rural areas, due to the proliferation of FM stations, but there are so many radio stations that it is difficult to target the audience.

The Farmers Education Unit in MAFC and a few other organizations broadcast agriculture related programs on television and/or radio. ADP airs a television program. The Farmers Education Unit has a mobile video show facility which allows the programs to be shown in different places for a wider coverage. The Farmers Education Unit also airs a one-hour radio program every week, *"Ukulima wa kisasa"* and similarly MVIWATA airs a half-hour radio program every week on Radio Maria to mobilize farmers, raise awareness of relevant issues, and present some success stories. Farmers participate by calling in to the program to present their views or ask questions, and those who need specific information contact the relevant people at the offices.

Print media (Newsletters/bulletins/magazines)

The Farmers Education Unit in MAFC has expertise in mass media dissemination including print media. The unit produces posters, leaflets and magazines conveying various kinds of information. The unit produces the materials on request from various departments and organizations. Other organizations such as MVIWATA produce a monthly newsletter where they present success stories about farmers and other contemporary issues in agriculture. The newsletter also provides market information. Leaflets and brochures are widely used by NGOs and the Tanzanian Coffee Research Institute.

Box 8: The case of Tanzanian Coffee Research Institute – Mbimba sub-station

Mbimba sub-station provides an example of commodity based private extension. The Tanzanian Coffee Research Institute is a private not for profit research institute under government guarantee. This means that it is semi-autonomous but the government guarantees them secure funding from donors and other sources.

The main mandate of the sub-station is to disseminate research outputs on coffee to farmers. It therefore focuses on adaptive research, extension and training. The sub-station serves five districts of Mbozi, Mbeya Rural, Rungwe, Ilejje and Mbanga. It is manned by three people, two researchers and one trainer/administrator.

The sub-station does not employ its own extension staff but through the DALDOs and District Agricultural Extension Officer (DAEOs), utilizes the district FEWs, trains them and facilitates them to provide extension services to the coffee farmers. The FEWs are trained on available coffee technologies, farmer mobilization, group formation and management. The FEWs mobilize farmers to form groups of 20-30 members and also identify existing farmer groups to be targeted. The group leaders are trained in group dynamics, management, budgeting and other business issues. Sometimes, supervision is jointly done with DALDO, DAEO, and the staff from the sub-station.

Because there are very FEWs, good farmers are identified and trained to work as paraprofessionals. They are called "Farmer Promoters". The farmer promoters are regularly trained in technical aspects to equip them with the knowledge needed to be able to advise their fellow farmers and update them on emerging issues in the coffee industry. Specifically, the topics include: production, seed multiplication, harvesting, processing, marketing, integrated pest management. The FEWs also participate in the farmer promoters training as some of them have not attended refresher courses since leaving college. Brochures are compiled on each topic to guide the farmer promoters and FEWs while in the field.

It was reported that the farmer promoters usually perform better than the FEWs as they are more committed and the sub-station can hold them responsible, unlike the FEWs over whom the sub-station has no control. The other challenge with the FEWs is that after training them, they may be transferred to other non-coffee growing areas and so the farmer promoters are more reliable. In addition some FEWs do not like working in remote places, preferring to stay in the office rather than going to the field. The farmer promoters are given TSh. 20,000 per month and there are plans to regularize their incentive system and also provide them with bicycles.

The group approach is based on the cooperative union model, which used to be very strong with structures extending to primary societies. Farmers see this as a revival of the cooperative movement, which was disbanded during structural adjustment programs to liberalize the economy. The major incentive is that farmers bulk their coffee and are able to obtain a good price at auction. The minimum quantity that it is possible to sell at auction is 20 metric tons which can only be achieved by a group of farmers. The payment from the auction goes to the group account. The farmers are now aware of the entire value chain as they participate in all the processes up to the auction market. The banks are now willing to extend loans to the farmers because of this bulking system, using their produce as collateral.

Culturally, coffee is a man's crop and it is not unusual to find young men who own coffee plantations, given to them by their parents. However, there are no groups specifically for youth.

Exhibitions/Shows

Exhibitions are organized mainly by agro-dealers to display and create awareness of the inputs available and their potential. This is part of their strategy to create demand for inputs but it is also an opportunity for disseminating knowledge and information related to inputs as the agro-dealers

interact directly with farmers. In the communities the agro-dealers target market days to access as many people as possible.

A National Agricultural Show (called Nane-Nane) is organized every year (Farmers' Day) by MAFC for all stakeholders in the agricultural sector to demonstrate and display their products and services to the public. A region hosts the national show for about 3-4 years to ensure that the demonstrations are well established and that there is continuity, before the show moves to another region. The shows are major knowledge sharing events bringing together a wide range of public and private sector actors in the agricultural sector. The show serves as a promotional event to demonstrate advances and achievements in the agricultural sector.

3.2 Sources of Information and Materials

The sources of agricultural information used in extension are so inter-dependent that sometimes it is difficult to trace the original sources of information used by the service providers. The sources of information are described in a rather generic way here and include farmers, private input dealers, research institutes and to some extent the NGOs.

Farmers are both recipients and sources of information. A lot of the knowledge and practices used in production are generated and transmitted by farmers. It is this knowledge that is often referred to as indigenous knowledge as it is passed on from generation to generation. Research organizations have been the traditional source of knowledge and technologies that are disseminated through extension, though most service providers cannot differentiate between knowledge generated by universities or by research institutes. New technologies and crop varieties and the associated knowledge are generated by research institutes. Farmers however, often adapt the technologies and knowledge to suit their environment. In the Southern Highlands, the Uyole Research Institute has been a major source of crop varieties specifically for maize and beans. Some of the varieties released by this research institute are reported to be widely adopted. As mentioned earlier, strengthening the research-extension linkages will enhance the flow of information from research to farmers.

The agro-dealers are a source of information related to agricultural inputs. They provide information to farmers and extension workers. Agro-dealers rely on the large input suppliers who provide the information in form of posters, leaflets and brochures. In addition to the direct interaction with clients and partners, agro-dealers also provide information through advertisements on radio. Sometimes, agro-dealers organize training for extension workers to provide technical information related to application of inputs. The agro-dealers rely on FEWs for wider dissemination of information and technologies.

3.3 Gender Targeting

Gender in agricultural extension is much wider than addressed in this study. It was not possible, within the scope of this study to consider the differential access to services and the suitability of the methods used for different gender categories. This study only attempted to identify targeting strategies for youth and women.

Youth

Nearly all the people consulted give the impression that youth are not interested in agriculture because it is not well paid, is labor intensive and is considered "dirty". Limited involvement of youth in agriculture is recognized as a problem as it poses a great risk for future food security. Caritas acknowledged that in their evaluation, this was a major concern. Caritas intends for example to target youth to become involved in their biogas project especially in the construction of biogas facilities.

Youth participation in agriculture is also constrained by lack of access to land and other production resources. Hence many young people continue to leave villages for urban centers in search of employment. The youth that are on the fringes of the agricultural value chain act as petty traders

and middlemen. Where markets have been constructed, MVIWATA reports an increase in participation of youth in the trade of agricultural products.

FAO is one of the few organizations that specifically targets youth to enhance their participation in agricultural enterprises. Through their Junior Farmer Field and Life Skills (JFFLS) approach, FAO targets youth in schools. Box 9 below describes this intervention as it is practiced in Tanzania.

Box 9: Junior Farmer Field and Life Skills (JFFLS approach)

The JFFLS is a good example of a youth program. It targets youth in schools aged 12-17 years. It emerged from a program intended to supply food for work. FAO worked with the local leaders and teachers to mobilize parents' support to teach pupils agriculture production skills for long-term food security. The program was received with mixed feelings. In some places, there was resistance from parents while in other places it was well received and embraced quite quickly. It differs from the typical FFS as it integrates life skills such as entrepreneurship, health, gender and environmental issues in the curriculum.

The pupils formed their clubs and with the help of their teachers selected agricultural enterprises of their choice. Some of the enterprises included goats, onions, cabbage or maize. Field extension staff were trained and facilitated to provide technical support to schools. The project ended two years ago but the JFFLS have multiplied and are still going on. The major challenge was that agriculture is not part of the primary school curriculum, making it difficult to integrate agricultural programs within the school activities.

According to FAO (2007), JFFLS is:

- A sustainable response to empower orphans and vulnerable children living in the world with HIV and AIDS.
- A way to improve self-esteem, livelihood options and long-term food security of the vulnerable boys and girls living in rural areas.
- A means to institute a gender equal attitude, improve nutrition, agricultural knowledge and life-skills among children in a participatory way thereby reducing their risk of pursuing HIV-risky survival strategies.
- An important tool in promoting respect for the sustainable use of the world's natural resources.
- Based on real and locally identified needs of orphans and vulnerable children, an attempt to be inclusive of both in and out of school youth.

The guiding principles of JFFLS include child protection and security; gender-equal attitudes; participation; addressing vulnerability; removing stigma and discrimination; and a right to food.

The WFP initiative of food for assets is introducing gender sensitive technologies such as water carriers that can be easily rolled by children. The WFP targets food insecure communities and the main responsibility is to supply essential foodstuffs. WFP does not engage in providing life skills in the schools they work with. This is an area where WFP is eagerly seeking partnership with agencies interested in life skills development in schools.

Figure 4: WFP easy water carrying tank

Women

Generally there is consciousness about gender in service delivery, but whether women for example, should be organized separately into special interest groups is still controversial. While some think it is important to organize women separately to enable them access to services, others think it is better to have mixed groups comprising of both women and men. Those

who argue for separate women's groups think this is the only way women will be sufficiently comfortable to discuss their specific issues. Arguments in support of mixed groups are based on the fact that men still make the key decisions related to resources for agriculture, and therefore men and women need to work together and to agree on their actions. Women's groups that are mobilized for purposes of accessing agricultural services including extension are common. In some cases, women's groups are said to be proactive and perform better than mixed or men's groups, but performance is also very much influenced by cultural values. Tanzania Agricultural Market Development Trust (TAGMARK) for example explained that women were more vigilant in a pilot initiative for Farm Inputs and Savings Groups (mobilizing farmers to save to purchase inputs) in the districts of Songea and Mbarali (see Annex I). Most of the volunteers for this initiative were women and the motivation was their enhanced capacity to purchase inputs, something they were not able to do previously. The group helped them to realize their potential in terms of what they could achieve by themselves. Several other organizations also specifically target women in their service delivery. Caritas for example works with women's groups and one group has commercialized energy saving stoves, making stoves and selling them as a business.

3.4 Agribusiness Models that Enhance Extension Delivery

It can be difficult to understand and contextualize the concept of agribusiness models as the concept can vary especially when related to non-business like services like extension. This study has documented different initiatives that were seen to stimulate the demand for and delivery of extension services. A common understanding of agribusiness models was explored in the feedback workshop in which five models were comprehensively discussed with respect to the actors involved and their roles, and the strengths and weaknesses of the model. The different models are discussed below.

3.4.1 Farmer Cooperative Model

The cooperative model is one of the most well known and probably the oldest model for organizing farmers to access agricultural related services but this model has been regarded as failure in most African countries. The cooperative approach, as it has been practiced in Tanzania, was discussed in detail at the feedback workshop, with both positive and negative feedback received.

Positive

- Empowered farmers to articulate demand for services. It was a mechanism for organizing and consolidating the demand so that the service providers could respond in targeted way.
- Provided a platform for collective action based on shared need. It offered solidarity to farmers to be able to act in an organized manner.
- Stimulated entrepreneurship among farmers based on commodities. The cooperatives focused on specific commodities and aimed at developing value chains for those commodities. Collective marketing was the entry point to organizing the value chain.
- Enabled dissemination of information and technologies through well-established and functional structures right up to the producers.
- Worked well under a socialist system but not as well in a more capitalist system. There was a feeling that farmer groups with a business focus are better than cooperatives.

Negative

- Had failed in Tanzania due to mismanagement and the farmers remain skeptical about them. These poor experiences have led to some stigma associated with cooperatives.
- The structure of cooperatives in Tanzania was inefficient. The farmers had no real ownership of the cooperatives and in effect were not empowered. As a consequence, they did not access the services they expected. For this reason they remain unwilling to work within a cooperative.

Other opinions included those that thought cooperatives were a good model but had failed to work in many instances while in other instances there had been some successes. Cooperatives were seen as highly structured organizations suitable for highly specialized farmers but not suitable for those who are involved in many enterprises. The structure can be bureaucratic and the response to demand may not be prompt. Cooperatives were seen as a very good model for collective marketing but not necessarily effective in providing other services such as extension. The cooperatives were more oriented towards marketing and their major weakness was in the mismanagement.

Despite the challenges of cooperatives, there is no future for smallholder farmers unless they are organized into viable associations or cooperatives to enhance their bargaining power and take advantage of economies of scale. Building strong farmer cooperatives or companies can help smallholder farmers compete in the global markets. This view is held by nearly all organizations providing extension services, as they all tend to use a group based approach similar to cooperatives.

Rural and Urban Development Initiative (RUDI), an NGO, which has specialized in building farmer institutions, holds the philosophy that markets alone will not stimulate productivity, unless smallholder farmers are organized to market their produce collectively from a strong bargaining position. As long as the smallholder farmers sell their produce individually, they are prone to being cheated by the buyers and middlemen. For example some farmers are paid in advance, under contract and agree to an amount less than market prices because they need the money.

RUDI's approach is to build a new form of cooperatives i.e. association (companies) with a strong agribusiness orientation. It does so by training in technical aspects of productivity, that enhances agribusiness management skills and changes mindsets and. In partnership with RUDI, AGRA and MAFC, a training program has been developed to provide farmer groups with skills and expertise in entrepreneurship, management, warehouse management, quality control, post harvest, marketing etc.

The critical issue in enhancing farmer productivity is to work on their mindsets first. RUDI contends that given the socialist mentality ingrained in the history of Tanzania, farmers are not used to paying for inputs and so, unless there is a change in mindset, the provision of input credit may not be a strong incentive. This change has to be driven by the private sector, not government. RUDI's entry point is to organize farmers into marketing associations to sell collectively and to access better prices through a warehouse receipt system. A warehouse is central to organization of farmers with the principle of: *No warehouse, no association*. The warehouses previously owned by the defunct cooperatives are taken over, rehabilitated and managed by a committee elected by members of the association. The key principle is ownership and control by the farmer members. The bigger the membership the better but RUDI states that the minimum membership is fifty farmers. The associations are registered as profit focused companies.

Several associations come together at the district level to form a larger company and at this level, they can employ a professional manager and accountant. The decision to do so is taken by the associations themselves and it is necessary to build their capacity to manage the company well. In order to instill trust, the manager and accountants employed are guaranteed by relatives or friends well known in the community. The district companies can them form regional companies, which in turn may form a national organization. At the moment, there are no "genuine" national farmers'

organizations formed by solid entities. RUDI is of the view that a national organization cannot be comprised of individual members but rather associations or companies in a similar manner to the cooperative structure.

Box 10: RUDI's approach to building business oriented farmer associations (companies)

- The first step in RUDI's approach is to analyze the value chain to identify opportunities and constraints related to a particular commodity.
- Contact the district leaders to get buy-in and to solicit their support in forming an enterprise for a specific commodity at district and national levels.
- Mobilize and inform the community and district leaders on the opportunities related to the enterprise explaining the possible successes and failures.
- Volunteers interested in the enterprise register with a village contact person.
- Conduct a meeting of those who have registered with the village contact person and inform them on how to form an association, how to register it and elect their leaders. Gender is a key consideration in the leadership of the association. Encourage female representation in the leadership of the association.
- The association selects about 30 people whom RUDI works with to develop a strategic plan based on their priorities. The priorities emerge out of a critical and reflective analysis of their situation in terms of where they are now and where they want to be, the problems they experience and possible solutions to address their problems. The strategic planning meeting takes at least two days.
- Develop a one-year work plan.
- Set-up a committee to follow-up on their priorities, including capacity building initiatives to strengthen the association. The areas of capacity building usually include entrepreneurship, technical aspects of the enterprises, management and organizational issues.
- Identify and involve FEWs, train them and provide them with the necessary resources to enable them to provide technical support to the associations.

3.4.2 Input Market-led Extension Model

The core of this model is the input agribusiness dealers supplying seed, fertilizers and agro-chemicals. The agro-dealers create a market for their products by demonstrating the value of inputs to the farmers. In doing so, they also provide extension advice related to the proper use of the inputs. To provide such services, the agro-dealers may initiate partnerships with extension organizations to deliver advisory services that enhance the adoption of input use. Continued use of inputs also depends on availability of markets, and so either the farmer groups links with the markets directly or sometimes the agro-dealers may play a brokerage role to link producers to the market agents. The strength of this model lies in the fact that it is private sector driven and the private sector significantly supports extension service delivery, as illustrated in Figure 5 (drawn by the participants at the feedback

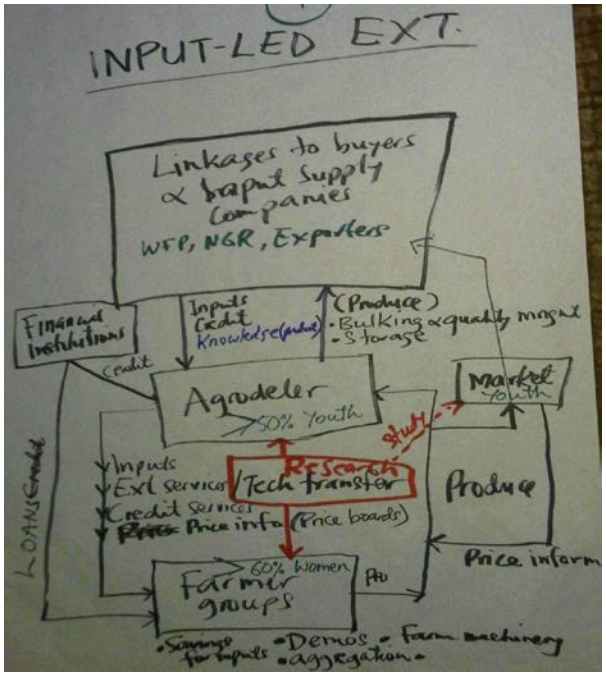


Figure 5: Illustration of the input market led model

workshop). The agro-dealers have to protect their market and therefore put in place mechanisms that ensure the quality of the inputs supplied. The model also promotes entrepreneurship and innovativeness among the farmers to add value to their produce through sorting, grading and some primary processing to attract better market prices.

The model is limited by the need for high capitalization by the agro-dealers to invest in stocks and storage facilities as well as to support the advisory services. The agro-dealers require access to favorable credit facilities and excellent management capabilities in order to secure the necessary capital. There is also a need to invest in storage facilities, such as warehouses, for the producers. This model can be strengthened by coordinated and reliable information delivery systems and farmers being organized to access information as well as the inputs. The WRCs could contribute to strengthening this model as they may provide nodes for reliable information supplied by the agro-dealers.

TAGMARK and Citizens Network for Foreign Affairs (CNFA) are promoters of this model and seek to strengthen it through agro-dealer business development and networking. The aim is to increase access to inputs by farmers through supporting agro-dealer businesses. The government input subsidy voucher system also supports this model, though it the participation of reliable agro-dealers with adequate financial capital and sound business management skills. TAGMARK and CNFA focus on training the agro-dealers to manage their businesses professionally and to promote their products through providing relevant advisory services.

A business clinic approach is used in agro-business development. The clinics focus on small groups of 15-20 agro-dealers who analyze their businesses systematically and identify capacity gaps that could be targeted by training. TAGMARK then identifies the appropriate trainers to conduct the training. The cost of the training is shared between the agro-dealers and TAGMARK/CNFA, though the agro-dealers meet a much smaller proportion (about 10%) of the cost. One of the major limitations for agro-dealers is the cost of appropriate premises for their businesses especially in rural areas. To help with this TAGMARK/CNFA provides up to 60% matching investment funds to agro-dealers to acquire premises. With support from AGRA, they operate in four regions in the Southern Highlands.

The agro-dealers are also linked to financial services and guarantee their loans. Through partnership with the National Micro Finance Bank (NMFB), AGRA provides funds to guarantee agro-dealer loans recommended by TAGMARK/CNFA. Many agro-dealers are reported to have raised their creditworthiness with other sources as well, because they now keep good records and also know their customer base. The loan default rate last year was reported to be only 3% indicating a high level of performance.

To stimulate demand, the following strategies are employed:

- Demonstrations at the village level to create awareness amongst farmers about the value of inputs. (A survey conducted before the intervention of TAGMARK/CNFA also indicated low farmers' knowledge about the value of inputs.) The demonstrations are managed by the agro-dealers, farmers and district FEWs. The agro-dealers provide inputs and work with FEWs providing advisory services. The role of the farmers is to host the demonstrations, learn and practice what they have learnt.
- Organize field days for farmers to demonstrate practices at various stages e.g. planting, weeding, top-dressing with fertilizers, harvesting etc. The post-harvest activities focus mainly on variety testing to establish acceptability.
- Encourage farmers to form associations to save money to buy inputs to experiment with for one season.

From the experience of TAGMARK/CNFA, this model could be strengthened by emphasizing:

- Access to output markets.
- Including government workers and FEWs in capacity building initiatives.
- Enhancing the capacity of farmers to access finance to purchase inputs, along similar lines to agro-dealers. The proposed Agricultural Bank will hopefully offer favorable sources of loans to farmers but it is not clear how it will operate yet.

3.4.3 Output Market led Extension Model

This model aims to create an output market as an incentive for farmers to produce more, and in the process seek extension services to support their endeavor. The intervention focuses on organization of the market including market agents, transporters and value addition. Figure 6 illustrates the model. The arrows indicate the information flows between stakeholders.

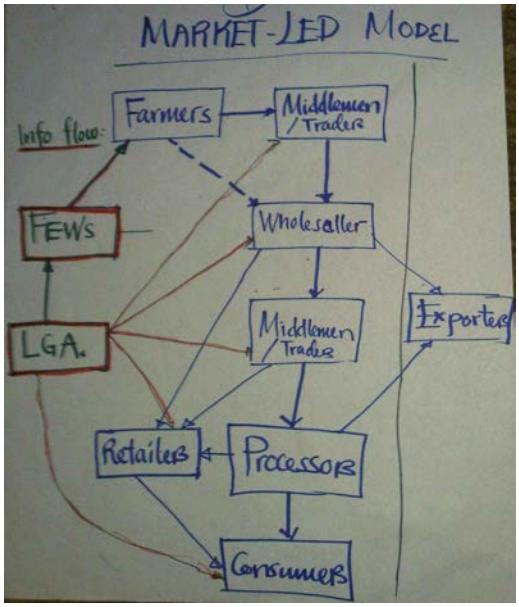


Figure 6: Illustration of Output market led model

The strength of this model is the reliance on personal or individual contacts and relationships. Well-connected individuals get easier access to relevant information. The other strength is the free market and freedom of the farmers to sell to the highest bidders without being restrained by contracts. Some of the weaknesses of the model are that individuals in the network such as the middlemen and traders may monopolize information. In addition the model is based on individual capabilities, and therefore most actors are not interested in dealing with organized farmers, but prefer to deal with individual farmers who do not have a strong bargaining position. Enhancing farmer access to information through the WRCs for example and strengthening farmer organizations should enable farmers to benefit more from this model. Extension services should undertake both these roles, through the provision of quality extension services that meet demand.

The National Grain Reserve Agency and the Mixed Crop Board are government initiatives with a mandate to purchase agricultural produce, partly to guarantee farmers a market. Such initiatives are supportive of a market-led model of extension. A guaranteed market provides an incentive for the producers to invest in their enterprises including the acquisition of information and technologies.

The Purchase for Progress (P4P) of the World Food Program also purchases large volumes of produce mainly maize and beans (Figure 7). WFP is piloting the P4P with farmer groups from whom 6200 metric tons is reported to have been purchased directly from farmers in 2009/10. This kind of market stimulates the demand for agricultural extension services. The P4P involves contracts with grain suppliers, but unlike in contract farming where the contract is signed at the beginning of the growing season, here the contract is agreed after harvesting. The contract specifies the volume, price, period of the contract and quality of

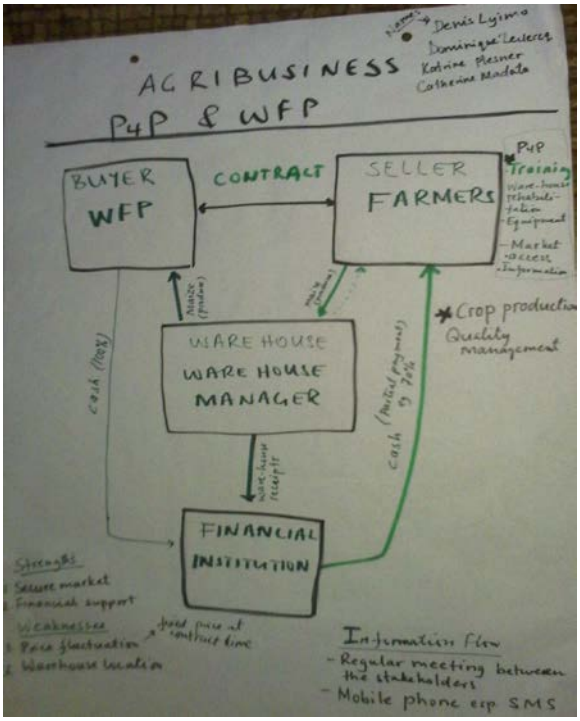


Figure 7: P4P model of the WFP

produce that will be accepted. Through this arrangement, linkages have been made with the finance institutions to provide credit to farmer groups to facilitate collection of the produce at warehouses and to pay the individual producers. Similar arrangements could be made with extension service providers to support the production and quality assurance processes.

3.4.4 Warehouse Receipt System Model

The entry point for the warehouse receipt system is marketing. Farmers bulk their produce to be able to access better markets and / or prices. Figure 8 illustrates a warehouse receipt system, showing the actors involved and their interactions. The warehouse receipt system encourages service providers including extension services to enhance production, quality management, value addition and marketing. It also serves as a form of security for financial institutions enabling them to provide credit to farmers with the produce in the warehouse acting as the collateral.

Some of the weaknesses recognized in this model include; farmers not being in position to determine prices for their produce, with the prices determined by the buyers; high levels of investment capital needed for the establishment and management of the warehouses; and the system not being suitable for perishable products. Areas that have been identified as needing strengthening include:

- Educating farmers how to operate in a business manner; how to utilize loans and how to deal directly with the banks rather than going through middlemen.
- Record keeping.
- Market oriented production, quality aspects during production and product handling.
- Value addition and marketing. The farmers need to go a step beyond selling grain to explore some primary processing to add value to their produce and hence fetch better income from their enterprises.
- Communication and networking between the actors. The flow of market information is very important and some banks would be willing to facilitate market information provision for some commodities e.g. organic coffee.

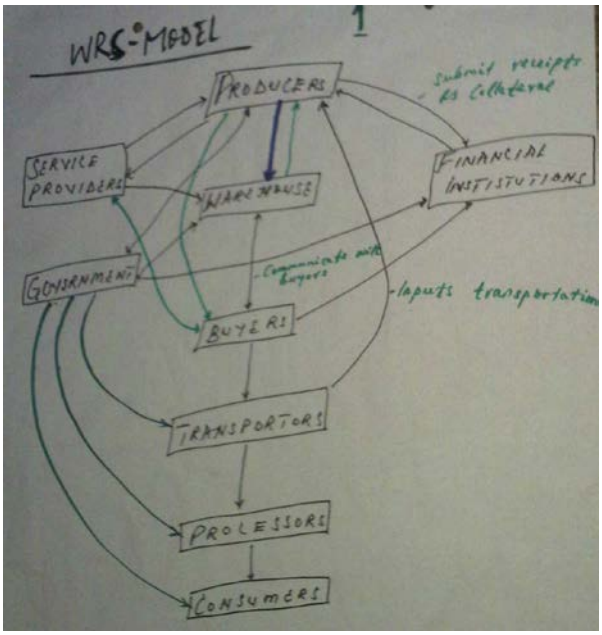


Figure 8: Actors and their interaction in a warehouse receipt system model

Currently, market and financial information are the main types of information shared in this system. Financial institutions provide their requirements for acquisition of loans but do not offer advisory services, and neither do they work with extension services to provide that kind of support. These institutions face a challenge when farmers apply for multiple loans, as the same collateral is used for each application. This can lead to difficulties in recovery of the loan.

