Addis Ababa University
School of Commerce

Assessment of Agricultural Innovations, Extension Projects and Their Development in Ethiopia

In Partial Fulfillment of the Requirements for the Award of Master of Arts Degree in Project Management

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As Thesis Research advisor, I hereby certify that I have read and evaluated this thesis prepared under my guidance by Liyuwork Fekade Bekele, entitled Assessment of Agricultural Innovations, Extension Projects and Their Development in Ethiopia. Here by certify that I have read this thesis prepared under my direction and recommended that it be accepted as fulfilling the thesis requirement for the degree of Master of Art in Project Management.

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DECLARATION

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List of Abbreviations and Acronyms

AGP	Agricultural Growth Program
AIS	Agricultural innovation Systems
AKIS	Agricultural Knowledge and Information Systems
ARDPLAC	Agricultural Development Partners Linkage Advisor Council
ARTP	Agricultural Research and Training Project
AR4D	Agricultural Research for Development
ASARECA	Association for the Strengthening of Agricultural Research in Eastern and Central Africa
ATVET	Agricultural, Technical and Vocational Education and Training
BPR	Business Process Reengineering
CAADP	Compressive African Agriculture Development Program
CIP	Coffee Improvement Project
CTU	Change and Transformation Unit
DA	Development Agent
DFID	Department for International Development
EGTP	Ethiopia's Economic Growth and Transformation Plan
EIAR	Ethiopian Institute for Agricultural Research
EARS	Ethiopian Agricultural Research System
FARA	Forum for Agricultural Research in Africa
FCA	Federal Cooperative Agency
FRG	Farmers Research Group
FTC	Farmers Training Centre
HLIs	Higher Learning Institutions
IAR4D	Integrated Agricultural Research for Development
IFAD	International Fund Agricultural Development
IPMS	Improving Productivity and Market Success
LED	Local Economic Development

MOARD	Ministry of Agriculture and Rural Development
NARS	National Agricultural Research Systems
NEPAD	New Partnership for Africa's Development
PASDEP	Plan for Accelerated and Sustainable Development to End Poverty
PIM	Program Implementation Manual
RARIs	Regional Agricultural Research Institutes
RED-FS	Rural Economic Development and Food Security
REFLAC	Research Extension Farmers Linkage Advisor Council
RCBP	Rural Capacity Building Program
SDPRP	Sustainable Development Program to Reduce Poverty
SMS	Subject Matter Specialist
SNNP	Southern Nations, Nationalities and Peoples (region)
TOT	Transfer of Technology
EIAR	Ethiopian Institute of Agricultural Research
ARDPLAC	Agricultural Rural Development Partners Linkage Advisory Councils
PADTES	Participatory Agricultural Demonstration and Training Extension System

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Abstract

Transforming Ethiopian agriculture from its current subsistence orientation into market orientated production system forms the basis of the agricultural development strategy of the Government of Ethiopia (GoE). The agricultural extension projects have a central role to play in the transformation process. This paper makes use of literature review and information collected from some woredas of Regional States of Oromiya, Amhara, Tigray and Southern Nations, Nationalities and Peoples Region (SNNPR) in Ethiopia to assess the extension project development, and analyze the approaches and processes used by the current extension projects.

The paper also identifies some of the major bottlenecks in the extension project and suggests recommendations for a more market oriented support service. The extension projects are in the process of transition, with emphasis being shifted to the use of the newly established Farmers Training Centres (FTCs). The FTCs are expected to serve as hubs for the transfer of improved technologies and knowledge, skill development, and the provision of other institutional support services. Agricultural extension projects are supported almost exclusively by the government through the woreda(district) Offices of Agriculture and Rural Development (OoARD). Although the country is following market oriented agricultural development strategy, the extension projects that has been organized for achieving food security objectives has not yet been adapted (both in capacity and organizational structure) to the level of agricultural innovation required for transforming subsistence agriculture to market oriented agriculture. Major problems of the extension projects include top–down and non-participatory approach, primarily supply driven, low capacity of experts and development agents, low morale and high turnover of extension staff, and shortage of operational budget and facilities.

It is recommended that steps be taken to adapt the extension project to fit into the market oriented development strategy. It is also recommended that support is provided to the extension projects to develop pluralistic and interactive operational models geared towards market oriented agricultural development including involvement of the private sector extension through co-operatives and large-scale commercial production and marketing companies. The creation of agricultural innovation teams both at the federal and regional levels will help develop innovative approaches and capacities at the district level, thus contributing to the alleviation of the top–down nature of the extension projects. Furthermore, it is recommended that the Agricultural Technical and Vocational Education and Training (ATVET) colleges be involved in the learning process and continuously include lessons learned in their curricula.

Chapter One
Introduction

1.1 Background of the study

Ethiopian development policy and strategy document had given credence to different economical, social, political and institutional arrangements including capacity building program to strengthen local institutions and organizations so as to reduce the bottleneck of development.

The quality of agricultural extension projects is an especially important issue in Ethiopia, where agriculture dominates the economy, accounting for 85 percent of employment, 50 percent of exports, and 43 percent of gross domestic product (GDP). Over 80 percent of the country's 91 million people live in rural areas (FAO 2010; CIA 2011), and most are extremely poor, with a daily per capita income of less than $0.50, and access to one hectare or less of land (IFAD 2011). In recognition of the centrality of agriculture in most Ethiopians' lives, government policy emphasizes what it calls agricultural development–led industrialization (ADLI).

The government is the major provider of extension through the *woreda*(district) offices of agriculture and rural development (WoARDs). These generally include such subsectors as agricultural development, natural resources, environmental protection and land administration, water supply and rural roads, input supply and cooperative promotion, marketing, and disaster management and food security. Agricultural extension projects fall under the agricultural development subsector and is further subdivided into extension on crops, livestock, and natural resources management (Gebremedhin, Hoekstra, and Tegegne 2006; Cohen, Rocchigiani, and Garrett 2008)

The government emphasis on commercialization of the agricultural sector has implications for the organization, staffing and operation of the agricultural extension projects. The role of extension is more critical for commercial oriented farmers than for subsistence farmers. When farmers produce primarily for the market (both domestic and export markets), quality and standard of the produce become much more important than during subsistence production, since competitiveness depends partly on quality of produce. Changing market conditions and consumer preferences require rapid adjustments in production technologies, and timely and effective transmission of market information. Post harvest handling and technologies play critical

role in market oriented production. Meeting quality of produce depends heavily on the use of the right technologies and methods of production. Important in this respect is also the role extension projects have to play in linking the different public and private stakeholders involved in input–output marketing and credit supply.

Considering these challenges this paper looks at the capacity of the extension institutions in Ethiopia, and how effective these institutions have been in meeting their mandate in the past. It then reviews historical progresses (strengths and weaknesses) and the newly developed extension strategy for Ethiopia. It concludes with suggestions for improving the extension projects in order to fit into its new role in the context of market oriented transformation of the Ethiopian agriculture.

1.2 Statement of the Problem

Globally, agricultural extension projects exhibit a number of generic problems confronting the projects including problems related to coverage; complexities involved in the projects; effect of wider agricultural development policy environment for success; the critical role of other institutional support services such as input supply, credit and agricultural marketing; lack of political support and commitment; inadequate public funding; and insufficient appropriate and relevant technologies.

Another generic problem confronting the extension projects is inadequate public funding. The problem is especially acute with regard to operational budget. Operating costs are usually liable to budget cuts. Shortages of operating costs seriously affect the effectiveness of the extension project (Axinn 1988). In many developing countries, lack and shortage of relevant and appropriate technologies to improve productivity is a major constraint confronting an extension project, a problem which is more serious in rain-fed, resource poor environments (Axinn 1988; Purcell and Anderson 1997). Part of the reason for the lack and shortage of appropriate technologies is the weak linkage between research, extension and farmers.

To alleviate the aforementioned generic problems of extension, a range of institutional arrangements have been tried, including improvements in extension management, decentralization, and commodity-focused approach, fee-for-service public provision, institutional pluralism, empowerment and participatory approaches, privatization, service contracting, and inter-connecting rural people and use of appropriate media (Anandajayasekeram et al. 2005).

Decentralization can facilitate flexibility and adaptability of extension projects to local environment and the needs of intended beneficiaries, although it can also improve local political interference on technical matters.

The interest of this research therefore is to investigate the effectiveness of agricultural projects in facilitating the extension projects to fit into innovative development strategy. Extension projects must develop pluralistic and interactive operational models geared towards innovative agricultural development including involvement of the private sector extension through co-operatives, other financial institutions and large-scale commercial production and marketing companies. The study can also fill the current knowledge gaps; so that resources can be boosted; and as a result productivity can be increased.

1.3 Research Questions

Over the last decade there has been a move towards conceiving agricultural research and extension in terms of 'innovation systems' (cf WB, 2006, Hall, 2008, Berdegué, 2005). This involves a shift from seeing innovation as a process of linear technology transfer to seeing it as an interactive process of two way learning and exchange between all the different actors. Accordingly, the rationale behind this study revolves around the following questions.

1. How do markets, not production, increasingly drive agricultural development?
2. How innovative can the production, trade, and consumption environment be for agriculture and agricultural products?
3. How can knowledge, information, and technology be generated, diffused, and applied through the private sector?

1.4 Objectives of the Study

In the view of the above statements, the objectives of the study are stated as follows:

1.4.1 General objective of the study

The overall objective of this study is to assess agricultural innovations&extension projects, and their development in Ethiopia

1.4.2 The Specific objectives of the study were:

(a) To measure the scale and impact of the innovation;

(b) To assess the innovation process with actors; and,

(c) To identify the type of innovation and main lessons.

1.5 Significance of the Study

The extension projects experience globally has led to the identification of the key success factors (Thropp 1996, as cited in Anandajayasekeram 2005), including participation and empowerment of farmers and communities, linkages between groups and institutions, innovative learning and communication, and supportive policy environment and political commitment. A common feature of the most successful extension projects has been farmers taking the lead or sharing control in all parts of the effort. Close collaboration between research institutions, extension agencies, nongovernmental organizations (NGOs), the private sector and farmers has also been an important factor of successful extension projectsperformance. Moreover, mutual learning process and exchange of information between farmers, experts and scientists facilitates improved problem identification and technology development. Government commitment at all levels helps bring about change more quickly.

