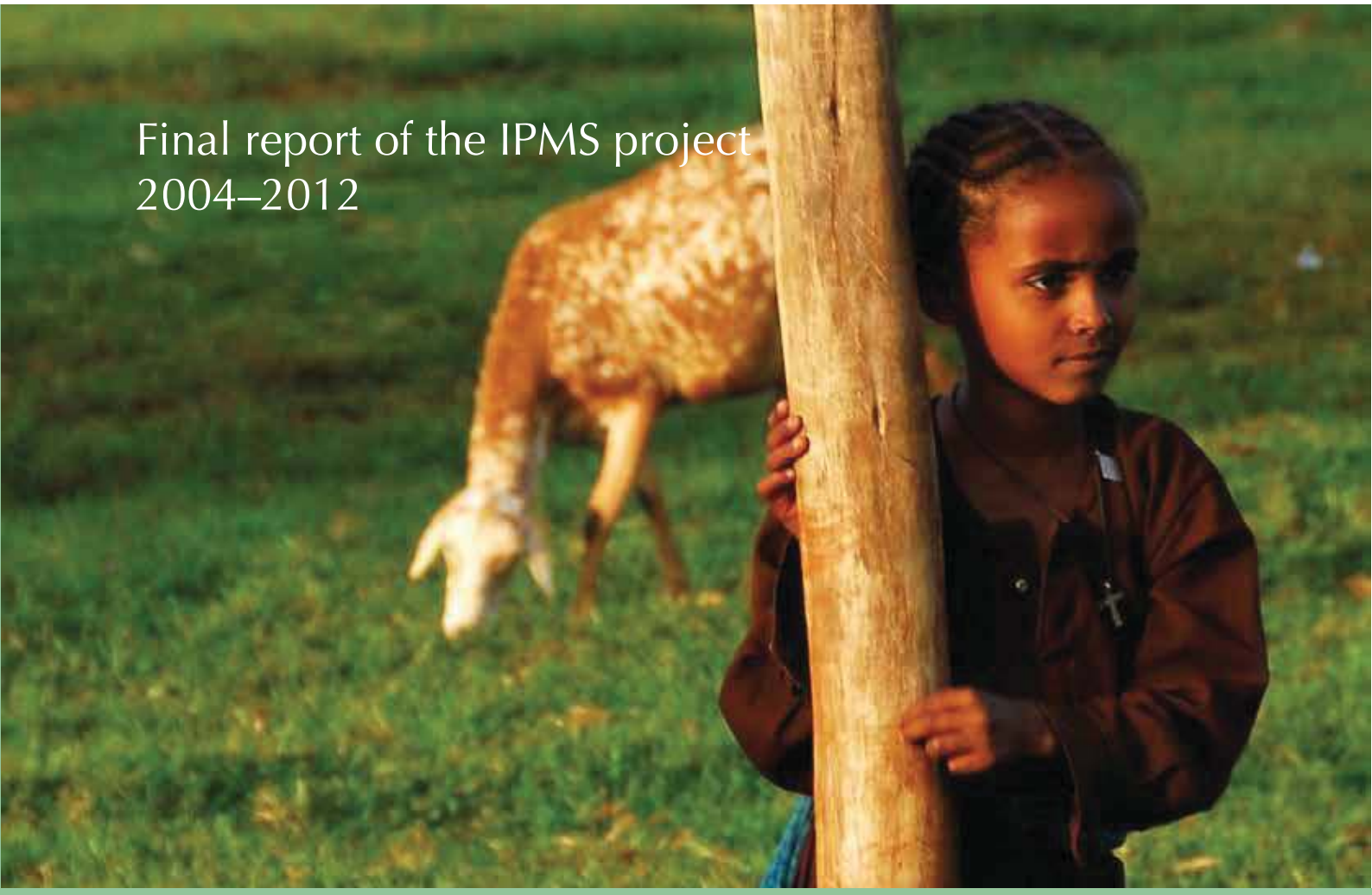

Final report of the IPMS project
2004–2012

Improving the productivity and market success of Ethiopian farmers

IPMS ETHIOPIA

Canadian International Development Agency | Agence canadienne de développement international

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Federal Democratic Republic of Ethiopia
Ministry of Agriculture

Improving the productivity and market success of Ethiopian farmers

Final report of the IPMS project, 2004–2012

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Acronyms

ACSI	Amhara Credit and Savings Institute
AESE	Agricultural Economics Society of Ethiopia
AGP	Agricultural Growth Program
AI	Artificial Insemination
AKC	Agricultural knowledge centre
ARARI	Amhara Regional Agricultural Research Institute
ARDPLAC	Agricultural and Rural Development Partners Linkages Advisory Council
ATVET	Agricultural Technical and Vocational Education and Training
BoA	Bureau of Agriculture
BOAM	Business Organisations and their Access to Markets
BoARD	Bureau of Agriculture and Rural Development
BoW	Bureau of Water
CAHW	Community Animal Health Workers
CBD	Coffee Berry Disease
CIAT	Centro International de Agricultural Tropical
CIDA	Canadian International Development Agency
CIP	International Potato Center
CoP	Community of practice
CRP	CGIAR Research Program
DVM	Doctor of veterinary medicine
EAP	Ethiopian Agricultural Portal
ECX	Ethiopian Commodity Exchange
EIAR	Ethiopian Institute of Agricultural Research
EMDTI	Ethiopian Meat and Dairy Technology Institute
ESAE	Ethiopian Society of Agricultural Economics
ESAP	Ethiopian Society of Animal Production
ETV	Ethiopian Television
FAO	Food and Agriculture Organization of the United Nations
FRI	Farm Radio International
FTC	Farmer Training Center

GIS	Geographic Information System
GoE	Government of Ethiopia
GTP	Growth and Transformation Plan
GP	Graduate Program
HAPCO	HIV/AIDS Prevention Control Office
HQ	Headquarters
IAAE	International Association of Agricultural Economists
ICARDA	International Center for Agricultural Research in Dry Areas
IFAD	International Fund for Agricultural development
IFPRI	International Food Policy Research Institute
ILRI	International Livestock Research Institute
IPMS	Improving the Productivity and Market Success of Ethiopian farmers project
IWMI	International Water Management Institute
KM	Knowledge management
KMIS	Knowledge Management and Information Services (of ILRI)
LOL	Land O'Lakes
MFI	Micro Finance Institutions
MoA	Ministry of Agriculture
NAIRC	National Agricultural Information Resource Center
NGO	Non-government Organization
NRM	Natural Resource Management
OCSCO	Oromia Credit and Savings Company
OoA	Office of Agriculture
OoARD	Office of Agricultural and Rural Development
PARS	Participatory Agricultural Radio Series
PMF	Performance management framework
PSNP	Productive Safety Net Project
RALC	Regional Advisory Learning Committee
RARI	Regional Agricultural Research Institute
RBM	Results Based Monitoring
SLM	Sustainable Land Management
SNNPR	Southern Nations, Nationalities, and People's Region
SNV	Netherlands Development Organization
TARDAP	Tigray Agricultural Research for Development Advisory Panel
TARI	Tigray Agricultural Research Institute
ToT	Training of trainers
UPS	Uninterrupted power supply
WALC	Woreda Advisory Learning Committee
WKC	Woreda Knowledge Center

Foreword

The Improving the Productivity and Market Success of Ethiopian farmers project was unique for ILRI at the time it was initiated, since it focused on increasing development outcomes/impact based on research. The research system was 'seduced' into this new research focus by the Ministry of Agriculture and Rural Development in Ethiopia and the Canadian International Development Agency, who had both concluded that despite the fact that many technologies had been developed by the national and international research centres, uptake of the technologies by the rural communities had been below expectations. At the same time, the government of Ethiopia had realized that its strategic focus on food security and natural resource management could be augmented by aiming to transform the subsistence-oriented smallholder production system to more market orientation. Both, therefore, challenged the ILRI management to develop and lead a project aimed to improve the livelihood of the rural population through a more market-oriented agricultural development.

Considerable learning by doing took place by both researchers and development practitioners, and in the end the project developed a set of interrelated activities to develop commodity value chains in 10 Pilot Learning *Woredas*. Not only did this influence the livelihood of farmers in these PLWs, but it also contributed to the transformation of the extension services in these PLWs. This approach also influenced the overall MoA's agricultural development strategy, which now includes more market-oriented development programs as part of its Growth and Transformation Plan.

IPMS also influenced the research agenda/strategy of ILRI, which has become more impact-oriented and now embraces the integration of components around value chains as part of its strategy.

The appreciation of the project by the various stakeholders is reflected in the many rewards it received from its partners. However, it goes without saying that the project could not have succeeded without the participation of the partners. A special mention is made of the support provided by H.E. Dr Aberra Deressa and H.E. Wondirad Mandefro—the State Ministers of Agriculture during the implementation phase. Also the participation of the Regional Bureaus of Agriculture and the District Offices of Agriculture in the implementation of the project activities is gratefully acknowledged. These service providers and enablers together with farmers and other value chain actors made the beneficial changes in the value chains happen in the 10 PLWs.

Last but not least, the role of CIDA as a donor but also as a learning partner has been very much appreciated, in particular the flexibility in allowing adjustments to the project resulting from its learning and innovation nature of the project—the project was not about building a bridge across a river, but finding a way to cross it.

Jimmy Smith

Director General ILRI

Executive summary

The Improving the Productivity and Market Success of Ethiopian Farmers (IPMS) project, funded by the Canadian International Development Agency (CIDA), was a research for development project that worked with the Ethiopian Ministry of Agriculture (MoA) from 2004–2012 to transform the smallholder subsistence farming system to a more commercial-oriented agricultural system.

To contribute to this transformation process, the project used a value chain systems approach, focusing on the MoA's extension system, value chain actors, service and input suppliers. While IPMS staff played a key role in introducing the approach and facilitating the interventions, the ultimate responsibility for implementation lay with these value chain stakeholders.