3.5 Monitoring and evaluation

Monitoring and evaluation of extension cannot be divorced from the structures of its delivery. The constraints related to structural arrangements (explained in section 1.2) inherently affect effective monitoring and evaluation of extension. No information on specific tools used for monitoring and evaluation of public extension services was available. The major monitoring and evaluation mechanism mentioned at all levels were quarterly reports. It was acknowledged that this mechanism

is not sufficient to understand fully what is actually happening on the ground in order to intervene with corrective measures. The ongoing clarification of the roles and responsibilities of the regional agricultural staff might address this matter.

The district agricultural staff are not well equipped to provide on the ground checks and support to the FEWs. The district agricultural officers are supervised by administrators who have no technical expertise and need the reports for accountability purposes rather than for monitoring and evaluation. The linkages and relationship between the district and regional agricultural is weak and not clear. This partly explains the reliance on reports as the means for monitoring and evaluation. The weaknesses in monitoring and evaluation could be attributed to lack of an extension policy or guidelines. These would provide the overall framework for developing an elaborate monitoring and evaluation system extending from the MAFC to the farmers.

4.0 Drivers of Success and Constraints

4.1 Drivers

The drivers and constraints presented here are those that influence the delivery of agricultural extension. Some of the drivers are positive enhancing delivery and access to extension services, while others are negative, constraining delivery and access.

4.1.1 Positive drivers

The positive drivers include government policy to subsidize agricultural inputs, the space and support for pluralistic service provision including public-private partnerships for delivery of extension services and initiatives for creating internal markets for agricultural produce. These are explained below.

Input subsidy

The government policy to deliver subsidized agricultural inputs through the private sector using the voucher system has enhanced extension delivery by attracting more active participation of the private sector (agro-dealers) in providing advisory services. With this policy, the number of agro-dealers and their distribution in the rural areas has increased. It is possible however, that access to markets could be a stronger stimulant for agricultural production and productivity than input subsidies. Markets would also enhance input use by farmers, as without markets, farmers cannot sell their produce and then pay for inputs. The desire for higher productivity in turn enhances the demand for extension services.

Pluralistic extension service provision

The government recognizes the inadequacy of the public sector to deliver extension services effectively, as well as the role of many other stakeholders in the delivery of extension. The government therefore encourages a pluralistic service delivery system which has allowed the development of mutually beneficial public-private partnerships in extension delivery. Many NGOs collaborate with districts in the delivery of extension, in particularly through PPPs. Although there are still issues in the operationalization of PPPs in terms of resource sharing and clarity of roles and responsibilities of the different actors, a good start has been made in promoting PPPs.

Enhancing internal market for food

There is often excess food in some parts of the Tanzania (e.g. South) while other parts e.g. North and Central may experience shortages. This suggests there is an internal market that is yet to be satisfied. WFP has been procuring large quantities of grain from other countries to supply the food insecure areas within Tanzania. It has further initiatives for procuring food grain from within Tanzania, such as the P4P program to supply vulnerable communities including the school-feeding

program. Last year, WFP purchased about 27 metric tons of grain from within Tanzania. The government initiative to purchase produce through the National Grain Reserve Agency and the Mixed Crop Board also enhanced the internal market.

Creation of such internal markets in turn stimulates production, but a major constraint is the high cost of transportation due to poor infrastructure for example from South to North Tanzania. The Home Grown School Feeding Program, where food is purchased from within the community and paid for by the district, has been championed by WFP. It is now being mainstreamed by the government and a bill has been formulated for consideration by parliament to standardize procedures for the school feeding program. It is already integrated in the poverty eradication action plan (MKUKUTA) and there are plans to mainstream it in the CAADP process. The Nutrition and Education Policy is supportive of the school-feeding program and there are plans to integrate nutrition education in the agricultural extension programs for wider community awareness. Broadening the internal market not only encourages higher productivity, but also introduces new standards, both of which increase the demand for effective extension services.

4.1.2 Negative Drivers

The negative drivers include reducing government support for agricultural education, inadequate support to the extension system and the challenges imposed by the choice of extension approaches.

Reducing government support to agricultural education

The Ministry of Education is de-emphasizing agricultural education by phasing out agricultural secondary schools which focused on developing positive mindsets and skills in agriculture. Such skills based schools are increasingly being phased out in preference of the knowledge and exam oriented education. Further, agriculture related programs in schools, such as the 4-H program, have not survived without external support. This sends a message to young people that agriculture is not important. Gradually this is leading to a reduction in the number of students interested in pursuing agriculture as a career. Creating entrepreneurs in agriculture is almost impossible if education does not regard it as important as other professions. A bigger challenge is how to groom farmers of the future and generate the interest of professionals in agricultural disciplines.

Inadequate support to agricultural education extends to the higher institutions of learning, i.e. colleges and universities. There is an increasing student intake in Sokonie University of Agriculture (SUA) for example but the facilities for training and staffing do not match the student numbers, making competence-based education rather difficult. Agriculture is a practical subject, especially for professionals working at the grassroots level, but the training is theoretical and classroom based. Opportunities for practical and field exposure for students through internships are limited by inadequate funding. The situation is exacerbated by the fact that the trainers and lecturers themselves have no practical experience. Given this kind of professional training, it is not unexpected that employers and even farmers are complaining about the competence of extension staff.

Facilitating the attachment of students to agricultural firms for a reasonable period could encourage the creation of agricultural entrepreneurs through agricultural education. This may be followed by a support system to finance creative ideas by students to become entrepreneurs. This way, they can learn the real-life dynamics of the agricultural business and are better placed to utilize the knowledge gained in their education.

Inadequate support to public extension

Public extension faces many constraints that limit the effectiveness of extension delivery. These constraints are to a large extent associated with inadequate funding for extension. These constraints include:

- Inadequate numbers of FEWs. Extension service delivery is severely constrained by inadequate staffing especially at the village level. In 2006/7 there were 3,379 FEWs serving over 14,000 villages. The problem was exacerbated by a unilateral freeze on recruitment imposed by the Structural Adjustment reforms. Currently there are an estimated 5,117 FEWs but the target is 11,700 (excluding livestock staff) by 2013. MAFC has intensified training of certificate holders at its 13 MATIs to meet this target. Information obtained at the regional level indicates that, officially one extension worker should serve 400 farmers but in practice they serve a lot more, notwithstanding the fact that 400 farmers is actually too high a number for one extension worker. An example was given of 500 livestock extension officers serving over 2.5 million farmers. This constraint is sometimes addressed by training paraprofessionals to try to reduce this gap.
- The FEWs lack basic working tools, equipment and transport to reach farmers. Under decentralization, responsibility for providing resources for FEWs lies with the Ministry of Local Government and specifically the districts. The districts are underfunded given the scope of services they have to offer.
- The wages are low and do not attract FEWs in especially to remote areas.
- There are limited opportunities for retraining or enhancing FEW skills through further training and short courses. Once extension professionals have graduated from the MATIs, the responsibility for continuing professional development, including refresher courses, lies with the districts or local government. It is assumed that refresher training should be part of the DADP's priorities, but given the prioritization process in DADPs, it is unlikely that staff training will emerge as a top priority. In addition, further training of an extension worker does not automatically translate into career growth or promotion. This is a disincentive for the FEWs or agricultural staff in general to undertake further training. New inputs, methods and knowledge are continuously being generated and the FEWs need to continue updating their knowledge and understanding otherwise the information they provide can become irrelevant. All these difficulties lead to a negative attitude of extension workers towards work.

Conceptual challenges to design of appropriate extension delivery approaches

Apart from the functional and logistical challenges, there is a conceptual challenge in designing appropriate extension systems. Currently Tanzania runs a unified approach to extension delivery which presents technical constraints. The FEWs are trained in specific disciplines and are expected to deliver advisory services in other disciplines in which they have not been trained. The effectiveness of unified extension demands two things; firstly retraining extension staff in the field to broaden their knowledge and skills and, secondly changing curricula in colleges from specialist training to more generalist courses. The latter is being pursued in the MATIs as discussed earlier but field training has not been undertaken

It is also important to note that training of extension workers is production oriented and does not address other essential areas such as marketing, entrepreneurship and value addition. These aspects need to be integrated in the college curricula and retraining programs for the FEWs. Generally, training institutes for extension professionals, especially MATIs, have no feedback mechanisms on the relevance of their curricula due to a lack funds to conduct tracer studies to establish the technical constraints faced by their graduates. However, with the support of a Canadian institute, MATI-Uyole is planning a comprehensive tracer study to inform its curricula review.

4.2 Considerations for Improving Success of Methods

Generally it is difficult to recommend one method over another as each of the methods has the potential to be successful if the requisite conditions are in place. Given that the overall goal of extension systems is a reflection of the uptake and utilization of knowledge and technologies for improved livelihood of farmers, it is unlikely that a single method would be able to achieve this. A

combination of appropriate methods, each one applied where it is most effective in the adoption process is likely to produce better results. However there are some characteristics that would improve the effectiveness of extension delivery regardless of the method or methods used. These characteristics include but are not limited to:

- **Group approach and strengthening farmer organizations**. Provision of extension services to individual smallholder farmers is almost impossible, due to the large number of smallholder farmers (over 80% of the population), and the low number of extension staff. The only viable option to satisfy demand is to have farmers organized in groups so that they can be more efficiently served by few FEWs. Development of strong farmer associations is essential for mobilizing the numerous smallholder farmers to achieve economies of scale and to facilitate dissemination of knowledge, skills and experiences.
- **Visual impact**. Although literacy levels are increasing with the expansion of education opportunities, a high level of illiteracy still exists among smallholder farmers. An effective extension method needs to use visual impact to influence adoption. As the saying goes, *seeing is believing*, and farmers are more easily convinced when they are able to see something applied within their context. This is partly the reason for popularizing demonstrations as they rely on visual impact.
- **Farmer learning and experimentation**. Farmers cannot continue to rely on extension, research and other external sources of knowledge and practices. A method that encourages farmers to learn and experiment is more likely to instill confidence among farmers to take the lead in addressing their own problems. Interactions between these farmers are critical to scale up and dissemination of knowledge through a social learning process, making it more relevant and sustainable. Experimentation triggers the demand for new ways of doing things and hence increases demand for effective extension services.
- **Broadening the scope of extension advice beyond production and productivity to cover the entire value chain**. Extension has tended to over-emphasize production and productivity aspects. It is now understood that the incentives for enhancing production and productivity are found elsewhere in the value chain especially within markets. An effective extension method needs to integrate a wide range of information and technological needs within the value chain. Market access and value addition are very critical in the success of extension.
- **Communication and proper use of extension methods**. No method can be more effective than its user. Extension is largely a communicative process, which requires understanding of some basic communication concepts. There are complaints that agricultural professionals, especially researchers are not able to communicate well with farmers, but similar complaints have also been raised about some extension agents. In addition, there is lack of understanding regarding the proper use of different extension methods. Each method is best suited to a certain situation and has its own guiding principles. If these principles are not followed, the method cannot be effective. A creative combination of methods used in a proper way will lead to adoption or uptake by farmers. For example, a demonstration is not an end in itself, it plays a specific role within the adoption process and a good extension agent should be able to apply other methods that take the process beyond the demonstration itself. A majority of extension providers do not seem to fully understand the methods they are using in terms of their purpose or goal, the procedures for application, the guiding principles, their suitability for the audience and context, and the method's limitations and strengths.
- **Possession of relevant technical content and facilitation skills**. The success of an extension method is reflected in its influence on farmer behavior, based on sound knowledge and appropriate technology. Influential interaction between the farmer and the FEW is enhanced by good facilitation skills. Most extension providers do not have sufficient knowledge or facilitation skills, making the use of any method rather ineffective. In some cases researchers

have the required knowledge but lack the necessary facilitation skills to deliver the content in a manner that will influence farmer behavior. The provision of extension agents with both the necessary knowledge and facilitation skills is essential for any extension method to be successful.

5.0 Conclusions and Recommendations

5.1 Conclusions

Based on the discussion in the previous chapters, the following conclusions can be made:

1. Tanzania is pursuing several initiatives to revitalize the agricultural extension system and to increase farmer access to extension services. Such initiatives include a protracted training program in MATIs to increase the workforce at the grassroots, FEWs level, and the country wide establishment of the Ward Resource Centers (WRCs). There is however a systemic challenge embedded in the structural arrangements for delivery of extension. The relationships and responsibilities between the MAFC, the regional government and district local government are not streamlined and there is no single chain of command and supervision to guide extension service delivery. In addition, the weak linkages between research and extension and between extension and other service providers such as microfinance and input supply severely constrain the usefulness of extension services.

2. A variety of extension approaches and methods are being used by several extension service providers, each method with their own limitations and potentials. The most common method being used is the FFS following a unilateral recommendation by MAFC, followed by demonstrations. Although the unilateral recommendation for FFS was based on success stories, a "one-size fits all" approach may not necessarily result in success given the diversity of contexts and needs even within the same country. In addition, the front-line implementers of these methods seem to lack the necessary understanding and expertise to use them properly in the existing context. This is further exacerbated by inadequate resources for the FEWs especially in the public extension service, rendering the methods generally less effective than they should be.

3. The role of the private sector in the provision of extension services is becoming increasingly significant especially with the recent involvement of private input supply companies. Consequently there are emerging PPPs which have the potential to enhance extension service delivery. The relationships for example, between NGOs and district extension offices in the areas visited, indicate a trend towards partnership based on complementarity and shared resources, mainly staff. For these partnerships to be effective, the roles and responsibilities of the partners need clarification and all parties must fulfill their obligations. Whereas there are commendable efforts to encourage collaboration between the private sector (NGOs and private companies) there is still limited interaction and collaboration between the private sector service providers. Joint planning and mutual accountability are yet to be achieved for coordinated interventions between private and public partners.

4. Extension is very critical in providing the necessary production and market information and supporting processes for the application of technology to modernize and commercialize agriculture. The current state of extension is unable to play that role effectively because of several constraints related to institutional arrangements; understaffing, inadequate resources and staff motivation, and the competence of the service providers. Without strengthening the extension function, the agricultural potential of Tanzania will remain latent and hence a green revolution will be unattainable.

5. Agriculture related policies and government structures for delivery of the social services including extension are continuously changing and in many cases such changes are erratic and unpredictable. This creates uncertainty among the stakeholders affecting long-term planning and investment in agricultural enterprises. The organization of extension and the structural arrangement for its delivery are changing at a rate that leaves the extension system in confusion. For example the move to unified extension delivery has had significant effects in the training of FEWs at MATIs. Currently, changes are underway to revert to the previous system, which will necessitate further change in the training institutions. Similarly, confusion is caused by uncertainty relating to the grain export policy. These changes affect the quality of extension services as extension managers and front-line agents, as well as the farmers are constantly reorienting from one system to another.

6. Conventionally, extension has been associated with production and productivity. Today, there is a realization that the most limiting factors are in market access, agricultural finance provision, and value addition. Private organizations, development partners and governments are increasing their attention and support to these areas but extension is generally not considered to be an integral element of those interventions. The scope of extension needs to be broadened beyond production and productivity to cover the entire value chain from production to consumption.

7. The disconnections in the institutional arrangements for the delivery of extension inherently constrain technical supervision. It is difficult therefore to develop and implement a performance based monitoring and evaluation system. No monitoring and evaluation framework was available and it was unclear if one existed. Without a monitoring framework that is easily interpreted at all levels, it becomes difficult to assess the performance of the individuals and the system as a whole. This could be partly blamed on the lack of an extension policy and/or guidelines that clearly articulate the strategic goals, mandates and mechanisms for delivery of extension. These are needed to develop performance indicators for extension. A performance based monitoring and evaluation for extension that involves a wide range of stakeholders is essential to orient the service providers to what they are expected to deliver.

5.2 Recommendations

A green revolution is unattainable without a functional extension system that facilitates knowledge and technology uptake for higher productivity and empowers producers to actively participate in the market economy including adding value to their produce. The recommendations presented here are generic and are not specific to AGRA. A collective effort between government, development partners including AGRA, and the private sector is essential to address the complex challenges of extension service delivery. In view of this and the conclusions made above, the following recommendations are proposed:

1. MAFC should fast track the development and ratification of extension guidelines within agricultural policy to direct implementation of extension in the context of pluralistic service provision and public-private partnerships. The guidelines need to streamline and clarify the management of public extension with respect to the roles and responsibilities of MAFC, the regional and district governments. A clear and continuous chain of command for effective technical supervision and audit is essential.

2. Develop and pilot a collaborative and integrated extension system in the breadbasket region. The collaboration should involve the key extension service providers namely; public extension, NGOs, farmer organizations, input suppliers, processors and traders, and should be characterized by synergies, complementarity and shared learning platforms for enhancing innovations in extension service delivery. The integration necessary refers to mainstreaming extension in the entire value chain. AGRA could champion the mobilization of government and development partners for this initiative.

3. A comprehensive program is needed for retraining extension agents in both technical content and proper use of extension methods in a participatory way to enhance learning, experimentation and service demand. The competence of extension agents to facilitate knowledge and technology driven farming is unsatisfactory, hence intervention is required through retraining.
4. Develop a performance based incentive system that attracts and retains competent extension agents to work with rural and remote communities. This needs to be accompanied by close supervision and a performance oriented monitoring and evaluation system. Performance of extension workers hinges on three key things namely;
   I. Facilitation, motivation and commitment of staff to their work and focused on making an impact.
   II. Close supervision, monitoring and evaluation to refocus continuously on anticipated goals and impacts.
   III. Technical and methodological competence of the staff to deliver services to the satisfaction of their clients.
5. Strengthen the training of front-line extension workers at the MATIs to reduce the number of farmers a single FEW serves. The critical areas in this endeavor include improving training facilities, increasing the numbers of trainers, and reorienting the staff in new approaches to training such as the competence based learning. These are the most limiting since government provides full sponsorship to the qualifying candidates.
6. Operationalize, equip and strengthen the WRCs as information and knowledge management centers to increase access to relevant information by different stakeholders, i.e. farmers, traders, and processors. The WRCs provide an opportunity to explore the use of ICT to enhance community access to agricultural related information.
7. Pursue and support farmer organization development based on business principles to take advantage of economies of scale and to enhance information dissemination. It is impossible to reach individual smallholder farmers so the most effective way to deliver extension to them is if they are organized. The farmer organizations also need to be empowered to demand high quality extension services that they can then share with their members.

Appendix 1: References

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Appendix 2: CNFA/TAGMARK Success Story of Agro-Dealer

Meet an Agro-Dealer Who Takes His Business Beyond Business Traditions

His face always bears a smile. He is a hard working individual who, with his truck, is accustomed to spending sleepless nights delivering fertilizers, seeds and chemicals to farmers so they can have them on time. Farmers calls him "mkombozi" translated as "the savior". He is otherwise known as Msemwa of Junior Agrovet, a CNFA/TAGMARK trained agro-dealer.

He began his agri-business in 2005 at a small town called Igomelo in Mbarari district with one shop and start up capital of about Tshs 75,000 (USD 50). Today he runs four shops witha working capital inclusive of assets of approximately Tshs. 170 million (USD 125,925). His four shops serve more than 6,000 farmers and are all based in villages; Igwachanya and Rujewa are located 183 km and 128 km respectively from Mbeya city and Ubaruku and Ruiwa are 19km and 20 km respectively from main road towards Iringa and Ruiwa.

He says that "Good business is not only about how much I'll be able to earn, is also about how much will my customers, the farmers be satisfied with my products and services. My business is focused on the customer's needs and satisfaction".

Business has not always been easy for Msemwa. In the early days he says farmers were reluctant to buy improved seeds and fertilizers because their land was not fertile enough to ensure adequate returns on the greater investment cost. Changing the mindset of the villagers was a formidable challenge. But Charles Msemwa did not sit down and complain. "What I did was to hire a "bwana shamba" (read extension officer) to organize farmers meeting in their villages and start teaching them the benefits of using improved seeds, chemicals and fertilizers. This created a great demand for my products," he explained.

But then he realized that knowledge alone is not enough especially since he was dealing with smallholder farmers. In last planting season 2009/2010 Msemwa therefore decided to introduce a lending system to the farmers. With his truck and a loud speaker he drove through villages announcing that he was offering credit to any willing farmer who would pay him back after the harvest. In that season he lent Tshs 233 million (USD 172,600) worth of inputs to 900 smallholder rice farmers who were part of the local rice irrigation scheme. He says that the CNFA credit guarantee agreement with TFC helped him access the substantial amount of inventory he needed to support this marketing scheme.

The results are staggering. Where farmers used to harvest 7 bags per acre, they acheived 20 bags per acre this season, approximately three times more than they are used to.

Msemwa expounds on his concept, "The difference with my kind of business is that we enter into a contract with the farmer who belongs to a farmers' association where each farmer is given a certain timeline to ensure that they sell their produce and pay back cash. Because some farmers are offering to pay using bags of paddy worth the same value as the fertilizer, he has opened a godown for storage and is now trading in outputs. The farm itself is acts as collateral.

What is interesting about Msemwa's model is that farmers have organized themselves into credit groups which meet, analyze, and authenticate new members who would like to receive credit, place orders, receive products, and make payments and follow-up of payments. Msemwa receives these orders and using his two tonne truck, makes deliveries right to their villages around the clock. He elaborates, "I am not waiting for them to come to my shop. I follow them where they are."

He says, "Other agro-dealers have been sceptical to do what I do, but the secret lies in collateral. In this case, the farm itself stays as the "consigner". Why should we not make sure farmers are served?" "I need to make sure that farmers who are disadvantaged can still access improved fertilizers and increase their yields, particularly women. And I think am succeeding!" Msemwa adds.

Charles Msemwa now has a power tiller and recently secured investment capital which allowed him to purchase a planter and harvester for his farmers. He expects the number of clients to double in the next season in alignment with the trend he has experienced in requests for credit.

Appendix 3: Success story with FFS from Caritas

Caritas DEVELOPMENT OFFICE – DIOCESE OF MBEYA

P. O. Box 179 MBEYA, Tel 025 2503452, Fax 025 2500903, E mail caritasmby@yahoo.com

AN EXPERIENCE OF FARMERS INNOVATION ON PADDY SEEDS MULTIPLICATION IN FAMER FIELD SCHOOL APPROACH AT MAHANGO MSWISWI VILLAGE IN MBARALI DISTRICT

Caritas Development Office is a faith based organization that has been working in the Catholic Diocese of Mbeya since 1975. The organization started working in Mahango Mswiswi village in 2008 under the Agriculture and Rural Development Program. One of the main components of the program is to ensure the use of available natural resources in a more sustainable way, thus promoting sustainable agriculture practices.

In 2008, Caritas collaborated with TAGMARK/CNFA and Dakawa research center Morogoro on the issue of new seed varieties for paddy. Caritas obtained one kg of four new varieties i.e. TXD 88, TXD 306, Mwangaza and Super India. The seeds were supplied to Mahango Mswiswi village, Tujimbaje group to be used for a Farmer Field School demonstration. In the same season of 2008/2009 a field school at Mahango planted five plots of the varieties i.e. the four mentioned above and one farmer seed called "India Rangi ya Mkia". The Caritas extension officer facilitated the established of the field school and all FFS recommended procedures were followed (AESA (Agro Ecosystems Analysis)).

The total area planted for each plot was 100m^2 and the harvest per each plot was as follows: - TXD 88 = 48kgs, TXD 306 = 40kgs, Super India = 32kgs, Mwangaza 16kgs and Farmers seed (India rangi) = 8kg.

After various analyses during the crops' growth, farmers developed an interest in the new varieties due to their high performance in the field. After harvesting the group members agreed that they should not sell the seeds, but continue multiplying with the assistance of the extension worker in the FFS and members' respective fields.

in the 2009/2010 season the group planted the same varieties again in the field schools and hired land to plant a quarter of an acre of each variety and the yield were as follows: -

VARIETY	AREA	YIELD/PLOT/KGS	ESTIMATED YIELD/ACRE/KGS	ESTIMATED YIELD/HA/KGS
"MWANGAZA"	1000m2	18 tins@16kgs = 288 kgs.	1152 kgs	2,880kgs
SUPERINDIA	1000m2	36 tins@16Kgs = 576 kgs	2,304 kgs	5,760 kgs
TXD 306	100m2	57 tins@16Kgs = 912 kgs	3648 kgs	9,120 kgs
TXD 88	1000m2	59 tins@16Kgs = 944 kgs	3776 kgs	9,440 kgs
INDIA RANGI YA MKIA	1000m2	12 tins@16Kgs = 192 kg	768 kgs.	1920 kgs.

Farmer's comments and observations for each of the varieties planted were as follows:

(1) Mwangaza

- Is an early maturity variety that takes 2.5 to 3 months
- Seed size is big compared to TXD varieties
- Produces few tillers
- Palatable for eating
- Yield is low compared to other varieties

(2) Super India - resembles the characteristic of Kilombero

- Attractive for marketing as it is palatable
- The size is big and has an attractive aroma
- Production is high but can't compete with TXD varieties.
- Ensures food security and surplus income at household.

(3) TXD 306

- Is short variety that matures at 30 days.
- Produces many tillers – but less than TXD 88.
- Very tolerant to insufficient water in the field
- It does not lodge when there is strong wind.
- Good for food security and surplus income at house hold
- Not very good for market due to small seed size and it is not very palatable

(4) TXD 88

- Highly productive compared to other varieties mentioned above
- Takes 3 month to mature
- Ensures food security and surplus
- Produces more tillers and does not lodge easily when there is strong wind
- Withstands shortage of soil moisture
- Seed size is short and thick
- Not very good for market due to small seed size and it is not very palatable

(5) India rangi ya mkia(farmer's seed)

- Easy to lodge and has low yield compared to the improved varieties above.
- Takes 3 ½ up to 4 months to mature
- Needs high rainfall per season
- Market demand is low and does not ensure house hold food security

Successes, Impact on target farmers groups:

1. Famers managed to multiply each improved seed from 1kg to the mentioned figures above.
2. Learnt agronomic practices through FFS e.g. application of decomposed FYM, use of wooden harrow, planting in rows that most of the farmers are not used too, etc.
3. 10 farmers adopted the techniques of planting in rows which has given them a higher yield (15 to 25 bags per acre) in their fields.
4. Part of the harvested yields from the four improved varieties have been distributed to group members for individual multiplication (each member received 5 kgs of each variety) and the remaining seed will continue to be multiplied by the group for future seed marketing.

Challenges

- Lack of special farms for production of improved paddy seeds due to demand for these varieties

Recommendations

- The government to establish a paddy seed producer
- Government should continue to invest in paddy production through partnerships with the private sector
- Farmer field school method should be encouraged as a means to disseminate innovations to famers.

Season 2010/2011

In this season group members have decided to distribute seeds among themselves for further multiplication. Each member should plant an area between half an acre to one acre. The intention is to have seeds to sell to other farmers as these varieties have been accepted by farmers in that village and nearby villages.

Prepared by

Luckson Mwakalindile

Extension Officer – Caritas Mbeya

Appendix 3: List of Key Informants

Category of Organization	Name of key informant	Position and Organization	Address
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Appendix 4: List of participants in the Feedback Workshop, Dar es Salaam, 15 February 2011

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AGRICULTURAL EXTENSION IN MALI

Report of a study commissioned by the Extension Support Function Program of the Alliance for a Green Revolution in Africa (AGRA)

Hortense ATTA DIALLO, Ph.D.