Therefore, this study is expected to be useful for policy makers and executive officials. Secondly, it is to be useful to give insights for researchers and designers interested for further investigation and to formulate appropriate extension program that can better fit farmers. Thirdly, the result can help as a channel for further macro-level studies.

1.6 Scope of the Study

Extension projects in Ethiopia until about 2002 were focused on increasing production and productivity in view of achieving food security (Mathewos and Chandargi 2005). However, it had become apparent around 1996 that without integrating farmers into the market, sustained growth in the agriculture sector would not be realized. The main concern of this study was to investigate the transformation of subsistence agriculture into market orientation as a basis for long-term development of the agricultural sector. Such policy emphasis on market orientation has led to the recent establishment of a State Ministry of Agricultural Marketing within the Ministry of Agriculture and Rural Development (MoARD). Within this State Ministry, specific

emphasis is given to the role of co-operatives for the supply of credit and input/output marketing services. The extension service will have to make proper linkages with the co-operatives.

Accordingly, the research findings could be used to raise awareness among different stakeholders and also serve as background information for others who seek to do further related researches and would serve in formulating and revising agricultural extension strategies in different places with different socio-economic situations.

1.7 Structure of the Thesis

The thesis is organized in five main chapters. The introduction part describes about the background of the study including statement of the problem, objectives, significance and scope of the study. Subsequent to the introduction, relevant literature is reviewed in chapter two. Basic concepts and theories of extension programs are described. Chapter three deals with the description of the study area and also it discusses the methodology employed for data collection, analysis and conceptual framework of the study are presented in this chapter. Main findings of the study are presented and discussed in chapter four. Finally, chapter five presents the summary, conclusions and recommendations based on the results of the study.

1.8 Limitations of the study

Because of budget and time constraints the study has the following limitations:

- Products were not tested to assess the impact of innovation & extension projects on agricultural features because of lack of time and lab facilities.
- The analysis is limited to the past development plan period (2010/11-2014/15) due to the lack of various resources.

Chapter Two

Literature Review

In this chapter, relevant literature to the theme of the study has been reviewed. It presents concepts, theories, definitions and typology of innovations in agricultural sector. The chapter also deals with a review of theoretical and empirical literature related to the main concern of this thesis.

2.1 Agricultural Innovation – Conceptual Foundations

Over the last decade there has been a move towards conceiving agricultural research and extension in terms of 'innovation systems' (cf WB, 2006, Hall, 2008, Berdegué, 2005). This involves a shift from seeing innovation as a process of linear technology transfer to seeing it as an interactive process of two way learning and exchange between all the different actors.

Six changes in the context for agricultural development heighten the need to examine how innovation occurs in the agricultural sector (World Bank 2006):

a) Markets, not production, increasingly drive agricultural development.
b) The production, trade, and consumption environment for agriculture and agricultural products is becoming more dynamic and evolving in unpredictable ways.
c) Knowledge, information, and technology increasingly generated, diffused, and applied through the private sector.
d) Exponential growth in information and communications technology has transformed the ability to take advantage of knowledge developed for other purposes.
e) The knowledge structure of the agricultural sector in many countries is changing markedly.
f) Agricultural development increasingly takes place in a globalized setting.

2.2 Defining Innovation

Innovation means putting a new idea or a new technology into use. An Invention, a creation or a new product only becomes an innovation when it improves how things are done, is economically viable to adopt and has a significant impact in its area of application (Berdegué 2005). Scientific

research and technology development are often confounded with innovation. However, before a new variety, a new cropping system, a new idea about microfinance or a new technology for tracking products can be considered an innovation, it has to be effectively adopted. As such, innovation requires not only creation or introduction of a new idea or technology but also creating the conditions so it can be effectively adopted and used.

Further, an innovation is a new way of doing things for a particular group, organization or business. The fact that the idea is already known by others does not stop it being an innovation for the group adopting it.

2.3 Integrating Technological and Institutional Innovation

Over the last decade agricultural development has been shifting its main focus from production issues to giving much more attention to development of markets and the creation of effective value chains. Agricultural productivity and technical capacities remain critical. However, if there is no market demand or the market is not effectively connected to producers through efficient value chain mechanisms; there is often no incentive for improving agricultural productivity.

Creating effective and efficient marketing mechanisms and value chains requires combining technological innovation with institutional innovation. Institutions are the 'rules of the game' that shape the way humans behave and the way markets operate. They include government policies and regulations, taxation arrangements, coordination mechanisms between different actors in markets, informal rules between market players, and arrangements according to which financial, marketing, communication for transport services are to be provided (Woodhill 2008).

It is increasingly recognized that inappropriate institutional arrangements are often the major barrier to effective development and to tackling the underlying causes of poverty and unsustainable resource use. Key areas for institutional innovation include: developing and meeting food quality and safety standards; introducing traceability into the value chain; creating effective producer organizations; establishing stakeholder learning and coordination mechanisms; changing agri-food businesses procurement policies; establishing mechanisms for public private investments in market infrastructure.

Institutional innovation can require a different research and development pathway than technological innovation. In particular, institutional innovation is even more dependent on effective coordination and multi-stakeholder engagement. Historically much of the agricultural research and extension capacity and infrastructure have been oriented towards technology development and limited attention was paid to institutional development. By now, the awareness is growing that the latter is at least equally important, if not more decisive for the generation and spread of innovations.

2.4 Market Driven Innovation and Value Chains for Agricultural Development

A value chain approach to agricultural development looks at how market opportunities, at local, national or international levels, can be developed and linked with producers. This involves assessing the whole value chain to improve its efficiency and to find ways of ensuring that small-scale producers can meet the market requirements and benefit fairly from participating in the value chain. All actors along the value chain may benefit from the advantages gained by application of this approach.

Often, small-scale producers are not very well situated to benefit from emerging market opportunities. Wholesalers and retailers are moving towards direct partnerships with producers, who can guarantee the provision of a steady supply of produce complying with the quality criteria and volumes required, which can shorten the value chain.

For small scale producers to engage in and benefit from new market opportunities they need to be able to bulk up their produce and ensure quality standards. This requires effective producer organizations and enhanced capacities. To respond to this new environment, traditional agricultural research and extension services that focused mainly on production capacity need to complement their services with a set of new functions and services that include:

- conducting market analysis;
- supporting small-scale farmers to get organized into producer organizations;
- introducing quality assurance mechanisms;
- assisting producers to see and understand market opportunities and demands;
- brokering relationships and communication between different actors in the value chain;
- ensuring access to financial services that align with market demands;

— providing business development services; and

— developing systems to supply market information.

Figure 1 illustrates the value chain,the actors directly or indirectly involved along the chain, the factors influencing the behavior of the actors, and the dynamics of the process. The top layer shows the main elements of the value chain. The middle layer shows the network of actors along the value chain and illustrates that within the network of actors, there are flows of inputs, products, finances and information.

The lower layer shows the institutional factors that influence how the chain functions and the incentives for different actors.

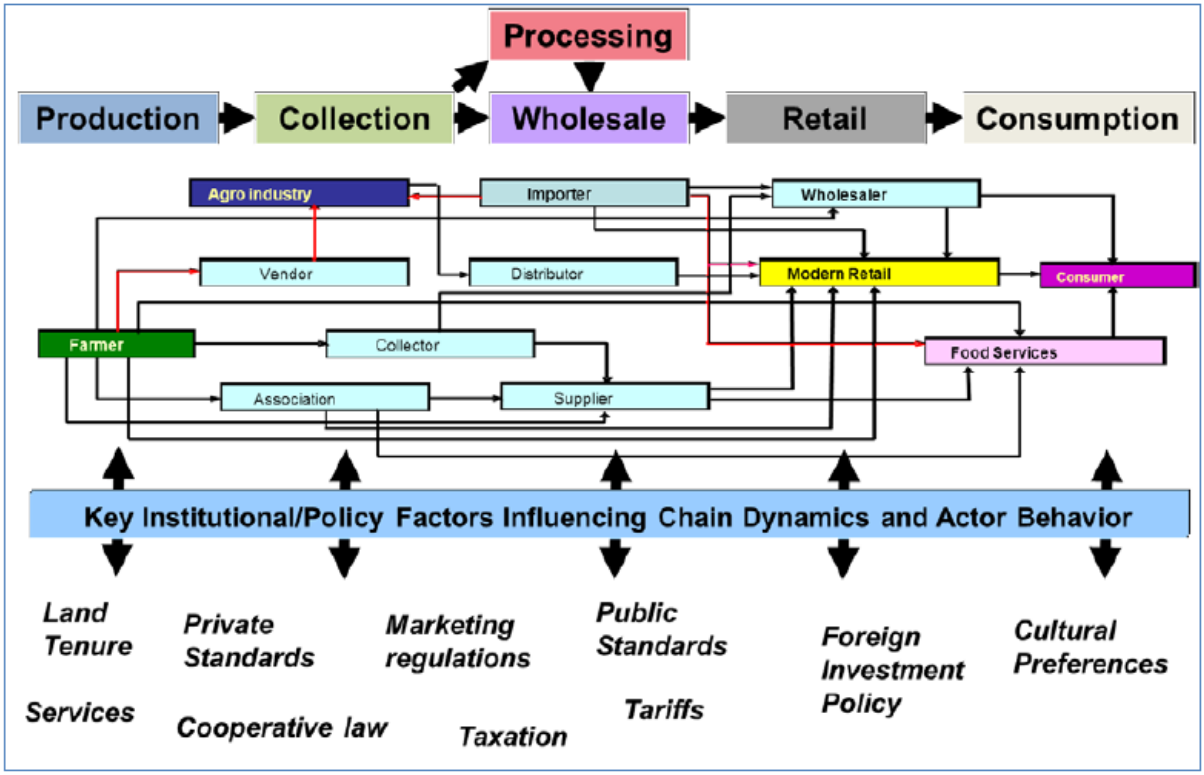

Figure 1.Illustration of a value chain showing institutional factors that influence its functioning
Source: Vermeulen et al., 2008

2.5 Livelihood Assets and Innovation

Apart from the growing interest in innovation systems and value chains, the livelihoods approach (DFID 1999) also has gained increased attention over the last decade. This approach focuses on all the assets (capitals) local people need to develop the resilience of their livelihoods to deal with changes in the social, economic and environmental conditions they live in. Five assets are generally recognized:

1. Physical – infrastructure; housing; processing equipment; transport
2. Social – community organization; producer organizations; trust and support networks, governance, rules and regulations, services
3. Financial – income, earnings, savings, investments, access to credit and other financial services; insurance
4. Natural – possession, infrastructure, access to land, water; minerals, breeds, seeds, vegetation
5. Human – labour; knowledge skills and attitude; leadership

It has been recognized that it requires an integrated approach to strengthen livelihoods in all these assets to tackle poverty effectively. Often, the lack of success in the development of value chains is due to the fact that insufficient attention is paid to developing all these assets which are essential for producers to effectively participate in the value chain.