The project targeted 10 Pilot Learning *Woredas*[1] (PLWs), located in Tigray, Amhara, Oromia and Southern Nations, Nationalities, People's Regional States to test a variable set of interventions geared to develop a more commercially-oriented smallholder system. In support of these PLW focused interventions, IPMS also contributed to Regional and Federal level interventions in the extension system.

The identification of potential marketable commodities and interventions in each PLW took place through a participatory process with involvement of private and public sector value chain stakeholders. Use was made of the Ansoff growth matrix, a marketing planning tool, which helps to determine products and market growth strategies by distinguishing between existing and new products and existing and new markets. To involve women in commodity value chain development, a rapid assessment of women's involvement in the commodity value chains was followed by an action planning process to determine commodities and interventions which would result in a more gender balanced development. An integral part of such a strategy was to improve access by women to inputs including credit, especially for women-friendly commodities such as poultry and small ruminants. Prioritized commodities and interventions were reviewed and adjusted annually based on lessons learned and progress made. The results of the commodity development process are summarized in IPMS working paper 30 (http://cgspace.cgiar.org/handle/10568/24411). Indicators include increases in number of participating farmers, including female farmers, volume of production in terms of acreages and number of animals and revenues obtained from sales. Following the Ansoff matrix approach, the following value chain achievements are highlighted.

Production of several new products included improved higher quality mango and avocado varieties in eight PLWs, introduction of Cavendish banana in Metema, upland rice introduction in Fogera, new chickpeas and pulses varieties in Ada'a and Alaba for export markets. All of these introductions were facilitated by village level production and sale of seeds and seedlings by specialized farmers. With the exception of chickpeas and pulses, all the new products were sold into the existing local markets. Gross annual production value of banana has grown from zero to an estimated Ethiopian birr (ETB)[2] 5 million per annum business in Metema in 2009.[3] Annual upland rice production in Fogera grew from 0 to 5000 ha with an estimated gross production value of about ETB 100 million. The production/sale of higher quality fruits has started and peaks in sales are expected in 3 to 4 years. In Ada'a, the introduction of high yielding export chickpea varieties saw an almost 80% replacement of existing local varieties in 5 years' time and doubling of the yield/ha.

1. *Woreda* = District
2. Exchange rate as at 2011, CAD 1 = ETB 17.13.
3. Early in 2011, when the project stopped providing direct support to Metema, the banana business had grown to ETB 50 million/annum according to information provided by the district office of agriculture.

At the same time, the project partners also linked producers of existing products to new markets, in particular peri-urban fluid milk to urban centres, semi-processed honey to local and export honey markets, small ruminants' to export abattoirs/markets. Such linkages were also facilitated by production, input/service supply and marketing interventions. While fluid milk sale/supply from peri-urban farmers to urban centres quadrupled in most PLWs through collective action, the number of farmers involved is still relatively small. The project therefore started addressing one of the main bottlenecks, i.e. lack of improved dairy animals, through a hormone assisted mass insemination program which is being adopted by the national and regional livestock research and development systems. At the same time the project stressed the importance of dairy development for butter production in rural areas.

Most PLWs expanded the production and sale of existing products into existing markets. Excellent examples are vegetables, in particular onions, which benefitted from the development of private seed supply systems, improved access to irrigation water/facilities and more transparent market arrangements. As a result, irrigated high value vegetables area/production increased between 60 to 200%. Also, annual production of certified onion seeds in Fogera by 150 farmers reached 20.5 t valued at ETB 8 million in 2010. It not only served onion producers in the district but also in neighbouring districts. Another example is the doubling of live sheep, goats and oxen production/sale for the local market as a result of increased fodder availability, feeding practices and credit to purchase additional animals for fattening. A particularly successful intervention in this respect was the development of improved communal management systems for grazing areas, which resulted in a quadrupling of biomass quantity and improved quality. Introduction of conservation tillage, as a result of participatory extension methods and linkages with private shops for supply of herbicides, not only resulted in increased cereal production areas but also in reduced burden on women in terms of weeding. Cereal production in other PLWs, especially teff, increased 2.5 times as a result of the introduction of a new variety developed by Ethiopian Institute of Agricultural Research (EIAR) and the establishment of a seed multiplication system.

While most of the value chain development in PLWs progressed well, development of some commodities was less successful. Most of these unsuccessful commodities can be classified in the category new products/ new markets. Examples are Vernonia in three PLWs and cotton in Alamata, which did not take off because of market (agribusiness) failure. Another example was the safflower petals value chain, for which linkages with an export market/agribusiness had been initiated. The business remained very small in scale because of insufficient economic incentives for producers. The project was also less successful with the development of some existing oil crops (sesame and noug), because of lack of economic incentives for the producers as compared to other commodities. At the same time, some commodities which were not identified during the initial assessment, for example lentils in Ada'a and hot pepper in Fogera, later became prominent commodities mainly because of improved market opportunities.

The project strategy to increase women participation in commodity value chain development followed a flexible and stepwise approach with an initial focus on commodities such as dairy, small ruminant production, poultry raising, and backyard fruit production, which have traditionally been the domain of women; as their incomes increase and capacity is built, they may then take on other more profitable enterprises such as cattle fattening. Facilitating linkages between women and traditionally male dominated markets and access to inputs and services, especially credit, was another successful strategy of the project.

To support the development of the commodity value chains, the project invested heavily in three other project components, i) knowledge management, ii) capacity development and iii) documentation and promotion.

In knowledge management, a major achievement was the establishment of a system to capture and share knowledge in 10 PLWs, linked to federal knowledge systems. At *woreda* level, meetings, workshops, field days, technology exhibitions and study tours were institutionalized to capture and share knowledge. Also, knowledge centres, which provide access to hard copy and electronic information, were established in project districts, zones and regions (28 in total). Knowledge sharing in the districts was furthermore supported with provision of audiovisual equipment to view videos and relevant agricultural programs in the knowledge centres and Farmer Training Centers (FTC). At federal level, the project contributed to the establishment of a National Agricultural Information Centre and the development of the Ethiopian Agricultural Portal (EAP) and provided hardware as well as technical advice. The portal contains around 700 documents (200 in local languages) and 400 links to relevant programs and projects.

The project paid special attention to women's involvement by mainstreaming gender in each of the project pillars, including knowledge management. Men and women at all levels need to change their traditional ways of working and begin to acknowledge the potential and need for actively involving women in Ethiopia's rural development. To create awareness of the role of women in commodity value chain development the project collected information on the role of women in each commodity and compiled the information and potential interventions in idea sheets for use by extension workers. Subsequently, women participation/ownership in field days and promotional events was encouraged and rewarded. Some good examples are: women's organized field day in Ada'a, participation/rewards for women in livestock fairs/field days where a woman won first prize for small ruminants fattening in Goma.

Capacity development for service providers, farmers and other value chain actors in market-oriented development took place through a continuous process of training, coaching and mentoring. Initially, Training of Trainers (TOT) and specialist training was conducted on different components of the project approach, including participatory extension, agribusiness development, knowledge management, gender mainstreaming and environmental assessment. Later on, this was followed by Result Based Monitoring and Evaluation (RBME) and market-oriented extension training. There were a total of 1036 participants in such events, and the trainees passed on/used their skills in the implementation of their duties to 4300 participants (30% female) in the PLWs. To fill gaps in staff capacity, the project also supported MSc and BSc training of public sector staff—in total 91 staff successfully completed their education. Training in technical skills for extension staff, farmers and other value chain actors took place at federal and district levels. Most training was followed by meetings, workshops, field days and further training to learn and build on the experiences gained. In total 15,000 (21% female) extension staff participated in commodity specific training at federal and PLW levels. Farmers and other value chain actors' participation in these capacity development activities totalled about 32,500 (21% female). Subsequent farmer to farmer exchange of skill and knowledge resulted in an increase in the number of farmers producing marketable commodities and production of agricultural inputs in each of the PLWs. To increase female participation in capacity development activities joint husband/wife training and women group training for commodities favoured by women were organized. It was noted that such women oriented training require careful planning of venue and timing, since the gender analysis show that women usually have a rather heavy daily burden, which can limit their participation.

Finally, the project and its partners documented its findings in 31 working papers, 47 articles/abstracts in proceedings, 30 journal articles and book chapters, 19 commodity value chain case studies, 9 videos, 7 project brochures on approaches and synthesised gender and commodity value chain development. All documents are published in the ILRI repository (http://cgspace.cgiar.org/handle/10568/1) for use in and outside Ethiopia. The project website attracted some 4500 unique visitors each month. Also, around 90 thousand hard copy publications and 2000 DVDs were distributed.

The project sponsored and/or supervised over 130 MSc thesis research studies on themes/topics, of which 100 are posted online. During the project life, the project staff gave numerous presentations in different workshops and conferences. Towards the end of the project, an agri-gender workshop and a smallholder commercialization conference and technology exhibition were organized to share its findings with the research and development community. IPMS also used the services of Farm Radio International (FRI) to prepare and broadcast two Participatory Agricultural Radio Series (PARS) on fruit value chain development and apiculture through local radio stations in Sidama and Tigray. Also, a four part gender empowerment TV series, based on IPMS experiences, was prepared and broadcasted on ETV with the help of a local production company.

To mainstream project strategies and interventions, IPMS responded to requests by the MoA and Bureaus of Agriculture (BoAs) to contribute to the development of regional and federal market-oriented agricultural initiatives, including technical support for federal livestock development strategy and regional apiculture development strategy. Support was also provided to Agriculture Growth Program (AGP) through capacity building and development of a gender strategy. Financial/logistics support was also provided for the development of the Ethiopian Commodity Exchange and multiplication/purchase of improved cereal and pulses seed by the Ethiopian Seed Enterprise. To institutionalize future value chain capacity development in Ethiopia, the project also conducted an inventory of on-going and intended capacity development activities by mandated educational institutions, projects and programs.