March 2011

Table of Contents

Acronyms

AFRRI	African Farm Radio Research Initiative
AGRA	Alliance for a Green Revolution in Africa
AJDM	
AMASSA	Association Malienne pour la Sécurité et la Souveraineté Alimentaire - Malian Association for Food Security and Sovereignty
AOPP	Association des Organisations Professionnelles Paysannes – Association of Farmers' Professional Organizations
APCAM	Assemblée Permanente des Chambres d'Agriculture – Permanent Assembly of Chambers of Agriculture
ASHC	African Soil Health Consortium
ASPM	Agro-dealer Strengthening Program for Mali
AU	African Union
AVC	Agricultural Value Chain
BNDA	Banque Nationale pour le Développement Agricole – National Bank for Agricultural Development
BEACIL	Bureau d'Etudes et d'Appui Conseil des Initiatives Locales – Office of Education and Board of Support for Local Initiatives
CAADP	Comprehensive Africa Agriculture Development Program
CABI	Centre for Agricultural Bioscience International
CAEB	Conseils et Appui pour l'Education de Base – Advice and Support to Basic Education
CAECJ	Centre d'Appui à l'Entrepreneuriat Collectif pour les Jeunes – Center For Support to Collective Entrepreneurship for Youth
CESPA	Center for Services of Audiovisual Production
CILSS	Permanent Interstate Committee for the Fight against Drought in the Sahel
CLA	
CLCOP	Comité Local de Concertation des Organisations Paysannes – Local Committee of Consultation of Farmers' Organizations
CMDT	Compagnie Malienne de Développement du Textile – Malian Textile Development Company
CNFA	Citizens Network for Foreign Affairs
CNOP	Coordination Nationale des Organisations Paysannes – National Coordination of Farmers' Organizations
CPS	Cellule de Planification et des Statistiques – Planning and Statistics
CRA	Chambre Rurale d'Agriculture – Rural Chamber of Agriculture
CRCR	Comité Régional de Concertation des Ruraux – Regional Committee of Rural Consultation
CRRA	Agricultural Research Centers
CRS	Catholic Relief Services
CRU	Regional Commission of Users
CSA	Commissariat à la Sécurité Alimentaire – Food Security Commission
CSCRP	Cadre Stratégique de Croissance et de Réduction de la Pauvreté - Strategic Framework for Growth and Poverty Reduction

CSLP	Cadre Stratégique de Lute contre la Pauvreté - Strategic Framework for the Fight against Poverty
CTA	Technical Center for Agricultural and Rural Cooperation
CVECA	Caisse Villageoise d'Epargne et de Crédit Autogérée – Self Reliant Village Savings and Credit Bank
DGIS	Netherlands' Directorate-General for International Cooperation
DNA	National Directorate of Agriculture
DRA	Regional Directorates of Agriculture
EFAP	L'École des Métiers de la Communication - School of Business Communications
ESF	Extension Support Function
FAO	Food and Agriculture Organization
FRI	Farm Radio International
FFS	Farmer Field School
FPO	Farmer Professional Organization
GDP	Gross Domestic Product
GTZ	German Technical Cooperation Agency
IAR4D	Integrated Agricultural Research for Development
ICT	Information and Communication Technology
IDA	International Association for Development
IER	Institute of Rural Economy
IFDC	International Fertilizer Development Center
IFRA	Institut Rural de Formation et Recherche Appliquée – Rural Institute for Training and Applied Research
IFS	Initiative for Soil Fertility
IICD	International Institute for Communication Development
IICEM	Initiative intégrée pour la Croissance Economique du Mali – Integrated Initiative for the Economic Growth of Mali
INSAH	Institute of the Sahel
IPR	Institut Polytechnique Rural – Rural Polytechnic Institute
IRRRA	Initiative de Recherche sur les Radios Rurales en Afrique – Research Initiative on Rural Radios in Africa
LABOSEM	National Seed Certification Laboratory
LOA	Loi d'Orientation Agricole – Agricultural Orientation Law
M&E	Monitoring and Evaluation
MoU	Memorandum of Understanding
Mt	Million metric tons
NEPAD	New Partnership for Africa's Development
NERICA	New Rice for Africa
NGO	Non-Governmental Organization
OMA	Observatoire du Marché Agricole – Agricultural Market Observatory
OPAM	Office des Produits Alimentaires du Mali –Food Products Office, Mali
PAFISEM	Project for the Support to the Seed Sector

PAPAM	Programme d'Accroissement de la Productivité Agricole - Program for Increasing Agricultural Productivity
PDAAA	Programme Détaillé pour le Développement de l'Agriculture Africaine
PDES	Plan de Développement Economique et Social - Economic and Social Development Project
PEA	Pôle des Entreprises Agricoles – Agricultural Business Clusters
PNIR	Programme National d'Investissement Rural, National Program of Rural Investment
PNISA	Programme National d'Investissement dans le Secteur Agricole – National Investment Program for the Agricultural Sector
PRECAD	Projet de Renforcement des Capacités des Collectivités pour un Développement Durable - Project to strengthen community capacity for sustainable development
P4P	Purchase for Progress
SAP	Système d'Alerte Précoce – Early Warning System
SDDR	Schéma Directeur du Développement Rural – Master Plan for Rural Development
SG2000	Sassakawa Global 2000
SME	Small and Medium Enterprise
SNV	Netherlands Development Organization
SOCODEVI	Société de Coopération pour le Développement International - Cooperation Society for International Development
USAID	United States Agency for International Development
USC	Unitarian Service Committee
WFP	World Food Program
WUSC	World University Services Canada

Executive Summary

In Mali, the Strategic Framework for the Fight against Poverty (CSLP) (2nd generation), which is a strategic framework for growth and poverty reduction (CSCRP) puts an emphasis on food security, rural development and the development of SMEs.

In September 2006, the Malian Government adopted the Agricultural Orientation Law (LOA) which sets policy guidelines for agricultural development in Mali. The Agricultural Orientation Law affects all economic activities in agriculture and related sectors including processing, transport, trade and distribution.

Extension policy supports the involvement of the private sector and the civil society and favors ICT, a value chain approach and input subsidies. The policy also supports women and youth in agricultural activities along the value chain. However, this support needs to be enhanced.

Mali's economy is based on agriculture. The country exports cotton fiber, peanut oil, potato, sesame, mango, mangosteen, guava and corn. Products imported include wheat, palm oil, refined sugar and tea.

Extension stakeholders include the government through the Directorate of Agricultural Development and its decentralized services, research, universities, other education institutions, donors, NGOs, agricultural input dealers (agro-dealers), farmers and the media.

Several extension approaches including ICT (radio, TV, videos, tapes, mobile phones) and the distribution of input kits are used. Other commonly used approaches are field demonstrations, field days, farmer field school (FFS), warehouse receipts, training of agro-dealers and connecting farmers to microfinance organizations.

The sources of information are diverse. Farmer to farmer information exchange is important. Other materials include regular media (TV, radio, printed media), database and website.

Agribusiness models include the CMDT system, P4P model, BEACIL, CNOP's agribusiness clusters, and warehouse receipt systems.

Monitoring and evaluation (M&E) needs to be carried out all institutions and for all activities, not just for externally funded projects for which it is a requirement. There should be a framework for exchange and discussion among all stakeholders but mainly between research and extension. Efforts made by the government such as agricultural subsidies for inputs should continue.

Some positive drivers of change are input subsidies, the relatively high price of grain, availability of technologies and improved information technology and communication. Negative drivers include an insufficient number of public extension service agents, insufficient resources to support public extension activities, illiteracy, lack of collaboration between extension service providers, lack of communication between stakeholders and the high cost of using media.

From this study, the following recommendations were made:

- Create synergies between projects (within AGRA and also with others)
- Establish coordinated activities between stakeholders
- Improve or enhance sharing and knowledge exchange
- Create a framework for consultation for stakeholders
- Work with all public, private and civil society extension service providers
- Encourage other, private, service providers
- Make an inventory of all extension services providers
- Monitor and evaluate service providers
- Develop agricultural value chains
- Strengthen capacity at all levels
- Use extension approaches that work well and are complementary
- Expand the range of services provided (e.g. include plant clinics)
- Enhance communication through the better use of TV, radio, brochures, posters, leaflets, megaphones in public places etc.
- Encourage youth to become involved through sensitization of rural youth
- Facilitate women's access to extension services
- Emphasize training of extension agents
- Enable women’s access to credit and subsidies
- Subsidize rural communications

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1 Introduction

1.1 Background

The Alliance for a Green Revolution in Africa (AGRA) has identified the need for an Extension Support Function (ESF) to contribute to the integration of extension activities within AGRA programs and enhance linkages with national extension systems and other extension initiatives in the countries where they work. AGRA sees these linkages as important to ensure increased awareness and accelerated uptake of farmer-ready green revolution technologies and practices, taking into account the unique needs of women and young farmers. Draft objectives for the ESF include the following:

- Strengthen synergy and collaboration within AGRA programs and with other projects through joint development, resource mobilization, programming and implementation of extension activities.
- Facilitate uptake and up-scaling of farmer ready technology and practices through approaches including farmer groups and farmer organizations.
- Increase smallholder farmers' and particularly female farmers' access to extension services, through strengthening their capacity to demand the services.
- Leverage information and communication technologies (electronic and print media) to enhance access to markets, credit, consumer demand and other factors.
- Monitor uptake of interventions through continuous diagnosis and learning, database building and using feedback for improvements.
- Explore ways of integrating youth and young graduates (particularly female) in activities along the agricultural value chain.

These studies aim to gain a detailed understanding of the context and extension needs of the chosen breadbasket areas within each of the countries. This information will then be used as a base on which to take decisions on where the funding should be directed and what specific activities would support an improved extension function across the AGRA programs. The objectives of the in-country study were to establish the state of extension services, with a focus on the institutional arrangements for delivery of extension; policy directions and their impacts on extension; methods and approaches used; agribusiness models that enhance the delivery of extension, and the targeting of extension to ensure increased and sustainable crop productivity.

1.2 Methods Used

The study methodology was developed during a design workshop held in Nairobi, Kenya, on January 6th and 7th 2011. In Mali, the study consisted of individual and group interviews based on an interview guide and also on site visits to various stakeholders. A stakeholder consultation/validation workshop was held at the end of the study, to test and strengthen the results of the individual and group discussions. That workshop saw the participation of previously interviewed stakeholders as well as others that had not been interviewed. A presentation of the preliminary findings of the study was made followed by discussions. Additionally participants, organized in groups, considered different agribusiness models in Mali. Results of the workshop were fed into this report. Mali is divided into 8 regions plus the district of Bamako (see Figure 1), 49 cercles (group of communes) and 703 communes (groups of villages). There are 18 urban communes and 666 rural communes. In the course of this study, organizations located in the region of Sikasso were visited along with others in Bamako. Individual and group interviews were based in the district of Bamako, Bougouni and Sikasso (see Figure 2).

Figure 1: Map of Mali: Regions

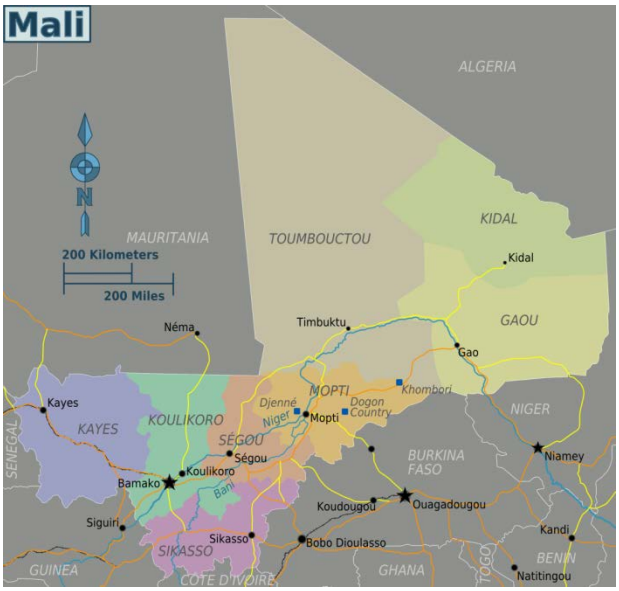
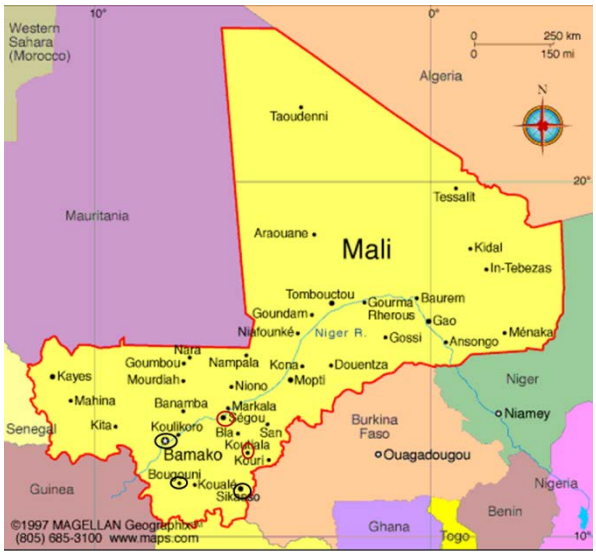


Figure 2: Visit and Breadbasket Areas



Black ellipse: visited areas; Red ellipse: other breadbasket areas

2 Country Policy and Institutional Context

2.1 Extension Policy

The economy of Mali is based on agriculture. According to the Malian Government, rural development must contribute to the achievement of food security, increasing incomes of rural producers, and therefore improving the living conditions of rural populations.

Laws and Regulations

The Malian Government has recently adopted the Agricultural Orientation Law (LOA), which was added to the Master Plan for Rural Development (SDDR). The Agricultural Orientation Law (LOA) of 5 September 2006 which sets policy guidelines for agricultural development in Mali, is the legal framework for the development of the agricultural sector. The Agricultural Orientation Law affects all economic activities in agriculture and related sectors (processing, transport, trade, distribution and other agricultural services) and their social and environmental functions.

There are a number of other sectoral laws and decrees of relevance. **Law No. 10-032,** 12 July 2010, relates to seeds of plant origin and establishes rules for the management, production, marketing and quality control of seeds of plant origin. The new law sets the stage for the transfer of responsibility for seed production to private seed companies and farmers; allows for the organization of farmers into groups to provide services to their members; and allows the provision of microfinance. **Decree No. 10-428/P-RM** of 9 August 2010 sets the rules for enforcement of this law. **Law No. 08-008**, 28 February 2008, relates to the control of the quality of fertilizers and establishes the rules for the quality control and the standards of fertilizers. **Decree No. 08-177/P-RM** of 27 March 2008 sets the rules for enforcement of this law.

The Strategic Framework for the Fight against Poverty (CSLP) (2nd generation) is a strategic framework for growth and poverty reduction (CSCRP)/ 2007-2011 (adopted in Ministry Council on 4/10/2006). It outlines the policies and programs that the country intends to implement on the macroeconomic, structural and social level to promote growth and reduce poverty over the period

2007-2011. It outlines the financing plan and external funding needed for that period. The strategic framework has two main objectives:

1. Promote an annual growth rate of 7.0% through the generation of wealth and job creation across promising sectors of the national economy such as rural production (agriculture, livestock, fisheries, agroforestry, fruit and vegetables), the mines and energy sector, and the goods and service sector (tourism, culture and ICT).
2. Improve public administration by the continuation, consolidation and deepening of reforms undertaken in institutional areas (decentralization and de-concentration) of democratic governance (democracy, fight against corruption), the economy (microfinance and private sectors) and the social sector (education and health, in particular the fight against HIV / AIDS).

The priority areas include:

Food security. Increased food security will be achieved through the promotion of agricultural commodity chains for plant, livestock and livestock sector products, fisheries, aquaculture and forestry sectors products as well as through the promotion of agricultural mechanization.

Rural development. Improved rural development will be achieved through facilitating access to equipment and inputs (mechanization, animal traction, improved seeds, fertilizers, pesticides, food, fodder, agricultural by-products and agro-industrial inputs); and development of access to finance for producers and agricultural fields operators through the increased supply of financial services (Rural Development Fund, National Agricultural Risks and Disasters Funds, specific lines of credits, guarantee funds, refinancing credit, incentives aid programs, etc.).

Development of SMEs. The development of SMEs will occur through the creation and promotion of competitive craft and industrial units for processing and marketing agricultural and mining products.

A **National Program of Rural Investment** (Programme National d'Investissement Rural - PNIR) was developed in relationship with development partners to include the current government policy on rice is focused on the water control.

The National Investment Program for the Agricultural Sector (Programme National d'Investissement dans le Secteur Agricole (PNISA)) is responsible for overseeing all irrigation programs in the country. This program puts a special emphasis on the development and the implementation of strategies aimed at increasing production by improving productivity, reducing production costs and increasing the value of agricultural products on the national market and in the sub-region through effective marketing strategies. It:

- Aims to open up production areas by building rural roads and improving access of farmers to communication and rural electrification.
- Aims to build the capacity of research and extension service providers in the generation and diffusion of technologies and techniques that intensify production systems adapted to local conditions.
- Focuses on the development and implementation of participatory strategies for increased use of mineral fertilizers and other good management procedures as well as access to agricultural mechanization.
- Ensures that the development of irrigation technologies and irrigation schemes are central to strengthening the security of agricultural production.
- Is committed to enhancing agricultural production through processing through the development of agro-industries and linking farmers with markets.
- Focuses on the use and application of good agricultural practices and standards that respect the environment and take into account climate change.
- Advocates the establishment of consistent land management policies incorporating social, political and economic dimensions, matched with legislative frameworks conducive to

investments and safeguarding the interests of small farms on which agricultural production still largely relies.

- Aims to consolidate the already established dialogue framework for decentralization.
- Is based on the development and implementation of strategies that encourage partnerships between the public and the private sector to improve producers' access to financing.

Some of the irrigation projects implemented under this program have generated incomes 4 to 8 times higher than those with no irrigation.

The Program for Increasing Agricultural Productivity in Mali (Programme d'Accroissement de la Productivité Agricole au Mali – PAPAM) approved by in 2010, is funded by the International Development Association (IDA) of the World Bank, the European Union and the United Nations. The PAPAM aims at increasing the productivity of small producers in the regions of Segou, Sikasso, Mopti and Koulikoro, and will contribute to the specific objectives of food security and agricultural growth. The project aims to address the main obstacles to modernization of agriculture in Mali: low agricultural productivity, lack of production infrastructure and the lack of sectoral coordination. The investment program will focus on three areas: technology transfer and delivery of services to producers, such as research, advisory services and access to finance; small and large scale infrastructures for irrigation, and promotion of a programmatic approach and sectoral monitoring in order to create a policy and institutional environment conducive to increasing agricultural productivity.

The Government of Mali subscribed to the **Initiative for Soil Fertility** (IFS) initiated at the 1996 World Food Summit. The objective of the IFS is to fight the decline in soil fertility. Supporting organizations include FAO, World Bank, national research institutes, NGOs and private sector representatives. A National Action Plan for the management of soil fertility was detailed in 2002, but the Soil Fertility Plan has not yet been implemented due to a lack of funds.

The **National Communication Policy for Development** contains a legal and regulatory institutional framework and its implementation has been programmed in the short, medium and long term.

Input subsidies

Adequate funds for the purchase of agricultural inputs and equipment for the benefit of farmers are ensured by the government providing subsidies of 50% to farmers' professional organizations (FPOs). The FPOs are expected to contribute a further 30% of the cost while development partners are solicited to provide the remaining 20% of the costs involved.

To ensure food security after the recent price increases, Mali has encouraged rice production, through the provision of input subsidies and fertilizers. This action has already increased production to 1.6 million metric tons. The 2008 Rice Initiative focused on subsidies for seeds and fertilizers. In 2009 the subsidies were extended to maize, sorghum and cotton. Seed subsidies cover 50% of the market price, while those for fertilizers (depending on the market price) covers about 60% for the first year and then decreased to 40% or even 30%.

Value chain

The Comprehensive Africa Agriculture Development Program (CAADP) is at the heart of efforts by African governments to accelerate growth and eliminate poverty and hunger in African countries through the African Union's (AU) New Partnership for Africa's Development (NEPAD) initiative. As part of the implementation of the CAADP, the Conference of West and Central African Agriculture Ministers, the Technical Center for Agricultural and Rural Cooperation (CTA), the U.S. Agency for International Development (USAID) and the German Technical Cooperation Agency for Development (GTZ) jointly organized a training of trainers workshop in December in Dakar on advocacy, development and implementation of CAADP, with a focus on value chains.

After many studies, the Conference of West and Central Africa Agriculture Ministers has adopted a value chain approach to addressing Pillar 2. This approach allows small producers access to markets and opportunities to expand trade, including regional trade that allows for income generation.

A value chain can be defined as all the activities that are needed to transform raw materials through different phases of production, marketing and trade, to a product that can be sold and consumed. At each step of the chain, value is added.

While some of the policies are implemented, some need to be reinforced and others are falling behind. For example, the transfer of responsibilities for seed production and distribution to the private sector is working fairly effectively. However quality control of fertilizers and pesticides is not being carried out in Mali due to a lack of the necessary infrastructure and competency. Although many texts mentioned the promotion of women and the youth, by facilitating access to production factors and technical and financial support mechanisms, there is no visible effect on the ground. There is also a lack of change on the ground within agricultural value chains.

Agricultural support services in Mali

Mali depends largely on foreign aid for major agricultural support services. Policies are determined by the country, but the financing of these services is shared between the national government and external partners who are involved with funding of training programs, extension services, research and credit. Irrigation programs are funded by different levels of government (national, district and regional) while funding and development of inputs policies is the exclusive responsibility of the national government.

The public sector plays an important role in the supply of extension services and research and shares this role with the private sector and NGOs for training. The public sector plays no role in credit, input or irrigation services. Indeed, credit is provided by the private sector, NGOs and producer organizations; inputs by the private sector and producer organizations, and irrigation by the private sector, NGOs and producer organizations and villages.

2.1 Agricultural Economy

Mali is heavily dependent on foreign aid and is a major recipient of both multilateral and bilateral aid. Multilateral donors include the International Monetary Fund, World Bank, African Development Bank, Arab Funds, and European Union. Bilateral donors include France, the United States, Canada, the Netherlands, China, and Germany. The Malian government appears committed to implementing economic reforms, privatization, and free-market policies in order to meet the expectations of international donors and investors.

For the Malian Government, the agriculture sector is the growth engine for the country. Mali's economy is based to a large extent on agriculture, with an overwhelmingly rural population and small producers making up over 80% of the population. Many of these small producers are engaged in subsidence farming of cereals (mainly sorghum, pearl millet, and corn, rice), peanut, sugarcane and vegetables. Cotton and livestock (cattle, goats, and sheep) account for 75-80% of Mali's annual exports. Agriculture contributes to 35% of GDP. Cereals cover around 80% of cultivated land with 1 million farms growing cereals and contributing 30% of the agricultural GDP. The Economic and Social Development Project (Plan de Développement Economique et Social - PDES) has a target of 10 Mt of grain produced per year by 2012 (4.8 Mt were produced in 2008-2009).

Table 1: Main import and export products to and from Mali

Import products	Export products
• Palm oil	• Cotton fiber
• Refined Sugar	• Peanut oil
• Milk	• Shelled peanut
• Milled rice	• Potatoes
• Broken rice	• Sesame
• Wheat	• Mango, mangosteen, guava
• Wheat flour	• Corn
• Tea	• Potato

2.2 Recent Trends in Agricultural Practice

Recent trends in agricultural practices focus on the following areas.

Subsidies on inputs. These are mainly provided through the Rice Initiative (see section 2.1).

Technologies: improved, certified seeds, fertilizer microdosing. Farmers are encouraged to use improved varieties of crops developed by research and multiplied by private seed producers. Fertilizer micodosing, promoted by AGRA, is being implemented by NGOs and researchers from the Institute of Rural Economy.

Other innovations: market, value chain. Farmers do not want to limit themselves to only production, but try to add some value to their products. Many carry out activities such as processing. Additionally, in order to obtain a good price from their products, farmers need to understand the market. There are several institutions working on gathering market information and make it available to farmers.

Demand-driven extension services. For extension services to work efficiently, farmers need to know what is information available, but this is usually not the case. The rural population needs to be made aware of this new approach towards extension activities.

Privatization of the public extension service. The provision of extension services is changing from public to private sector suppliers. Private extension service providers include NGOs, consultants and input suppliers. However, there is no evaluation of private extension service providers, and it appears to some researchers that many NGOs who are providing extension services, are actually involved in research, for example selection and production of varieties of certain crops. Additionally, it appears that the rural population are not ready for these new methods of extension provision.

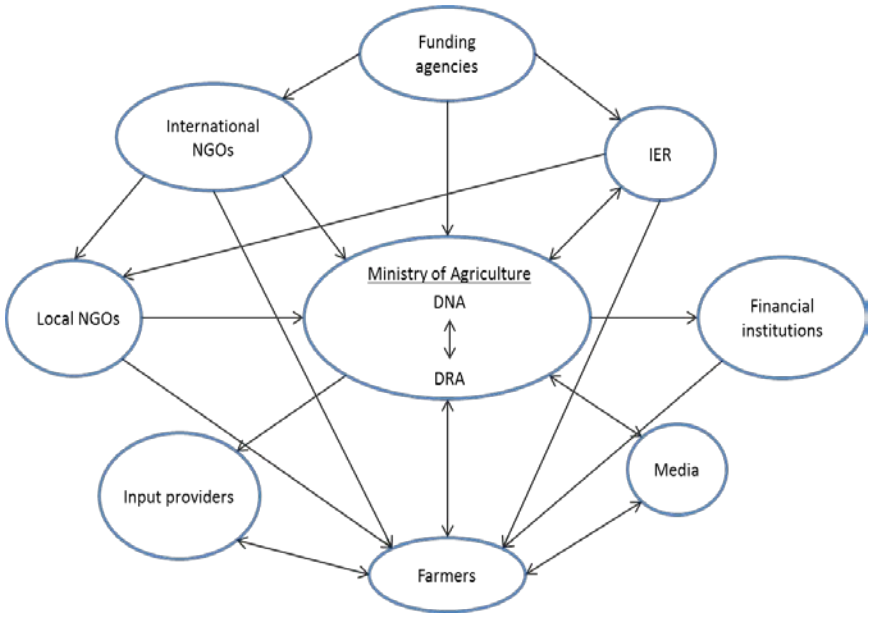
Contracting. Some NGOs or producers' organizations that provide extension services to farmers usually use extensionists from the Directorate of Agriculture who are not operating because they do not have the necessary resources. The parties involved sign a contract. Farmers' associations can now sign a binding contract with an organization before the crop is produced. They have an obligation to deliver the product on time and in the quantity and quality requested. This is usually hard to achieve for the farmers' groups. The Purchase for Progress (P4P) program uses contracting with some women groups.

2.3 Institutional Map

Agricultural extension services are generally provided directly or indirectly by three sources: the public sector, the private non-profit sector and the private for-profit sector. The public sector includes the Ministry and Departments of Agriculture and Agricultural Research Centers. The private non-profit sector consists of local and international NGOs, foundations, community boards and associations, bilateral and multilateral aid projects. The private for-profit sector includes commercial production and marketing firms (i.e. input manufacturers and distributors), commercial farmers or

farmer group operated enterprises, agro-marketing and processing firms, trade associations, and private consulting and media companies. Figure 3 illustrates how different organizations interact.