2.6 Scaling Up

A key question for the development of interventions is how to 'scale-up' successful interventions in order to have a wider impact. The issue of up-scaling is central to the AGP (Agricultural Growth Program) of Ethiopia. Ways have to be found for specific interventions to have an impact beyond their immediate focus. However, the scaling up challenge is not as easy as it may seem. A defining feature of agriculture is the enormous differences between different locations in terms of agro-ecological conditions, production and market opportunities, services, infrastructure, human capacities, culture, etc. This means that a technology or institutional change that worked well in one location will not necessarily work well in a different location.

Across the development sector there is a growing interest in the implications of complexity thinking. Recognizing complexity means recognizing that there are so many variables or factors influencing a situation that it is very hard to know exactly what will happen as a result of an intervention. This calls for a shift from top down linear planning to forms of interventions that are more dynamic, learning-oriented and adaptive. Easterly (2006) makes a distinction between planning and searching. He argues that too much of development has focused on ordered planning when in fact what is really required is much more entrepreneurial searching, which in essence implies responding to opportunities as they emerge.

The diversity of agriculture combined with accepting the complexity of development has significant implications for the idea of scaling up. In short it means that scaling up should not focus on 'best practices' that are widely promoted, but rather on 'best fits' - taking experiences and lessons from other places and modifying and adapting them to create 'innovation' in a new location.

It needs to be recognized that when a new technology has been successful in a particular location the technology itself is often only part of the story. A whole set of institutional factors, approaches and incentives help to create the conditions for success. Trying to scale up the use of a technology without the complementary institutional conditions will often fail. For example, in the Holeta area of Ethiopia, farmers have been successful in developing and growing new varieties. However, behind this technological dimension lies a significant social and economic infrastructure of farmer groups and financing mechanisms. Simply promoting the new varieties to other farmers without this institutional enabling environment is unlikely to have an impact.

The aforementioned remarks have major implications for how to go about scaling up and for the competences required from researchers, farmers, extension staff, development planners and policymakers alike. For scaling up in diverse, complex and rapidly changing contexts, all these actors cannot do without an innovation systems perspective.

As a result of decentralization and participatory approaches, the extension advisory services will be increasingly provided by a diversity of government, private sector and NGO actors. According to the specific institutional context in the various countries, the public sector and the private sector, as well as civil society organizations may each play a particular role in the

innovation system. Many innovations will develop, both at technological and institutional level. The system requires a mechanism to learn from new, often very local experiences, i.e. a monitoring and learning facility. This learning from local practices and experiences will be a major task for the management of extension at national and regional level, and will have to be open for experiences from both public and private sectors involving all key innovation system stakeholders. In such a setting, identified and documented good local practices can be considered for use on a wider scale through a carefully designed scaling-up strategy. Up-scaling can be about quantitative aspects of more farmers adopting or adapting technologies to their own situation, but it may also refer to policies and institutional and organizational dimensions. Based on innovation system concepts, the factors of success of up-scaling good practices need to be analyzed ex ante (Zalf, 2010). Scaling-up efforts need to be carefully monitored and periodically evaluated. Capacity to guarantee such close supervision is scarce, but at the same time an essential component in the innovation systems approach.

2.7 Capacity Development

There is renewed attention for capacity development. For example, the 'Accra Agenda for Action' was strongly directed towards the need for enhanced capacity development. It stated that: 'without robust capacity—strong institutions, systems, and local expertise—developing countries cannot fully own and manage their development processes' (OECD 2008).

On the other hand, it also needs to be recognized that large scale training programs often fail to create capacities. Consequently there is now attention for more integrated approaches to capacity development that look at how individual, organizational and institutional aspects link together to enable effective performance.

2.8 Innovation Systems and Processes

The concept of innovation systems has evolved over time and is being built on developments such as farming systems research, participatory technology development, participatory learning and action/participatory rural appraisal, agricultural knowledge and information systems (AKIS).

The articulation, background and rationale of an innovation systems approach is well captured in the World Bank's 2006 publication on "Enhancing Agricultural Innovation: How to Go Beyond

the Strengthening of Research Systems". This publication was the result of an international workshop on "Development of Research Systems to Support the Changing Agriculture Sector". The concept has also been well articulated by authors such as Hall (2007, 2008), Speilman (2005), Berdegué (2005).

The World Bank (2006) publication defines an innovation system as: "a network of organizations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organization into economic use, together with the institutions and policies that affect their behavior and performance. The innovation systems concept embraces not only the science suppliers but the totality and interaction of actors involved in innovation. It extends beyond the creation of knowledge to encompass the factors affecting demand for and use of knowledge in novel and useful ways."

Innovation essentially occurs through the interaction between the different domains of market demand; agri-food enterprises; service and support mechanisms; research and education and in the centre the domain of intermediaries who help to broker innovation.

According to Hawkins et al, (2009), four key principles are important for an innovation systems approach:

(a) developing a joint agenda between key stakeholders in the innovation system;
(b) organizing the facilitation of the multi-stakeholder learning process;
(c) assessment of the effects and outcome of the process on the different actors in different dimensions; and
(d) development of ex-ante scaling up strategies, including institutional and policy aspects.

The innovation process is the process that leads to innovation, it is dynamic and often unpredictable and not linear, it is about the combined knowledge of the many actors in an innovation system. A simplified example is the bringing together of farmers' knowledge (often undocumented indigenous knowledge), research knowledge (e.g. on new market-oriented technologies and the market knowledge (on quality, consumer demands etc.)), which are all needed to make something happen. This process often needs bringing the relevant actors together (brokering), as well as guiding the interaction (facilitation and coaching). These brokering, facilitation and coaching services are important for effective and dynamic innovation systems.

Generally, an integrated perspective on different areas for innovation given the above conceptual overview of an innovation systems perspective covers the connection between local production and value chains. The importance of considering the peoples overall livelihood strategies and capitals as a precondition for engaging in market linked entrepreneurial activity is key to the perspective. Emphasis must also be given to the opportunity for developing local agribusiness initiatives (clusters) where a combination of local value adding, bulking and service delivery leads to off farm economic development. Also advised is the need to support improved service delivery for all stages of the value chain and for creating the enabling institutional and policy environment. Ultimately the opportunities for small-scale producers are influenced by consumer demand and the factors influencing this.

2.9 Innovation Brokering

Within the innovation systems approach there is increasing recognition for the importance of innovation brokers. These are individuals or organizations that help to create space for innovation by bringing different actors and ideas together and creating linkages that otherwise would not exist. This brokering role is complementary to the traditional agricultural extension role which has often focused more at the farm level and on technology transfer. Innovation brokers work across scales, even helping to make linkages between foreign markets and local producers. They need to be highly knowledgeable of the sector, have trust and respect from the different players and be able to communicate across the boundaries of business, government, producers and NGOs.

Chapter Three

Research Methodology

In this chapter, brief description of the study area & research methodology are presented in detail.

3.1 Approach used

In line with the terms of reference the main activities undertaken for this research were:

(i) Desk study on global developments on innovation processes in the agricultural sector, also based on a number of cases;
(ii) Analysis of the policy environment for innovation processes in Ethiopia;
(iii) Stakeholder analysis in Ethiopia;
(iv) Compilation of various reports and policy brief development.

For the stakeholder analysis, various data is collected from the following five key domains of the national agricultural innovation systems:

(a) the Demand Domain (market and consumer parties);
(b) the Enterprise Domain (farmers, traders, processors and input supply companies);
(c) the Education and research Domain (Universities, Research Organizations in public and private sector);
(d) the Support structures (financial services, training support, infrastructure); and,
(e) the Intermediary Domain (Extension services in public and private sector).

During the research special attention was given to fragmentation of the agricultural knowledge and innovation system. Three agricultural knowledge systems can be distinguished with possible interactions:

a) Agricultural knowledge system in which the public sector dominates, and which focuses on smallholder farmers. Main actors are apart from the public sector, the farmer cooperatives.
b) Agricultural knowledge system with a major role for national and international NGOs, still focusing on smallholders and medium-scale farmers.

c) Agricultural knowledge system dominated by the large export oriented corporate farms, often in the horticultural sector.

The level of interaction and learning between the three systems was analyzed. The various actors have their own examples of innovation, the institutional histories and mechanisms that made the innovation possible, as well as role in the overall agricultural development process. Accordingly, Potato Variety Development and Marketing, Malt barley technology, Fruit grafting, Zero Tillage, Improved Onion seed production, Haricot Bean, Goat Farming, Bread Wheat, Taro variety dissemination, Hybrid maize seed, &Honey production are some of the innovation examples in the agricultural sector in Ethiopia.

3.2 Selection and Description of the Study Area

During the past two decades and particularly in the past five years, Ethiopia managed to achieve high economic development by implementing the Agricultural Development-Led Industrialization (ADLI) strategy.

Progresses made since the last one decade in growth and expansion of services and improvement in human resource development are remarkable. In terms of agricultural development, emphasis has been given to production and productivity increment through the use of inputs such as improved seeds, fertilizers and recommended agronomic practices, coupled with capacity building, institutional arrangements and infrastructure development as well as scaling up of best practices.

Hence, this study is underpinned by regional case studies of the development framework for innovative agricultural practices carried out in Ethiopia by different agents. In undertaking this research, it is attempted to supplement the findings from specific case studies with information from other reports and studies on the development framework for the agricultural sector.

Even though they are geographically and culturally diverse, the regional states share characteristics that are typical of Ethiopia where innovative agricultural practices could be an important tool for poverty reduction: level of economic development are low, though per capita income is growing; rural sectors are large; the agricultural sector is primitive; and poverty is widespread (as participant in the Highly Indebted Poor Countries program, Ethiopia is preparing a poverty reduction strategy paper). While agriculture is said to be the backbone of Ethiopia, the country is attempting various approaches to innovative practices and establishing institutions for related projects for the

development of the agricultural sector. This diversity was expected to make the study richer and its conclusions more robust.