Introduction

The Improving Productivity and Market Success of Ethiopian Farmers project was agreed in June 2004 by the then Ministry of Agriculture and Rural Development (now Ministry of Agriculture), the International Livestock Research Institute (ILRI) and the Canadian International Development Agency (CIDA).

The project's long-term objective was:

- To contribute to improved agricultural productivity and production through market-oriented agricultural development, as a means for achieving improved and sustainable livelihoods for the rural population.

The project's purpose was:

- To strengthen the effectiveness of the government's effort to transform agricultural productivity and production, and rural development in Ethiopia.

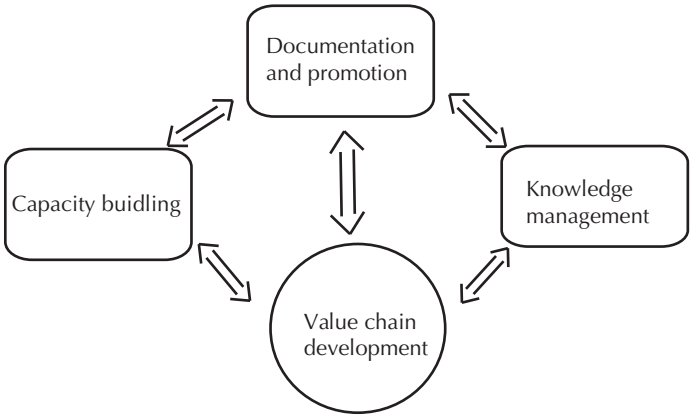
To achieve this purpose, the project introduced/tested a participatory market-oriented value chain development approach to help boost production and productivity of smallholder farmers. The results and lessons learned were documented and used for promotion in and outside of the project areas.

The approach is holistic in that it considers input supply, production, agricultural services, marketing, and business support services as necessary building blocks to develop commodities. It stresses business principles as the driving force for production decisions. Both the public and the private sectors are seen as critical actors in commodity value chains. Knowledge and capacity building efforts are encouraged to leverage innovations and increase efficiencies. Selection of priority commodities, diagnosis of challenges, and designing of interventions all follow these principles. To operationalize the approach, the project created four main pillars:

- Knowledge management
- Innovation capacity development of partners
- Participatory marketable commodity development
- Development and promotion of recommendations for scaling out

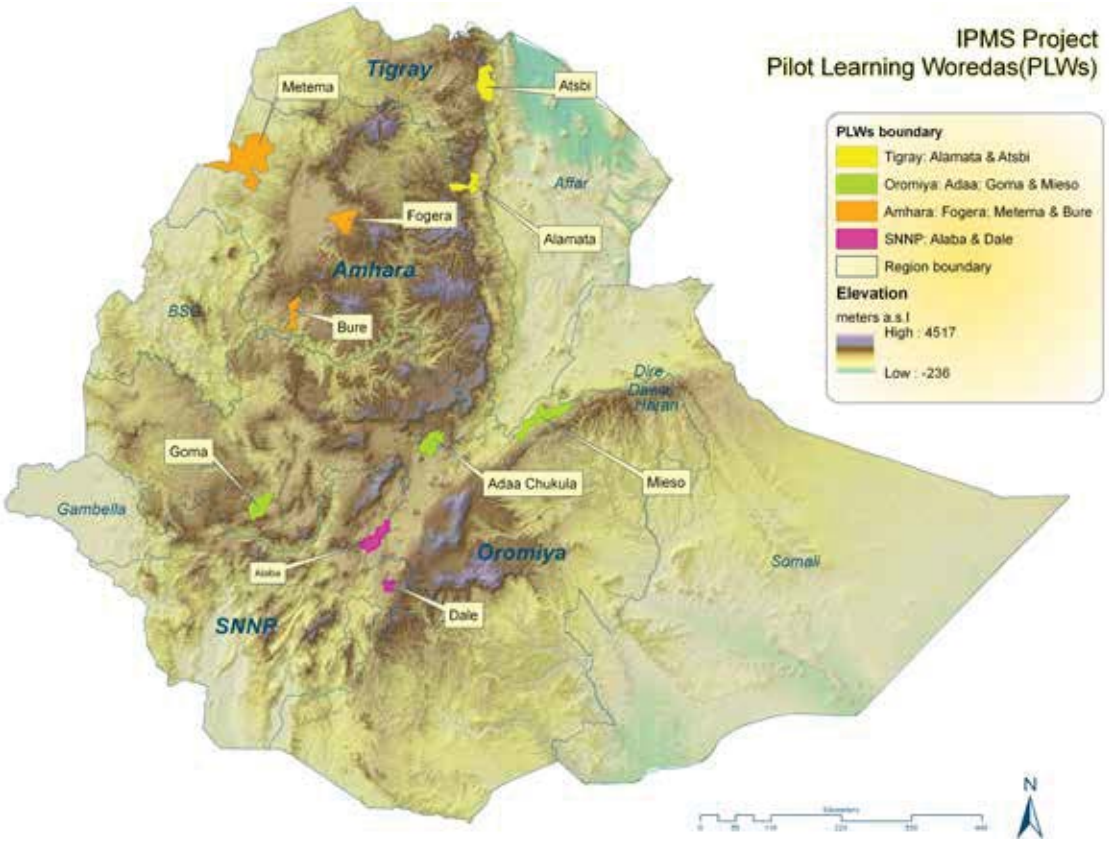
Gender, HIV/AIDS and environmental considerations are mainstreamed in each of these components.

Figure 1. IPMS development/research framework



During the scheduled five year project life from 2005 to 2010, much emphasis was given to test/develop the new approaches with project partners in 4 regions and 10 Pilot Learning *Woredas* (PLWs), while during the no cost extension in 2011/12 emphasis was given to scale out and up interventions, approaches and lessons learned to a wider audience.

Figure 2. IPMS Pilot Learning *Woredas*



In this final project report, a summary is provided of all the interventions resulting from using the approach together with results and lessons learned. The report follows the 4 project pillars and at the end has a section summarizing the project's strategy and results on gender mainstreaming, followed by a general summary conclusion and recommendation section. Many details can be found in project publications, which have

been uploaded on the website[4] including an impact assessment on the uptake of value chain interventions and income of the farmers (IPMS working paper no. 30).

The project was implemented by value chain actors (especially farmers) who add value to the commodity at different stages of production and processing, input and service providers and staff from MoA at federal, regional and district levels, which were in turn capacitated and coached by IPMS staff—see **Annex 1** for key project actors.

Goma district sheep fattening value chain development: How knowledge management, capacity building and documentation and promotion change the lives of smallholders

In Goma district of the Oromia Regional State, an initial rapid value chain diagnostic study of the small ruminants fattening system identified various bottlenecks hindering increased growth. The diagnostic study revealed that most farmers used traditional fattening methods with a very small number of animals and based on free and often uncontrolled environmentally damaging use of communal grazing system. In addition, little or no linkages existed with the animal health delivery system, resulting in important levels of accidental death of animals. Using various approaches including a participatory sheep fattening platform at community level, knowledge on possible solutions were shared with farmers and service providers.

As a result, several value chain interventions were implemented by the stakeholders including: i) using a concentrate feed for shortened fattening cycles; ii) stall feeding/tethering to improve feed utilization efficiency and reduce environmental degradation of grazing areas; iii) increasing the number of fattened animals/household; iv) developing a leguminous fodder (seed) production system; v) establishing linkages with locally available concentrate feed suppliers; vi) improving linkages with veterinary services; vii) establishing a revolving credit scheme with local credit institution to purchase animals and inputs and viii) establishing a community-based livestock insurance schemes to cover accidental death of animals during the fattening period. To enable the stakeholders to adopt these interventions, capacity development activities were organized for the producers, including feed ration formulation, selection of appropriate lambs for fattening, deworming, housing and forage (seed) production.

The initial rapid value chain diagnostic study also revealed that women's access to knowledge and capacity development activities and inputs for sheep fattening such as credit and other services was often limited. Following the project's gender sensitive development approach, project staff entered into long 'advocacy' negotiations with the extension services, credit institutions and communities. The main aim of this negotiations to ensure to increased participation of women in knowledge management and capacity development activities, access to credit and representation in governing structures of the community-based livestock insurance scheme.

To share knowledge within the group as well as with other farmers in the district, field days and a local show and competition for best fatteners was organized (knowledge management), which led to an expansion of small ruminants value chain development to more communities in Goma district, the following year.

The whole process and the preliminary findings were documented in a case study which was uploaded on the project website (http://cgspace.cgiar.org/handle/10568/27936). Several presentations were made in regional and national workshops/conferences to promote the approach and interventions. The small ruminant fattening story also received international attention in the CGIAR system through a feature article illustrating the case of one of the women fatteners (http://www.cgiar.org/consortium-news/ethiopia-sheep-fattening-transforms-lives/). The article which was published as part of the international Women's Day celebration also showed that the woman improved her livelihoods and expanded her activities to other 'businesses'.

Overall impact of small ruminants fattening in the IPMS sites, as measured by the project, showed an increase in the number of participating households from 27,523 in 2005/06 to 54,554 in 2009/10 and female-headed households from 4657 to 9519. The number of fattened sheep increased by 91% over the same period.

4. During the project life, the www.ipms-ethiopia.org website was developed and used. This site has been closed and all documentation is accessible at http://cgspace.cgiar.org/handle/10568/177. The website content is permanently accessible at http://ipmsethiopia.wordpress.com

Knowledge management

The objective of the project's knowledge management pillar was to develop and test an agricultural knowledge management system highlighting innovations and appropriate technologies.