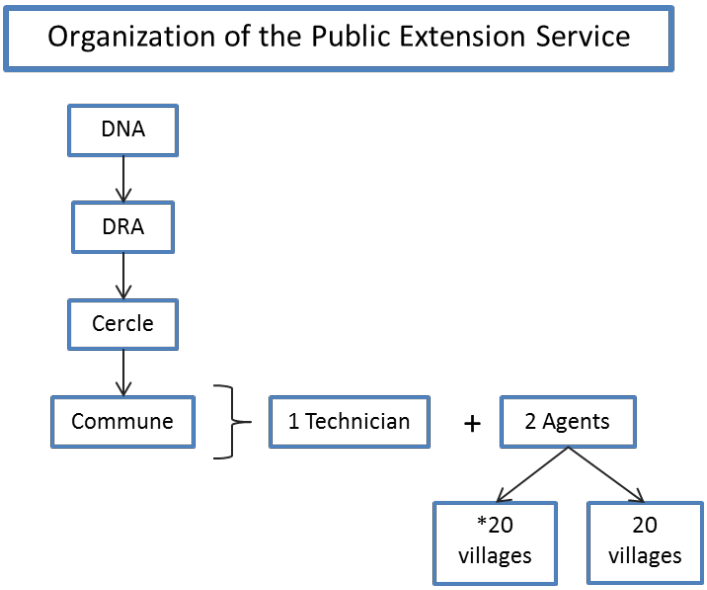
Figure 3: Relationships between the various stakeholders involved directly or indirectly in agricultural extension



Ministry of Agriculture

Within the Ministry of Agriculture, the National Directorate of Agriculture (DNA) is in charge of the agricultural extension service. The simplified organization of the DNA is shown in Figure 3. The detailed organization of the DNA and the Regional Directorates of Agriculture (DRA) is provided in Annexes 1 and 2.

Figure 4: Organization of the National Directorate of Agriculture



*NB: large variation in the number of villages covered.

The reported extension agent : village ratio varied depending on the person interviewed. Sometimes it was reported that one extension agent was responsible for 5 to 6 villages, or less than 10 villages. However one document reports one agent for 20 villages, while another agent interviewed said that are two agents cover about 75 villages.

The extension service staff is growing old. There is a real need for replacement. The Malian government, in an effort to improve the extension service, has recently recruited 302 new extensionists. However, the problem is still far from being solved. There is a real need for refresher courses. There are female extensionists, but they generally only spend a few years working in the rural areas before returning to the city to join their spouse. This reduces the number of female extensionists to a low level in rural areas.

There is also a lack of financial resources. The agents in the field, when they have a motorcycle, may not have fuel. They are unable to move and therefore to assist farmers when needed. The wages are also low and not attractive.

There are many difficulties within the public extension service. Some donor assistance is given to public extension, but often funds are channeled through other agencies. In many cases these agencies still rely on public extension agents for implementation, sometimes contracting individuals directly. At the end of the project, when the funds run out, staff then return to the National or Regional Directorate of Agriculture public extension service.

Universities

Universities use market oriented approaches to train people involved in extension services at the management level since they are involved in policy making. Universities also participate in the delivery of extension services.

IPR/IFRA

The Institute of Rural Economy (IER)

The Institut d'Economie Rural or Rural Economics Institute (IER) is responsible for most aspects of agricultural research. IER is the main research institution in Mali that focuses on the implementation of the national agricultural research policy. The decentralization of IER has made it possible to cover all the agro-ecological zones of Mali. IER has six agricultural research centers (CRRA) distributed throughout the country. These centers have both a regional and national remit and are located in Kayes, Sotuba, Niono, Mpoti and Gao. It participates in the delivery of agricultural extension services through its mission:

- To contribute to the definition of research into agricultural development.
- To build and implement agricultural research programs.
- To provide technical support to agricultural development.
- To contribute to the training of, and the scientific and technical information available to the research and the agricultural development staff.
- To work towards the development of suitable technologies for the increase in production and the improvement of the productivity of the rural world.
- To disseminate the results of research and studies.
- To provide services in its areas of competence.

Other educational institutions (schools, institutes)

There are a number of agricultural schools and institutes involved in training. Some function well while others do not provide the necessary level of training. The curricula need to reflect recent trends in the agriculture sector and should be updated. The use of ICT should be effective.

The Rural Polytechnic Institute/ Institute Rural Training and Applied Research (Institut Polytechnique Rural - Institut Rural de Formation et Recherche Appliquée – IPR/IFRA) is the only state higher

education institution specialized in the rural matters. In 2008, the subject of Agricultural Extension was created, study of which is only open to those in employment. Students come mainly from the National Directorate of Agriculture (DNA) and DNA provides supervision to the students during their field work.

Suppliers, manufacturers and distributors of inputs

This group of actors is or should be able to provide some support to farmers regarding the products they manufacture or sell. Some distributors of agricultural inputs also run demonstration plots in villages.

National and international NGOs

NGOs or farmers' organizations often use public extension services for their activities, accessing the services through signed contracts. Communities also access extension services through signed contracts with extension agents. However the problem with NGOs as extension service providers is that they often work with people who are known to them personally but do not necessarily have the necessary experience in the provision of extension services.

Private sector extension

Some institutions work with other providers of extension services such as consultants.

Producers' organizations

There are producers' organizations, syndicates, cooperatives, village associations and others. These organizations have grouped themselves on a local or regional basis, especially in the Kayes and Sikasso regions. Some have regrouped into a network of Chambers of Agriculture, or as a group of coordinated producers etc. Producers' organizations that provide extension services often do not have the necessary resources and therefore they use other extension service providers (public or others) to implement the activities.

Funding agencies (Donors)

These agencies provide funds for extension services to local and international NGOs and to the DNA or its decentralized structures.

Financial institutions

Several financial institutions support the agricultural world. In Mali, the main bank involved in financing agricultural activities is BNDA (Banque Nationale pour le Développement Agricole – National Bank for Agricultural Development) which finances well organized structures such as Compagnie Malienne de Développement du Textile (CMDT – Malian Textile Development Company), NGOs, etc. The activities covered range from production to marketing of products. BNDA also finances agricultural inputs and equipment. Microfinance institutions are also involved in providing credit to farmers either individually or through their organizations.

Media

The media (radio, television and print media) are becoming increasingly instrumental in the transformation of agriculture. Their main role is to send a stream of information to a large number of recipients. They play an important role in the fields of information, education and entertainment. However the high proportion of illiteracy constitutes a problem as most farmers cannot read and therefore do not understand the information provided. In addition, the high cost of newspapers, radio and television limits the use of these media by farmers. In Mali, the most widely used medium is radio. Every household, even in the rural areas, owns a radio.

There are many institutions or organizations that provide extension services. Therefore, there is a need to ensure quality control in the delivery of services. Most stakeholders were of the opinion that the Ministry of Agriculture should be in charge of this quality control.

3 Extension Approaches

3.1 Key Changes in Extension Approaches

Some changes in extension approaches and technologies have occurred recently. They include:

- The use of media varies. There is little use of newspapers and TV for the dissemination of extension related information. The major constraint remains the cost, especially for the TV, and although rural radios are used, this use can be maximized.
- The use of other ICTs, particularly mobile phones, is greatly increasing especially in the collection of market information. There was a validation workshop on e-agriculture in Mali with information provided by the Ministry of Communication and ICT. The report was not available during the study period.
- Support to value chains is increasingly seen as a way of targeting support to farmers and a number of initiatives aim to take a value chain approach
- Training and financing of agro-dealers to provide advice to farmers when they visit their shops is seen as an alternative or complementary approach to using dedicated extension agents. It is argued that they have vested interests in providing good advice and that this is a more cost effective means of delivering extension

3.2 Extension Methods

A variety of extension methods are used (see Table 2) with some being more common in Mali.

Table 2: List of Extension Methods

- Farmer Field Schools
- Training & Visit
- Demonstration
- Agricultural day
- Seed stock market (yearly)
- Distribution of kits (seeds, fertilizers)
- Fairs
- Farmers exchange Visit
- TV and radio spots and programs
- Sketch
- Use of indicative signs (widespread)
- Videos and/or tapes in local in local languages
- Mobile phone (price on the market)
- Meetings(face-to-face)
- Training (ex: use of computer tools)
- Training of agro-dealers after a census
- Technical guides
- Showcase (field along the road)
- Community newspaper (e.g.: kibaru)
- Use flyers (very little): cost, limited target
- Large billboards?

Commonly used extension methods

Mobile phones

Mobile phones are widely used in Mali even by the rural populations. Their use is particularly noticeable by market agents who collect agricultural products prices from different markets throughout the country. Market agents for Association Malienne pour la Sécurité et la Souveraineté Alimentaire (Malian Association for Food Security and Sovereignty, AMASSA), Afrique Verte, the Agricultural Market Observatory (OMA) and the Regional Committee for Consultation of Rural Populations (Comité Régional de Concertation des Ruraux, CRCR) all use mobile phones, especially the text/SMS facilities.

Farm Radio International gave mobile phones to participating radio stations in the chosen pilot villages. At the beginning of each campaign, call credit was also provided. This allowed, for example an interaction between the communities and the extension agents, who most of the time cannot travel because of the lack of resources (see Box 1).

Box 1: Farm Radio International

Farm Radio International (FRI) in partnership with World University Services Canada (WUSC) implemented a project called African Farm Radio Research Initiative (AFRRI). This project wanted to explore the power of radio in delivering information to African farmers' and its impact on food security. Some of the research questions were: how African farmers use the information they hear? What information is useful? What is the best format? How can radio stations make use of inexpensive and accessible technologies such as mobile phones and MP3 players? The Canadian-led research project received a grant from the Bill and Melinda Gate Foundation. The project was active in five countries: Ghana, Mali, Malawi, Uganda and Tanzania.

In each of countries, advisory committees representing farmers' organizations, radio stations, research organizations, government extension agencies, and other stakeholders came together to develop detailed action research plans. Partner radio stations produced and broadcasted a variety of participatory radio campaigns with and for farmers that addressed their food security priorities.

In Mali, for example one of the weekly scripts focused on rural women processing and selling shea butter. The program was about the Fakocouru Women's Binkadi Association in Mali where the women in this 850 member association make butter. The program describes the butter producing process and shows how with this work, the women were able not only to generate some income, but also preserve the shea trees and therefore fight against desertification.

A campaign on improved composting methods in Mali resulted in a fourfold increase in the percentage of farmers adopting this practice.

Radio and videos

Radios are used widely in Mali. There are more than 300 radio stations (private, community or association-based) in the country. The national rural radio has decentralized stations in all the regions. Some of stations synchronize some programs to broadcast at a set period, so that people throughout the country get the same information.

Radio is a good example of spreading general awareness and creating interest in farming innovations; giving timely warnings about possible pest and disease outbreaks; facilitating farmer-to-farmer extension by broadcasting the success of farmers in one area to farmers in other areas; and providing information about the prices and availability of inputs and market prices for outputs or agricultural products.

In Mali, the types of broadcasts and radio programs that are most useful to farmers and produced for the Participatory Radio Campaign are public programs, reports of testimony, programs with listener call-in and call-out (incoming and outgoing calls), programs that interact with extension workers, programs with contests, field interviews, studio interviews, telephone interviews, micro-programs with griots, artists, community leaders or farmers and local songs. In each zone, the local language is used.

The data collected by OMA agents on the prices of agricultural products are disseminated weekly mainly through the radio.

Participative videos are used for training and information dissemination for farmers through public meetings in the village. During the session, a video on a particular subject is shown, followed by questions and answers between farmers and extension workers. There is a facilitator to moderate the debate. The entire session is recorded and broadcast on the radio. This allows a larger community to understand and learn about the subject being discussed.

The Center for Services of Audiovisual Production (CESPA) uses video and multimedia communication resources (including visual scripts) for training of farmers. The Center aims to provide rural African populations with the knowledge necessary to master new tools and techniques of production through multimedia communications and original participatory approaches.

Television

Compared to radio, TV is less popular in rural areas. Most households to do not own a TV set. The prohibitive cost of TV is a limiting factor in the use of TV for the transmission of agricultural information by the extension service providers.

Print media

There is printed material in French with several daily newspapers (e.g. L'Essor), weekly newspapers (e.g. Le Courrier) and a monthly magazine for the youth (Grin-Grin). There is also printed matter in the national language (e.g. Kibaru, Jèkabara) and specialized print material. For example "*Graine d'espoir"* (Seed of Hope), is a monthly magazine whose goal is to inform rural populations and is "the echo of national initiatives for the development of farming in Mali".

Range of products on display at CNFA Mali

Training of agro-dealers

The Citizens Network for Foreign Affairs' (CNFA) Agro-dealer Strengthening Program for Mali (ASPM) works to increase rural incomes and reduce poverty by transforming Mali's underdeveloped and fragmented input distribution practices into an efficient, commercially viable input supply system. This project allows greater access to essential inputs, technologies, agricultural services and output markets by creating links between commercial input companies, financial institutions and smallholder farmers, thus changing the lives of rural farming households. The agro-dealers receive business management and technical training that help them identify potentially profitable market opportunities to sell their products. CNFA/ASPM organizes demonstration plots. A MoU is signed between the Agricultural Services and CNFA. The agents install, monitor and supervise the plots.

There is a need to offer refresher courses (or retrain) the agro-dealers as new technologies or products become available.

Warehouse receipts

Mali has a warehouse program that is referred to as "Tierce Détention," (third party detention) which is storage of private stock in a third-party warehouse. In Mali some of the institutions involved are Niesigiso, Kondo Djigima, Kafo Djiguine, CVECA and Faso Djigui. The financial institutions lend money to farmers' organizations after receiving in return, as warranty, an agricultural product for example, which is stored in a warehouse where the movement of the stocks is controlled. For Faso Djigui, a federation of farmers' organizations, the crops concerned are rice and maize, and the farmers receive two-fold assistance:

- The so-called "pre-payment system" allows the farmers to acquire inputs, receive assistance towards the cost of transplanting, and support to cope with the lean season.
- They benefit from collective sale of their produce.

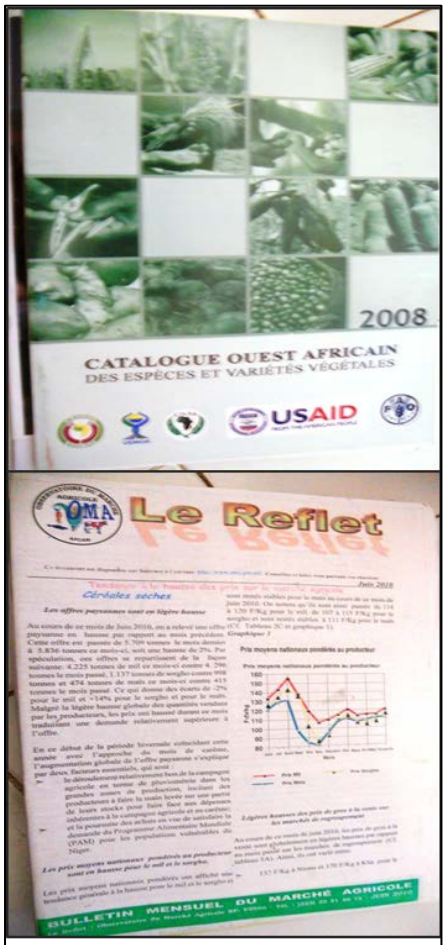
Gathering demand and supply service

The Commissions of Use of Research Results (CRUs) are groups of producers' and agricultural product processors, created at both regional and national level to interact with researchers in order to ensure the researchers take into account their needs regarding production and processing constraints. Five regional CRUs were set up, while at the national level, a national commission of users was formed, composed of chairmen of the different CRUs. The general objective is to establish a dynamic dialogue between agricultural research and the users of the research in order to improve agricultural production and productivity. This seeks to address the missing or weak link between research and extension.

3.3 Sources of Information

Several sources of information are used in Mali. They include the following:

- Information provided by IER, OMA (see Box 2), Assemblée Permanente des Chambres d'Agriculture (Permanent Assembly of Chambers of Agriculture, APCAM), DNA.
- Information collected in the field (field-schools demonstration plots, visits).
- Information provided by traders, processors, producers, consumers.
- Exchanges during meetings, fairs, open days, farmers' day.
- Radio, TV programs (e.g. Carnet rural).
- Databases on technologies available on the internet (e.g. INSAH).
- Radio messages.
- Farmer to farmer.
- Banks.
- Agro-dealers.
- Planning and Statistics Mobiles.
- Websites (e.g. OMA)
- Newsletters.
- Magazines.
- Institutions (e.g. IER Info).
- Production data.
- Product prices.
- Market intentions.
- Listing of product providers (at cooperative and association level).
- Activity reports.



Two examples of print media: book and magazine

Box 2: The Observatory of Agricultural Market (OMA)

• Produces and disseminates statistical information to users; OMA works in partnership with all other structures collecting information on the agricultural sector.

• Analyzes price trends and other indicators to assess the situation of the agricultural market in the short, medium and long term.

• Conducts on its own initiative or on request, activities, studies and research on factors that influence price setting.

• Promotes exchange of information between producers (farmers), traders, processors and policymakers within and outside the country.

• Ensures when necessary, the training of stakeholders on the functioning of agricultural markets and how best to integrate existing opportunities in the decision to buy and sell agricultural products.

3.4 Gender and Youth

The president of a women's cooperative and extension agent in Niena

In order to cater for the knowledge needs of women, it is important to understand their role in agriculture. Women are key in agriculture in Mali, mainly managing subsistence crops for the family, while men manage semi-commercial and commercial crops. Some cropping and processing activities are carried out specifically by women: e.g. shea butter, peanuts (on a small scale), lowland rice (in marginal zones) and maize. Women must usually wait until the men have finished their field work (such as plowing) before starting theirs, due to the lack of access to equipment and tools. Both target groups are taken into account in the Law on Agriculture of Mali and there are dynamic women's associations (or cooperatives) that could be key partners in extension initiatives targeted at women. It should also be noted that women do not own land, so that production of vegetable crops on small plots to earn income would be a good initiative to improve livelihoods.

Young people have their own organizations and also find themselves in other professional organizations. For example one youth association met during the study works towards the reception and reintegration of young rural girls who had been in town as servants. The girls were trained in sewing and hairstyling rather than agriculture allowing them to return to their villages. This idea could be built on.

Box 3: CAECJ – supporting youth initiatives

The Center for Support to collective Entrepreneurship of Youth (Centre d'Appui à l'Entrepreneuriat Collectif pour les Jeunes – CAECJ) is an initiative of the Canadian Cooperation for International Development (Société de Coopération pour le Développement International – SOCODEV) and the Malian Association for Food Security and Sovereignty (AMASSA) that aims to address the problem of youth access to employment and their participation in economic growth. CAECJ operates in Bamako and its suburban areas and targets populations aged 18 to 40, organized in cooperatives or associations, and interested in building a business project. CAECJ has two main objectives:

- To contribute to the acquisition of entrepreneurial skills for the youth.
- To encourage the emergence and consolidation of collective enterprises initiated by youth.

CAECJ provides training and support. The training program is structured around two components: 1) the first is free and is available to start-ups and 2) the second, fee-based, supports functional businesses and those not involved with CAECJ from the beginning.

CAECJ also provides coaching through: information; the provision of a computer room with internet services; a documentation center; and advice service for young people which helps with enabling links with partners; and facilitation of access to finance through development of business plans; mediation between beneficiaries and financial structure and technical and / or financial guarantees. The CAECJ also provides advisory support in the areas of management, accounting, marketing and administration.

3.5 Agribusiness Models

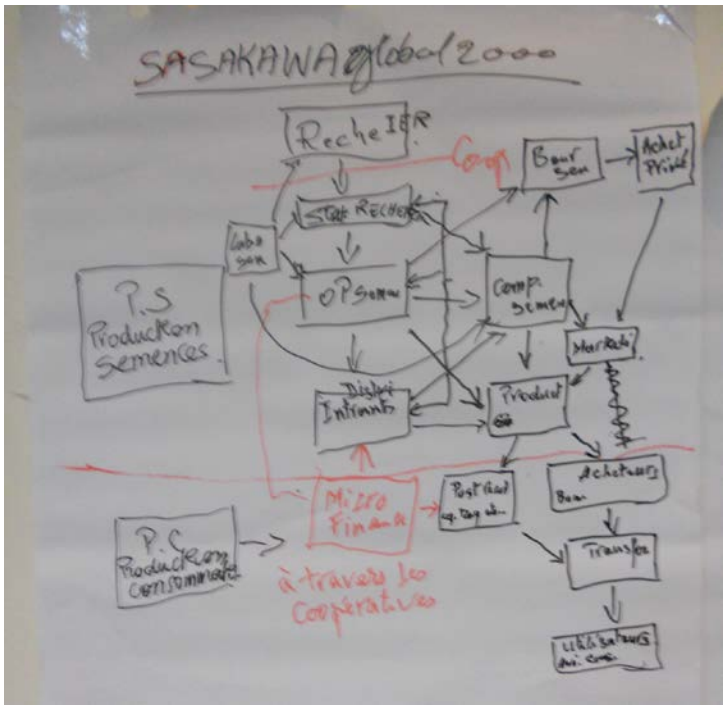
A number of different agribusiness models were identified with farmers either organizing themselves, or are organized by companies buying their products, or intermediaries such as NGOs. The models initiated and led by small producers allow collective sale of the goods produced where market opportunities are created for smallholders. Models driven by buyers include contract farming

and rural retailing. In the intermediary models initiated by NGOs or farmers' organizations, there is a commercial service component including consolidation units and sales. A number of examples are given below, with the roles of different stakeholders in the model being identified.

1) Sassakawa Global 2000 – Maize

Sasakawa 2000 have established an agribusiness model which organizes production of both seed and grain. Stakeholder roles are given in the table below

Stakeholder	**Role**
Sassakawa Global 2000	Provides assistance in connecting stakeholders
Research (IER)	Generation of technology, seed production
Farmers' organizations	Certified seed producers, grain producers, sales
Laboratory (LABOSEM)	Controls production of seeds and certifies the seed under a contract between LABOSEM and IER
Seed companies	Contract with seed companies and IER for production of certified seed and seed distribution; Buying from the farmers' organizations
Agro-dealers	Sales and distribution of inputs
Extension service providers (public, NGOs, private)	Provide advice and technical support
Microfinance institutions	Support cooperatives and organizations involved in seed production with microfinancing for farm inputs and outputs
Traders	Private buyers through the seed stock market
Processors	Manufacture and/or sale of produce for animal or human food
Consumers (poultry farmers, breeders, general population)	Use end product purchased from farmers, traders, or processors



Agribusiness model: Sassakawa Global 2000

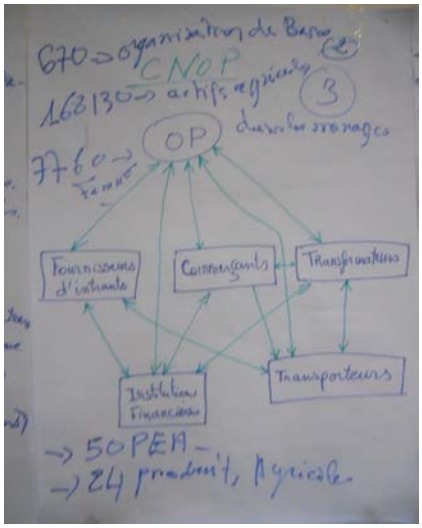
2) *CNOP (Coordination Nationale des Organisations Paysannes – National Coordination of Farmers' Organizations)*

The overall objective of the CNOP is to enable Malian farmers' organizations to contribute to the definition of a clear vision of Malian agriculture and a coherent agricultural policy centered on family farms. CNOP works with the Pôle des Entreprises Agricoles (PEA) or Agricultural Business Clusters to coordinate the actions of the stakeholders throughout the value chain through a synergy of actions. Farmers' organizations, in partnership with IFDC, are implementing PEA to develop trade networks involving different stakeholders including producers, buyers, financiers, transporters and processors. This network will reduce the number of intermediaries involved in the sale of domestic products.

CNOP has 168,130 farm assets, 670 organizations and 54 PEAs. This big organization works on 24 agricultural products. It is intended that the interaction between the different stakeholders instead of being competitive, is beneficial for all within PEA. CNOP is about to create a super PEA for sesame.

The **Development of Agribusiness Clusters in Mali** project (funded by The Netherlands' Directorate-General for International Cooperation (DGIS) aims to increase the number of agribusiness clusters in Mali by 30%, and to build on the strategy of making agro-dealer clusters sustainable – economically, organizationally and environmentally. The project also contributes to business development in rural areas and agri-input distribution. Roles of different stakeholders are given in the table below

Stakeholder	**Role**
National steering committee composed of representatives from CNOP, technical services (DNA),research institutions, input providers, NGOs, banks, civil society, processors, traders, transporters	Orientation, monitoring and control
IFDC	Technical and financial partners
Farmers' Organizations	Implement Agribusiness clusters
Traders	Buying and selling of products
Input providers	Sell/provide inputs
Financial institutions	Provide micro-financing and loans
Transporters	Transport of products and inputs

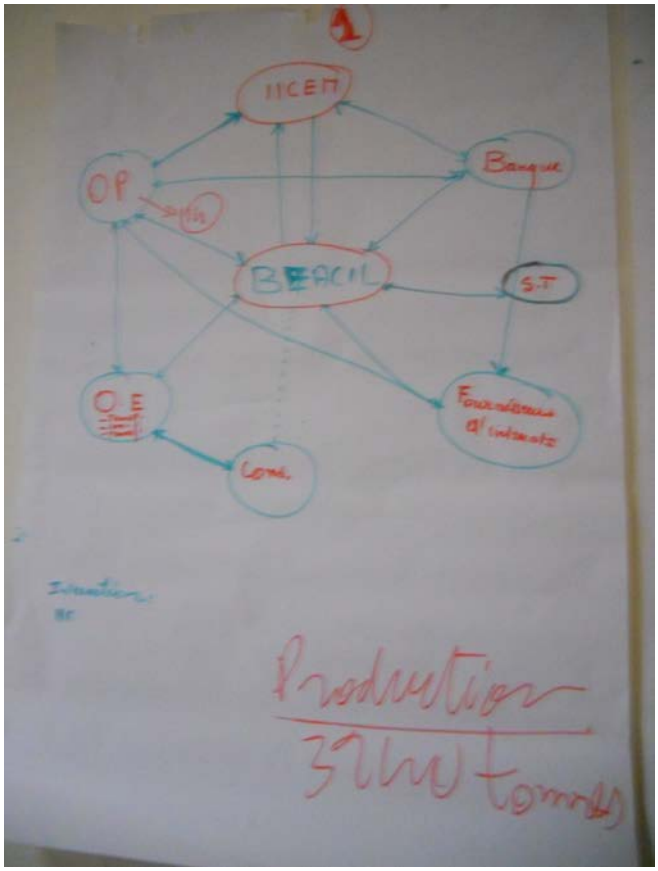


Agribusiness model: case of CNOP

3) *BEACIL (Bureau d'Etudes et Appui Conseil aux Initiatives Locales - Office Studies and Advisory Support to Local Initiatives) – Maize*

This agribusiness model focuses on the agricultural sector, civil and agricultural engineering, management of projects and programs, and good governance and decentralization. BEACIL works with 14 farmers' organizations. Initially BEACIL obtained 3240 metric tons of maize from the 14 organizations. Stakeholder roles are given in the table below

Stakeholder	**Role**
IICEM	Funding partner, contract with BEACIL; guarantee funds for inputs
BEACIL	Selects farmers' organizations that meet required standards (legal, financially solvent); capacity building; locates and secures funding; provides guarantee of fund to the bank; monitors reimbursement of loan; supports and advises farmers' organizations
Bank	Provides funding through loans to farmers' organizations; provides funding through loans to input providers
Technical services (DNA)	Capacity building; provides improved varieties
Farmers' organization	Produce and sell maize, purchase necessary inputs
Economic operators	Involved in transport, marketing, processing
Input providers	Provide/sell required farm inputs; reimbursed through warehouse receipt
Consumers	End purchasers of maize for consumption



Agribusiness model: case of BEACIL

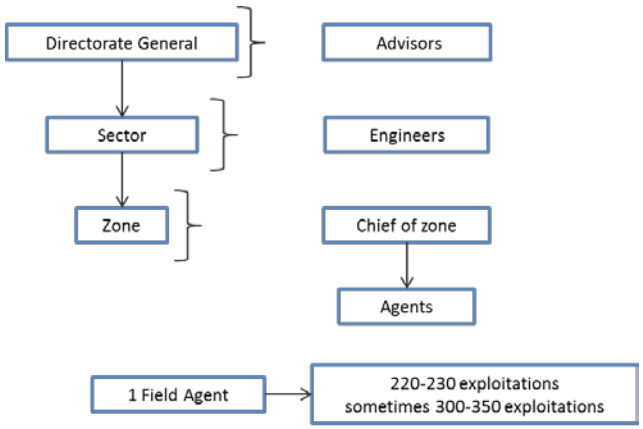
4) *CMDT (Compagnie Malienne de Développement du Textile – Malian Textile Development Company) - Cotton*

CMDT operates south of the river Niger (Dioila cercle, Koulikoro region, Baroueli, Bla and San cercles, Segou region and the entire region of Sikasso) and in the West in Kita cercle, an area of 134,518 sq. km comprising of 6345 villages and hamlets. In their intervention areas, CMDT requires farmers to use one third of the field for cotton and two third for food crops, mainly cereals.