The research is also intended to enhance World Bank advice to countries where it is actively involved in the development of the agricultural sector

3.3 Data collection method

3.3.1 Secondary data

This thesis is prepared based up on secondary data. Literature on socio-economic impact of innovation, farming management, institutional arrangements for extension projects, environmental regulation policies, development plans of Woredas and other studies were collected from Environmental Protection Agency, Woreda Agricultural Office, IDE, Ethiopian Institute of Agricultural Research, International Livestock Research Institute and internet to supplement the research.

Accordingly, three categories of rural households identified by the joint Ethiopian-Donor Sectoral Working Group on Rural Economic Development and Food Security (RDE-FS) are selected for the study:

1 Food security category, structurally depending on food aid, through the safety net program and through emergency aid programs. Some 7-12 million people, facing great challenges in terms of natural resource depletion and recurrent droughts. The main challenge is guaranteeing household food security, as in the safety net program.

2 Growth 1 category: Majority of rural households, estimated at 50-55 million people, who have just enough to live off, but have serious productivity problems and limited market integration, with degrading natural resources. Main challenge is to transform their mainly subsistence production system, with enhanced input supply and market linkages.

3 Growth 2: Some 3-5 million people with better market integration and involvement in (semi)-commercial, specialized production of commodities. The main challenge is to improve quality and enhance added value throughout the value chain.

3.4 Method of Data Analysis

The AGP intervention results are analyzed by assessing whether they are: (1) comprehensive (included production, marketing, marketing and irrigation infrastructure development), (2) value chain (dealing with stakeholders including producers, assemblers/traders, processors, distributors, exporters, retailers and finally consumers), and (3) decentralized and demand-driven (bottom-up planning process and equal participation of women and men in problem identification, planning, implementation and monitoring the activities).

Basically, AGP gives a priority to strengthen and develop relevant institutions for agricultural growth in terms of working facilities and skill development. Key institutions selected for AGP intervention are:

- extension services at federal, regional and woreda levels,
- Agricultural Development Partners Linkage Advisor Council (ARDPLAC),
- Soil Testing Laboratories and Animal Health Services,
- women/youth groups, and
- Cooperatives.

AGP is estimated to cost about USD $ 264.115.8 million, major donors being World Bank, UNDP, CIDA, REN, and USAID. Government and community will have also some contributions to the total fund requirement. The Ministry of Agriculture at federal level and the sector Bureaus at Regional and Woreda levels have the overall responsibility and accountability for execution of the program.

Chapter Four

Results and Discussions

The AGP is a five-year program and implemented in selected targeted areas in four high potential regional states, namely Tigray, Amhara, Oromia, and SNNPR. Based on criteria such as suitability for agriculture, potentials for irrigation, access to infrastructure and institutional capacity, 80 woredas are selected; i.e., 34 woredas in Oromia, 22 woredas in Amhara, 19 in SNNPR and 5 in Tigray. Based on the research and literature review, the following section examines some results of the agricultural development program in Ethiopia.

4.1 Positive Examples of Innovation

There are many positive examples of agricultural development, both technological and institutional to be found in Ethiopia. This research identified some innovations. They are also captured by reviewing what several literatures stated to be the best examples of innovation in the sector. The examples cover different regions in Ethiopia. These examples offer an insight into innovation dynamics and illustrate the value of learning lessons from such experiences. In most of the examples the strong driving role of market incentives and the importance of individuals and organizations who play a 'brokering' or coordinating role was notable.

The examples listed provide a rich picture of the variety of innovation in terms of the three main characteristics recorded: (i) the scale and impact of the innovation; (ii) the innovation process with actors; and, (iii) the type of innovation and main lessons. The lessons to be drawn on agricultural innovation dynamics in Ethiopia can serve to orient agricultural development at local and policy levels.

Although different drivers of innovation were mentioned in the survey, notably research actors (MoA, research institutions as well as universities) and policy-, decision-makers, and international development partners, because of their market orientation and market partners, played a role. Some different stakeholders (notably research and extension) came up with similar innovations, illustrating interaction.

It is clear from the examples provided, that market actors play a crucial role in almost all the innovation examples. Most innovations combine technological and institutional aspects. Many literatures tend to identify the technological aspects, while in further researches the institutional aspects emerge. For example, seed cooperatives (potatoes, onions, hybrid maize, and bread wheat), farmers' research groups, regional seed policy, course and curriculum change (university and ATVET), farmer-to-farmer technology transfer, farmer category targeting, small-scale business service provision.

The innovation process is generally understood to be involving different actors. Research actors are almost omnipresent, but extension and other public sector actors (including Ethiopian Seed Enterprise) are often mentioned. Of the enterprise domain, smallholders and their groups (FRGs, FREGs) are seen as key partners, although cooperatives less often. The role of women in innovation process seems to depend on the types of commodities involved. Their role is high in garden crops, horticulture, dairy and poultry. For example, women organized themselves regarding potato innovation in Holeta and in some FRG groups in the rift valley, women also acted in groups to participate in potato seeds multiplication and marketing.

The role of women in dairy innovation is significant. Facilitation of the process, actor network or platform is often done by one of the stakeholders, and rarely by free actors. The main characteristics of well-functioning agricultural innovation system, based on lessons from other countries and global experiences with innovation are analyzed as follows:

— The innovation systems perspective is relatively well addressed in the referred innovations. A variety of stakeholders is involved from the start of the innovation process. In absolute terms this performance is minimal; only three cases (potatoes, malt barley and onion) show the required score.
— Quite a few innovation examples follow a value chain approach and are strongly market oriented; seven of these form the maximum score. The value chain approach is relatively well developed.
— A pluralist service system in which public and private, as well civil society service providers closely work together, which is important for knowledge sharing, learning and up-scaling, is only found in a few examples, including one innovation of private service delivery itself.

— Although an estimated 10% of all Ethiopian farmers are a member of a cooperative, and the widespread adoption of the Farmer Research and Extension Group concept, emphasis on farmer empowerment in the referred innovations is limited. The exceptions are those in which farmer groups are directly involved in the innovation e.g. on seed potato and bread wheat seed production and dairy and honey production.

— In all innovations limited attention is given to the involvement of the local government and the contribution to local economic development.

The overall conclusion based on this rather random list of encountered innovations in parts of Ethiopia is that more emphasis is needed for pluralism in service provision, farmer empowerment and the role of the local government.

Table 3: Main characteristics of documented innovations

	Innovation	Innovation systems perspective (all key actors strongly involved)	Value Chain development and market orientation	Pluralistic advisory services systems (public, private and CSO)	Empowerment of producer organizations (incl. women)	Local Economic Development (Woreda involvement)
1	Malt Barley	****	****	*	*	*
2	Fruit grafting	***	**	***	*	*
3	Zero Tillage	***	*	***	*	*
4	Onion seed	****	**	**	**	*
5	Haricot Bean	***	****	**	*	*
6	Goat Farming	**	*	*	**	**
7	Bread Wheat	***	**	*	****	**
8	Taro variety	**	*	*	**	**
9	Hybrid maize	***	**	**	*	*

**** = Principle well addressed in this innovation; *** = somehow addressed; ** = hardly addressed; * = not addressed

Although positive examples are provided in relation to the use of innovation systems and value chain perspectives, the role of the market actors in the innovation process at an early stage, needs to be strengthened.

Cooperatives/unions also apply innovative seed supply system though this is driven by development partner funded projects and international private sector activities. For instance, the "local seed business project" funded by the Netherlands Embassy and jointly implemented by Hawassa university, the regional Bureau of Agriculture, NGOs, Cooperatives, research institution and individual farmers resulted in increased awareness of business undertaking by the cooperatives; closer collaboration with stakeholders and increased engagement of students on adaptive and development research. The unions engage in marketing of agricultural products. Hadiya Farmers Cooperative Union has established wheat processing factor to engage in value addition creating market access to the producers whose business behavior has positively changed due to the participatory joint seed business development project. Similar experiences have been observed with NGOs working with cooperatives in different parts of Ethiopia including Oromia and Amhara regions.

4.2 Understanding of Market Driven Approaches and Innovation Systems and Processes

Many researches indicate that an attitude change is needed in how agricultural development is understood. There remains a strong perception that agricultural innovation predominantly involves developing and having farmers adopting new technologies that will increase yield. The concept of agriculture innovation systems is not well understood across the agricultural education, extension and research institutions. This is understandable as the agricultural education curriculum has historically focused largely on technical capacities for production and not on the capacities needed to develop new markets and coordinate agricultural value chains.

When it comes to innovation, most people initially think examples of a new technology. Most actors in the agricultural innovation consider innovation as generating a new technology. The mentioned technology is then still mostly referring to the production function of the value chain, rather than processing or marketing. The national policy framework has only partially embraced the role of the private sector as a driver for innovation (e.g. due to ECX, marketing monopoly of the cooperatives, etc.).

However, the given examples of innovation show the central role of the market and private sector interest in driving innovation. The innovation process is, however, mostly not starting with the market and the analysis of market opportunities and/or market feasibility studies. Involvement of market actors only occurs at a late stage. Market supply or spot market focus rather than market demand is often the starting point (cf referred ECX policies). The GTP (2010/11-2011/15) also still sees the role of the private sector, mainly in terms of input supply (fertilizer and seeds) and less in terms of marketing.

Research (EIAR and regional research institutes) has adopted in its strategy the agricultural research for development principles. The research system uses a limited innovation system perspective, as evidenced by the use of these principles (cf IAR4D principles referred to earlier):

(i) The joint development of the research and development agenda is used in some platforms such as the coordinating groups and learning alliances (NGO approach), while the local ARDPLACS are yet to be established, and need to be based on learning from the RELC experience. How flexibility of local innovation processes and networks are facilitated is not yet clear, nor the Woreda commodity priority setting process (see AGP for high potential Woreda);
(ii) Facilitation of interaction and learning between actors is often the role of research by default, as hardly any other services are available. Land learning approaches, such as in Farmer Field Schools, and learning alliances are not used widely;
(iii) Joint and multiple, ex-ante, assessments are not mainstreamed and require a value chain, as well as livelihood systems perspective, gender, etc.
(iv) upand out-scaling strategies are based on inventories of best practices, although possibly useful as a database, do not provide sufficient attention for functional (approaches), institutional, cultural, political aspects, at best some agro-ecological aspects are in place. In reality the following four main principles are not fully mainstreamed in the public research system (Tsedeke Abate, 2006, Heemskerk, 2007).