Knowledge management (KM) is a process—not one activity or event—that enables delivery of the right content/experience (information, technology, skill) to the right people at the right time. Extension and research organizations therefore require a systematic approach to identify knowledge needs, and, capture, synthesise/store and share/leverage knowledge to achieve its ultimate impact. KM was/is a rather new concept in Ethiopia with only few agricultural development projects trying out the approaches and extracting lessons.

Knowledge management is seen as an integral part of a new, more market-oriented extension system. The system evolved over time through interaction/learning with partners and ultimately consisted of various interrelated components.

While some system components only targeted the PLWs, other components also served a wider audience of beneficiaries, thus contributing to the project's promotion pillar.

Identification of knowledge needs

At the start of the project, an assessment was made of the required information to develop the selected commodities. Annually, such gaps were reviewed, using meetings and field assessments—also see commodity development. Identification of knowledge needs may be determined internally by the communities concerned as well as by external stakeholders with access to knowledge not available to the community. Especially for a more market-oriented agricultural development process, external knowledge about markets, advanced technologies and new organizational forms is required.

Capturing and sharing knowledge

Knowledge capturing and sharing is an on-going process, driven by the project's interventions. Various tools/methods, often multipurpose in nature, were used and are described below.

Study tours

To capture new knowledge/ideas on market-oriented agriculture development, a study tour to Uganda, to view private extension systems and market-oriented commodity development, was organized for the IPMS steering committee members in 2005. This was followed by a study tour to India for policy/decision-makers in 2006. During this tour, particular attention was paid to knowledge management systems in rural areas. In the fifth project year, chairpersons of the *Woreda* Advisory and Learning Committees (WALC) from the 10 districts together with project staff were taken on a study tour to Kenya to visit farmers and agribusineses engaged in dairy and horticulture value chain development.

In-country study tours, to the other PLWs and neighbouring districts, were actively used for project partners (farmers, public sector staff, and administrative staff). They were greatly appreciated by participants as a means to capture new knowledge/ideas. It was interesting to note that contacts made during such tours, were later pursued to gain additional knowledge and/or initiate economic activities. Participants made use of cameras provided by the project, which enabled them to share their findings with others in the district.

In total 99 in-country study tours were organized for/by PLW partners, and 2959 people participated (see Figures 3 and 4 for details). In general, study tours were not limited to viewing the production of commodities but also included visits to businesses involved in processing and marketing and supply of inputs.

Figure 3. Number of study tours held for PLW partners

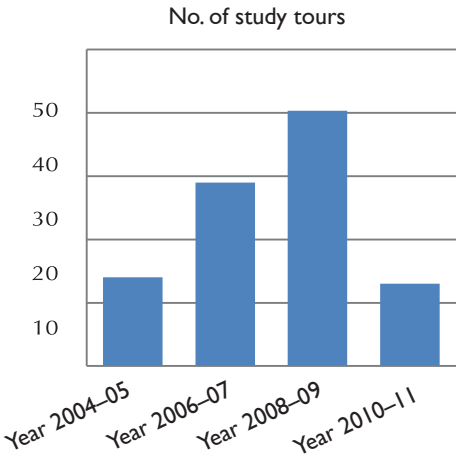
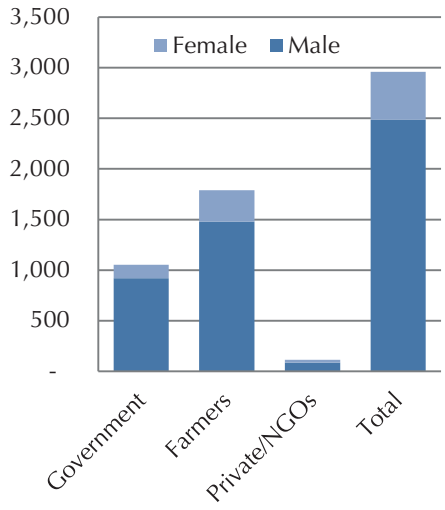


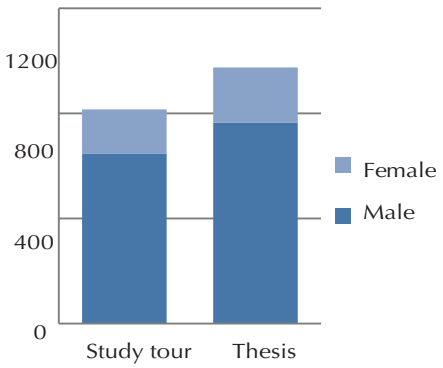
Figure 4. Number of PLW participants in study tours



Workshops/seminars/field days

The project facilitated the capturing and sharing of knowledge between project partners in the PLWs using seminars, workshops and field days. Several seminars were organized to enable PLW participants in study tours to report back on observations made, others were organized for MSc students to present the findings of their studies. An overview of participation in these seminars is shown in Figure 5.

Figure 5. PLW participation in study tours and thesis research



Fourteen students also presented their findings in seminars organized by ILRI's Capacity Strengthening Unit (CaST) at the ILRI Addis campus in Addis Ababa. IPMS also co-organized a student alumni day at the ILRI campus together with ILRI's CAST Unit. During this event, fourteen students presented their thesis work.

A combination of workshops, seminars and field days were used in the PLWs to share knowledge and learn from project value chain interventions. These events are reported in the capacity development section, since they often followed/were combined with skills development training. For some of the field days, mobile audio visual was used to show video clips.

Workshops, seminars and field days/visits were also organized for partners from outside the PLWs, i.e. to neighbouring districts, zones, regions, and federal levels. These events were aimed at scaling out project approaches and interventions that were often (co-)hosted by partner institutions. A more detailed description is provided under promotional activities.

Technology exhibitions

At the start of the project, a technology exhibition was hosted at the ILRI campus by the MoA and the IPMS project to coincide with the official launch of the project (June 2004). In retrospect, this was actually the first formal KM activity undertaken by the project. In this exhibition, numerous examples of technologies from a multitude of value chain stakeholders including the ministry, international and regional research centres, educational institutes, NGO partners and the private sector were displayed.

The following year, IPMS co-organized a national/regional agricultural technology exhibition and workshop for market-oriented agricultural development in Mekelle in collaboration with the Tigray Bureau of Agriculture and Rural Development. The exhibitors included innovative farmers, national and regional research institutions, CG centres, *woreda* and regional agricultural offices/bureaus, NGOs and private sector input supply and marketing organizations. The exhibition attracted a large number of visitors (estimated to be over 30,000 in five days); including farmers, university and high school students, staff from the research and development organizations. The initiative was highly appreciated by the regional authorities as an effective form of sharing knowledge. The concept of the Tigray technology exhibition was adopted by the Tigray Bureau of Agriculture and Rural Development (BoARD) and was included in their 5-year development plan. Subsequent annual and regional technology exhibitions were co-organized/financed with the BoAs in each of the four regions during the project life. The project partners used these events to display/demonstrate their value chain interventions, as well as to gain knowledge from other exhibitors.

During the life of the project, technology exhibitions were also organized at the zonal and district level to display/share knowledge on value chain interventions.

An innovative practice introduced in several of these exhibitions was the 'rating' of different products by visitors, including tasting of different honeys, fruits, chickpeas etc.

Documented knowledge

The project synthesised knowledge from studies, observations, analysis and lessons learned in various formats for use in and beyond the project areas. All can be downloaded from http://cgspace.cgiar.org/handle/10568/177.

Publications

The following documents were produced by IPMS and partners

i. Working papers—31

ii. Commodity value chain case studies and synthesis—21 and 5

iii. Articles/abstracts in proceedings based on IPMS supported studies—47

iv. Journal/book articles based on IPMS supported studies—30

v. Technical/consultancy reports—17

An overview of these publications is provided in Annex 2.

One hundred and eighteen completed MSc studies and eight DVM studies, financed and/or technically supported by IPMS are listed in Annex 3.

Brochures and posters

- Flyers/brochures highlighting project approaches, pillars and interventions
- Idea sheets in Amharic and English summarizing potential gender interventions based on the diagnostic studies
- HIV/AIDS idea sheets in Amharic and English
- Six brochures (English and Amharic) summarizing project interventions, results and lessons learned on gender, and value chain development for dairy, live animals/meat, apiculture, fruits, vegetables
- Numerous posters on approaches, project components, commodity value chains
- A poster on HIV/AIDS in three local languages for distribution to FTCs in the project areas and regions.

Videos

The project produced semi-professional video films for promotional and training purposes:

- Livestock fattening in Metema (English)
- Irrigated banana development in Metema (English and Amharic)
- No bees–no honey Bure (English)
- The Dale fruit story (English)

- Onion from production to Market Alamata (Amharic)
- Gender development in Ada'a
- Gender empowerment in Bure part 1 and 2, Goma, Atsbi (Amharic)
- Fruit tree grafting training in Amharic
- Hormone assisted mass insemination (English)
- IPMS approach, results and lessons learned (English)

All videos are uploaded on the output section of the new IPMS website.

Cameras and video recorders issued to PLWs, were used to capture information on photographs and videos for use in training and knowledge management events.

Radio programs

Initially, the project hoped to initiate radio programs for broader information/knowledge diffusion in selected PLWs. However, the amount of effort needed to implement such an activity was found to be beyond the scope/capabilities of the project staff. In 2011, during the project's no-cost extension, an agreement was signed with Farm Radio International (FRI) to prepare participatory agricultural radio series (PARS) on apiculture value chain development in Atsbi and on fruit value chain development in Dale.

Agricultural Knowledge Centres

Following earlier attempts by the Ministry to pilot a computer-based information system linking the federal Ministry with regions, districts and *kebeles*, the project build on this idea by providing IT equipment and human resources for centre development at different administrative levels.

ICT support to Ministry

Early in year two, the upgrade of the MoARD data centre was initiated and in the second half of year three, IPMS completed the development of the National Agricultural Information Resource Centre (NAIRC). All hardware, software, and supporting documentation were officially transferred to MoARD.