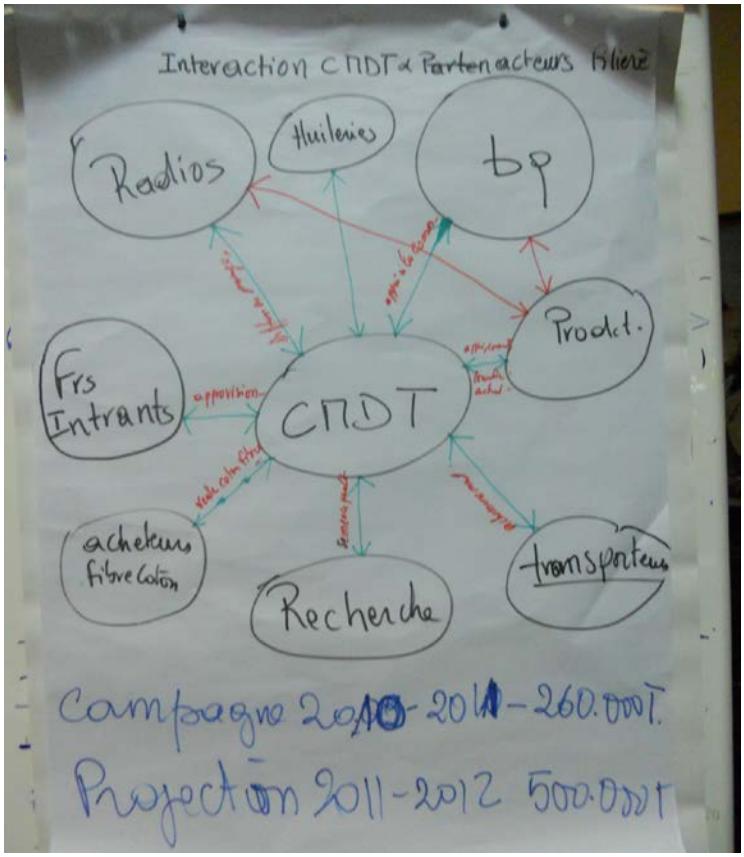
CMDT agricultural advisors are present in villages where they disseminate production and crop intensification techniques and ensure the production of good quality of cotton. CMDT has developed partnerships with producers, organized into cooperatives. Producer representatives participate in tenders for the purchase of the fertilizer and pesticide inputs necessary for cotton, and discuss the purchase of seed cotton, including the price. Cooperative teams organize village markets for weighing individual batches of cotton and loading of trucks. They manage inputs and farm credit. Stakeholder roles are given in the table below and or

Stakeholder	**Role**
CMDT Direction Technical team Laborers Factory	 Planning, management, supervision, monitoring and evaluation, purchase, sales Technical assistance to farmers Handling of ginning factories Buying of cotton seed, oil processing
Producers	Planting, production, harvesting, and making product available to CMDT
Input providers	Provide the necessary farm inputs
Buyers	Purchase of cotton fiber from CMDT
Private transport	Transport from the field to the factory, from the factory to the port, to the field
Research	Creates and makes available new adapted high yielding varieties, respecting the requirements of the market
Banks (consortium)	Financial backing for marketing to CMDT, and to the producers during production
Radio	Large dissemination of information
Malian Government	Regulation of the system

Figure 5: Organization of CMDT



The number of exploitations (enterprises) covered by one field agent is quite high.



Agribusiness model: case of CMDT

In 2010-2011, 260,000 metric tons of cotton were produced. Projected production for the next season is 500,000 metric tons. CMDT used to work with crops such as millet, sorghum and maize in addition to cotton, but following privatization it now works with cotton only.

5) P4P (Purchase for Progress) of the World Food Program

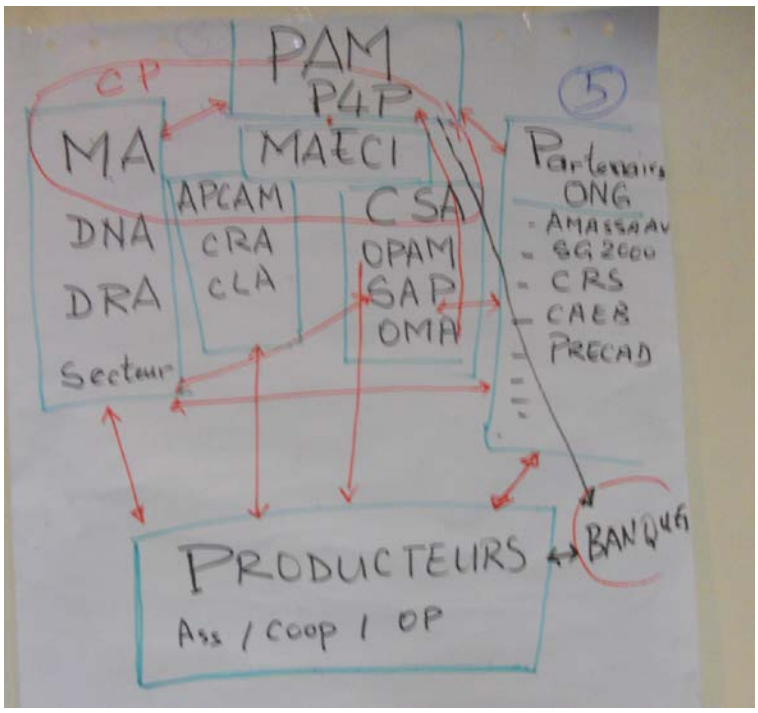
The Purchase for Progress (P4P) initiative is built on three pillars: WFP's demand, supply side partnerships with producers, and learning and knowledge sharing.

WFP is testing innovative ways to purchase food and works to expand opportunities for small farmers with low income, through competitive processes, direct contracting, forward contracting and simplified tendering.

Partnerships that undertake training and capacity building allow small farmers to acquire the skills and experience necessary to become competitive players in agricultural markets and sell their produce, not only to WFP but to others as well. Support is also provided to small farmers in other areas to facilitate access to credit, better understand the markets, and strengthen their organizational and management capacities.

Learning and knowledge sharing will be achieved by identification of best practices that will be mainstreamed into the agency's policies and program practices and shared with other stakeholders. Stakeholder roles are given in the table below

Stakeholder	**Role**
P4P Steering Committee (Ministry of Agriculture (National Directorate, Regional Directorate, Sectors), Ministry of Foreign Affairs, Food Security Commission)	Strategic orientation
NGOs: AMASSA Afrique Verte, SG2000, CRS, CAEB, PRECAD	Contractual agreements, training of producers, monitoring contract implementation contract, support to producers and farmers' organizations
Technical services: DNA and its decentralized services	Advisory services
Regulatory services, OPAM, OMA; SAP	Collect and dissemination of market prices; design of monitoring tools
OPAM	Quantity and quality control
Producers, cooperatives, associations, professional organizations	Provision of crop products
CRA, CLA	Participation in contract agreements and product delivery
Banks	Payment is made through the bank from the P4P program to producers



Agribusiness model: case of P4P

3.6 Monitoring and Evaluation

Monitoring and evaluation is usually only implemented during the life of funded projects. A logical framework (log frame) is established with all the indicator activities to be carried out as well as the expected results. In some institutions (e.g. IER), there are internal and external evaluations. However, sometimes the evaluations are not done regularly, often due to a lack of resources. In some cases, no M&E is done at all. Farm Radio International, through the African Farm Radio Initiative (AFFRI) studied the impact of the use of radio in the diffusion of agricultural information.

4 Drivers of Success and Constraints

4.4 Positive Drivers

- Input subsidies.
- Relatively high price of grain.
- Availability of technologies.
- Availability of incentives for different actors.
- Existence of radio program: “Carnet Rural”.
- Improved information technology and communication.

4.5 Negative Drivers

- Lack of communication between stakeholders.
- Organizations involved in extension operate in isolation.
- Insufficient number of public extension service agents.
- Insufficient resources for the public extension service.
- Illiteracy.
- High cost of using media.

4.6 Effective Methods

Traditional methods such as face-to-face meetings work, though this is not possible all time and it not possible to reach a large audience through face to face meetings. Some stakeholders preferred FFS, while others preferred field visits for demonstration plots. This depended on the people involved, the budget available, the targeted audience, etc.

Table 3: Comparison between FFS and demonstration plots

Farmer Field Schools	Demonstration Plots
• Mobilize farmers for a period of 6 months - no absence accepted • No flexibility in the participation of farmers • Expensive (per diem, food etc.) • Not always acceptable to mix men and women • Will the trainers trained take over the training? • Who should pay for the training of other farmers?	• Not too expensive • Requires few visits • An automated system is developed • Farmers do not always understand the reasons, cannot explain why

The large audience reached by radio means that radios are an effective tool and work well in rural areas. There are radio shows with experts on specific topics where it is possible to call during and/ or after the show. Another very effective use of rural radio stations is to sensitize the population about the use of Pics bags for the conservation of cowpea. The use of radios can be enhanced through training of radio hosts.

New methods (value chains, ICT) are being tested such as the use of tapes and or videos on value chains translated into local languages.

Box 4: Example of an ICT project

The Regional Committee for Consultation of Rural population (CRCR) is composed of several farmers' organizations (216). The CRCR has initiated a project called "Jekafo gèlèkan" which means "talk together under the palaver tree" with the support of IICD, to establish a system of communication, information, dialogue and exchange between the Local Committees for Coordination of Farmers' Organizations (CLCOP), the CRCR and other actors (such as AOPP and CNOP) regarding rural issues. This project has:

- Equipped the CLCOP with computers.
- Connected the CLCOP to Internet.
- Trained leaders of farmers' organizations on the use of computer, data collection and processing.
- Organized an information workshop of radios and other stakeholders in the region.
- Signed contracts with local radio stations for the disseminating of information and the mobilization of producers around rural development issues.

ICT used in the project

The project donated PCs, laptops, printers, photocopiers, a scanner, a camcorder, a digital camera and a computer maintenance package to the CRCR headquarters (Sikasso). For the administrative cercles, 7 CLCOP were also provided with computers and were trained to use them. A total of 80 farmers' leaders including 16 women were trained.An internet connection was installed at the headquarters of CRCR in Sikasso and the CLCOP of Kadiolo, Koutiala and Bougouni. Besides the internet, the project's organizations also use tools including fixed and mobile telephones, community and private radios, TV and Radio Talk time (CARs) for relay activities.

This project had an impact on farmers' organizations through capacity building and succeeded in positioning CRCR as a federal body representing the farmer movement in the Sikasso region. It has also led to the total or partial financial autonomy of the CLCOP. New memberships have been registered.

Training of agro-dealers works but the effectiveness and impact of such training needs to be addressed.

5 Conclusions and Recommendations

5.4 Conclusions

Many actors are involved in agricultural extension throughout the value chain in Mali. Some of these stakeholders were interviewed during the in-country study. This study highlights the relationship between these stakeholders.

It has been found that actions in the field are numerous, varied and often scattered, and that there is a lack of coordination between stakeholders. Advice and support services to smallholders are spread across different ministerial departments, but these organizations often operate in isolation, limiting the effectiveness of the extension services. Other constraints include a lack of coordination between the actors involved through the value chain. There are activities that target women and

youth, however support to these two groups needs to be enhanced, for example by facilitating access to credit or agricultural equipment. The use of ICT could be optimized.

It is important to build on existing technical capabilities within public extension services and provide the extension workers with the means necessary to be fully operational. Private and civil society extension providers are growing in number and this capacity should be used. It is necessary to continue to develop the value chain including for crops produced by smallholders. It is essential to have capacity at all levels. There are several extension methods which may complement each other. For example while radios are good are at disseminating agricultural information, a demonstration plot is necessary to see how things operate on the ground. Physical contact between extension workers and farmers remains necessary.

5.5 Recommendations

Recommendations were made regarding what needs to be done and who should AGRA work with.

What needs to be done.

- Create synergies between projects (within AGRA and also with others).
- Establish coordinated activities between stakeholders.
- Improve or enhance sharing and knowledge exchange.
- Create a framework for consultation for stakeholders.
- Work with all extension service providers: public, private and civil society.
- Encourage other service providers, including those from the private sector.
- Make an inventory of all extension services providers.
- Monitor and evaluate service providers.
- Develop value chains.
- Strengthen capacity at all levels.
- Use extension approaches that work well, especially those that complement each other.
- Expand the range of services provided (e.g. plant clinic).
- Enhance communication of extension messages, through better use of TV, radio, brochures, posters, leaflets, megaphone announcement in public places etc.
- Facilitate women's access to extension services.
- Enable women’s access to credit and subsidies.
- Emphasize training of extension agents.
- Subsidize rural communications.
- Coordination, technical supervision and quality control should be the responsibility of the government.

At an agricultural school in Sikasso

The agricultural schools should produce well trained youngsters, including with adequate training in the use of ICTs, so that they continue to work in the agricultural field. Young unemployed graduates can be retrained for jobs in agriculture, though this has been tried before and failed because the young people returned to the cities. Therefore attention must be paid to rural youth to sensitize them to agricultural opportunities. In addition those people that spray plantations could be trained to provide other services.

Who should AGRA be working with

The Alliance for a Green Revolution in Africa should work with all stakeholders involved with agricultural extension.

Extension services providers. The public extension service of the National Directorate of Agriculture (DNA) and its decentralized services should be included. Since the public extension service also works on contract with some NGOs or projects, that option could also be used. However, it is necessary to build the capacity of the agents through refresher courses to ensure that the information provided to the farmers is correct and up-to-date. Monitoring and evaluation of the services provided is a key element. Apart from the public extension service, both private and civil society extension service providers should also be considered. A good monitoring and evaluation system should be put in place.

Research institutions (example: IER, INSAH). Without research, there will be no technologies. AGRA should continue to support research that addresses the needs of the rural population. A need to follow the concept of International Agricultural Research for Development (IAR4D) in research was also suggested during the workshop.

Universities, institutes and schools. Extension services are also provided by universities. Additionally, these institutions are involved in training. Relevant technologies or approaches can be taught to students or school children if included in the curricula. To quote one professor from the stakeholders' workshop: "a place of choice should be given to the quality of the training given to the extension agents".

Media. Working with radio stations is essential.

NGOs. AGRA should work with selected NGOs such as the Netherlands Development Organization (SNV), FRI, CNFA and Kilabo.

Input suppliers - dealers . Trained input dealers or suppliers can help in the delivery of agricultural extension services. AGRA should therefore work with these actors.

Farmers' organizations. Some farmers' organizations are involved in agricultural extension. However, they usually rely on the agents from the Ministry of Agriculture. AGRA could work with some farmers' organizations based on an evaluation of their past activities.

WFP (P4P). AGRA should work with the P4P project of the World Food Program (WFP) in Mali.

FAO. This organization carries out several projects in Mali. Collaboration between AGRA and FAO is encouraged.

Opinion on draft ESF objectives based on in-country experiences:

The draft ESF objectives are as follows:

- Strengthen synergy and collaboration within AGRA programs and with other projects through joint development, resource mobilization, programming and implementation of extension activities.
- Facilitate uptake and up-scaling of farmer ready technology and practices through approaches including farmer groups and farmer organizations.
- Increase smallholder farmers' and particularly female farmers' access to extension services, through strengthening their capacity to demand the services.
- Leverage information and communication technologies (electronic and print media) to enhance access to markets, credit, consumer demand and other factors.
- Monitor uptake of interventions through continuous diagnosis and learning, data-base building and using feedback for improvements.

- Explore ways of integrating youths and young graduates (particularly female) in activities along the agricultural value chain.

These objectives are relevant and can be achieved. During the course of this study, we were informed about some of the on-going projects/programs. There are many more that we may not be aware of. It is essential to have such information in order to strengthen synergy and collaboration between them. In the same way, extension activities are conducted by different types of extension service providers (pubic, private and civil society). These activities need to be monitored and evaluated.

Extension advice and support is scattered throughout different ministerial departments or even different ministries. It is important to know what is being done and by who. This information needs to be made accessible through, for example, the creation of a database.

There are technologies which are already available that farmers do not know about and are not yet using. Therefore facilitating the uptake of these technologies and others that will be developed will contribute to improving the livelihoods of the farmers.

A greater and better use of should be made information and communication technologies. And finally, women and youth are still falling behind in development of their livelihoods and their involvement in the agricultural value chain should be facilitated.

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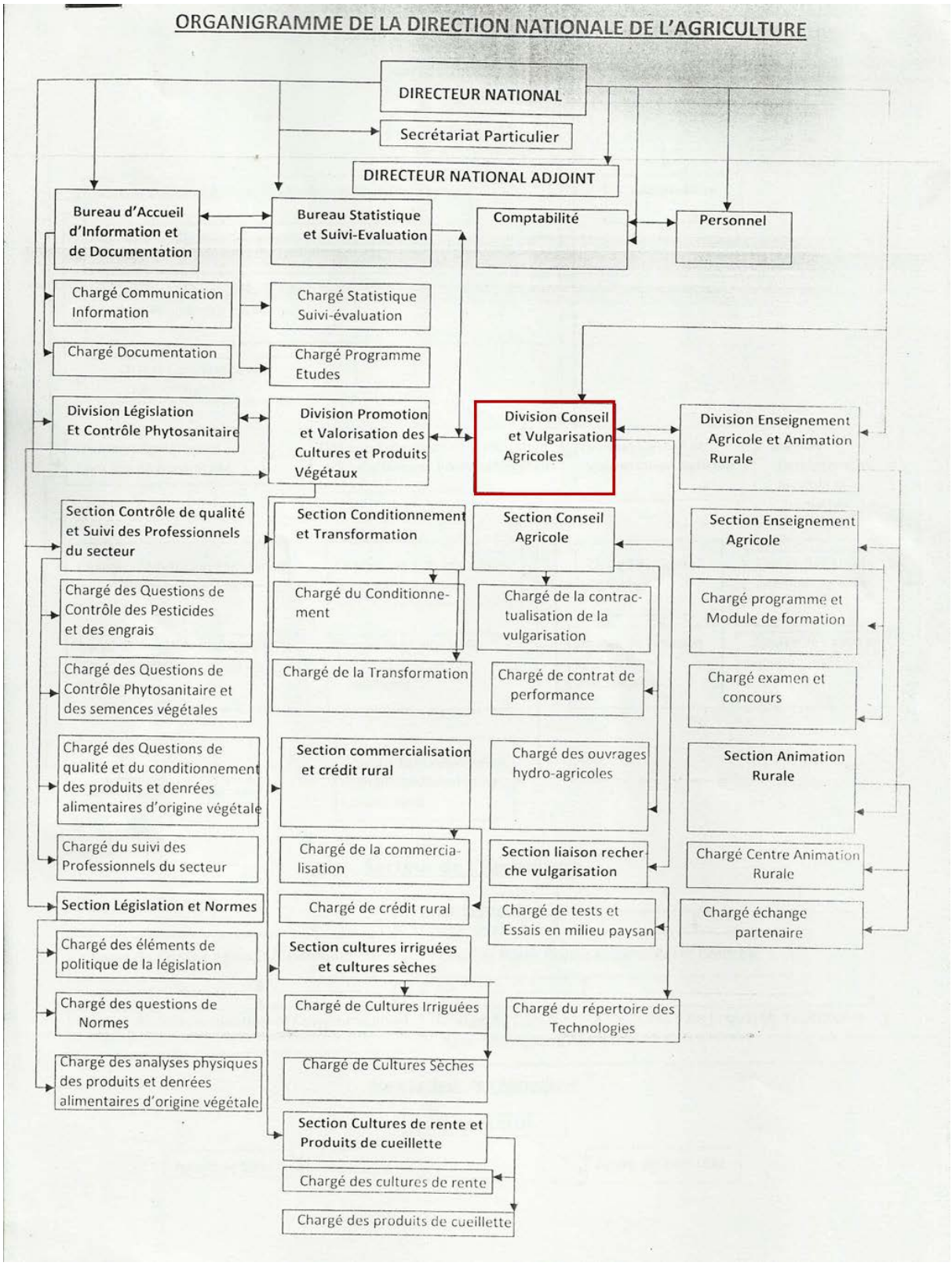
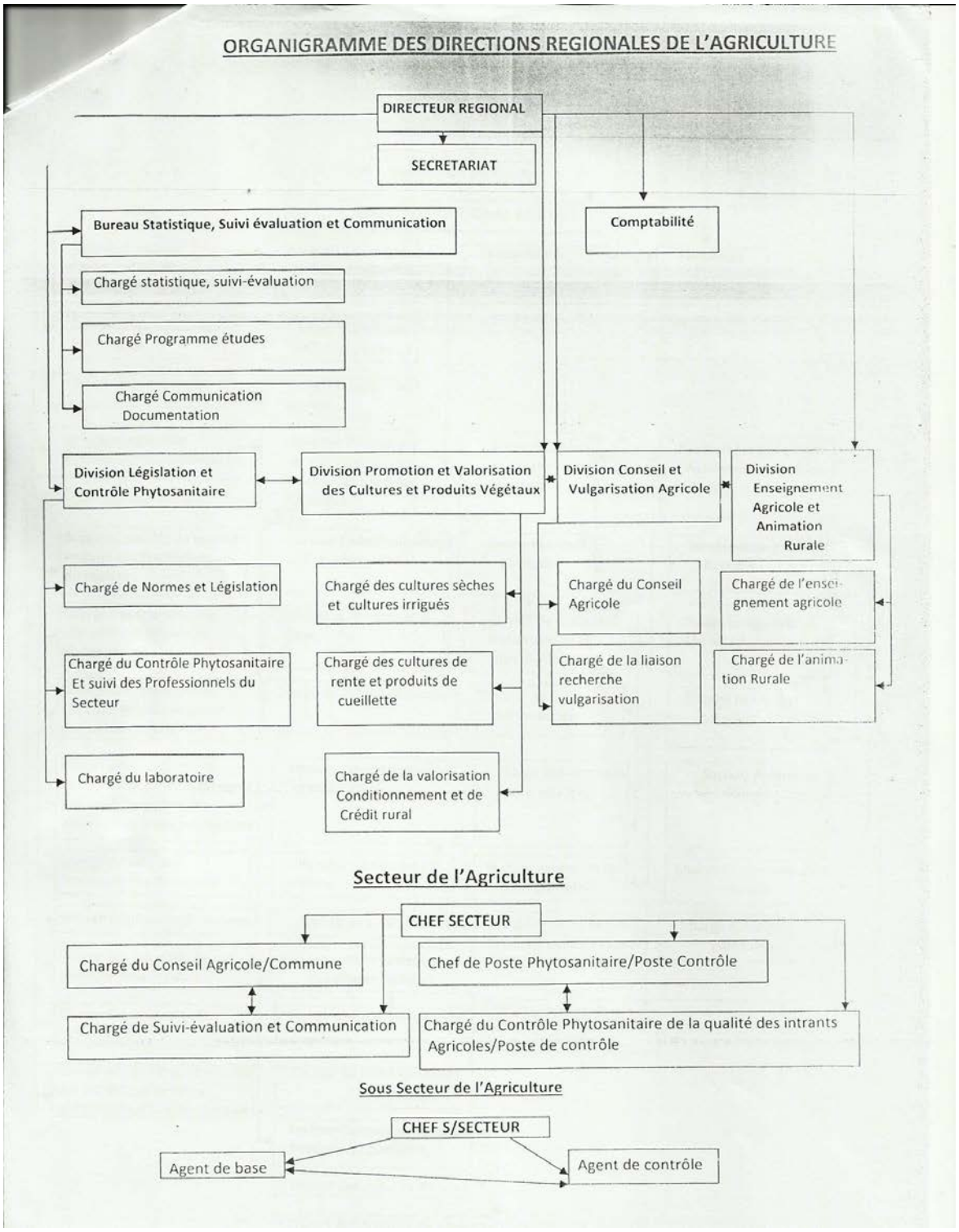
Appendix 2: Organization of the National Directorate of Agriculture



Appendix 3: Organization of the Regional Directorates of Agriculture



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Appendix 5: Itinerary

23 January	Arrive in Bamako for the country study
24-28 January	Interviews in Bamako
28 January	Interview in Katibougou
29 January	Interview in Bamako
31 January	Departure for Sikasso; interviews in Bougouni and Niena
1 February	Interviews in Sikasso
2 February	Departure for Bamako; interviews in Bamako
3 February	Contact other stakeholders
4 February	Interviews in Bamako
5 February	Departure for Abidjan
1 March	Arrive in Bamako for the AGRA Stakeholders' Workshop
2 March	Preparation of workshop with AGRA and CABI
3 March	AGRA Stakeholders Workshop
4 March	Departure for Abidjan

Appendix 6: List of participants – Stakeholders Workshops, Bamako, 3 March 2011

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AGRICULTURAL EXTENSION IN MOZAMBIQUE

Report of a study commissioned by the Extension Support Function Program of the Alliance for a Green Revolution in Africa (AGRA)

Dr George Oduor

February 2011

Table of Contents

Acronyms

ADEM	Agencia de Desenvolvimento de Manica (Development Agency of Manica)
ADPP	Ajuda de Desenvolvimento de Povo Para Povo (Development Aid from the People for the People)
AGRA	Alliance for Green Revolution in Africa
AIS	Agricultural Innovation System
AKIS	Agricultural knowledge and information system
ASIP	Agricultural Sector Investment Program
ASP	Agricultural Service Providers
ASP	Agricultural Support Program
AUSAID	Australian Government Overseas Aid
CAADP	Comprehensive Africa Agriculture Development Program
CBOs	Community Based Organizations
CdM	Council of Ministers
CENACARTA	National Cartography and Teledetection Center
CEPAGRI	Agricultural Promotion Center
CLUSA	Cooperative league of the USA
CTA	Federation of Economic Associations of Mozambique
DANIDA	Danish International Development Agency
DE	Directorate of Economics
DECA	Desenvolvimento e Comercialisaçao Agricola Limitada (Agricultural Commercialization and Development Ltd)
DFDTT	Department of Training Documentation and Technology Transfer
DFID	Department for International Development
DNDR	National Directorate of Rural Development
DNEA	National Directorate of Agricultural Extension
DNER	National Directorate of Rural Extension
DNSA	National Directorate of Agricultural Services
DNSV	National Directorate of Veterinary Services
DNTF	National Directorate of Land and Forestry
DPA	Provincial Director of Agriculture
EMBRAPA	Brazilian Agricultural Research Corporation
EMP	Extension Master Plan
ESF	Extension Support Function
EU	European Union
FAO	Food and Agriculture Organization
FD	Field Demonstration
FDA	Agricultural Development Fund
FFS	Farmer Field School
FO	Farmers' Organization
GDP	Gross Domestic Product
GFP	Gender Focal Point
IAM	Cotton Institute of Mozambique
IARC	International Agricultural Research Center
IFAD	International Fund for Agricultural Development

IIAM	Institute of Agricultural Research of Mozambique
IKURU	*Name of a farmers' cooperative – the word means "strength"*
INCAJU	Cashew Nut Promotion Institute
INE	National Institute of Statistics
INFATEC	Land Administration Training Institute
INFOCOM	Informaçao Comercial e Mercados (Commercial and Market Information)
IPEME	Institute for the promotion of Small and Medium Enterprises
ISFM	Integrated Soil Fertility Management
JFFLS	Junior Farmer Field and Learning Schools
JVC	Joint Venture Company
KULIMA	*Name of an NGO – the word means "to plough" or "to till"*
M&E	Monitoring and Evaluation
MINAG	Ministry of Agriculture
MoU	Memorandum of Understanding
NEPAD	New Partnership for Africa's Development
NGO	Non Governmental Organization
PAPA	Plano de Acção da Produção Agrícola (Food Production Action Plan)
PARPA	The Action Plan for the Reduction of Absolute Poverty
PEDSA	Plano Estratégico de Desenvovimento do Sector Agrário (Strategic Plan for Development of the Agricultural Sector)
PO	Producers' Organizations
PROAGRI	National Agricultural Development Program
PROMER	Rural Markets Promotions Program
PRONEA	Programa Nacional de Extensão Agrária (National Agricultural Extension Program)
P4P	Purchase for Progress
REPETE	Periodic Technology Review Meeting
SDAE	Serviço Distrital de Actividades Economicas (Office of the District Service for Economic Activities)
SIMA	Agricultural Market Information System
SISNE	National Extension System
SME	Small and Medium Enterprise
SMS	Subject Matter Specialist
SPER	Provincial Extension Service
SUE	Unified Extension System
SWAP	Sector Wider Approach Program
T&V	Training and Visit
TIA	MINAG's Agricultural Household Survey
UCAMA	Provincial Union of Farmers of Manica
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WFP	World Food Program

Executive Summary

To assist in the development of an effective ESF that will integrate extension activities across AGRA programs and also link these programs to ongoing extension activities in Africa, AGRA commissioned this in-country study in Mozambique. The study was conducted in Maputo city, Manica and Sofala Provinces between 30th January and 13th February and the results presented at an evaluation stakeholder workshop held on 24th February 2011 in Mozambique.