At the same time public research and extension services are gradually becoming more market-oriented in Ethiopia. For research this is evidenced by a publication on value chain development, which highlights good practices in scaling up and out of new technologies through partnerships with market parties (Tsedeke Abate, 2006). Interaction with the private sector was also triggered

by ASARECA Competitive Grant Scheme projects and CGIAR research projects (ILRI, CYMMIT), which strongly emphasize market orientation in research. In extension, the market orientation is relatively new, as such services are largely left to the Cooperative Agency and the Marketing Agency of the corresponding ministries (Berhanu Gebremedhin et al., 2006).

4.3 Drivers of Innovation

The growing Ethiopian economy, combined with emerging export demand presents many opportunities for market-oriented agricultural development. As illustrated by most of the case studies market linked/value chain oriented agricultural initiatives are flourishing. In these cases the driver of innovation and agribusiness development is the market opportunity. Although technological production capacity is a critical component, evidence suggests that to achieve a rapid up-scaling of current successes, reforms are required in the institutional setting, to ensure a more market driven approach to agricultural innovation and development. Up to now, the existing agricultural research and extension system remains predominantly focused on technology development and enhancing productivity at farm level.

Research and extension priorities have traditionally been focused to assisting attainment of food security. Now that agricultural strategies are changing towards more industrial-led (read agribusiness-led) rural development, more room will develop for market parties as the driving force in agricultural innovation and development.

Most actors in the research and education domain see the supply of technology and hence their own role as the main driving force for rural innovation. In practice research is conscious of the role of the market and interacts with market parties both for seed supply (bread wheat, onion seed, potatoes, etc.) and processing (malt barley, durum wheat, dairy sector, etc.). An important element here is the advanced capacity of research organizations to actually drive this process, as evidenced by the many examples in the appendix which illustrate a drive by research.

An overall concern remains on the importance given to the private sector in value chain development, in innovation, in service delivery, and the realization that the private sector and in particular the market actors are essential for triggering innovation and hence enhance competitiveness in the sector.

Commercial horticulture (flowers, fruits, vegetables, haricot beans), as well as small-scale horticulture innovation processes (honey, carrots) is driven by the market, but all other more food security type innovations (bread wheat, potatoes,) and domestic market innovations (malt barley, dairy, onions, goats, taro, maize) are still largely driven by the public sector, but also eventually discovering the private sector (Tsedeke Abate, 2006).

4.4 Linkages between Key Players

Different players involved in innovation exhibita fragmentation in the knowledge systems in general, but particularly at a local level (woreda and kebele). Mechanisms for coordination have been formed at regional and zonal levels and are planned at woreda level. Lessons from these platforms illustrate the importance of coordination but there remains a limited role in facilitation of innovation processes. The current platforms have been largely government instituted with a major dominance of the public sector. More open, transparent and flexible mechanisms are needed, based on interest rather than duty to ensure a stronger coordinating role with market players. The current separation between different ministries of the agricultural production functions and the marketing functions as carried out by the unions and cooperatives was noted as a potential risk in further delinking production and market innovation. The emphasis in the AGP on coordination through ARDPLACS at all level offers ample opportunity for strengthening linkages. The way in which this coordination role is executed is likely to have a significant impact on innovation processes in the sector.

Most agencies recognize the separation and parallel functioning of knowledge systems driven by private businesses, NGOs and governments agencies, but the following observations were made:

- in general the trend is for further integration between all three systems;
- integration between NGO driven systems and Government driven systems is developing faster, notably between NGOs and extension at the lower levels;
- relation between private sector and governments systems remains limited, except for input requirements. Exceptions exist for the large scale state farms, which are mainly producing food crops;

— interaction between MoA and research organizations (EIAR and the regional research organizations) and the Universities is not structural and limited to informal arrangements and projects.
— the relation between the research organizations as a whole and the private sector as well as farmer organizations (cooperatives) remains weak and anecdotal.

At Federal and Regional level (mostly research centre-based), Research, Extension and Farmer Linkage Councils (REFLC) were established (starting in 2001) by EIAR and RARIs and the corresponding research centers. These platforms were to bring together farmers, researchers, extension specialist and other development practitioners. At the village level, research also gave emphasis to working with Farmer Research Groups (Seid Ahmed et al., 2006). Extension has been experimenting with Woreda Extension Advisory Committees at District level while FTC management committees bring together actors at Kebele level. The platforms have been referred to by some as innovation platforms and teams (AGP, 2010, Berhanu Gebremedhin et al., 2006), but in practice all these committees did not go beyond coordination of activities. The REFLC were not only facilitated (both in the true sense and in terms of resources), but also actually driven by research.

New multi-stakeholder platforms (ARDPLACs) are replacing the existing REFLCs. The REFLCs operated at Federal, Regional and Zonal levels. Although the functioning of the REFLCs was not evaluated, the Committees were focused on coordination, were dominated by research, and were not really facilitated by independent actors, in order to make effective learning possible. The main change with the establishment of ARDPLACs is that these: (i) Have a wider composition; (ii) are to be facilitated by extension; and (iii) will also be operating at Woreda level. The ILRI supported IPMS programme supported Woreda Knowledge Centre, administered by the Woreda Advisory Learning Committee, has experimented with innovation and learning processes at District level. Centres have, however, often not gone beyond information sharing, capacity development and coordination of activities, also due to the absence of facilitation capacity.

Some NGOs in Ethiopia have been experimenting with innovation platforms, networks or learning alliances, which are more focused on a particular value chain or commodity. Learning

alliances are clusters of farmer organizations, NGOs and other actors, which aim at improving their business and market position, through a facilitated learning process which integrates training and work activities in a cycle of workshops, field assignments and coaching visits (http://ethiopialearningalliance.net). SNV (BOAM) is supporting similar initiatives in the pineapple, dairy and honey innovation systems by organizing multi-stakeholder innovation platforms, which are facilitated by externally contracted consultants in a process in which the platforms meet every 3-6 months and implement agreed activities in between http://www.businessethiopia.com.

Component I of the AGP deals with agricultural production and commercialization. Its sub-component 1.3 is about Market and Agribusiness Development. The institutional arrangement during PASDEP vests the authority to implement this component with the Ministry of Agriculture. The recent shift of the Agricultural Marketing function to the Ministry of Trade may disjoint the development of commercial agriculture. In effect, the Ministry of Agriculture which is the implementing agency for AGP has no mandate to implement the market and agribusiness development component of AGP. Thus, the implementation task has been given to USAID, which may not serve as a permanent solution.

4.5 Innovation Brokering and Facilitation

Brokering of innovation networks and facilitation of innovation processes is a capacity which does not widely exist in the current extension setup. Some experiences are emerging through private sector, NGOs and donor supported initiatives. In general, brokering and facilitation skills are weak particularly at local levels. Nevertheless, it is increasingly realized by research and extension that such skills are needed if all relevant actors (e.g. market actors, and private service providers) are to be engaged in the innovation process. The lack of 'soft' skills was also a key issue raised by the IFPRI/Gates report. Recognition of the value of 'free actor facilitators' (people or organizations who are perceived by others as having a relatively neutral position), is growing but still relatively limited. Research and university organizations as well as the corporate horticultural sector see potential for playing a greater role in this regard.

Free actor facilitation experiences mainly exist with NGOs (e.g. coordinating Group mode by SNV, or the learning alliance by NGOs) and the commercial sector (Horticultural Development

Agency as facilitator in the floriculture export system). These are promising in terms of being truly interactive (based on independent facilitation), but also had disadvantages (costly and slow process, no active coordination of the process), and sometimes driven by NGO or donors rather than supported by system stakeholders.

The Farmer Trainer Centers can develop into local platforms, networks, based on the anticipated steering committee. The local FTC DAs (with education in crops, livestock and natural resource management) will be complimented with a cooperative and marketing DAs. A multi-stakeholder FTC steering committee could oversee the facilitation role of those DAs.

EIAR researchers in particular (e.g. Headquarters, SARI and Ambo), but also researchers from Universities are increasingly interacting with market parties (Tsedeke Abate, 2006, Heemskerk, 2007) and have as such changed their attitude towards the private sector, but according to research managers, market orientation skills and knowledge still needs to be improved, as is evidenced in the Hawassa University Operational Research project (MotiJaleta et al., 2007).

A similar observation applies to the perceived need of facilitation skills in multi-stakeholder settings, as well as the need to have independent or free brokers in such processes. The need is recognized by SNV, not less by researchers (e.g. Hawassa University, SARI, EIAR Headquarters), as well as the Bureau of Agriculture, as expressed by their observation: “Facilitation of the innovation process?: “ We can do it ourselves”.

The public extension system, operating at various levels (Kebele, Woreda, Region and federal level) could potentially play this facilitation role in value chains and innovation processes. The current capacity of the public extension system to facilitate processes and/of multi-stakeholder interaction is however weak and not emphasized yet. Yet, plans exist for enhanced capacity development for the facilitation of market and value chain integration.

The teaching mode of universities and extension, and the role of graduate students in villages in the absence of staff has led in some cases to emphasis on student development rather than on rural development or its integration. Practical attachment has been limited by lack of budget and staff supervision, resulting in graduates with little facilitation skill.

Cooperatives are creating good opportunities in terms of linking research, extension and universities. On the bases of out growers, unions are facilitating production of commercial crops by their members; also serving as an agent that secures market for their products. The local seed business project jointly implemented by Hawassa, Haramaya, Mekele and Bahir Dar Universities and the Oromia Seed Agency, research institutions and cooperative unions is a good example in this case.

Other existing pilot experiences that can be mentioned in this context are presented through SNV (honey and pineapple case), ILRI/IPMS (dairy and honey), commercial service providers (floriculture, honey quality control), and PROLINNOVA. At a different level, IPMS (ILRI and Melkassa Agricultural Research centre) has facilitated in a dynamic way, and based on a strong market involvement, the development of e.g. onion seed production.