These include:

1. A web server and associated database server that powers the Ethiopian Agriculture Portal.
2. An e-mail server and associated software that hosts an enterprise email system for the MoARD.
3. A systems management server that is used to provide services such as centralized anti-virus platform, centralized security and systems update platform, and centralized backup services
4. An internet security and acceleration server used as software firewall and internet caching
5. The basic Windows network operating system server with active directory
6. Two six KVA redundant UPS systems for power protection
7. Two 14,000 BTU redundant air conditioning systems to maintain appropriate temperature for the servers room, and other network accessories such as network core switch and a router for access to broadband internet service.

The federal centre was furthermore supported with broadband internet access for a two year period and IT staff support, i.e. MSc scholarship for the head of the IT unit plus temporary staff to maintain the system. When the ministry moved to its new premises, all equipment was transferred and integrated into the newly acquired system. To ensure access to the servers, the project during its no cost extension supported the replacement of the UPS as well as the purchase and installation of a 150 KVA back-up generator for the ministry's IT department.

Regional/zonal/district level centres

Based on an experience in Alaba *woreda*, IPMS started supporting the development of *Woreda* Knowledge Centres (WKC) in the second project year. *Woreda* Knowledge Centres are defined as an information resource centres or venues that facilitate access to knowledge by providing the following functions:

- Traditional library
- Digital library
- Resource centre
- Audiovisual centre
- Online access point, and
- Informal meeting venue

Construction/renovation support for the centres and basic furniture was provided when necessary. Computers and printers were installed to encourage their use for reporting and access to knowledge stored on DVDs and CDs. While centres were equipped with hard copies of the projects documents, linkages were also created between these knowledge centres and other major suppliers of knowledge such as research centres and regional BoAs.

Later on, access to the internet was supported by financing monthly subscription for dial up internet connection through land lines or satellite phones. In the final project year the project purchased CDMA devices to improve wireless access to the internet. Training of *woreda* staff on computer operation was done at the same time.

Over time each centre was provided with a camera, video recorder, TV and DVD player to capture interesting interventions/events and using it for knowledge sharing and capacity development activities in and outside the district.

At the request of the project's Steering Committee, the knowledge centre concept was extended to the 4 regional BoARD and RARIs and the 10 project zones. Support was provided in the form of computers and printers and subscription to the internet, when necessary.

A total of 28 knowledge centres have thus been established by the project.

Village level Farmer Training Centres

The ministry developed Farmer Training Centres (FTCs) throughout the country as part of their strategy to improve the extension services. IPMS build on this initiative by selecting 4 FTCs in each of the 10 districts to increase access to knowledge and equipped them with audiovisual equipment, computer and printer and when possible with internet access.

Websites and electronic portals

IPMS website

The project developed its own website for the electronic dissemination of its findings/results in and beyond its target areas. It also included baseline information and a GIS atlas for each of the PLWs. The GIS database included administrative and socio-economic parameters such as villages, peasant associations, road networks and other infrastructure, markets, and similar data that may affect agricultural development in the project PLWs. Some of these GIS characterizations were made for areas larger than the project PLWs (e.g. road network mapping for all of the SNNPR). Spatial data on service providers such as location of farmers' cooperatives, flour mills, microfinance institutions, health posts, farmer training centres (FTCs) etc. were also included. These GIS database helped shape and inform project interventions throughout the project lifespan and is a recommended undertaking for other projects.

Ethiopian Agricultural Portal

IPMS developed the Ethiopian Agriculture Portal (EAP) www.eap.gov.et, which is a gateway to resources relevant to Ethiopian agriculture. EAP is hosted at MoA as of the year 2005 and contains various resources on agricultural production, marketing and capacity building. In addition the portal contains links to basic information of various institutions, business services, programs and projects affiliated with the development of Ethiopian agriculture. In mid-2011, the portal was upgraded by an external consultant hired by the project. Up-to-date and robust open source software; Drupal, for content management; and MySQL, for database management, are used on the newly upgraded portal. The upgrade includes new features such as; advanced search options so that resources could be searchable in their title, author, year of publication and key words; free Amharic software to read Amharic and Tigrigna documents; EAP feed to alert new additions on the portal. In addition, social media sites—Facebook, twitter, slideshare and Flickr were created and linked to EAP as part of the upgrading. Each social media site contains valuable resources on Ethiopian agriculture and current issues that adds to the content of the portal and thus, increases its usability.

By the end of October 2012, there were approximately 700 resources on the agricultural commodities and capacity building sections of the portal. Of the total, close to 200 resources are in Amharic and other local languages. Other sections of the portal (research, partners, and other resources) contain web links of various institutions and organization (research, education, NGO, farmer cooperatives, private sector). Currently, there are more than 400 links and basic information on the various stakeholders of Ethiopian agriculture on EAP. The upgraded EAP receives on average 1400 visitors and 6000 page views per month, despite the frequent power outage and internet disruptions that prevent the portal to be online.

For users with limited access to internet, IPMS, with the help of a local consultant, developed offline copies of the EAP using open source software 'server to go'.

While early on, the project attempted to establish a content managers group at the federal ministry, whose members could individually select and upload documents, this idea was abandoned in part due to the reorganization which took place in the ministry and technical difficulties scanning hard copy documents. The project therefore decided to engage a project consultant who liaised with the ministry's staff and other potential contributors to obtain, scan and upload documents.

Partner networking

Woreda Advisory and Learning Committees (WALCs) were established in each PLW to serve as forums in which potential interventions were discussed between partners. WALCs also monitored implementation and lessons learned that were shared in meetings and workshops. Initially, most WALCs were composed of staff from public institutions. As the project progressed, a broader representation in terms of institutions, value chain actors, and expertise was sought and in many cases achieved. To facilitate linkages, gender and HIV/AIDS offices were also included in the WALC.

Similar structures were established at the regional and federal levels; however these were less active partly because of overlapping existing government initiated structures such as research and extension linkage committees,[5] in which project staff participated to share its lessons.

Some PLWs experimented with *communities of practice* (CoP) as another knowledge sharing tool/process. Very few of the CoPs lasted the life of the project. Sustaining a thriving community with relatively large member base, vision and shared commitment of time and effort proved difficult in most cases.

Several PLWs also initiated learning structures (platforms) around commodities to share knowledge and initiate actions around specific commodities. Furthermore, at the regional level, project staff/partners participated in commodity platforms/learning events established by others such as the PSNP+ program, SNVs, BOAM program, LOL dairy project and OXFAM's UK program.

Outcomes and lessons learned

To assess the outcomes of the knowledge management pillar, the project conducted annual outcome surveys and special studies.

A survey (IPMS M&E report year 5—see website) covering 62 *woreda* experts in the 10 PLWs in the fifth project year, indicated that 62 and 24% respectively agree and strongly agree that the Office of Agriculture in general use the enhanced knowledge-based approaches in developing market-oriented commodities in their *woreda*.

Analysis of farmers' response about whether they have received information for the selected priority commodities indicated that farmers have got more information about the selected market-oriented commodities in year five as compared to the baseline period. Aggregate analysis of the sample data for the 10 PLWs indicated that access to information for the selected commodities has improved from 57% during the baseline to 72% in year five, and this result is found to be statistically significant.

The other two indicators of the expected outcomes of the knowledge management component of the project are 'level of change in access to information' and 'usefulness of information received by farmers and institution'. Both access to information and usefulness of information have improved in year five as compared to the baseline situation. Farmers and extension staff alike reported that the volume, multiplicity of information type (information on production, input supply and marketing) and diversity of source of information has improved as compared to the baseline situation.

Frequency analysis of the M&E data obtained from the 63 experts working in the ten PLWs, showed improved linkages and coordination of the OoARD with other public organizations particularly the research institutes. In this regard, 73 percent of the respondents agree that the OoARDs work in coordination with other government organizations in developing market-oriented commodities. The linkage between the OoARD and the agricultural research system is considered to be the most beneficial by the majority of people interviewed from the OoARDs. However, according to some experts, even though there had been a number of linkages formed with different research institutes which have led to a continued collaboration, some of the linkages have not continued (or will not continue) because they are based more on personal connection of individuals rather than institutional linkages. Linkages were mainly in the form of knowledge sharing during farmers' days, training or on joint demonstration activities. Improved access to new varieties/breeds, management practice and resource persons for training on specific areas have been identified as the most important aspect of such linkages. Improved linkages were also reported between OoARD and private individuals/organizations involved in the supply of inputs or in marketing of outputs. As many as 70% of the respondents choose the OoARD work with the private sector such as cooperatives, micro finance institutions and other private entrepreneurs for the development of market-oriented commodities. Similarly about 62% of the respondents agree that the OoARDs use different commodity platforms or multi-stakeholder committees to facilitate the development of market-oriented commodities.

5. Recently these REALC were replaced by new structures, i.e. ARDPLAC.

Specific interventions

Diagnostic studies conducted/facilitated by the project (see Table 13) indicate that in the traditional setting much use is made of oral knowledge sharing between farmers, service providers and other value chain actors. Most oral knowledge sharing takes place in group structures/events, including traditional social structures (*idir, equb*) by male and female farmers and formal (cooperative) organizations, mostly by male farmers. It is for this reason that oral exchange of knowledge in group events such as field days, seminars and workshops were found to be powerful tools to encourage interaction and learning between the various partners in the PLWs. 'Ownership' and organization of these events by value chain actors (with some support by the extension services) should be encouraged.