With a total area of 799,380 km^2 and a population projected to be 21.7 million by October 2010, Mozambique has a relatively low population density. Agriculture is dominated by 3.2 million small scale farms (family sector) with an average size of 1.1 ha of farm land (PROAGRI, 2004). Agriculture plays an important role in rural employment generation, as well as contributing to household and national food security and is central to the economy accounting for 20% of GDP and 80% of exports. Agricultural development is fundamental for poverty reduction, as rural families generate about 80% of their income from the agricultural sector. The principal cash crops are cotton, cashew nuts and tobacco, and the main food crops are maize, cassava, sorghum, rice and beans. Agricultural productivity is low due to the low use of modern inputs or mechanization.

Mozambique has produced several policy documents which aim at improving the agricultural sector. The Action Plan for the Reduction of Absolute Poverty, PARPA I and II, (2006-2005 and 2006-2009) was to reduce absolute poverty from 70% in 1999 to less than 60% in 2005 and less than 50% in 2010. The National Agricultural Development Program [*Programa de Agricultura*] (PROAGRI I and II) was set up to address the lack of harmonization and fragmentation of donor intervention in the agricultural sector. The IFAD-funded National Program for Agricultural Extension (PRONEA) aims to reform the government-based extension system towards the promotion of a new extension approach based on enhanced participation of the target group in service provision, decentralization of services to district level and partnership with other actors including through outsourcing. The Extension Master Plan (EMP) (2007–2016) formulated under PROAGRI II provides the strategy framework for the implementation of PRONEA program. Based on the prevailing challenges, the extension system is developing on the basis of three main principles; (i) decentralization of the services to district level; (ii) enhanced participation of the target group in services provision; and, (iii) partnership with other actors, also through outsourcing. Two main pillars for the organization of agricultural extension have been the National Extension System (SISNE), in which different extension providers from the public and private sector have a role; and the Unified Extension System (SUE) of the Ministry of Agriculture in which all agricultural services operate through a single extension officer contacting farmers in a particular area of operation.

A number of institutions provide extension services directly or indirectly. These include the public sector (government research, training, regulatory bodies etc.), the private sector (NGOs, commercial farms, financers, international development organizations) as well as the farmers (as individuals or groups). The direct suppliers of extension are the 2,238 SISNE extensionists as well as the NGOs who deal directly with the farmers.

The training and visit (T&V) approach of extension is the oldest, having been introduce by the World Bank in 1988, and although conditions forced it to be modified in 1992, this approach appears to be in its sunset days as it is non-participatory and expensive. By 2010 over 28,000 families were using this approach. The more participatory approach of Farmer Field Schools (FFS) first introduced in 2003 by FAO was institutionalized in the EMP and there are currently 1,115 schools in 12 districts. The new initiative of Junior Farmer Field and Learning Schools (JFFLS) targets youth with information on agriculture and other sectors (e.g. health) with a hope that the youth will influence their parents to practice what they have learned at the JFFLS. There are currently more than 54 JFFLS in Manica and Sofala Provinces targeting over 100 orphans and other disadvantaged children. Other approaches include on farm trials of which there are 685, field demonstration plots (152,880), farmer-to-farmer exchanges and the use of print and electronic media.

Most of the changes in the extension system came as part of PROAGRI, and include a minimum education requirement for extensionists (tecnico medio-diploma), a pluralistic extension system which allows for competition and participation of the private sector as well as smart subsidies (voucher program) which increases the access of smallholder farmers to inputs such as fertilizer and certified seeds.

Farmers considered informal farmer-to-farmer interactions, radio and agro-dealers as their main source of agricultural information. Extensionists received their information mainly from researchers (although the researcher/extensionist linkages were found to be weak), and the radio. Agro-dealers receive their information from the manufacturers of the inputs they sell. This is the information they pass on to farmers who come to procure the said inputs. Researchers tend to rely on their own research and that of their counterparts as the main source of information.

Gender and youth are recognized as an important issue in extension. Under PROAGRI, a Gender Unit was established at the Directorate of Economics, and Gender Focal Points established at provincial and district levels all with a view to mainstreaming gender in all government programs. Shortage of funds and staff makes the functioning of this unit very difficult. There is also a youth focus, as is indicated in the establishment of JFFLS. In addition ADPP and ADEM NGOs in Gondola District (Manica Province) are currently financing clubs which are training 184 farmers (mostly young) in activities aimed at improving the livelihoods of the clubs' members.

Commercialization of agricultural produce continues to be a major challenge to farmers. However a number of agribusiness models are being tried to improve the links between the farmers and the market. The most successful model has been the formation of IKURU, a Mozambique owned agri-trading processing and exporting company based in Nampula. This cooperative is owned partly by farmers and by private investors. No evidence of such a structured and functional cooperative was seen during the study, although CLUSA, an NGO which participated in the formation of IKURU has opened an office in Chimoio (Manica Province), hoping to develop similar cooperatives in the Beira Corridor, learning from previous mistakes. Another model is the input driven approach in which commodity based companies (cotton, tobacco, and cashew) supply farmer associations with inputs such as fertilizer, pesticides, certified seeds and technical advice. These farmer groups then contractually sell their produce to the said companies, having a guaranteed market. This model is also used by seed companies that contract farmers to multiply and then resell the seeds to these companies. A final model is the innovative Purchase for Progress (P4P), which relaxes the procurement requirements to make it easier for small holder farmers to participate in selling produce to WFP.

Whereas most international organizations use the logframe method in monitoring and evaluation (M&E), public institutions rely on the specific sections of the provincial and district administration charged with M&E. This follows the development of annual workplans and budgets and monitoring by supervisors. Recent studies on the impact of extension services on agricultural productivity and livelihoods of farmers have shown pessimistic results.

A number of positive and negative drivers to agricultural extension were identified. Supporting drivers include favorable written policy documents and laws; pluralistic extension approaches allowing private sector participation; smart subsidies; recognition of farmer associations as a critical driver of agricultural development and vast unexploited agricultural potential. Negative drivers are poor working terms for public extensionists; weak research-extension and inter-institutional linkages; weak marketing systems; lack of affordable credit and loss of qualified trained public staff due to transfer to administrative posts or to better-paying NGOs.

Recommendations on how the extension system can be improved are given.

1 Introduction

1.1 Background

The Alliance for a Green Revolution in Africa (AGRA) has identified the need for an Extension Support Function (ESF) to contribute to the integration of extension activities within AGRA programs and enhance linkages with national extension systems and other extension initiatives in the countries where they work. AGRA sees these linkages as important to ensure increased awareness and accelerated uptake of farmer-ready green revolution technologies and practices, taking into account the unique needs of women and young farmers. Draft objectives for the ESF include the following:

- Strengthen synergy and collaboration within AGRA programs and with other projects through joint development, resource mobilization, programming and implementation of extension activities.
- Facilitate uptake and up-scaling of farmer ready technology and practices through approaches including farmer groups and farmer organizations.
- Increase smallholder farmers' and particularly female farmers' access to extension services, through strengthening their capacity to demand the services.
- Leverage information and communication technologies (electronic and print media) to enhance access to markets, credit, consumer demand and other factors.
- Monitor uptake of interventions through continuous diagnosis and learning, database building and using feedback for improvements.
- Explore ways of integrating youth and young graduates (particularly female) in activities along the agricultural value chain.

These studies aim to gain a detailed understanding of the context and extension needs of the chosen breadbasket areas within each of the countries. This information will then be used as a base on which to take decisions on where the funding should be directed and what specific activities would support an improved extension function across the AGRA programs. The objectives of the in-country study were to establish the state of extension services, with a focus on the institutional arrangements for delivery of extension; policy directions and their impacts on extension; methods and approaches used; agribusiness models that enhance the delivery of extension, and the targeting of extension to ensure increased and sustainable crop productivity.

1.2 Methods used

The in-country study was conducted between 31st January and 11th February 2011, with an additional interview done on 25th February 2011 (Appendix 1). Methods used to collect information for the study included a desk review of relevant literature, key informant interviews, stakeholder consultations and focus group discussions. The first few days focused on the capital Maputo which hosts the heads of government ministries, departments and research institutes as well as the head offices of donors, NGOs, international agricultural research centers (IARCs) and agribusiness organizations. Field visits were then made to the breadbasket region of the Beira Corridor. This includes the city of Beira and rural district of Gondola (Sofala Province) as well as the city of Chimoio and rural districts of Gondola and Manica (Manica Province).

Fig 1. Sites visited – 4 (Manica Province), 5 (Maputo City) and 9 (Sofala Province)

2 Country Policy and Institutional Context

2.1 Agricultural Economy

Government support to the agricultural sector has focused on three main strategies, the Green Revolution (2007), the Food Production Action Plan (Plano de Acção da Produção Agrícola, PAPA, 2008-2011) and the Strategic Plan for Development of the Agricultural Sector (Plano Estratégico de Desenvolvimento do Sector Agrário, PEDSA, 2009-2019). These initiatives have led to increased investment in the sector, enhancing domestic production of the main food staples, market integration between regions and agricultural value chains, which has reduced the country's reliance on imported food commodities. One objective of PAPA's strategy is to enhance the country's storage capacity, which is cited as a key obstacle preventing small scale farmers participating in the commercial maize market as well as restricting an increase in inter-regional trade. Currently, both private and public national capacity (silos and warehouses) is estimated at 560,735 metric tons. However, there is still a need for the construction of small scale rural silos to incorporate farmers into the market system, allowing them to store maize until prices rise. The government is planning to increase storage capacity by 143,000 metric tons by 2012.

With a total area of 799,380 km^2 and a population projected to reach 21.7 million by October 2010, Mozambique has a relatively low population density. The most populated provinces are Nampula in the north and Zambezi in the center, which, combined, account for nearly 40 % of the total

population (70% of which is rural). Mozambique is divided into 10 provinces, 33 urban municipalities, 128 rural districts, 394 sub-districts (postos administrativos), 1,071 localities (localidades), and 10,025 communities (comunidade povoacoes). The total area of arable land is estimated at around 36 million hectares, of which only about 9 million hectares are currently under cultivation (PROAGRI II, 2004). However, as agricultural systems are predominantly rain fed, production can fluctuate widely from year to year. According to the Ministry of Agriculture (MINAG), the existing potential for irrigation, where basic infrastructure requirements are already in place, is 120,000 hectares. However, only 55,000 hectares are used at present; about 35,000 ha. are under sugarcane and most of the remaining 20,000 ha. are under rice and vegetables.

Agriculture is dominated by 3.2 million small scale farms (family sector) with an average size of 1.1 ha. of farm land (PROAGRI, 2004). Agriculture plays an important role in rural employment generation as well as contributing to household and national food security and is central to the economy accounting for 20% of GDP and 80% of exports. An estimated 80% of the workforce is in the agriculture sector, 95% of the women and 66% of the men. Poverty is greater in rural areas (55%) than in urban areas (52%). Rural poverty is primarily attributable to limited agricultural development, limited market development and poor productivity levels. Agricultural development is fundamental for poverty reduction, as rural families generate about 80% of their income from the agricultural sector.

Tree crops, especially coconut and cashew, grown by small farmers are an important source of foreign exchange earnings, and contribute to household food security. Other major cash crops grown by small farmers include cotton and tobacco. These cash crops, along with oilseeds, tea, citrus and horticultural crops (particularly tomatoes), offer alternative sources of income to the small farmers in inland districts, where coconuts and cashews are not grown. On a larger scale, about 40,000 hectares of industrial sugarcane plantations (35,000 under irrigation) are grown at four operational sites in Maputo (2) and Sofala (2) provinces surrounding the sugar mills. Sugarcane production has increased rapidly from 386,000 metric tons in 1998 to approximately 3 million metric tons in 2010 as a result of improved production practices and an increase in the area planted.

Maize and cassava are the major staples; other food crops include sorghum, beans, groundnuts, millet and rice. Cassava is grown mainly in the north where it is the main food staple, and it is being introduced, along with sweet potatoes, under a government initiative in drought-prone areas throughout the country. The area under sweet potatoes is also increasing.

Most crop yields in Mozambique are low. The use of modern inputs (improved seeds, fertilizers and pesticides) and mechanization is almost non-existent (less than 2% of farmers use fertilizers or pesticides, 5% use animal traction and less than 10% use some form of agricultural equipment) (PROAGRI I, 2004; p21, ASP, 2005). The use of purchased inputs is limited to a small number of modern farm enterprises growing cash crops and vegetables and to out-growers of tobacco and cotton, producing crops on contract. The yields of cereals grown for subsistence are generally low, and losses in the field and stores are high.

Cattle, goats, sheep are reared in extensive grass-based systems and at such low stocking rates that body conditions are generally excellent.

2.2 Extension Policies

The current MINAG has undergone several transformations from the time it was referred to as Ministry of Planning, Finance, Agriculture & Rural Development, then Ministry of Agriculture, then Ministry of Agriculture and Rural Development and now MINAG.

The main objective of Mozambique's Action Plan for the Reduction of Absolute Poverty, PARPA I and II, (2006-2005 and 2006-2009) was to reduce absolute poverty from 70% in 1999 to less than 60% in 2005 and less than 50% in 2010. This was to be achieved by prioritizing the promotion of human development and the creation of a favorable environment for a rapid, inclusive and broad-based

growth in education; health; agriculture and rural development; basic infrastructure; governance and macroeconomic and financial policies. In agriculture, the two main pillars that were targeted were in empowering producers to increase productivity and transforming the role of public institutions.

Since most of the country's poor depend on the agriculture sector (directly or indirectly) for their livelihoods, broad-based productivity increases in the sector are seen as an effective way of reducing poverty. Modernization of the sector and productivity growth raises the incomes of smallholder farmers and creates jobs in related industries that are labor intensive, e.g. processing and marketing. In the mid-1990s, donors funded 90% of all public expenditure in agriculture and natural resources. This was done through a complex web of about 350 separate projects, pulling agricultural public investment and programs in several awkward directions (PriceWaterhouse Coopers, 2007). The large number of projects put an even greater strain on the weak managerial capacity within MINAG.

The National Agricultural Development Program [*Programa de Agricultura*] (PROAGRI I and II) was set up to address the lack of harmonization and also fragmentation of the donor's intervention in the agricultural sector. PROAGRI I was funded by a wide range of donors including AUSAID, DANIDA, DFID, FAO, IFAD, UNDP, World Bank and USAID. Under the framework of an Agricultural Sector Investment Program (ASIP), PROAGRI was developed to reform MINAG. Donor consensus on the process meant this program represented one of the first sector wide approach programs (SWAP) in southern Africa. The ambitious PROAGRI I ran from 1998 to 2004 with goals including promotion of poverty reduction; decentralization and empowerment of stakeholders; good governance; a market-oriented policy; mainstreaming gender and HIV/AIDS issues and environmental sustainability. The three priority areas of the program were i) institutional reform and modernization, ii) the reinforcement and development of the capacity of public services to support agriculture, livestock production, forests and wildlife and iii) sustainable management of natural resources, farming land, wildlife, water and forests. These were to be delivered through eight components namely institutional development, support to agricultural development, livestock development, extension services, research, land management, irrigation and forestry and wildlife.

PROAGRI I was particularly focused on carrying out important institutional changes in MINAG and a major success was in the establishment of management procedures for planning, budgeting and financial control within MINAG (PriceWaterhouse Coopers, 2007). The improvement in management capacity was the result of improved working conditions and environment, improved staff qualifications, an increase in staff allocated to provincial level activities and better services offered by MINAG. PROAGRI I also helped MINAG in the redefinition of its core functions, organization and approaches within the framework of a market economy and decentralization. However, despite these positive results, there is no evidence that these institutional changes translated into an improvement in agricultural performance, or increased the government's capacity to promote pro-poor, demand driven services (Cabral et al, 2007), leading to the World Bank and USAID withdrawing their financial support after a review done by PriceWaterhouse in 2006.

However, the remaining donors signed a MoU with the Government of Mozambique for the implementation of PROAGRI II (2006-2010) in 2007 with a different strategy emphasizing the importance of supporting decentralization and promoting demand-driven service provision and recognizing the need to coordinate interventions in the sector outside the mandate of MINAG – e.g. markets, rural infrastructure and financial services. The objectives of PROAGRI II were (a) to build on the institutional strengthening achievements of PROAGRI I and complete the reform of the Ministry of Agriculture and the transformation of its operating modalities; (b) to improve the capacity at province and district level for agricultural planning and program implementation in connection with the interventions supporting district decentralization; (c) to encourage and foster the evolution of farmer groups and associations and their partnerships with appropriate public, private and NGO sector agencies as service providers and/or enterprise partners; and (d) to translate these improvements as effectively as possible into direct, tangible and meaningful benefits and impact, the

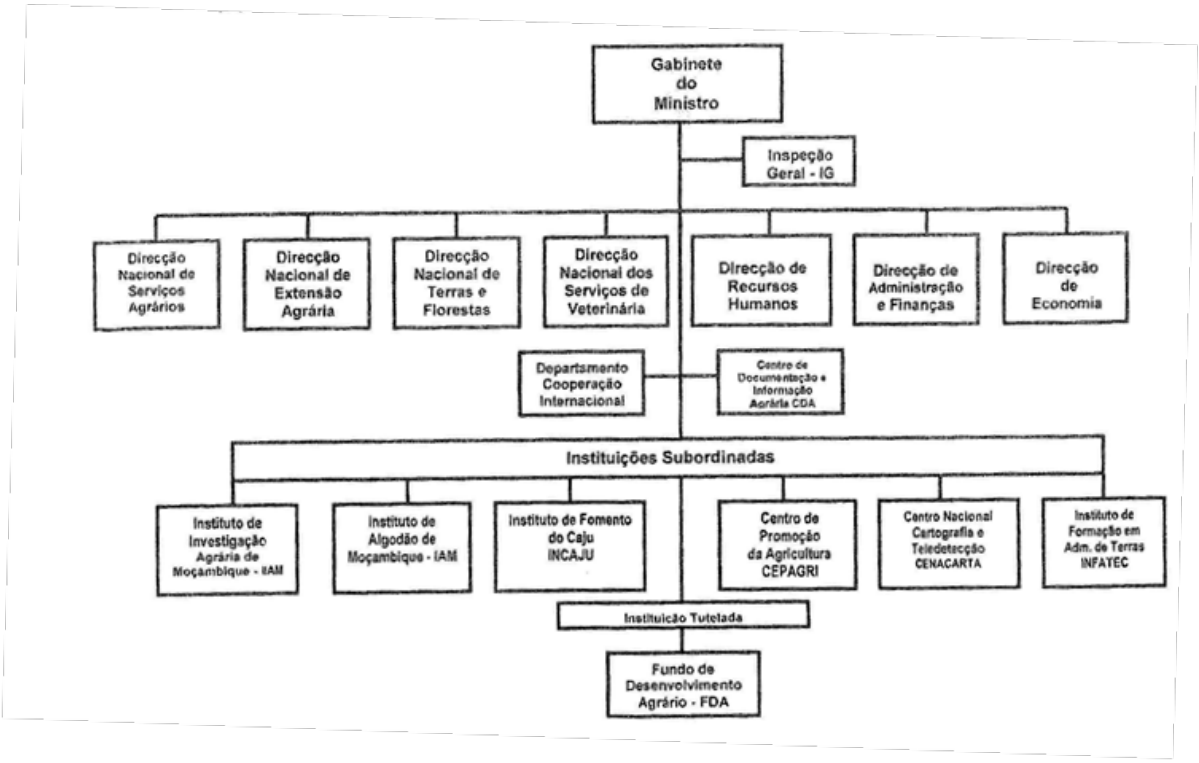
highest priority being given to accelerating the implementation of directly productive interventions at the small and medium farm and household level. MINAG was responsible for the implementation of PROAGRI II and for ensuring that the objectives of the program are consistent with those of PARPA II.

PROAGRI II has stimulated changes which are in line with NEPAD's focus including decentralizing responsibility and funding for field extension services, contracting or outsourcing some or all field extension services; sharing costs between national and local government farmers and systematically monitoring and evaluating programs and their impacts.

The structure at the Ministry of Agriculture

The government structures have increasingly been decentralized with an emphasis on the role played by districts in district development plans (including agriculture), based on plans made by the Community Development Committees. MINAG has undergone several changes, which continue to date. MINAG is composed of seven directorates namely i) National Agricultural Services (DNSA), ii) National Directorate of Agricultural Extension (DNEA), iii) National Directorate of Land and Forestry (DNTF), iv) National Directorate of Veterinary Services (DNSV), v) Human Resources, vi) Administration and Finance and vii) Economics (see Fig 2). Within MINAG there are also subordinate institutions which undertake research, regulatory and other services including i) Agricultural Research Institute of Mozambique (IIAM), ii) Cotton Institute of Mozambique (IAM), ii) Cashew Nut Promotion Institute (INCAJU), iii) Agricultural Development Fund (FDA), iv) Agricultural Promotion Center (CEPAGRI), vi) National Cartography and Teledetection Center (CENACARTA) and vii) Land Administration Training Institute (INFATEC).

Fig. 2 Organizational structure of Ministry of Agriculture



Extension Services in Mozambique

Agricultural extension falls under DNEA whose organizational structure is as indicated in Figure 3. It operates in close collaboration with the other directorates. The DNEA links with the Provincial Rural Extension Services (SPER) under the Provincial Director of Agriculture (DPA) in each province. The SPER in turn links with the Office of the District Service for Economic Activities (SDAE) as shown in

Figure 4, under the District Director of Agriculture in each district (Fig 5). SDAE is quite a diverse office composed of six sub-offices, including one for agriculture (under which the district rural extension team falls). As can be seen, the structure is quite complex and still evolving.

Fig 3. Organizational structure of Agricultural Extension, Central Level

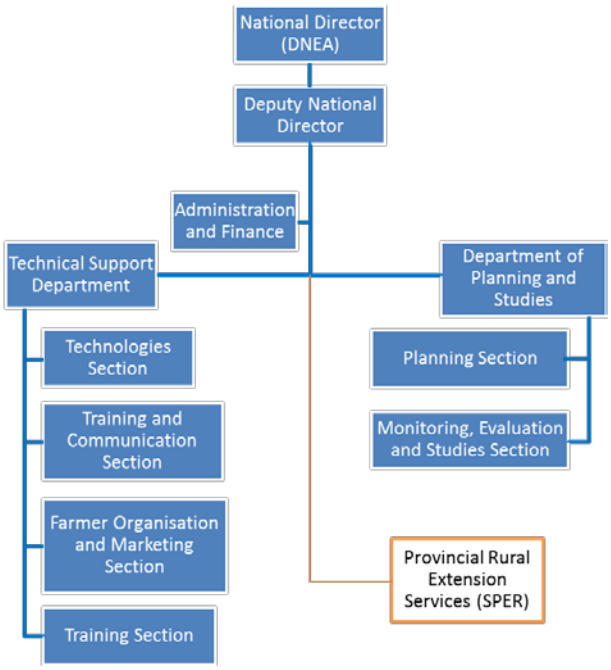


Fig 4. Organizational structure of Agricultural Extension, Provincial Level

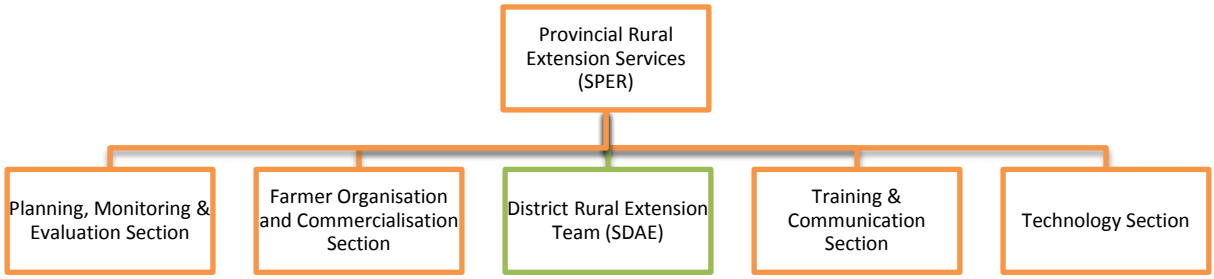
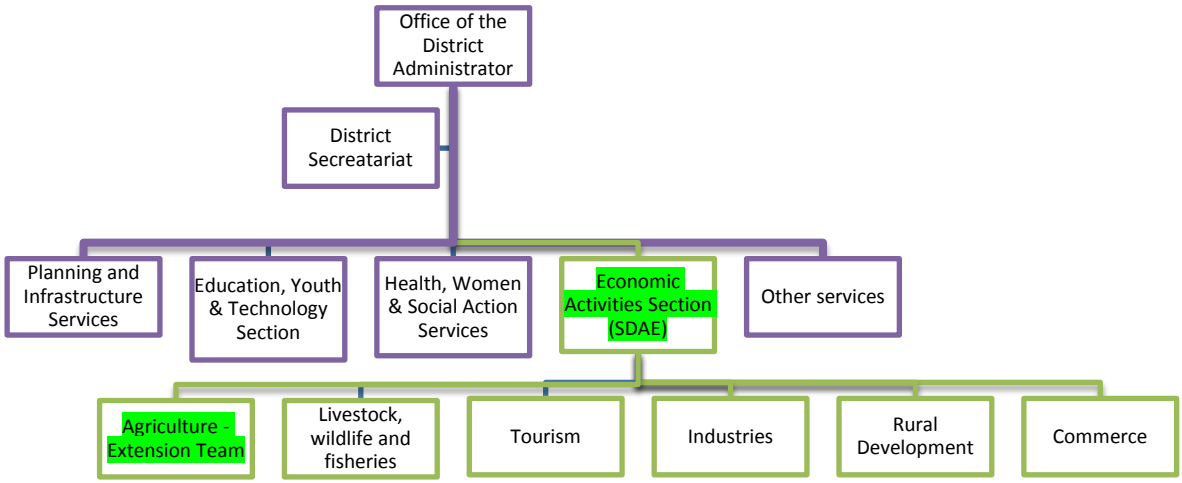


Fig 5. Organizational structure of Agricultural Extension, District Level



All the above structures are in line with PROAGRI which enforced the decentralization of the government structure, with the district as the basic unit of extension services in MINAG.