An important element in the facilitation of multi-stakeholder processes are the incentives available, which are not only compensating to some extent for the investment made, but also important to overcome the attitudes of distrust (e.g. between public and private sector). The IPMS programme opted for stakeholder meetings without allowances in order to identify genuine interest, while the old RELC meetings (now being replaced with ARDPLACS) were being driven by sitting allowances. Other more immaterial incentives are more in the organizational support for multi-stakeholder interactions (research policies and Competitive Grant scheme requirements) and genuine interests of the actors (e.g. the private sector in the SNV and IPMS supported platforms, and commercial farmer cooperatives).

4.6 Role and Capacities of Research Institutions

Ethiopia has a strong foundation for agricultural education at both the university and college levels and is producing a large number of graduates. However, the capacities of these institutes are severely stretched in terms of physical, financial and human resources. The consequence is that graduates do not necessarily develop the full set of competencies and practical experiences required to be fully competent in the positions they take on after graduation. There is a limited interaction between the education institutions and the research and extension system, which reduces the opportunities for students to gain practical experience. These issues are widely

acknowledged and both the government and the institutes themselves have a strong interest to strengthen the effectiveness of agricultural education and training.

The Ethiopian Institute of Agricultural Research (EIAR) has evolved through several stages since its first initiation during the late 1940s. Until the mid-1960s the Imperial College of Agricultural and Mechanical Arts at Haramaya, was the major research entity. The establishment of the Institute of Agricultural Research (IAR) in 1966 was the first nationally coordinated agricultural research system in Ethiopia. The Ethiopian Agricultural Research System (EARS) consists of EIAR, Regional Agricultural Research Institutes (RARIs), and Higher Learning Institutions (HLIs). As an apex body, EIAR provides strong leadership in coordinating research within the Ethiopian Agricultural Research System (EARS), by taking a leading role in influencing agricultural policy development. This leading role is not taken for granted by the Agricultural Faculties of the Universities, nor by other research actors (regional research organizations, private sector, CG institutes etc.) In addition to conducting research at its federal centres, EIAR is charged with the responsibility for providing the overall coordination of agricultural research countrywide, and advising Government on agricultural research policy formulation. Currently, the EARS comprises 55 research centers and sites located across various agro-ecological zones. EIAR's mission is to conduct research that will provide market competitive agricultural technologies that will contribute to increased agricultural productivity and nutrition quality, sustainable food security, economic development, and conservation of natural resources and the environment.

Research organizations have developed a systems perspective in their work over the years, based on previous work on farming systems, watershed systems, and value chains. A large number of scientists has been trained amongst others by ICRA (54 researchers) in Agricultural Research for Development (AR4D) with an innovation systems perspective, although not all are still in the research system. Previous Netherlands funded programs on vertisol management, cool season legumes and barley have introduced new concepts such as priority setting by multi-stakeholder committees, Farmer Research Groups, gender sensitivity and up and out-scaling strategy development.

The capacity of researchers in facilitating innovation processes is illustrated by the publication of value chain development cases (Tsedeke Abate, 2006) and publications on Client-Oriented

Research (Dubale et al., 2000). Although this has led to the operationalization of multi-stakeholder platforms, the innovation systems perspective based on research as a mere contributor to innovation has not been fully institutionalized.

4.7 Role, Curriculum and Capacities of Education Institutions

Ethiopia has a strong foundation for agricultural education at both the university and college levels and is producing a large number of graduates. However, the capacities of these institutions are severely stretched in terms of physical, financial and human resources. The curriculum has remained largely of a technical nature meaning that students do not adequately development the marketing, innovation and 'soft' competencies that are increasingly recognized as an important complement to technical capacities. The consequence is that graduates do not necessarily develop the full set of competencies and practical experiences required for them to be fully competent in the positions they take on after graduation. There is a limited interaction between the education institutions and the research and extension system which further constrains the creation of opportunities for students to gain practical experience. There is wide recognition of these issues and a strong interest from both the government and the institutions themselves to strengthen the effectiveness of agricultural education and training.

4.7.1 Universities

There are 23 public universities in Ethiopia; some 10 new ones are planned to emerge soon. The agricultural universities are highly focused on the role of producing large numbers of agricultural graduates. They have limited resources for this function and resources for engaging in collaborative research and making linkages with the agricultural research institutions are even more limited. Historically the curriculum has been largely technically orientated with less attention for the marketing, socioeconomic and stakeholder facilitation aspects of agricultural development. Cognizant to this, a NUFFIC funded agribusiness and value chain program is going to be established at Haramaya, Hawassa, Jimma and Ambo Universities and are expected to be part of the solution.

Despite resource constraints, there are encouraging examples of university staff working to support students in field learning activities. For example the link between Jimma and Hawassa

Universities in the horticulture sector, Hawassa University and bread wheat research and Ambo University, which is supporting local women in dairy production.

4.7.2 ATVETS

There are 25 ATVETS across Ethiopia that provide diploma level training in the agriculture sector and which since 2000 have produced some 60,000 graduates (12 per cent women) who have mostly been initially employed as DAs. There are seven federal ATVETS managed by the MOARD, with the remainder under the MOE structure.

The focus of the ATVETS has been on animal science, animal health, plant science, natural resources and more recently cooperative development. The ATVET system provides a strong foundation for the capacity development of field level extension staff.

There are also innovative examples of ATVETS engaging in a wider range of service delivery and of actively linking with research, extension and NGO initiatives (see example 19). Overall, however, there remain significant issues that need to be addressed. The curriculum remains highly focused on scientific knowledge and technical skills with limited attention for areas such as marketing, participatory approaches to extension, gender issues facilitation and communication. The ATVETS have a very high throughput of students for the available resources. This has implications for the availability of teaching facilities and resources and the ability of the institution to provide in-depth individual guidance, particularly in relation to practical skills. Equipping graduates with the practical competencies needed to gain the trust and respect of farmers and to be effective in the field remains a major challenge.

The high demand for trainers in the ATVET system means that it is not always possible to find staff who also have the necessary practical orientation and competencies. The feedback received in undertaking this assignment very much aligns with the conclusions drawn by the IFPRI/Gates Foundation Review of Extension (Davis, 2009).

4.7.3 Incentive Structures

In looking towards change in how universities and ATVETS function and link with research and extension, it is important to bear in mind incentive mechanisms. There are minimal reward mechanisms for staff to take such initiatives. Indeed, resource constraints and demands for large scale education make taking such initiatives very difficult.

4.8 Role, Functioning and Capacities of Agricultural Extension

Agricultural extension is foreseen to become more decentralized, agribusiness and market-oriented and farmer demand led in a change process as part of the AGP. This implies a key role for extension in multi stakeholder processes for agricultural innovation. As yet public extension has not been heavily engaged in this role and has limited process management and facilitation capacity. Although curriculum change at ATVets is planned, this has not yet been fully developed and implemented. In implementing the AGP, fostering a public extension system that is able to flexibly respond to the dynamics of local level situations is critical. As clearly articulated by the IFPRI/Gates study (Davis et al, 2009), significant challenges exist within the current extension system in relation to field level resources, incentives structures and 'soft' skills of extension agents. However, the enormous scope of the extension system offers much opportunity along with good examples of where it has been very successful.

No models or blueprints for extension exist, but a general consensus is developing for a decentralized, market-led and demand-driven extension system of public, private and civil society service providers (Swanson and Rajalahti, 2010, Davis and Heemskerk, 2010). The application of these principles can be analyzed in more detail in the Ethiopian context:

Decentralization: Agricultural extension is part of the agricultural development budget in each woreda in Ethiopia. The numbers of development assistants have centrally been established, but the operational budget is decided upon locally and is part of the formula-based allocation to each woreda. Extension officers become woreda staff members. Differences' in extension approaches at woreda level can develop, requiring strong mechanisms for sharing knowledge between wereda. This needs to be another dimension of the up-scaling component of the AGP.

De-concentration: Although extension service delivery has been deconcentrated to the FTC level and the kebele (several in each FTC area of influence). Service delivery is still largely oriented from the top and follows T&V approach characteristics, although officially replaced by PADTES, the Participatory Agricultural Demonstration and Training Extension System. The PADTES approach, used by SG 2000, largely depended on agro-ecological zone wide blanket recommendations, demonstrated in FTC plots and farmers' fields, with little room for local demand orientation.

Multiple service provision: In different woreda other service providers are operational such as NGOs and private service providers, as well as services provided by the cooperative unions. Coordination is through the woreda, but since formal mechanisms such as ARDPLACS are not yet in operation this coordination is still weak. IPMS has experimented with other local service providers and the coordination at district level.

Farmer empowerment: Farmers are encouraged to join primary cooperatives in order to get access to inputs and markets. The primary cooperatives sell their produce to cooperative unions. Some unions have federated (e.g. in coffee or in the SNNP Region). Only about 10% of the primary cooperatives have a share in cooperative unions, while only about 10% are women. Farmers have also joined RUSACCOs for savings and credit, these are being organized into Cooperative banks (Oromia Cooperative Bank, and the SNPPR Cooperative Bank in the process of being established). Interaction with Farmer Research and Extension Groups is promoted in relation to seed production and technology testing and demonstrations.

Outsourcing services: The realization that certain services are needed, which only exist outside the public sector has not been operationalized and is not supported at policy level. Although this was an option in the Rural capacity Building Project, RCBP), it was never implemented (Pers. Comm. CIDA).

Partnerships: Extension has developed relative good relations with research organizations (sometimes based on Memoranda of Understanding), although not at all levels and sometimes based on one-way relations and rather administrative (e.g. RELCs at National, regional and Zonal level). General partnerships with private sector actors in marketing inputs and outputs are limited, while relations with cooperatives remain limited to the primary cooperative level.

Similarly limited formal relations exist (apart from some externally funded projects) between research service providers at federal, regional and University level.

Extension approaches: The overall extension approach has changed from a teaching mode (top-down) to a facilitating mode in which farmers are facilitated to express their needs, and demands towards other actors in the innovation system (Berhanu Gebremedhin et al., 2006). The capacity to do this has however not been created. Training in new skills and mindsets is needed.

Capacities and Incentives: Despite the large scale training of DAs, capacity at the FTC level is often weak. Further, there is a very limited incentive structure for DAs to stay in position and fully perform their role. These incentive issues relate to salary levels, career progression opportunities, equipment and resources to effectively carry out their tasks and supervision and mentoring.