An assessment was made of *woreda* knowledge centres in the final project year (Tesfaye Lemma et al. see Annex 2). The study shows that the WKCs are providing experts and others with better access to relevant knowledge and information. About 94% of the users (experts and others) found the resources and services at WKC relevant and useful in preparing them better to discharging their duties. Access to computers and internet and enhanced skills to use the computers, availability of printed and audiovisual materials improved access by users to relevant knowledge and information. The centres also served as venues for knowledge sharing, including hosting seminars conducted by IPMS graduate fellows. In all of the PLWs, the respective OoA have assigned knowledge centre attendants for the day to day management of the WKCs. Though some of these attendants have additional tasks, all are financed by the OoA's own budget. Although dial up internet connection have been provided to all WKCs, functionality of the services was very much limited due to poor connection speed. The resources made available in the WKCs are perceived as relevant by most of the *woreda* level experts. Asked about the relevance of printed and electronic documents, 50 and 31% of the sample respondents in the 10 PLWs agreed or strongly agreed that the WKC have relevant materials to the development of market-oriented commodities. For WKCs to be effective it is important that they are institutionalized in the MoA.

Each of the knowledge centres and FTCs was provided with training materials, source books, project documentation, videos, etc., which continued during the project life. Institutional linkages (collaborations) that might result in better content provision were attempted with federal and regional research and development organizations. However, the fact that such collaborations did not normally exist required special efforts to foster these institutional linkages. Lately it has been observed that various other projects have started using the IPMS's WKCs and FTCs to display posters and provide training material. An example is IFPRI's ESSP project which recently distributed copies of relevant publications to each of the project's 28 WKCs.

At the federal level it was noted that the support provided for centre and content development by the project fitted well into the overall policy of the MoA. This is illustrated by the fact that the ministry has taken over the cost of broadband connection and purchase of additional hardware when moving to its new premises. It is also noted that many institutions started buying in to overall KM concepts especially through developing content for the agricultural knowledge system including the MoA's own website www.moa.gov.et, a website by the Sustainable Land Management (SLM) Project, a website on development projects in Ethiopia by the donor/government group (RED&FS). Important to note is that the ministry has now excellent broadband access, however, access to databases/websites hosted on the ministry's servers is hampered by frequent power cuts. A standby generator for the MoA was therefore purchased and installed in the final project year. An issue still to be addressed by the ministry is staffing of the centre, to ensure sustainability in terms of content development and maintenance of the portals.

A summary of good knowledge management practices within the overall extension system framework can be found in a brochure entitled: Selected good practices in agriculture knowledge management.

Gender

The project's strategy was to mainstream gender in each of its pillars, including knowledge management. The initial gender assessment indicates that women traditionally do not have much access to knowledge through the formal (extension) system, and mostly rely on their informal group institutions (Aregu and Puskur 2010). The project addressed this issue by ensuring women participation in knowledge management events such as field days and study tours. Women participation was also encouraged in project initiated partner networking institutions such as WALCs. Towards the end of the project, women prominence in value chain development was highlighted through awards ceremonies during field days as well as women organized field days. An interesting story on the power of involving women in study tours is highlighted below.

Kassu Bure visiting IPMS sites

Through IPMS I have attended training in fruit nursery grafting (along with 10 men) and have received fruit scions and pepper seedlings for demonstration purposes. I also had the chance to join an experience sharing visit when 10 of us (3 women and 7 men) travelled for 14 days throughout Ethiopia, visiting IPMS sites in Tigray, Amhara, Oromia and SNNPR. The trip was like a dream. I did not imagine I would ever have the chance to visit these places, given my current status as a widow. I had been out of Bure *woreda* only once before, to Bahir Dar. On this trip I saw many things that I want to follow up: poultry, fruit and vegetables. I have already adopted some of the ideas I have seen, such as urban agriculture techniques.

HIV/AIDS

An important component of the project's knowledge management pillar was creating awareness of the dangers of market-oriented agriculture HIV/AIDS as well as promotion of prevention methods in partnership with the district HAPCO offices. To develop a strategy, the project conducted an assessment of HIV/AIDS status in each district which was used to make stakeholders aware, including major centers of disease spread. To measure impact, voluntary testing was found to have significantly or moderately improved by 95% of the respondents and protection against unsafe sex by 72% (IPMS working paper 30).

Innovation capacity development

The objective of the project's capacity development pillar was to develop, strengthen innovation capacity of farmers, pastoralists, and public and private agricultural sector organizations that respond to challenges and opportunities in the agriculture sector.

The initial diagnostic studies included an assessment of existing public sector agricultural support system *vis-à-vis* perceived roles and capacity for a participatory market-oriented agriculture development approach. The assessment is summarized in the project's first working paper: 'Commercialization of Ethiopian agriculture: Extension service from input supplier to knowledge broker and facilitator'.

The assessment indicated that the existing public sector extension, research and education system had a food security and natural resource management (NRM) focus, while capacity for market-oriented smallholder agriculture was limited. Also, a substantial part of the support provided by the ministry evolved around the supply of inputs and services, a role which could move to cooperatives and small- and medium-scale private enterprises. It was also noted that the ministry had created a favourable environment for improving the extension system, including training of field level staff through the TVET college system as well as the establishment of Farmer Training Centres (FTCs).

These diagnostic findings, a review of literature, the ministry's plans, and partners' ideas were incorporated in the design of an extension system aimed at transforming subsistence agriculture to market-oriented agriculture. Critical elements in the design were market orientation, value chain and innovation systems framework, impact orientation, knowledge, partnerships, gender, HIV/AIDS and environment. These elements were integrated into three main extension roles, i.e. i) knowledge management, ii) linking of partners and iii) skills development. The first two roles have been elaborated in the knowledge management section and the skills development interventions/support is elaborated in this section:

- In service capacity development approaches/methods and production skills
    - public sector agricultural development system
    - agricultural education and research system
- Building MSc and BSc capacity of public sector staff
- Capacity development of value chain actors to produce inputs and outputs
- Development of training materials
- Implementation support PLWs

Similar to the project's knowledge management pillar, the bulk of the capacity development activities were geared to service providers and value chain actors within the 10 districts, however, it also targeted capacity development of partners at regional and federal level to facilitate scaling out of interventions and approaches.

Capacitating extension system

Approaches/methods

The public extension system in the PLWs was targeted to take the lead in the transformation process from subsistence to (semi) commercial smallholder agriculture. To familiarize project partners and project staff at the federal, regional and PLW levels with new concepts/approaches, a series of national TOT training/workshops was organized at the start of the project implementation process in 2005; these included:

- Extension innovation training, facilitated by IFPRI and ILRI/IPMS staff, followed in 2007 with participatory market-oriented extension training facilitated by IPMS/ILRI and CIAT staff
- Agri-business development training facilitated by CIAT and ILRI/IPMS staff, followed in 2006 with workshop/training on 'Alternative modes of agricultural service delivery' facilitated by a consultant and IPMS/ILRI staff
- Integrating gender and HIV/AIDS training/workshop by ILRI/IPMS staff and consultants, followed in 2007 by training/workshop on practical experiences of mainstreaming gender and HIV/AIDS in market led agricultural development.

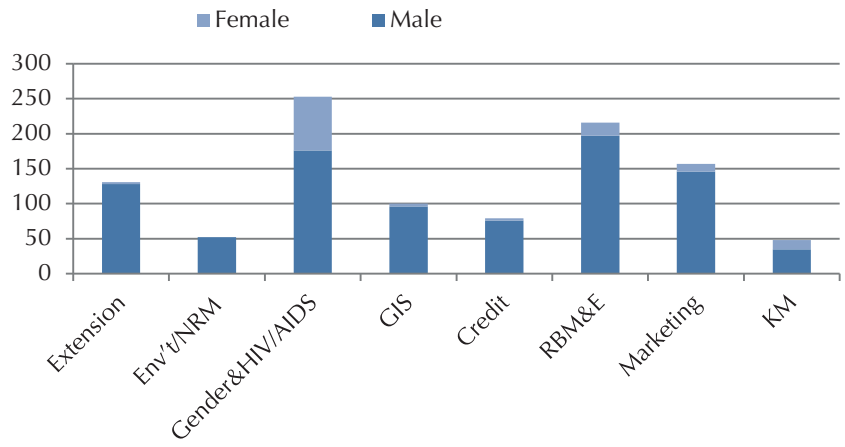
The project also embarked on national/regional organized/facilitated training/workshops for specialized public sector partners in support of the new development approach/interventions including:

- National environmental assessment training for NRM staff, followed by a 2-day training on environmental monitoring by a consultant and ILRI/IPMS in each of the four regions
- Regional training on use of GIS for selected PLW, zonal and regional staff in all 4 regions
- Regional training on credit proposal writing for micro finance institution staff and selected PLW staff in all four regions
- Federal (MoA) level staff training on results based monitoring and evaluation
- Training course in Wageningen University (Netherlands) on market access and sustainable development for steering committee members.

To scale out and up these new service provision skills to a wider group of development workers, the project, from 2008 onwards, also provided training for national/regional partners on some of these topics including courses on rapid market assessment and linking farmers to markets for IFAD funded projects in SNNPR, Amhara, Tigray and to the USAID funded CIP potato value chain project. RBM training was also provided to BoA/RARI staff in each of the four project regions, funded by regional governments. In the final project year, the project also provided training to AGP coordinators on gender mainstreaming and result based management. A total of 1036 (130 female) staff benefited from these training directly,[6] see Figure 6.