The IFAD-funded Agricultural Support Program (ASP) constitutes a pivotal part of PROAGRI II (IFAD, 2006), and aimed to address the limited progress achieved under PROAGRI I in terms of establishing sound implementation mechanisms and improving service-delivery at the field level by strengthening the government's capacity to promote appropriate, pro-poor demand-driven services through decentralized government structures. IFAD therefore channeled funds to the DNEA to support the National Program for Agricultural Extension (PRONEA). It aims to reform the government-based extension system towards the promotion of a new extension approach based on enhanced participation of the target group in service provision, decentralization of services to the district level and partnership with other actors including through outsourcing.

PRONEA's goal is to increase income and improve household food security of smallholder farmers, with special emphasis on female headed households, HIV/AIDS affected households and other vulnerable groups. The main activities to be implemented by the program include: the introduction of appropriate pro-poor technologies to raise productivity; expanding access to technical support services; establishment or strengthening of farmers' groups, FFSs and civil society organizations to empower them to articulate their extension needs and establish linkages with NGOs, private sector partners and markets.

Mozambique is changing from a public-sector dominated centralistic agricultural extension system to a more pluralistic, decentralized advisory service system in which civil society organizations, public and private sectors operate together, based on principles of subsidiarity and comparative advantage (Eicher, 2002a,b).

The Extension Master Plan (EMP) (2007–2016), formulated under PROAGRI II, provides the strategy framework for the implementation of PRONEA program. The document recognizes that agricultural extension in Mozambique faces important challenges in reaching the poor, due among other reasons to high socio-economic and agro-ecological heterogeneity, low level of education among farmers, and weak market-orientation of the smallholder sector. The extension system is being developed following three main pillars, namely decentralization of the services to the district level; participation of the target group in services provision; and partnership with other actors, including through outsourcing. The Master Plan highlights the importance of promoting the active participation of farmers in service provision as a way to ensure that extension services respond to their priorities and specific needs. Thus, the new extension approach promoted by the government will be focused on promoting appropriate learning methodologies which value local knowledge, as well as on participatory planning and monitoring and evaluation. The need to strengthen the business orientation in agricultural extension will also require the active involvement of the private sector.

The PROAGRI (I and II) strategy established the need for a national agricultural extension system for the facilitation of the transformation of the smallholder agricultural sector through agricultural innovation. In the EMP, the two main pillars for the organization of agricultural extension in Mozambique are the:

- National Extension System (SISNE), in which different extension providers from both the public and private sector have a role. SISNE is the system in which all extension providers interact, including MINAG's DNEA (with support of subject matter specialists from DNSA, DNSV and DNTF and other public extension agencies), NGOs, private sector extension workers, producer organizations and farmer communities themselves.
- Unified Extension System (SUE) of the Ministry of Agriculture in which all agricultural services operate through a single extension officer contacting farmers in a particular area of operation.

MINAG's agricultural extension addresses minimal core functions such as transmission of technologies, promotion of producer organizations, strategy development, coordination and

mandatory vaccinations. Further strategic functions are producer organization empowerment (in planning, service provision, and value chains) and entrepreneurial skills and management.

Principal measures to be undertaken are listed as: (i) disseminate information on technology options for the various productive systems, and train producers to apply these technologies through a widening of the rural extension network; (ii) promote producer organizations to take on the responsibility of managing available resources; (iii) establish ties between suppliers of agricultural inputs and users (producers and associations); (iv) establish clear ties with private companies and NGOs involved in providing extension services, strengthening the rural extension networks through outsourcing. Other measures include: (i) organize the extension network on vertical lines with the main operational co-ordination at the provincial level and basic execution at the district level; (ii) carry out information/extension campaigns based on participatory diagnoses; and (iii) develop methodologies for community participation in natural resource management.

It is hoped that the pluralistic provision of the extension service will contribute to greater cost effectiveness and enhance farmer responsiveness compared to the situation where the public extension service is the sole provider. Decentralization of governance and service provision under PROAGRI has led to a stronger role by provinces and districts. However, the District Agricultural Development Plans, on which this system should be based, are usually of poor quality or non-existent, and do not contemplate the often complementary roles played by the different extension service providers, contracted through outsourcing and based on competitive advantage, principles of cost effectiveness and sustainability.

New laws have been also developed to a) allow MINAG as well as the local governments to contract NGOs and private agricultural service providers for service provision at all levels, b) facilitate the formal registration of farmer associations and cooperative groups.

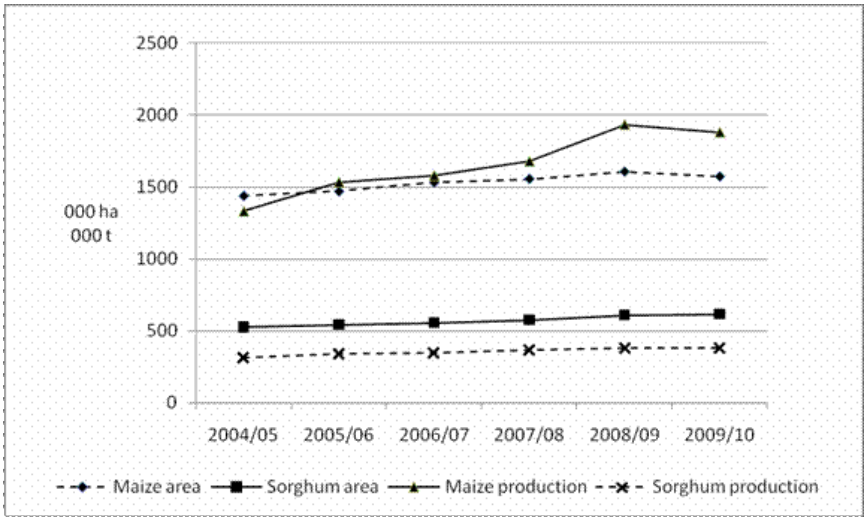
2.3 Recent Trends in Agricultural Practice

Rains: The rains in 2008/09 started on time and led to expected harvests in most parts of Mozambique. However the 2009/10 rains varied in the different parts of the country. In the northern zone (Nampula, Cabo Delgado and Niassa) the rains started on time in October and early November and continued with satisfactory amounts and distribution throughout the main cropping season leading to good harvests. The northern parts of the central zone (Manica, Tete, Zamezia) also received normal rains leading to fair harvests, although in the southern parts the rains were delayed or failed necessitating replanting. However this was followed by heavy rains leading to flooding, worsened by the release of more water from the Cabora Bassa reservoir. Large areas had the crops washed away. The southern zone (Gaza, Maputo and Inhambane) is usually dry although they too suffered some floods towards the end of the season.

Area under cultivation: The areas under beans, groundnut and cassava showed a slight increase in 2010 in the north and central regions. This was presumably attributable to the very favorable results of last year's harvest and support from PAPA. Given the large amount of maize remaining in store from 2009's harvest in the northern region, many farmers there are reported to be considering changing to more lucrative crops such as sesame or soya in the coming year. Although this is a logical short-term response to a glut of maize in the region, a change away from maize could have negative implications for the country's long-term food security. The current government program of silo construction should, however, go some way towards reducing this threat, especially if it achieves a measure of price stabilization that encourages maize production (FAO/WFP, 2010).

Figure 6 shows the national area and production time series for the two most important cereals, maize and sorghum. The graph demonstrates the steadily increasing area under both crops in recent years and a more rapidly increasing maize production on account of rising yields (FAO/WFP, 2010).

Figure 6: Maize and sorghum time series: area and production, 2004/05-2009/10



Pests and diseases: There have been no major emergences of pests and diseases in the country. However coconut plantations, especially in Sofala Province but also in Nampula Province, have, since about 2005, suffered increasingly from lethal yellowing. The virus has taken a severe toll on very large numbers of palms to the evident detriment of many livelihoods. The Millennium Challenge Account (MCA) is reported to be supporting the multiplication of replacement planting material in the form of short-stature lethal-yellowing-tolerant palms, but producers are reluctant to expend the energy required to grub out the dead palms and wait for eight or nine years for the new palms to start producing. The disease has not yet spread to Inhambane Province.

Commercial citrus and mango plantations were infested by fruit fly in the second half of 2009, to the extent that exports to South Africa were halted by MINAG between November 2009 and March 2010. However, exports of these food items resumed in March 2010.

Emergence of new higher value crops: Sesame production has been increasing recently in response to favorable prices, especially in Cabo Delgado, Nampula, Tete, Manica and Zambezia Provinces, with a reported national production of about 37,000 metric tons in 2008/09. Sesame often replaces cotton and soya, but in areas in the northern region with large surpluses of maize, farmers are frequently tempted to change from maize to sesame. Paprika is also emerging as an important cash crop especially in the border provinces neighboring Malawi, where the crop is a major revenue earner.

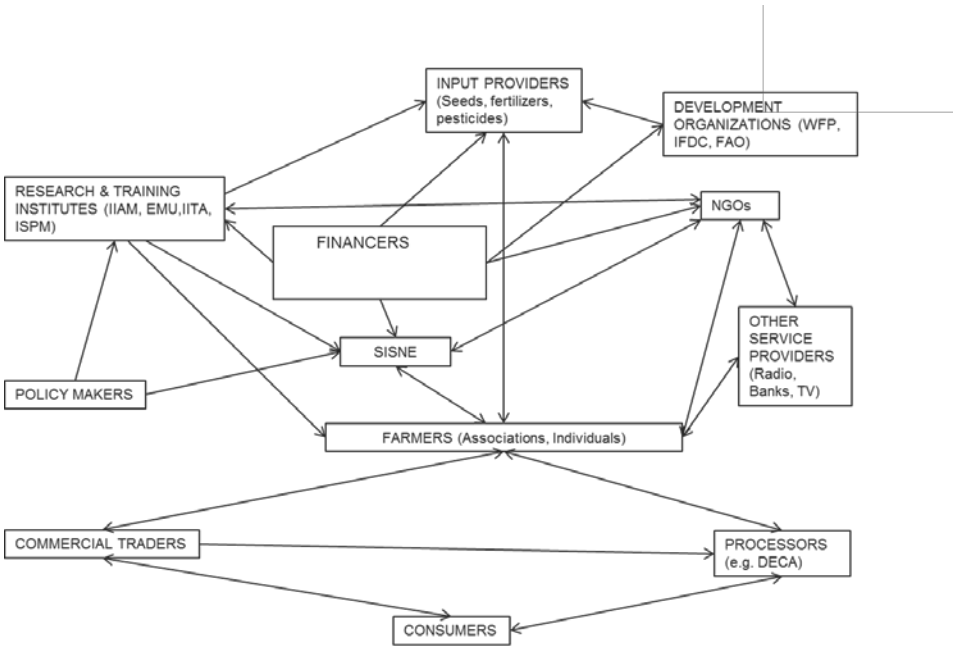
Smart subsidies (voucher system): The EU/FAO funded and IFDC implemented voucher program starting in 2009 has increased the access of smallholder farmers to certified seeds and fertilizers. Targeting over 25,000 maize and rice farmers on 12,500 ha in the provinces of Manica, Nacala, Sofala, Tete and Zambezia provinces, there are signs that the yields of these crops have started to increase. Evaluation of this is planned for later this year.

2.4 Institutions Offering Extension Services

Several public and private institutions are involved in the provision of extension services in Mozambique. The relevant ministries create the environment in which the extension service operates, through the various policies and legislations. Although not possible to show in Figure 7 these policies affect all these institutions. Most of the staff within these different institutions, including extensionists, are trained by the training institutions (universities, agricultural colleges, etc.). Central to the extension services is the National Agricultural Extension Service (SISNE) composed of both public, NGO and private (commercial) extension staff. This is the category that is usually in direct contact with the farmers and whom these farmers depend on for “advice and other

services". Before the advent of participatory extension methods, extensionists were an integral link between the generators and the users of any information/technology. Using funds from financers, usually in supported projects that may involve research and training institutes or NGOs, the extensionists either receive or participate in the generation of the information/technology they then pass on to the beneficiaries (usually farmers). However a weak link between extensionists and research/training institutes was observed. Input (agro-dealers in seeds, fertilizers, pesticides, farm tools, etc.) providers were observed to be a crucial link especially to the farmers when the latter go to procure inputs. The input providers also pass on information (mainly for the input manufacturers) about the inputs sold to the farmers. The smart subsidies program has strengthened the linkages between development organizations (FAO, IFDC) and input providers (seed and fertilizer sellers) who are supported to sell inputs to farmers at subsidized prices. NGOs (CLUSA, KULIMA, UCAMA) play a crucial role in organizing farmers into associations and then linking these to input (agro-dealers, banks) and output (commercial traders, processors) providers. Consumers of the agricultural products are also important players by influencing demand and the price of what farmers produce.

Fig 7: Institutional matrix showing the players in agricultural extension system



3 Extension Approaches

Under colonial rule before 1975, Mozambique used to have a commodity-based extension service for commodities such as cotton and cashew. Extension systems for general smallholders' livelihoods did not exist, although the local shops ('cantinas') often marketed production surpluses, provided input, and advised farmers on crop production and marketing. In the early years of independence, agricultural extension for smallholders was limited to a number of externally funded development projects (Walker *et al*., 2006). The public extension service was institutionalized in 1987, within the Ministry of Agriculture (DNER, 1997). Public extension focused on the smallholder family sector and the training and visit (T&V) model was adopted and financed by the government of Mozambique, the International Fund for Agricultural Development (IFAD), World Bank (WB) and the Food and Agriculture Organization (FAO) (DNER, 1997). A large number of extension providers from the public, private (commercial companies) and 'third' (NGO, CBO) sectors have been involved since the 1980s. International donors, bilateral and multilateral as well as international NGOs, continue to fund extension services, both through the public system (some 50%) and through off-budget projects and NGOs.

Private sector extension is mainly funded through the corresponding supply chains such as those involved with tobacco, cotton and cashew. Agricultural service providers (ASPs) are either contracted directly by the cash crop institutes that are funded by levies (e.g. the Cashew Company of the Ministry of Agriculture (MINAG), Cashew Institute (INCAJU), for cashew and the National Institute of Cotton (IAM) for cotton) or through donor funds. Farmers' organizations (FOs) are equally involved in agricultural extension, but more on a voluntary basis or as individual farmer promoters.

Geographic coverage by the extension system is as follows (DNEA, 2010)

- **Public Sector**
  - 128 Districts
  - 12 Cities
  - 317 Sub-districts (of 405 PAs)
- **NGOs**
  - 118 NGOs
  - 104 Districts
  - 180 Sub-districts
  - 3 Cities
- **Private sector (Commercial companies)**
  - 36 Companies
  - 68 Districts
  - 89 Sub-districts

Of the public extensionists, there are 714 general extensionists and supervisors (13% of them female) and 56 from the INCAJU (cashew nut institute). On the other hand, NGOs and Commercial companies have 817 and 651 extensionists, respectively. This gives a total of 2,238 extensionists (compared to 1,678 in the last year). With a smallholder population of 3.2 million, this gives an extensionist: farmer ratio of 1:1,430.

The public extensionists are distributed in different provinces in Mozambique as shown below. Of the 432,234 farmers assisted, 193,162 (45%) were women and 239,072 (55%) men.

Table I. Distribution of public extensionists in different provinces Source: DNEA, 2010

Province	Planned		Achieved		Total	
	Men	Women	Men	Women	Men	Women
C.M.	4,225	9,800	4,440	9,902	14,025	14,342
Map	10,775	23,825	6,938	24,356	34,600	31,294
Gaz	7,843	16,457	8,169	17, 232	24,300	25,401
Inh	8,000	9,500	8,528	9,526	17,500	18,054
Man	23,080	16,920	20,587	14,691	40,000	35,278
Sof	23,430	42,570	24,907	43,578	66,000	68,485
Tete	19,950	13,300	19,327	12,617	33,250	31,944
Zamb	32,544	29,896	43,694	21,608	62,440	65,302
Namp	22,719	13,090	67,632	17,336	35,809	84,968
C.D.	17,905	9,566	16,657	9,230	27,471	25,887
Nias	17,588	14,145	18,193	13,086	31,733	31,279
Total	**212,000**	**188,000**	**239,072**	**193,162**	**400,000**	**432,234**

NGO extensionists assisted 346,474 farmers (cf 285,229 in the previous year) whereas commercial companies helped 193,165 (cf 254,709 in the previous year).

3.1 Extension Approaches and Methods in Use

A number of approaches and methods are used in the provision of extension services. These include a) Training and Visit; b) Farmer Field Schools, c) Junior Farmer Field and Learning Schools (JFFLS); d) On-farm Trials; e) Field Demonstration plots (FD); f) Farmer to Farmer exchanges.

a) ***Training and Visit (T&V):*** The concept of T&V extension was developed in the early 1970s, and implemented as a component in two regional irrigation projects, the Seyhan (Phase 2) project in Turkey, and the Chambal (Rajasthan and Madhya Pradesh) project in India, both funded by the World Bank in 1974. The general principles of T&V are briefly described below;

i) A hierarchical organization with several layers of management overseeing a large cadre of village level workers under a single line of command, so that extension workers are not controlled by, or responsible to, other authorities (such as communal leadership or special crop-oriented organizations). The organization included subject matter specialists who were the technical resource staff.

(ii) A rigid bi-weekly schedule of visits to a defined fixed list of contact farmers (later modified to contact groups) in specific villages within a village worker's area of responsibility. The contact farmers (or groups) were expected to disseminate information further to other farmers within the community.

(iii) Fortnightly regular training of village level workers, administered by superiors and subject matter specialists, and focused on the information to be delivered in the coming couple of weeks.

(iv) No involvement of the extension organization and its field level workers in non-extension duties, such as input distribution and loan applications. Extension staff were to handle only agricultural information services.

(v) Regular interactions (through seasonal workshops) of extension's leaders and subject matter specialists with research station scientists. Specialists were expected to conduct their own on-farm research.

(vi) Concentration on the most important crops, and on messages about relatively simple low cost improved practices.

The primary aim of this approach is to increase food production, and this is the only indicator in monitoring its impact. This system is constrained by issues of scale, inadequate interaction with the agricultural research systems, inability to attribute benefits, weak accountability, lack of political support leading to incentive problems among staff and managers of extension, and limited budgetary resources. Its top-down "technology transfer" nature as well as the incompatibility of its high recurrent costs with the limited budgets available domestically, often leads to fiscal unsustainability (Anderson et al, 2006). The T&V approach is the oldest in the country and was introduced in 1988 but modified in 1992 to make it more participatory. By 2010 there were over 28,000 families using this approach, of which 14,252 belonged to 572 groups, 8,154 to 331 associations and the rest (6,548) were individual farmers belonging to no group. These demonstrated various agronomic practices including improved seeds, use of pesticides, irrigation, soil conservation, conservation agriculture, ISFM, etc.) through demo plots and learning centers. However the current belief is that it should be discontinued and that Mozambique should develop its own model for extension, based on the three key principles highlighted in PROAGRI II, i.e. decentralization, participation and partnership including outsourcing.

b) ***Farmer Field Schools (FFS):*** One alternative seen as suitable for replacing the T&V approach is FFS. FAO introduced FFS in Mozambique in 2003 through a South-South Cooperation Project in Zambezia province. In collaboration with MINAG, a total of 124 schools were set up involving 400 farmers who produced rye and vegetables. Following its success, the first project is being scaled-up through the National Program for Food Security (PAN II), which focuses on empowering groups of smallholder farmers to improve their livelihoods and food security. The FFS approach has been institutionalized in the Extension Master Plan in order to increase the impact of extension on food security and agricultural productivity among poor households and especially women. A FFS (composed of 25-30 farmers each) is a practical, hands-on ecologically based "school without walls" where a group of people work together, where their basic knowledge is valued and respected, where they are empowered to learn and be proud of it. The theme to study is chosen by the group itself. The "facilitators" of the FFS are, in a large majority, farmers themselves which provides the potential for rapid outreach to a large number of farmers at an affordable cost. The group receives a small fund (about US$400) to run the FFS, pay for the inputs and the costs of the facilitator's visit and the field day where other members of the community are invited. This fund is then maintained by the group itself and used to continue the activities of the group.

Over 50 FFSs have been established in Boane District of Maputo, benefiting over 800 families from 12 communities. Nationally over 1,115 FFS have been established in 12 districts in Maputo, Sofala and Manica and over 31,600 farmers were assisted by 2010. FFSs have contributed to empowering the participants, strengthening the interactions and relationships among farmers, as well as between farmers and extension agents, to developing farmers' capacities in relation to problem analysis and decision-making, and to promoting collective action. The experience with FFSs has certainly contributed to strengthen the capacity of extension offices to address the specific needs and priorities of farmers through the use of appropriate facilitation, communication and learning-by-doing methodologies. The formation of farmer facilitators, with support from contracted NGOs, is also contributing to the development of a more cost effective extension system which is 'closer' to farmers. Farmers also feel a greater sense of ownership as they work on their own farms.

Box 1: FFSs, summary of activities and results

Topics: Farming techniques, soil fertility, animal health, new-castle disease, different varieties, inter-cropping, compost,

Special topics: HIV/AIDS, malaria, nutrition, diarrhoea, gender, medical plants, savings and credit, literacy, marketing, agro-processing, organic farming.

Innovations: marketing of tomato; improved livestock enclosures; improved methods of controlling soil erosion, post-harvest technologies; conservation agriculture; garlic production.

Empowerment: improved capacity to solve problems and make autonomous livelihoods choices; Better capacity to interact with extension workers, local authorities, buyers and NGOs; improved capacity to replicate technological innovations on individual farms; working in group.

Challenges: sustainability; master trainers are overloaded; new FFSs needs technical support and the old ones need support on business management and marketing

Source: FAO 2009a

Although the initial investment costs in training and education are relatively high, the FFS approach represents a cost-effective way to expand coverage by involving farmers in the formation of a community-based agricultural extension network. The use of experiential learning can ensure an effective transfer of knowledge, which is particularly suitable to people with low levels of education, including women. The government is currently engaged in a process of scaling-up the FFS

methodology as part of the implementation of the new extension paradigm. This process will be underpinned by a strong capacity building program for extension staff. The evaluation conducted by FAO (2009b) reveals that FFSs had a positive impact in terms of improving farmers' social capital, strengthening their knowledge and capacity to use new farming practices and technologies, which in turn resulted in increased productivity and income.

c) ***JFFLS*** is a new initiative to empower teenage girls and boys (12-20 years) with agriculture and life skills that will ensure improved livelihoods and the long-term food and nutrition security of their households (FAO, 2010). Having piloted these in Malawi, FAO is replicating the same initiative in Mozambique. Working with a team of three facilitators composed of a local school teacher, lead farmer and a social animator, the local community identifies an intervention to be introduced and the location of the field (e.g. a school). The children share what they have learned with their parents, and part of the food produced is sold and the rest consumed by the students' families. Challenges include i) lack of capital starter-packs for graduating children (implements, seeds, etc.) to enable continued production, ii) inability of the children to practice what they have learned due to unfavorable environment at home and ii) possible accusation of favoritism by parents of those children not included, as not all children in the school can be included. There are over 54 JFFLS in different districts in Manica and Sofala provinces, targeting a total over 100 orphans and other vulnerable children.

d) ***On-farm trials:*** New technologies in Mozambique are either imported from abroad, generated on station or sourced from farmers (indigenous technologies). However, before these technologies are promoted, it is important that these are tested under the farmer's field conditions. This is usually a researcher led but participatory activity involving the extensionists and the farmer. The point is usually made to the extensionists and the farmers that these are trials and may or may not work. IIAM usually takes a lead on these for on-station or lab new technologies, those introduced from EMBRAPA or by International Agricultural Research Centers. In Mozambique there were a total of 231 on-farm trials on different crops by 2010, 171 of which were on maize, the staple crop in most parts of the country (Table 2).

Table 2: Number of on-farm trials on different crops in Mozambique Source: DNEA, 2010

Trial	Planned no.	Actual no.	Beneficiaries.
Maize	202	171	225
Cassava	1	1	6
Rice	8	6	163
Sorghum	1	1	4
Beans (different types)	4	7	107
Water melon	1	1	4
Sweet potato	4	2	6
Ground nuts	16	16	20
Soya bean	9	10	12
Horticulture	7	7	10
Maize & Nhemba bean	4	9	128
Total	**257**	**231 (90%)**	**685**

e) ***Field Demonstration plots:*** Once a new technology has been tested in the field and proven to be beneficial, it is then promoted (demonstrated) to the farmers under field conditions. This activity is usually low risk and is extensionist led, but involving the farmer on whose farm the technology has been trialed, as well as his/her neighbors. Such a site can also double up as a field day site, with more farmers invited beyond just the neighbors.

Table 3: Number of demonstrations of different crops and inputs and beneficiaries

Demos	Planned No.	Actual No.	Beneficiaries
Maize	1,736	1,675	49,636
Rice	326	331	9,935
Sorghum	256	198	5,294
Beans (various)	544	404	13,689
Horticulture	477	943	24,270
Sweet Potato	2	1	84
Irish Potato	133	17	4,064
Ground Nuts	427	561	7,449
Bean	93	86	4,548
Cotton	40	0	0
Agric. Inputs	270	175	12,331
Sesame	239	314	7,327
Cassava	63	44	597
Soya Bean	54	9	11
Cereal/Legume Intercrop	790	479	13,642
Total	**5,450**	**5,237 (96%)**	152,880

Source: DNEA, 2010

f) ***Farmer-to-Farmer exchanges:*** This is similar to a demonstration field but is managed by a contact farmer who has been trained over a season or more (also called farmer focal point). This method was mentioned by only two farmers, one of whom said this is the most convincing method of disseminating information/technologies because the contact farmer is "one of us". This could be expensive though.

Another form of farmer-to-farmer exchange is through exchange visits. This is where farmers from one region are taken to another region where a new technology has been adapted. DNEA facilitates this when the funds are available, and extensionists usually also join the trip to facilitate the farmer-farmer interactions or to learn also (if the technology is new to him).

Another farmer-to-farmer exchange is through market fairs that are similar to agricultural shows. UCAMA, a provincial union of farmers in Manica, is well known for this.

g) ***Use of print and electronic media***: Most farmers indicated that radio is the most effective method of dissemination agricultural information to them. This is because most of them own radios and there are several local community radios which broadcast in local languages. Usually every province is offered about 26 hours of radio time/week to disseminate various messages on new technologies. The constraint of lack of education amongst farmers in accepting new technologies is partly overcome by radio broadcasts in local languages – Radio Mozambique (which broadcasts in AM and FM) in Manica broadcasts in five different local languages. IIAM's Strategic Plan (2011-1015) included effective engagement with Radio Mozambique in the dissemination of generated information. Currently IIAM scientists compile agricultural information in Portuguese and pass this on to the radio station that translates it into local languages before transmitting it. Radio station staff also accompany IIAM scientists when they visit farmers, for a better understanding of the needs of farmers. Radio programs usually last about 15 minutes and cost about US$ 200. TV is not very popular due to poor level of rural electrification.

Lack of agricultural information was a common complaint especially amongst farmers. In 1991 Michigan State University assisted MINAG to set up the Agricultural Market Information System (Sistema de Informacao de Mercados Agricolas - SIMA), which the government has been financing wholly since 2001. MINAG (Statistics Department of Economics Directorate) have staff in the provinces who gather information on availability, flow and prices of agricultural products and send this information to Maputo. Information is collected on over 25 products in 27 producer, wholesale

and retail markets. Regional and international prices of selected commodities and market commentaries are also included. The information is collated and synthesized into weekly bulletins ("Quente Quente") or monthly bulletins which are available in print and electronic forms. This market information is also disseminated in the form of radio, TV, and soon as SMSs. IFDC has requested MINAG also includes data on inputs. Besides stakeholders in major towns, there was less evidence of the use of this system.