4.9 Incentive Mechanisms

The development of agricultural research, education and extension in Ethiopia has historically focused to a large extent on the development of human capacities with less attention given to the incentive mechanisms necessary for this capacity to be effectively deployed. Most dramatically this is seen in relation to the functioning of the farmer training centers. The capacity of a very large number of DAs has been created through the work of the ATVETS. However at the field level the incentives for the DA to stay in their position and to perform as expected are often weak. Further, the incentives mechanisms for farmers to actively use the training centers are also not necessarily effective. To create an effective market linked innovation system, it is necessary to understand and manage the incentive mechanisms that drive the behavior of the key actors in the system.

Overall, it is necessary to consider economic, social and moral incentives and how they interact. These are evident in all the innovation cases studied. Firstly, if there is no economic incentive in terms of new markets, higher income, greater cost efficiency etc. then a key driver of innovation is missing. However, many of the innovations also depend on strong social incentives in terms of how farmer groups work, communication and trust building between actors in the value chain and recognition for people who make a valued contribution.

At the interface between agricultural market development and the function of agricultural research, education and extension, it is important to recognize that there are very different incentives at play. Private sector players are very strongly driven by economic incentives while public sector players have a more complex set of incentive mechanisms.

From a public sector perspective, the following examples of incentive mechanisms are important to consider to create an overall enabling environment for innovation and to motivate individuals in the public sector to perform effectively:

- Clear policy directions and mandates.
- Motivating salary structures and career prospects.
- Funding and resources that enable required tasks/mandates to be effectively carried out.
- Effective management and leadership of public sector employees
- Management styles and approaches that encourage questioning, new ideas and risk taking.
- Transparent and effective monitoring and evaluation of programs.
- Public recognition for good performance.
- Team work and management that hold individuals accountable for delivery on results

It was beyond the scope of this report to look extensively at incentive structures. However, it is clear that capacity development must be well balanced with creating an enabling environment with appropriate incentive mechanisms. The question of incentives was also a key issue raised by the IFPRI/Gates Foundation report on Extension.

Chapter Five

Conclusions and Recommendations

This section provides overall conclusions related to innovation systems, extension, capacity development and the AGP and then gives a set of recommendations for related projects.

5.1 Innovation systems and Processes

The innovation systems concept is a network of actors who interact with each other to experiment, learn and to create the enabling environment for new products and service to be put into use. Ethiopia has in place many of the key elements of an agricultural innovation system.

These include extensive agricultural research, education and extension facilities and capacities, a nationwide network of cooperatives and unions, traders, input and service suppliers and active policy development.

The lessons drawn from this research reinforce the view, also articulated in other research reports and policy and strategy documents, that the large potential for agricultural innovation in Ethiopia remains constrained by insufficient linkages between the different parts of the system. In particular, between public and private sector, as well as between service providers in the public, private sector and civil society

In addition, the diversity of agro-ecological zones, geographical features, livelihood systems and administrative boundaries in Ethiopia, highlights the need for flexible mechanisms to facilitate specific, tailor-made innovation processes, emerging at local level. This requires a pluralist system of intermediary agricultural input and service suppliers based on a diversity of public, private and NGO actors.

The need and desirability for better linkages between the different actors for an effective market linked innovation system was clearly articulated by all key stakeholders. However, they were equally clear that there are many barriers in the current institutional arrangements and funding mechanisms that hinder such collaboration. There is a long-standing tradition to give priority to vertical lines of hierarchy within each sub-system and within organizations and entities active in such a sub-system. However, often the key to successful innovation processes is horizontal

networking, and because of the aforementioned tradition, people and their organizations have relatively little experience in that respect.

Apart from local markets, the cooperative marketing system and the emerging ECX system, a limited independent marketing system exists. The developing market structure, now policy supported, plays however a role in triggering innovation, but not all other actors realize this importance. Political room has been created to involve the market actors earlier in innovation processes, but apart from the mindset, more emphasis is needed on skills and knowledge development for enhanced market orientation. Of particular importance in creating an overall conducive environment for agribusiness development that creates synergy between local and international players.

5.2 Pluralist Extension System

The Ethiopian public extension system has an impressive national network of support for smallholder famers, 60,000 extension workers, which is an enormous potential for rural development support. The structure of the system is based on Farmer Training Centres, SMS technical support at woreda level and coordination with other stakeholders at the level of zones and regions.

At present the system is changing its approach from the transfer of technology (TOT) mode, in which extension is considered to be the driver of innovation, towards a more participatory mode in which extension is one of the necessities supporting innovation processes at local level and facilitating linkage with other actors. Extension has largely been operating in the campaign mode making use of recommendations specifically geared to the Agro-Ecological Zone it is working in and identified best practices. The transition to a provider of facilitation and brokering role is far from complete and requires massive capacity development, also though coordination and interaction with other (private, NGO, cooperative) service providers (see case on ATVET curriculum change).

Research institutes (EIAR, RARIs), Universities), market actors and donor supported programmes that bring in external knowledge resources as well as often contracting facilitation services, are the main drivers of innovation in agriculture in Ethiopia. This implies that extension staff, also at kebele level, needs to have the skills to interact with all these actors. The public,

private and NGO service providers need to share their experiences, for example at woreda level, based on the case described for the woreda Knowledge Centre. There is scope for scaling up this approach. Coordination at this level (WERC/WEAC or ARDPLAC) needs to bring out the lessons to be learned, as well as support new innovation processes in the woreda. The wide variety of experiences of different projects, public and private actors further illustrate the potential to learn from the different approaches and experiences. Innovation processes can be driven by policies, as was the case with the emphasis on food security.

Policies, however, also influence the way in which the above mentioned processes function and how lessons between different knowledge systems can be shared. The extension system has a role in linking learning at the local level with higher level policy-making (vertical interaction), as well as supporting the lessons and good practices of different local actors and service providers.

5.3 Capacity Development

The need for enhanced innovation processes and the important role identified for a variety of demand oriented and tailor-made services from a pluralist extension system has exposed some significant capacity gaps at all levels in the current, mainly public, extension, research and education system. The processes are fragmented and key actors (e.g. market parties or financial services) lack key capacities.

The need for a flexible system of facilitation and bridge-building between actors in the innovation system and coaching of learning and innovation processes requires capacity development in the wider sense. Interaction among existing platforms and linkages need to become more balanced and reciprocal, organizations need to change allowing such interaction while supporting the flexibility in engaging with other actors, and individuals need to develop the skills and mindsets for such interaction. This also requires that the actual facilitators should upgrade their competence (e.g. public and private extension)and extension management at different levels (Woreda, Kebele, National).

The staff needed at FTC/Kebele (Diploma) and Woreda (BSc) level is trained by ATVETs and Universities, respectively. Training and education curricula and methodology of these entities should be adapted to accommodate for the newly required competences in terms of facilitation and brokerage of innovation processes, and enhanced market orientation/integration. These need

to complement the existing and important attention given to technical capacities. New ways of classroom learning, practical training and field assignments, should be developed on the basis of concrete cases and actions to develop the required skills.

The overall framework and planning for local agribusiness development and the required services is limited. At the same time, the innovation examples illustrate a general demand for market-oriented services. Complementing of the mainly technical competences of the public extension workers

(Development Agents and SMS staff) with business development competence can be further enhanced by facilitation and brokering skills. Simultaneously room for institutional change needs to be created based on discussed existing examples, such as introduction of more effective bottom up and participatory processes, as well as involving other service providers, which have the required competences on business development and facilitation of innovation processes.

Capacity development is an important element for all actors across the sector, including the private sector. The training given at universities and ATVETs is the basis for expertise and capacity in the sector. However this needs to be complemented by other forms of short course and on-the-job capacity development across the sector.

5.4 Implications for the AGP

The agricultural production and commercialization component of the Agricultural Growth Programme has three subcomponents:

(a) Institutional strengthening and development;
(b) Scaling up of best practices;
(c) Market and agribusiness development. For each of these three subcomponents the above made conclusions have some implications.

A main element in the drive for institutional strengthening and development is the establishment of multi stakeholder coordination committees (ARDPLAC) at woreda, regional and federal levels. These platforms are important for coordination, but for innovation processes at that level more flexible structures are needed, as well as a capacity to facilitate such multi-stakeholder processes.

The AGP has identified the need to learn from good practices by individual farmers and others actors in the innovation system. Apart from making inventories of such good practices (innovations at a limited scale), which is being done by regional bureaus of agriculture, more comprehensive stocktaking in terms of systemic analysis of the institutional context is needed. It is also important to learn from best practices in terms of local innovation processes. These practices should be analyzed and discussed in Woreda ARDPLACs, which should coordinate and oversee further strengthening of local innovation processes.

The component on market and agribusiness development requires capacity development and promotion of/ support of service providers for development of local businesses. The existing experiences, like the ones from IPMS, SNV, Agri-Pro Focus, including the services provided by cooperative and private input suppliers and output market actors, need to be used for learning from experiences, curriculum development and case study use.

5.5 Recommendations for multi-lateral support of the AGP

Previous international support for agricultural development in Ethiopia aligns well with the ambitions of the GTP and the AGP and provides a good base of knowledge and experience on which to build in supporting the AGP's implementation. In particular, the support for value chain development initiatives, public private partnerships, innovation in seed supply and capacity development of agricultural education are important elements on which to build.

The Key areas of the AGP different development agents may have most to offer are:

Sub component 1.1 – Institutional Strengthening

Sub component 1.2 – Scaling Up Best Practices

Sub component 1.3 – Market and Agribusiness Development

Sub component 3.2 – Monitoring and Evaluation

Overall it is suggested that the government would focus on supporting the elements of the AGP which are closely linked with knowledge management and capacity development. Based on the findings of this study the following eight recommendations are made in terms of how to most effectively support the AGP:

Recommendation One: Promote and Support an Innovation Systems Approach to the Overall Implementation of the AGP.