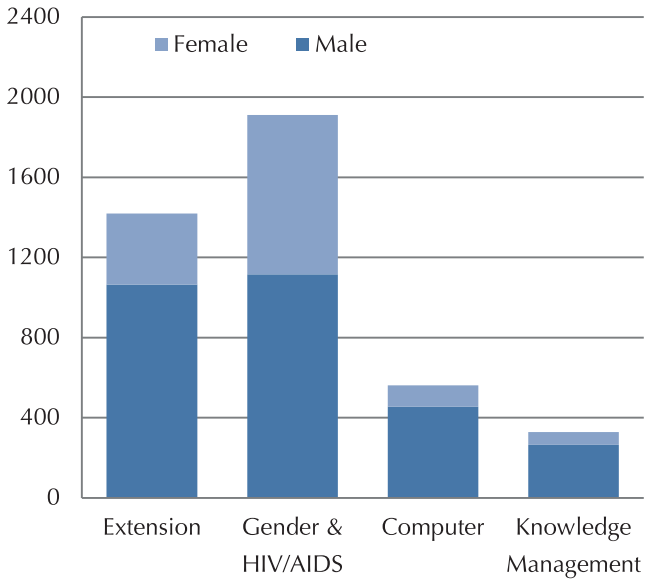
6. May contain double counting as some people attended more than one event.

Figure 6. Trainers and specialists participating in training/workshops on approaches and methods at regional and federal levels



At the PLW level, training, workshops and seminars on extension, gender, and knowledge management were conducted to strengthen the skills of public sector partners. Computer skills in support of the project's knowledge management component were organized with help of local computer experts. A total of 4291 (1323 female) staff in the PLW benefitted from the skills development in approaches and methods, see Figure 7.

Figure 7. Public sector participation in training, workshops and seminars on approaches and methods at PLW level



Technical skills

Development of technical skills on crop and livestock production technologies for public sector staff was mostly conducted at PLW level, however, the project also facilitated some specialist TOT training at national level including:

- National training on water management for irrigation/NRM staff by IWMI
- National training on sericulture at Alage ATVET financed at the request of the MoA

During the scaling out phase, project staff embarked on training of regional teams in SNNPRS, Tigray, Amhara and Oromia on technical and institutional aspects of hormone-assissted mass insemination in milksheds. Since training were conducted in sequence, previously trained staff from other regions acted as trainers in new regions. Follow up coaching was provided, once the trained team members engaged on the actual field activities. Most of these training were financed/co-organized with other federal, regional level organizations/ programs including AGP. A total of 327 (20 female) were trained in these technical subjects (see Figure 8).

At the PLW level, training was provided on advanced production technologies for marketable crop and livestock technologies. Total participation by public sector staff in these activities was around 14,713 (3148 female)—on average 1471.3 participants/PLW (see Figure 9). Several of these training were conducted jointly for public sector staff and lead farmers.

While most of the technical skills development for the public sector was geared to the production of outputs, some training was also provided for the production of inputs such as multiplication of improved seeds (cereals, pulses, and onions), development of fruit and coffee nurseries, bee colony multiplication, preparation and sale of urea molasses blocks, poultry feed, irrigation pump repair. Some training was also provided in small-scale processing and marketing (see Figure 10).

For all commodities, short-term training of public sector staff in PLWs was complemented by mentoring and coaching by project staff.

Figure 8. Trainers and specialists participating in training/workshops on technical skills at regional and federal levels

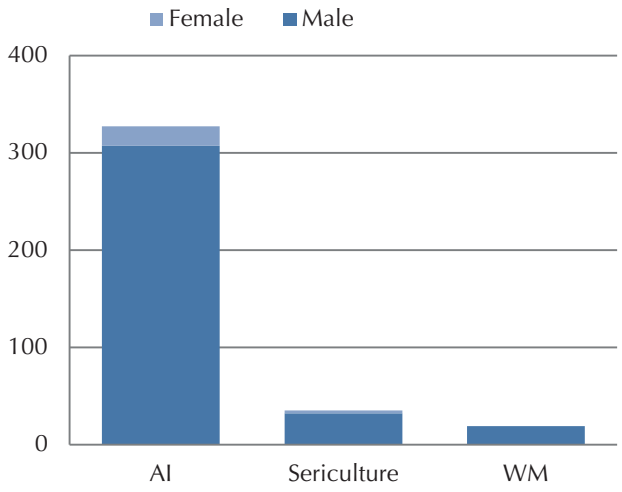


Figure 9. Public sector participation in technical skills training, workshops, seminars

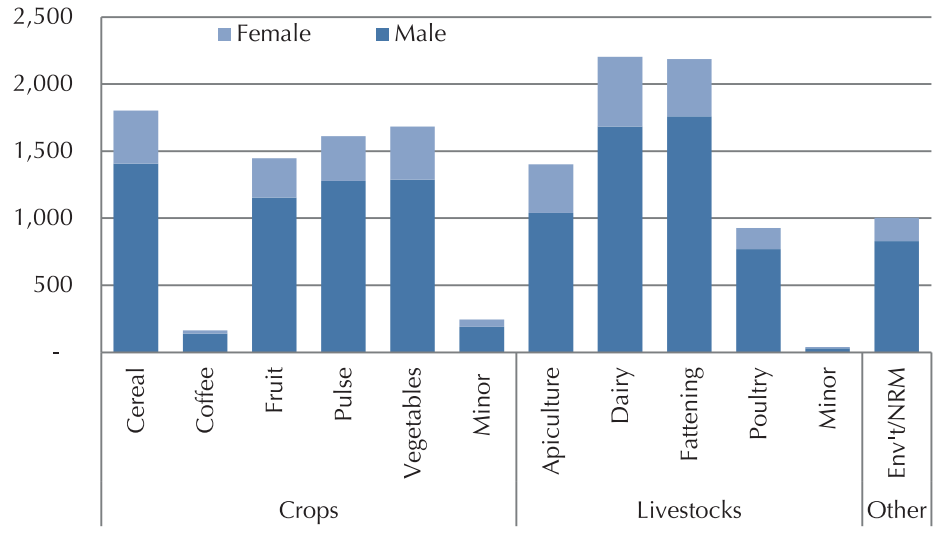
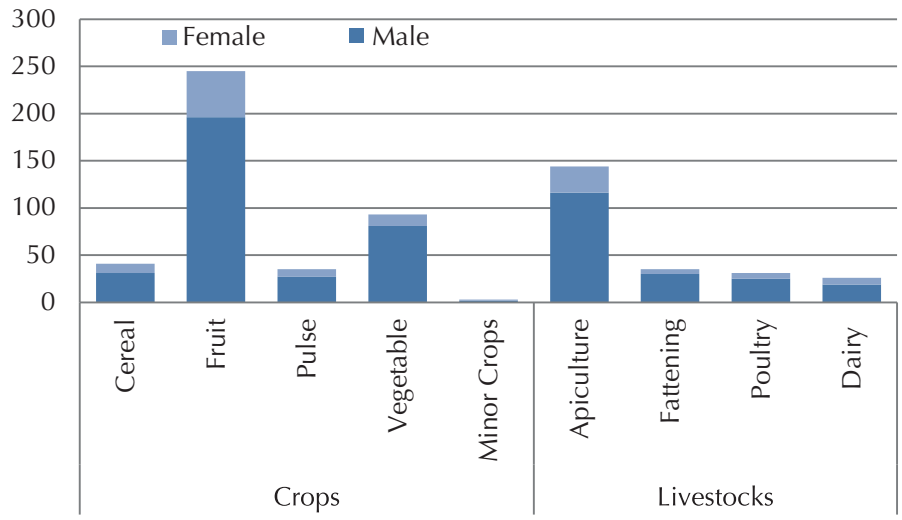


Figure 10. Input and marketing training public sector participants in all PLWs

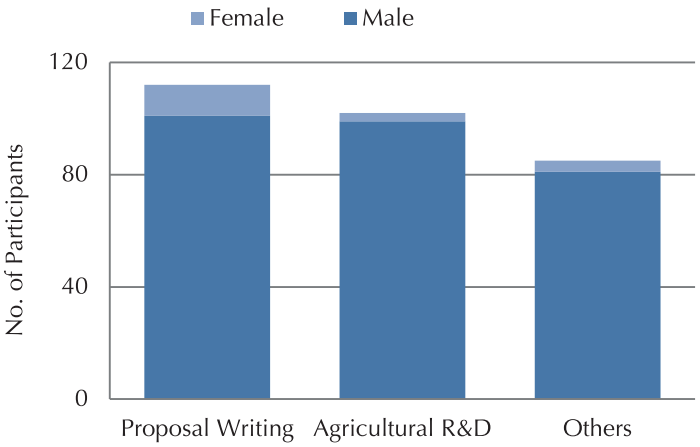


Capacitating agricultural educational/research institutions

While not a direct target beneficiary of the project, limited support was provided to educational and research institutions to facilitate market-oriented smallholder development. The support included the following in service training:

- Training in application of innovation system approach in agricultural research for development for regional and federal research staff by ILRI/IPMS and IFPRI staff
    - three days introductory training for federal and regional staff (TOT)
    - three days for ARARI staff
    - four days for regional research staff
    - four days for agricultural university staff
- Training courses on proposal writing for OARI, TARI, Wollo University
- Training course on research methods for OARI
- Training course on M&E for Jimma University

Figure 11. Training and workshop participants on research



Several staff members also acted as external examiners for around 100 MSc thesis defenses at the Haramaya, Hawassa and Mekelle universities.

As part of the IPMS scaling out/promotional activities, further support was provided to the educational and research institutions in terms of contributions to curriculum development, strategy for use of graduate research for development, value chain development training and others—for details see promotional section.

Building MSc and BSc capacity of public sector staff

Each of the 10 project districts was given the opportunity to improve the capacity of their subject matter/supervisory staff in support of participatory market-oriented smallholder development. Scholarships for six candidates/districts were provided and selection of candidates was made by WALCs as well as the universities, who set standards for admittance. The project encouraged the districts to use a gender sensitive approach and to give priority to soft skills development like extension, agricultural economics and marketing, knowledge management, gender, and rural development. To improve supervisory capacity at zonal, regional and federal levels, a similar approach was used to strengthen the capacity of subject matter, supervisory staff. Each zone was given the opportunity to select four candidates, each region selected five candidates, and the federal level also selected five candidates. Selections were based on similar criteria as used for the districts. Finally, some scholarships were also provided to the educational and research institutions in each of the regions. MSc trained staff were also assisted with financial and supervisory support for their thesis research. A total of 132 staff (56 female) was enrolled in this program, of which 91 have completed their studies and thesis work, 20 are on-going and 21 dropped out.