One stakeholder, IPEME stated that in addition to SIMA, they also use the Commercial and Market Information (Informacao Comercial e Mercados - INFOCOM). This is similar to SIMA although it is managed by the Ministry of Commerce and Industry and disseminates information on prices of commodities collected from supermarkets. Initially funded by FAO, but by the Ministry since 2007, INFOCOM provides i) weekly bulletins on prices (raw and industrial foods e.g. eggs, sugar, milk etc.) collected from 66 supermarkets and shops in provincial capitals and ii) annual bulletins including projected food balance sheets at national and sub-regional levels.

Print materials that are used include posters, calendars, leaflets and manuals. These materials are usually produced by the MINAG (DNEA) to raise awareness of an emerging disease/pest (e.g. army worms, larger grain borer and locusts), the need to manage an epidemic (e.g. vaccination of chicken against Newcastle disease). Others are project related to disseminate/promote successful technologies

3.2 Key changes in extension

Most of the changes came about through PROAGRI II and II.

All extensionists are required to have a minimum education level of secondary school (tecnico medio), and their supervisors, high school level (tecnico superior). Extensionists are trained at Instituto Agrario de Chimoio (IAC), Instituto Agrario de Boane (IAB) and Instituto Agrario de Tete (IAT). The supervisors in turn are trained at polytechnics established in 2005, namely Instituto Superior Politecnico de Manica (ISPM), Instituto Superior Politecnico de Gaza (ISPG) (for training in Agriculture) and Instituto Superior Politecnico de Tete (ISPT) (for training in geology). The Eduardo Mondlane University in Maputo has also started offering Masters in Education courses at its Department of Production and Plant Protection, Faculty of Agronomy and Forest Engineering. Previously it was possible to pursue a Bachelor in Extension course at EMU, but now only MSc courses are offered.

Extension was one of the eight components of PROAGRI I, which led to the government developing the National Extension Master Plan I (1999-2003) that called for the development of an Integrated National Extension System. The Master Plan permitted publicly financed extension to be open to multiple financial and delivery arrangements (including outsourcing where responsibility for extension delivery is contracted to the private sector). Public sector extension is promoting and supporting private sector involvement in extension provision through private companies, farmer associations, NGOs, individual farmers, or registered individual extension consultants. Outsourcing was piloted in cashew nut and cotton production in the provinces of Nampula and Zambezia between 2002 and 2010. The results are mixed although there is some evidence that the involvement of the private sector in extension delivery resulted in a remarkable increase in the total amount of cashew nut marketed, due to improved yields which resulted from improved pesticide use.

Smart subsidies (a voucher program) have made seeds and fertilizers more accessible to farmers and should result in an increased yield. However, the challenge is to get farmers to repay their loans, as the use of inputs is not part of the local culture.

3.3 Sources of Information

Different stakeholders receive their information from different sources.

Farmers: Their main source of information is the extension worker, either when the extension worker visits the farmer or when the farmer visits the local agricultural offices. Although there are few extension workers, they appear to be in good contact with farmers, using a variety of methods including mobile phones. Informal farmer-farmer contact was identified as a crucial method of information exchange (although there is a risk of spreading incorrect information). All farmers interviewed owned radios and many considered this to be the principle source of information on new technologies/methodologies. Although agro-dealers are poorly distributed in rural Mozambique (with few inputs available in production areas as most agro-dealers are located in provincial and district headquarters), they are an important source of information on the inputs they sell to farmers (verbal, posters, manuals, calendars). However there is a risk that they tend to promote these products with a view to making sales.

Extensionists: The main sources of information are researchers, especially IIAM, but also IARCs like IITA, CIP and IRRI. The exchange of information usually occurs during the implementation on-farm trials, and this may be the only time researchers link up with extensionists. However NGOs are an important source of information, especially on crops which are not with the mandate of IIAM, e.g. World Vision which was involved in the on-farm trials on sesame, pineapples and paprika. Extensionists also receive information via radio, TV, newspapers and indeed farmers.

Agro-dealers: They source their information from the manufacturers of the inputs they sell, especially through use of manuals, leaflets and posters. These are frequently visited by consultants from the countries where the inputs are manufactured. Development organizations like IFDC have also developed a close partnership with, and are a source of information for agro-dealers through the voucher program.

Researchers: The main source of information comes through links with fellow researchers at conferences and through scientific publications. EMBRAPA and Michigan State University scientists have a particular link with IIAM.

3.4 Gender and Youth

Under PROAGRI I the institutional mechanisms were established for mainstreaming gender in the Ministry policies, plans and activities, through the formation of a Gender Unit in the Directorate of Economics (DE). A Gender Coordinator was appointed and a network of Gender Focal Points (GFPs) was created at central, provincial and district level with the specific function to train the Ministry staff, promote and publish gender studies and ensure the incorporation of gender-sensitive data in the planning and monitoring and evaluation (M&E) system. However, although MINAG adopted a Plan of Action (2006–2008) as a mechanism for implementing the National Strategy for Mainstreaming Gender in the Agricultural Sector, a target for women was not set in the program design. The main problem however is lack of a budget and having limited staff, making gender mainstreaming weak.

In relation to gender issues, the Extension Master Plan (2007-2016) recognizes that, given that more than 95% of women in Mozambique are engaged in agriculture compared with 66% of men, *'The extension service will make sure that – marginal and less advantaged farmers including women and women headed households are adequately included and get benefits from the program'*.

The number of female extensionists is currently low – 13% of the 714 public extensionists (DNEA, 2010). This has been mainly because of the low enrolment of women in agricultural institutes (20%). Other reasons include i) the poor living conditions in rural area areas, ii) once married they tend to join their husbands elsewhere, iii) poor accommodation (housing) in rural areas. However action is being taken to reverse this imbalance e.g. prioritizing women in the allocation of housing, means of transport, etc.

According to DNEA the participation of women in FFS is higher than that of men, unlike in T&V. This is partly because FFS approach is more participatory, women spend most of their time in the farms

(where FFS activities are done) and issues discussed during "special topic" sessions of FFS (gender, health, culinary skills) are more attractive to women than men. Although there is a clear awareness of the importance of considering women as a priority target in agricultural activities, little attention is paid to ensuring that women are effectively enabled to interact with extension agents, benefit from adoption of new technologies and exert control over income and assets. Although many men are aware of the need to empower women, this does not happen due to cultural beliefs (especially in the Northern and Southern zones). This is particularly true in rural areas away from towns. However it was impressive to visit some all-women farmer associations (e.g. Rudjeko in Manica district of Manica Province) whose members stated that they do not enroll men as they think they are lazy and do not prioritize domestic/family needs over other social needs. The female dominated Mandruze Association in Dondo district of Sofala province produce rice, and also stated that there are few male members because of the hard work in the paddy fields.

However, a study on farm efficiency in Mozambique reveals that female headed households are less efficient than male headed households (Uaiene Channing, 2008). This is due to multiple reasons including women's time poverty, severe labor shortages and major difficulties in accessing technologies, capital and agricultural extension services, which in turn leads to low agricultural yields and low levels of food security. Findings from the study show that in any given year, male headed households had higher access to fertilizer, pesticide and extension services then female headed households. They were also more likely to use animal traction, and to be involved in cash cropping than the female headed household.

Evidence suggests that in Mozambique the development and dissemination of new technologies fails to take gender specific characteristics and requirements into account. For instance, little is invested in technology research into food processing, which is predominantly undertaken by women farmers. Post-harvest technologies have great potential for participation by women, though insufficient investments are channeled into this area. Minimizing postharvest losses is a very effective way of reducing the area needed for production and/or increasing food availability, which in turn can enable families to meet their basic food requirement. Appropriate technologies for processing food in rural areas are particularly needed. Traditional food technologies could be improved and upgraded to improve food quality and safety, alleviate women's workload as well as to develop value-added products with market potential.

The role of youth in agriculture cannot be overstated (given the value of family labor). However the role played by youth in productive agriculture as a business is not apparent. This is partly because most youth seek gainful employment in urban areas as agriculture is not a sufficiently rewarding economic activity. However there are some attempts to stimulate youth entrepreneurship. One of these is the JFFLS described above. KULIMA is a national NGO established in 1984 whose approach is to develop programs that address income generation and cross-cutting themes including gender and education in order to achieve community development. Operating in 10 provinces (including the Beira corridor), one of the activities of KULIMA is to support vulnerable groups including orphans and disadvantaged children to be educated and engage in gainful employment (small businesses). In Manica it supports over 50 orphans by paying their school fees and upkeep expenses. Once out of school these students are enrolled at the current three youth training centers which offer training in ICT, agriculture, food technology, etc. on development programs funded by EU, USAID or AusAID.

In the district of Gondola (Manica Province) there are a number of farmer and youth clubs which aim to improve the livelihood of members. These are financed by the NGOs Ajuda de Desenvolvimento de povo Para Povo (ADPP) and Agencia de Desenvolvimento de Manica (ADEM), see Table IV

Table IV. Farmer and Youth Clubs in Gondola District, Manica Province

Club	Sub-district	Location	Year formed	Financer	Female members	Male members	Total members	Activities
BoK	Cafumpe	Chiongo	2008	ADPP	19	31	50	Horticulture, maize, beans & groundnuts
Matole	Cafumpe	Chiongo	2008	ADPP	3	24	27	-do-
Ingomai	Cafumpe	Mutocoma	2008	ADPP	19	29	48	-do-
Maxumebi	Macate	Macate sede	2008	ADPP	25	18	43	-do-
Macate	Macate	Macate sede	2006	ADEM	10	6	16	Various including agriculture as well as disease prevention such as malaria and HIV/AID and improved hygiene
Total					**76**	**106**	**184**	

The clubs funded by ADPP were funded in 2008 for a period of 3 years after which they are expected to be self-sustaining. Towards the end of 2010 each club was given six pairs (male and female) of turkeys, guinea fowls, pigs and three pairs of goats with a view to sustaining these clubs. Diffusion of agricultural information has not started yet, while health information is disseminated using books, pamphlets and posters. However all these clubs are facing financial difficulties, except Macate which is involved in diverse activities including production and sale of horticultural crops and cereals. The other major problem is that the members do not own the land on which they operate, making investment and commitment to work on the farms difficult.

3.5 Agribusiness Models

One of the criticisms of T&V approach of extension is that it is production oriented and ignores the rest of the value chain (post-harvest). Although it is always encouraging to help farmers increase their agricultural production and productivity, this is unlikely to improve their livelihoods if there are no mechanisms to convert produce not utilized at home into an income. Many farmers, especially women, identified poor access to markets as a major constraint to their increased production. Weak rural infrastructure (roads, bridges, dams, electrification etc.), lack of transport (lorries, bicycles etc.), weak market information systems and poor links to buyers (traders, processors etc.) were common features amongst the farming communities which need to be addressed to enable smallholder farmers to transform from subsistence to market-led agriculture. In recognition of this, the Government of Mozambique, IFAD and AGRA jointly started support to the Rural Markets Promotions Program (PROMER) in 2009.

It has been recognized that farmers have to be organized into business groups (associations, cooperatives, unions etc.) to reap the benefits of economies of scale when sourcing inputs (credit, fertilizers, extension services, pesticides etc.) and outputs (market). The farmer organizations visited although having committed members, still need to be registered to be recognized as legal entities. An example of how a farmer association can link with the private sector for the benefit of its members is IKURU, Nampula province. Following the success of IKURU, CLUSA which was one of the partners who constituted this association, has now opened an office in Chimoio, Manica province with a view of setting up similar associations but with the benefit of lessons learned from IKURU.

Box 2: IKURU, an example of a successful cooperative

IKURU is a Mozambique owned, agri-trading, processing and exporting company. The company was founded in 2003 with initial investments from farmers associations. There were also investments by ethical investors (GAPI - a Mozambique public/private financial institution and Oxfam Novib – Netherlands).

IKURU currently has in excess of 22,000 farmer shareholders grouped in 29 farmers associations in the north of Mozambique. Around 40% of the farmer shareholders are women.

IKURU is now the most successful farmer-owned business in Mozambique. The volume of total crops marketed has increased from 300 metric tons per year in 2004 to 2,250 metric tons per year in 2009, an impressive figure representing annual growth of around per year 50%.

This represents a substantial increase in income to producers, contributing to improved livelihoods and enabling farmers for the first time to exert local control over their marketing options.

IKURU is owned by the farmers associations (14%), GAPI (43%) and Novib (43%) and sells its produce as organic and fair trade certified. Products which are sold, including to Europe, are cashew, groundnuts, sesame, soya beans, beans and maize. IKURU maintains ownership of its cashew nuts, subcontracting processing work to local processors before they are exported, rather than selling them to processors. This means IKURU has access to information on quality and export markets which it can feed back to its farmers, helping then to work out how to improve their crops. IKURU has received more than US$ 50,000 in Fair Trade premiums, most of which is spent on storage facilities. IKURU also sells agricultural inputs (seeds, fertilizer, pesticides), provides technical advice on post-harvest, processing, quality control and commercialization. Challenges include maintaining both organic and conventional products in the Fair Trade market, improving both volume and quality of agricultural produce (especially the high value crops of sesame and cashew nuts) and consolidating production, distribution and sales lines for seeds and other inputs.

Other models are input driven, especially those that were first developed in the early 1980s. These involve farmer associations that receive commodity related extension services. This happens whereby a commodity-based (e.g. cotton, cashew or tobacco) enterprise enters into a contract with a farmer association to supply on credit inputs such as seeds, fertilizers, pesticides as well as technical advice. The farmers then sell their produce to the said enterprise, having guaranteed market. Similar arrangements could also be made by a seed company (e.g. Semente Perfeita, Pioneer) which purchases basic seeds from IIAM then distributes it to its network of contract farmers for multiplication in the field. The farmers then sell back the multiplied seeds to the company which proceeds to process, package and sell them as certified seeds. The Desenvolvimento e Comercialisacao Agricola Limitada (DECA) is a company based in Chimoio, Manica Province which has prepared and installed the necessary infrastructure at over 50 buying points across Manica, to which local farmers (over 35,000) bring their maize which they have cultivated as out growers. DECA then purchases the produce at these centers and transports it to their factory in Chimoi for drying, fumigation, milling and packaging. DECA delivers cash payment at the buying points, thereby supporting economic activities in these rural areas.

The innovative Purchase for Progress (P4P) program coordinated by the World Food Program (WFP) links small-scale farmers to markets and also improves the quality and quantity of their produce. The program is supported by the Bill & Melinda Gates Foundation, the Howard G. Buffet Foundation, the European Commission, and the governments of Belgium, Canada, France, Ireland, Luxembourg, USA, and the Kingdom of Saudi Arabia. In the 5 year project (2008-2013) being implemented in Tanzania, Mozambique, Malawi and Ghana, farmers receive training from WFP and its partners in improved agricultural production, post-harvest handling of crops, marketing, agricultural financing, and how to contract with WFP. The program aims to relax procurement requirements to make it easier for small scale farmers to participate through i) direct contracts for well organized farmer organizations

receiving organizational support, ii) "soft traders" which encourage competition for contracts among small scale farmers and iii) warehouse receipt systems in countries where there are linkages to processors e.g. contracts are issued where evidence can be produced that processors are buying raw materials from small scale farmers already under the project. Challenges include low input use and post-harvest losses, which are addressed by IFDC and FAO, respectively. The FAO post-harvest specialist is housed within WFP offices in Maputo. Post-harvest training manuals have been developed and WFP encourages other partners to use these when training farmers. In 2010, the successful P4P initiative in Mozambique led to the purchase of 5,350 metric tons of maize and pulses from smallholder farmers – enough to feed more than 100,000 people for three months. However, this is way below the annual demand of 35,000 to 40,000t required every year.

The final model is "business as usual" where farmers produce as they always have, without a pre-identified market. This is common in rural areas far away from urban centers. Farmer associations in Manica and Sofala along the main Beira (Mozambique) – Harare (Zimbabwe) highway appeared content that their produce (maize, beans, potatoes etc.) will always find a market amongst the travellers. This was, however, not so certain, as seasons when the farmers found themselves with stores full of produce and no market were recounted by many farmers.

3.6 Monitoring and Evaluating

Monitoring and evaluation (M&E) activities were not very strong, especially at farmer level. International organizations use logframes with appropriate indicators to assess progress in their projects.

In many other organizations progress is monitored by the use of annual workplans and budgets. These are agreed upon at the beginning of each year and records kept at national or provincial headquarters. At MINAG, M&E of extension activities is undertaken and coordinated at provincial and district levels. At the provincial level responsibility lies with the SPER, although most of the activities are undertaken by extensionists at the district level, with each district also having a supervisor. Once agreed upon, monitoring is done through physical visits to the districts by someone from SPER, as well as by the extension supervisor to the different parts of his district. Visits are supplemented by quarterly reports (technical and financial). With the formation of SISNE, the district supervisor is able to monitor activities of both public and private extensionists. Success indicators include number of farmers assisted, number of demonstrations established and number of farmer groups established. Studies on the number of farmers adopting different technologies are very limited.

Results of studies on the impact of extension on agricultural productivity are varied. Both Finney (2003) and Walker et al (2004) reported pessimistic impacts, whereas the World Bank (2005) reported evidence of a positive impact, reporting also that the impact is highest in the lower extreme end of the crop income residue, i.e. extension is benefiting the rural poor.

4 Drivers of Success and Constraints

4.1 Positive drivers

The extension system and agricultural sector in Mozambique are governed by favorable policy documents and laws. These include PARPA, PAPA, PROAGRI and EMP. All these recognized the crucial role played by agriculture and/or extension. However, the implementation of these policies still remains a challenge.

A pluralistic approach to extension, as spelled out in the EMP, allows for an institutionally diversified system of extension through SISNE, that utilizes both public and private sector extensionists to respond to the farmers' extension requirements. The decentralization of extension services to the

provincial and district levels also allows for contracting of services on a competitive basis, allowing for outsourcing.

The smart subsidies (voucher program) is convincing the farmers that use of certified seeds and fertilizers can increase agricultural productivity – even amongst communities which hitherto never used inputs in agriculture. The impact of this program is to be assessed later this year by IFDC.

The recognition of the importance of farmer associations as an important vehicle for economic development of farmers is encouraging. Fortunately there are very qualified organizations like CLUSA, whose ability to form effective and functional legal farmer organizations is proven. Collaboration with other NGOs and public institutions like KULIMA, IPEME and ADEM only serve to improve the competency of this team to form more associations.

4.2 Negative drivers

Extensionists, especially the numerically superior public ones, are a crucial component of a rural development team. However, there is need to incentivize this cadre of stakeholders as they currently experience constraints including, i) there are very few of them, hence each one has to cover vast areas; ii) they are not sufficiently trained to cover the entire value chain as most are trained only on production of commodities. The available institutions are inadequate and need to broaden their curriculum to include post-harvest activities like agro-processing, storage, marketing and policy; iii) poor working conditions, including a lack of housing close to the farmers whom they are supposed to assist; iv) lack or poor maintenance of means of transport. Bicycles have no place in modern extension and motor bikes and vehicles are necessary;, v) limited opportunities for career development, extension is seen as a dead-end job and not recognized as a profession; vi) poor salaries leading to high exodus to better paying organizations like NGOs.

There are weak research-extension linkages, resulting mainly from the exclusion of extensionists in the development of project proposals. Linkages usually begin only after the technologies have been developed and need to be tested on the farm. According to the EMP, the MINAG, through the DNEA and provincial agricultural extension services, SPEA, has created a good environment to increase the exchange of information and experience. Most of NGOs and private for profit organizations in the provinces attend the annual technology review meetings (REPETEs). There is need for these meetings to be regular and include also field extensionists.

There are poor inter-institutional linkages and a lack of clear definitions of mandates. Extension activities are undertaken by institutions both in the ministries of agriculture and education, and clarification of where training ends and implementation begins may not be clear in some cases. Further, there is need to integrate the activities of the directorate of Training Documentation and Technology Transfer of IIAM with other directorates engaged in technology development.

Weak marketing systems frequently lead to farmers having a lot of produce which they cannot market. This refers both to food crops and seeds. This is compounded by poor post-harvest technologies that could help in minimizing storage losses. Rice farmers and those who produce perishable commodities like horticulture (fruits and vegetables) are hardest hit.

Lack of affordable credit, was a complaint amongst most stakeholders especially the farmers. The few banks that offer agricultural loans request for collaterals or demand interest rates which are beyond the capabilities of most farmers. A case in Manica showed that some farmers received credit from a bank which signed a contract with the farmer leaders, without informing the farmers of the loan conditions. This led to a default in the repayment of the loans, which continued to generate more interest ("Juros de demorar").

Transfer of qualified extension staff to administrative/political posts not related to extension.

4.3 Effective Methods

The T&V approach, even the modified version, may be abolished and replaced because of the incompatibility of its high recurrent costs with the limited budgets available domestically, leading to fiscal unsustainability. The advent of the pluralistic extension and decentralization of service delivery to the district level will expose T&V to greater competition from alternative approaches.

Commercialization of agricultural produce is crucial in uplifting the livelihoods of farmers. This is particularly so in rural areas away from towns and main highways. Agricultural production without an idea of where to sell is risky and often leads to farmers having full stores but no market. The complaint was articulated more by the women producers.

5 Conclusions and Recommendations

The Gender Unit at MINAG should be recognized, financed and made operational.

Research should assume a value chain approach and consider all levels and should be participatory, involving the end user of the developed technology from the project development stage. Research findings should also be disseminated better to reach more stakeholders, especially farmers.

An effective method should be formulated to undertake a study to quantify the impact of extension on agricultural productivity and livelihood of farmers.

Farmers should be further assisted in fulfilling the legal requirements for the formation of associations.

With the limited number of extensionists, the distribution should be guided by the agricultural potential of different parts of the country, avoiding a blanket distribution.

Commercialization must be improved, by way of linking farmer groups to appropriate markets and above all providing information on daily prices of different commodities. Information on the day's price improves the farmer's ability to negotiate for the best price for his produce.

Empower farmer associations to enable participatory planning of activities that affect farmers and also participatory M&E so that the farmer will eventually reward the extensionists according to the extension services rendered.

Improve the operationalization of extension at the district level. A way should be developed to enable the effective engagement between private and public extensionists to improve service delivery to the farmer. In addition, although the office of DNSA (agricultural services) receives resources from the ministry they do not have a physical presence at district level, forcing SPER (extension services) to assume the role of DNEA without corresponding additional resources.

The T&V extension approach should be gradually phased out and replaced by FFS and other approaches. This is the general trend in Asia (where it was conceived) and indeed other African countries like Kenya.

Extension terms and work conditions should be improved.

The Voucher programs should be used as an opportunity to train farmers and input suppliers on efficient, profitable use of fertilizer.

AgriFUTURO is a five-year, $20 million USAID-funded project that focuses on improving the efficiency of agricultural value chains—or the stages of production, from the farm to the market—of nine key crops, i.e. mangos, bananas, pineapples, maize, soy beans, peanuts, cashews and plantation forestry. The project aims to promote more competitive, prosperous and sustainable international trade in the country's agricultural sector to improve food security and reduce poverty. AgriFUTURO is based in the Nampula and Beira transport corridors in the north and central parts of the country. This is a

program that AGRA should associate with, especially in development areas that are already being addressed.

The future of extension in Mozambique

As a country that gained independence in 1975 and which only institutionalized extension in 1987; Mozambique offers an interesting case of studying institution building. Even as the EMP, which assumes there are technologies on the shelf which need to implemented, is being implemented, there are discussions as to whether the extension system should be downsized and privatized. Proponents say the government lacks the financial and human resources to run an effective extension system and should therefore pull out. The antagonists say that the government should not pull out of extension since the bulk of the 3.3m small holder farmers are mainly subsistence or semi-subsistence farmers who can ill afford paid-for (outsourced/contract) extension services. Paid-for extension system may work in cash crop based farming systems which produce cash crops for export (i.e. liable for tax which could in turn be used to finance contract extension). A fair conclusion is that private farms and NGO's should supplement but not replace the important role played by the public extension system.

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Appendix 2: Itinerary and interviewees of the study

Date	Organization	Persons met
Sunday 30th January	Travel to Maputo from Nairobi	
Monday 31st January	Instituto de Investigacao Agraria de Mozambique (IIAM)	Alcinio Fabio (Head Training Dept) Anabela Manhica (Head Tech Transfer), Jone Mirasse (Researcher) & Joaquim Americo Mutaliano (Researcher)
		Prof. Gilead I. Mlay (Country Dir, MSU)
	Instituto de Algodao de Mozambique (IAM)	Norberto Mahalambe (Dir) and Licinia Cossa
Tuesday 1st February	Technoserve	Juma H. Juma
	IFAD	Custodio Mucavele (Country Officer)
	FAO	Jose da Graca (Coordinator), Yogendra Kumar Sing (Technical Advisor)
	IFDC	Marcel van den Berg (Country rep)
Wednesday 2nd February	Min of Agriculture	Jose Antonio Gasper (National Director of Extension)
	World Vision	Chance Briggs (Prog Quality Dir), Fransisco Jr Matuca (Prog Officer)
	World Food Program	Billy Mwiinga (Operations Manager)
Thursday 3rd February	Travel to Beira (Sofala Province)	
	IFDC	Gil Mucave (Project Manager, Chimoio office)
Friday 4th February	KULIMA (NGO)	Marylene Madeleine (Coordinator), Theodore Kacamu (Head Technical Dept) & Cesario F. Jose (Local Advisor)
	Manguambe & Filhos (Agro-dealer)	Sinai Munguambe (Manager)
	AgriFocus Agricultura e Comercio Internacional Lda (Agro-dealer)	Julio Douglas Barros (Manager)
	Min. of Agriculture	Armando Dique Camissa (Provincial Head of Extension, Sofala)
Saturday 5th February	Mandruze Farmers' Association	Chica Richard Medson (President of Ass) and other leaders of the Association
	Min. of Agriculture	Julio Jorge Vilanculo (Extension Supervisor, Dondo District), Angelo Caetano Jone (Extensionist)
Sunday 6th February	Travel to Chimoio (Manica Province)	
Monday 7th February	Min. of Agriculture	Jorge Vidigal Fole (Ag Provincial Director of Agriculture, Manica); Jose Domingos Chiocho (Provincial Head of Extension, Manica) & Joao Aleixo (Communication Officer)
	Cooperative league of	Stefano Gasparini (Beira Corridor

Date	Organization	Persons met
	the USA (CLUSA)	Coordinator)
	UKAMA Farmers Union	Jose Basquete (President), David Rafael Munasse (Coordinator) & Fatilina de Conceicao Monjane (Head Programs)
	Min of Agriculture	Matias Juga (Extension Supervisor at District Economic Activities Services [SDAE], Manica, Gondola)
Tuesday 8th February	Uniao Distrital das Associacoes (UDAC)	Pita Pacanati (President), Emilia Fransisco (Vice president) & Bento Tauro (Secretary)
	Shawira Farmers' Association	FG discussions with farmers
	Rudjeco Farmers' Association	FG discussions with farmers
Wednesday 9th February	Semente Perfeita (Agro-dealer)	Alberto Antonio Vura (Production Manager), Massaite Elias (Administrator)
	DECA (Maize miller and trader)	Butch Chantler (Manager), Manuel Alexio Safur (Administrator)
	Radio Mozambique	Americo Estevao Basilio Viana (Delegate, Manica)
	Min. of Education	Rafael Massinga (Director, Instituto Superior Politecnoco de Manica)
Thursday 10th February	Travel to Maputo	
	Min. of Trade and Industry	Odete Mondlane Tsamba (CEO, Institute for the Promotion of Small & Medium Enterprises [IPEME])
Friday 11th February	Min. of Education	Nicia Giva & Luis Artur (Scientists at Eduardo Mondlane University
Saturday 12th February	Report writing (initiation)	
Sunday 13th February	Travel to Nairobi from Maputo	
Friday 25th February	USAID	John McMahon (Chief - Agriculture, Trade & Business)

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