Realization of the ambitions of the AGP will hinge on successful integration of market demands with technological and production capacity, effective input supply, local agri-business development and the creation of entrepreneurial producer organizations. Further, scaling up of success goes beyond rolling out standard practices, and also requires the tailoring of lessons to the specific requirements of particular locations and situations. Collaboration and coordination between different actors across value chains and between public, private and civil society organizations is also critical. All of these developments call for an innovation systems approach to realizing agricultural growth. Following the World Bank (2006), an innovation system can be understood as a network of all the public, private and civil society actors involved in the agri-food sector collaborating in ways that enable new products and services to be developed and brought into use. It involves not just the creation of knowledge but also the creation of the capacities, learning processes, policies and incentives mechanisms that make problem solving and market development possible. Key to an innovation system is brokering linkages between actors who otherwise may not engage with each other. Market linked innovations systems give particular attention to innovation at all points along a value chain. The importance of innovation in marketing, local agribusiness development and entrepreneurship is well recognized in the AGP. However, historically the sub-systems for agricultural research, education and extension have been mainly focused on aspects of production technology. Further, understanding of the innovation systems approach remains limited and fragmented and there are significant gaps in the capacities and incentives required for this approach to be widely operationalized across the sector.

There is however existing expertise on innovation systems thinking in the research system (based on ICRA and CTA training and client-oriented research programs in previous years) that can be mobilized in capacity development.

Options for consideration:

— Establishing a working group on strengthening capacities for implementing an innovation systems approach linked with the implementation of the AGP;

— Producing a guide on innovation systems approaches, specifically tailored to the Ethiopian context, to support the AGP;
— Integrating innovation systems criteria into planning specific AGP components;
— Integrating indicators and evaluation questions about innovation systems into the AGP monitoring and evaluation system;
— Strengthening linkages between Ethiopia and other countries working to develop an innovation systems perspective.

The following recommendations are all designed to contribute to or link with this first recommendation.

Recommendation Two: Strengthen the facilitation and innovation brokering capacities of key public, private and NGO actors.

Facilitation and innovation brokering capacities are critical for agricultural development. Brokering refers to the process of creating the linkages, relationships and trust that enable different actors to work together on innovations. Such brokering generally is carried out by an individual or party who is seen to be acting in the interests of all stakeholders or the effective function of an entire value chain. This reflects wider international experience related to the development of innovation systems, value chain development and participatory technology development. Such capacities are needed at two levels. One is directly with farmers, because working with farmers in a participatory way induces their active involvement in identifying and solving their own problems, which is key to creating the conditions for sustained improved productivity and links with markets. Two is across the entire value chain where it is necessary to bring different stakeholder together to find ways of improving the performance of value chains by developing mechanisms that allow small scale producers to effectively engage. There has been very limited development of facilitation and innovation brokering capacities in Ethiopia and the development of such capacities is largely non-existent in the educational curriculum. However, an underlying tenant of the AGP is effective multi-stakeholder engagement and learning. Not filling this capacity gap could be a major constraint to the ambitions of the AGP, as evidenced by the identification of the constraints in the innovation cases presented. No capacity exists with extension, and private actors in this field are few (see case 16 and 20 on pineapples and honey in particular). Strengthening capacity within this area needs to occur within

universities and ATVETS and also as professional development programs for researchers, extension staff, cooperative and union staff, NGOs and interested private sector actors.

Options for consideration:

- Establish a set of short courses on facilitation and innovation brokering for research, extension and university/ATVET staff in the AGP areas;
- Provide support for ARDPLACS to operate with a facilitated participatory 'learning' based workshop methodology in place of formalized meeting procedures;
- Establish an agricultural development facilitators network;
- Support the development of facilitation skills within ATVETS and universities as a pilot initiative (this could be in the form of a Niche program on facilitation/brokering/innovation systems to complement the market development Niche program);
- Support effective use of participatory rural appraisal methodology by extension staff in a restricted number of FTCs; which could be combined with
- Producing instructive manuals/guidelines/videos that show how effective facilitation can enhance the performance of multi-stakeholder processes and innovation systems.

Recommendation Three: Support an AGP wide initiative that would identify and scale-up effective innovation processes, particularly related to best-fit strategies and complementing technical innovations with market and institutional innovation.

Subcomponent 1.2 of the AGP focuses on scaling up best practices. Engaging heavily in this area of work is suggested as a potential niche area for the Netherlands. This would mean taking an innovation systems perspective to assess and support scaling-up opportunities. As explained before there are many examples of innovations and 'best practices' emerging in the sector. However, much more effort and investment is required to identify, learn from and then scale-up these examples. In particular there is a need to combine identification of technical 'best practices' with an understanding of the overall social, policy, market, and financial setting and innovation brokering factors that have created the conditions for successful market linked agricultural development. Experience both in Ethiopia and internationally is creating new insights about the scaling up of successful initiatives. Of particular importance is acknowledging

that scaling up occurs most effectively when it involves processes of adapting lessons from other locations to the unique circumstances of a new context. Therefore those 'scaling up' should develop the capacity to do just that: learn from insights and principles from elsewhere to create innovations in their own context. The variation in agro-ecological, market, infrastructure and socioeconomic factors between different locations is enormous. This means there is generally little scope for rolling out on a wide scale technologies and management practices without the need for adaptations to local situations. This implies the need for knowledge and capacity intensive approaches for 'scaling up best practices'.

Options for consideration:

- Supporting a small national level task group of key researchers, policy makers, leaders of education institutions and private sector leaders, linked with a specialist research team, to identify, analyze and promote innovations and innovation processes.
- Piloting an innovation and up-scaling process with a number of ARDPLACS in the priority areas for the AGP.

Recommendation Four: Combine direct support for the AGP with complementary activities that enhance innovation capacity and respond to market opportunities.

Significant innovations can be materialized when actors from outside the formal extension structure get support to take initiative, like NGO and research actors, getting support from different development partners. In many cases they have then partnered with the extension staff at district or FTC level to implement and scale up their work. Examples include: the seed sector initiative, Canadian CIDA IPMS, ASARECA competitive grant scheme, GTZ supported sesame value chain, honey and fruit sector development supported by SNV, etc. These are all examples in which donor funding was used to support complementary initiatives that serve as pilot innovations and also contribute to strengthening the capacity of government funded research and extension activities.

Development actors should balance their contribution to agricultural development in Ethiopia between direct support for the AGP and complementary activities. These complementary contributions should respond to opportunities for innovation and market development in a

flexible way. It is however critical that such activities are well aligned with other developments within the AGP.

Recommendation Five: Contribute to the establishment of an effective monitoring and evaluation (M&E) system for the AGP.

Considerable emphasis has been placed in the AGP on the M&E system. A M&E system that supports effective learning and 'scaling up of best practices' has to comply with particular requirements. In particular it needs to combine effective stakeholder learning approaches with quantitative and qualitative statistical analysis. Further, it is critical to understand why there has been success or failure, in order to use this understanding for improvements. This generally requires more in-depth qualitative analysis. Over recent years, a wide range of new methodologies have been developed that could assist to put in place a 'state of the art' sector-wide M&E system that also makes use of simple ICT-based support tools.

Options for consideration:

- Support for a learning oriented sector wide M&E approach be provided;
- Advice and training for such an approach be provided;
- Support learning from sector-wide M&E approaches in other countries;
- Designing the M&E system in a way that ensures it contributes to the practical 'learning of lessons' that can be used by all stakeholders to ensure 'best-fit' scaling up of success.

Recommendation Six: Encourage the use of an integrated value chain approach in the implementation of the AGP and contribute to developing the required capacities of key players for this to occur.

Many of the cases presented involve market parties at a late stage in the development of new production knowledge, even when they are aimed at increased market sales. Rather than starting with production, experience needs to be gained with innovation, which is driven by the market. The carrot, pineapple and haricot beans cases illustrate this.

Options for consideration:

— Involve market parties in some major domestic and export value chains and finance innovative activities which are initiated by the markets towards small-scale producers
— Making market linkages and value chain integration an explicit part of research design.
— Develop the capacities of research and extension institutions to support and facilitate an integrated value chain approach to agricultural development.

Recommendation Seven: Support pilot innovation outreach programs that strengthen linkages between research, education and extension and are linked with the work of ARDPLACS.

There is widespread recognition among people working in research, education and extension that linkages are weak and need to be strengthened. This is also the main lesson of the innovation cases presented in Attachment Two. However, the motivation and resources for this to happen is limited. The need to strengthen the practical competence of graduates also points to the need to create more opportunities for students to engage in 'real world' project activities. There is ample evidence that when research, education and extension do collaborate, often linked with donor supported initiatives, that much innovation and synergistic development does occur.

Options for consideration:

— Providing resources to enable pilot innovation and outreach programs that bring research, education and extension together to work collaboratively on priority areas for the AGP such as market and agribusiness development and water management.
— Establish a series of graduate research programs that are action research based and focus on the practical issues of extension and innovation systems.

Recommendation Eight: Continue and enhance the support for capacity development of Universities and ATVETS with a particular focus on complementing technical competencies with those for marketing, agribusiness, facilitation and innovation brokering.

Development agents are already active in a range of programs aimed at strengthening Universities and ATVETS. Enhanced capacity to produce the type of graduates needed for realization of the AGP will be critical and it makes sense for those agents to continue their work in this area. However, it is suggested that such capacity development should be especially focused on capacitating graduates who can act from an innovation systems perspective and on

assisting educational institutes to interact more directly with research and extension. Specific focus is needed on:

- A proper balance in the curricula between knowledge and skills in the domains of technology and farming systems, market development, socio-economic, institutional issues and facilitation.
- Effective linkage between theoretical/conceptual knowledge, practical skills and attitude for graduates to have a well-balanced overall competence.
- Bringing in more practical examples into the course programs, including relevant field assignments (e.g. small scale irrigation in the communities around Alage ATVET, rather than large scale irrigation on campus), as well as bringing practitioners from research and extension from the public and private sector for innovation cases presentation.

Resource constraints have meant that education institutions have at times struggled to offer the type of all-round practical and utilization-focused training needed under pressure to provide as soon as possible graduates to farmer training centers or for other functions within the sector. Given the focus of the AGP, it may be fruitful to strengthen education institutions focusing on piloting new approaches in the priority areas for the AGP.

Recommendation Nine: Strengthen mechanisms for bilateral or multi lateral business and technical cooperation for agricultural development plan such as the dairy, horticulture, water and seed sectors. There is a range of issues and opportunities where specific business linkages and support from global expertise could provide direct benefits for implementing aspects of the AGP. These areas may include for example the horticulture, dairy and seed sectors and water resources management. These are all areas on which some global communities have world-leading technical expertise and proven business models.

Options for consideration:

- Creating specific programmers or a funding pool to enable such cooperation;
- Strengthening coordination between national and international stakeholders;
- Further development of global initiatives in the Ethiopian agriculture sector.

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