Considering the two main selection criteria, i.e. soft skills and gender, Figure 12 shows that 70% of the training was geared to soft skills development. Figure 13 shows that 27% of MSc trained staff were female and 67% of BSc trained staff were female. The latter reflects the gender staff composition in the system, i.e. relatively less female staff at BSc level which can be upgraded to MSc level.

Figure 12. Soft/technical skills distribution of MSc and BSc educated staff

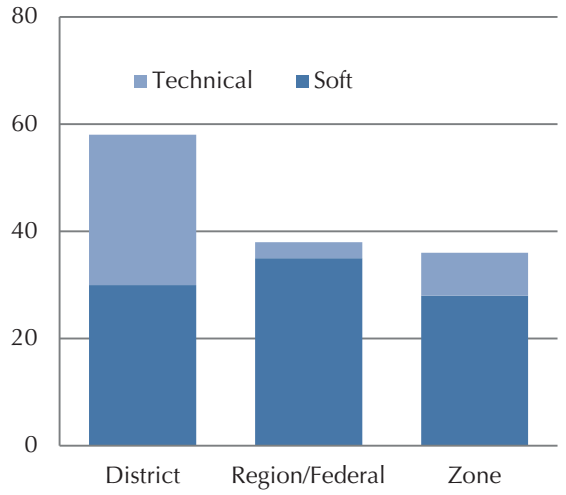
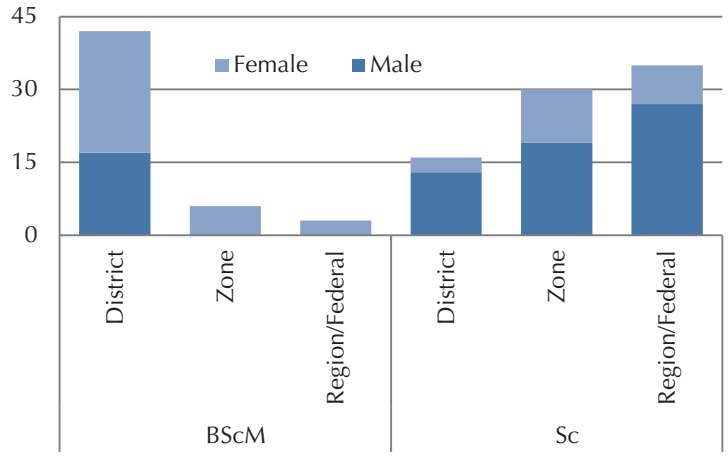


Figure 13. Gender distribution of MSc and BSc educated staff



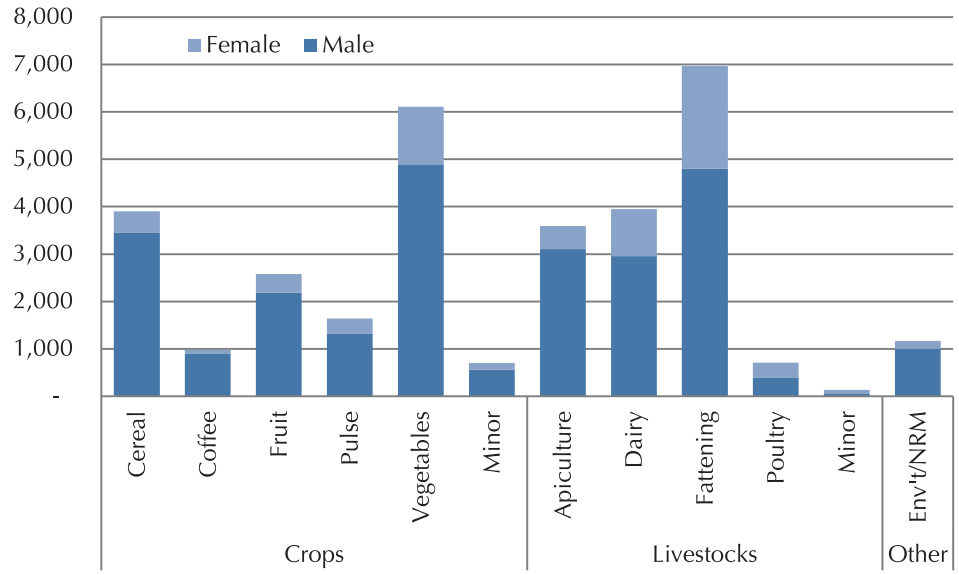
The project also built the capacity of other agricultural sector workers through thesis research support or attachment, i.e.

- 67 (12 females) MSc students received financial/supervisory support of which 65 have completed their studies
- 52 part time attachments (17 female) for their BSc, DVM or MSc and PhD studies

Capacity development of value chain actors

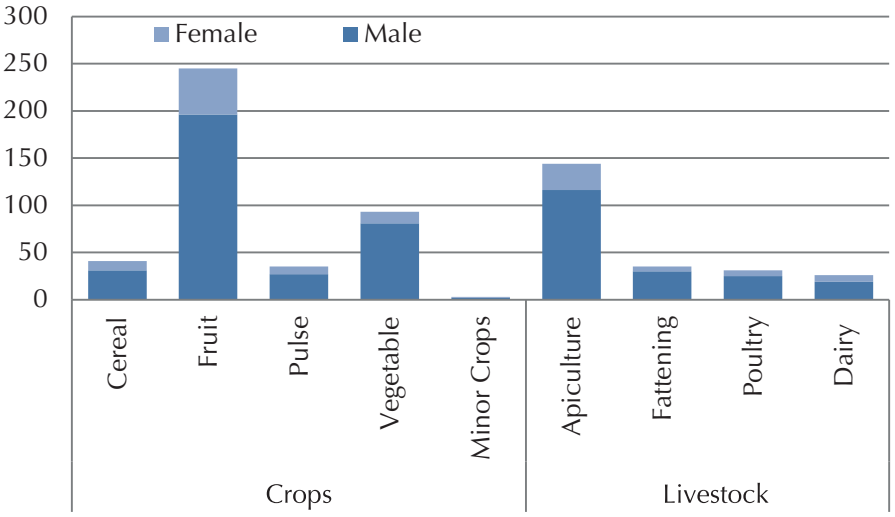
Most of the capacity development of farmers focused on the use of advanced technologies for production of outputs. Most of these training were conducted by project partners and facilitated by IPMS. Total participation by farmers in these activities was 32,433 (6792 female), which is on average 3243/PLW, see Figure 14.

Figure 14. Farmer participation in technical training, workshops, seminars and field days at all PLWs



Part of the training was also provided for the development of skills in production of inputs and supply of services including: multiplication of seeds/seedlings, multiplication of bee colonies, hive construction, crop spraying services, private AI delivery, production of UMBs, and irrigation pump repairs. Participation in these training totaled 3133 (526 female)—on average 313/PLW.

Figure 15. Farmers and service providers participating in input supply and marketing/processing



Training materials development

The technical training by project staff and partners was mostly based on existing training materials, which can also be found on the EAP. The project partners did, however, develop some additional technical materials in areas found to be lacking, in particular on water management (IWMI) and on apiculture development (ARARI/IPMS). Training materials were also developed for soft skills development (see Annex 4 for overview of training materials—some documents were published in local languages).

Supporting PLWs

To develop the public sector capacity to support market-oriented smallholder development, IPMS provided infrastructure/manpower support for the public sector institutions at the PLW level.

Model FTCs in PLWs

In each PLW, the project encouraged the use of four FTCs, which had been established with the help of the communities and the WoA. Support was provided in the form of knowledge management (see previous section) basic office and classroom furniture, motor cycles (five/district) and supply of demonstration materials (seeds, seedlings, beehives, pumps).

PLW capacity support

Besides the knowledge centre support (see previous chapter), the project's main support at PLW level was manpower in the form of a research and development officer and assistant who facilitated the various project activities through on the job coaching and mentoring. The project also provided annual financial support for each *woreda* for implementation of knowledge management, capacity development and value chain development.

At the end of the project the project vehicle, motorcycle and office furniture and equipment were handed over to the districts.

Outcomes and lessons learned

The expected outcome of the project's capacity development component is strengthened innovation capacity of farmers, pastoralists, community-based and private sector organizations, and agriculture and natural resource management public organizations to support the development of smallholder, market-oriented agricultural production systems.

The project's outcome monitoring (IPMS M&E report year 5, see website), indicates that farmers in different PLWs acknowledged that the extension system has improved in terms of providing extension services for market-oriented commodities, i.e. they indicated that during the past five years, the extension system has started giving special attention to extension of market-oriented commodities, which were not focused on before. Farmers revealed that the extension system has started providing important technical messages and organizing periodic practical training. Facilitating linkages and alternative ways of input supply services and providing marketing support services for market-oriented commodities are good signs of improvement of the extension system. However, even though there are some levels of improvements in the extension service for market-oriented commodities as compared to the baseline situation, according to farmers, there are some widespread problems which make the extension system weak. According to farmers, the system is still far from being dynamic in addressing critical problems along the value chain to the majority of farmers.

A self-assessment of OoARD staff also showed that the extension system has shown improvement with regard to its responsiveness for market-oriented commodities (IPMS M&E report year 5). However, it was reported that most of the extension supports are only limited to transferring general agronomic/husbandry messages during mass gatherings.

However, the ultimate 'proof of the pudding' of farmers having been capacitated is the increase in the number of farm households participating in market-oriented agricultural production. According to the project's impact survey, increase in the number of participating households in improved production of commodities at least doubled over the project life. As observed in the knowledge management section, this achievement also need to be attributed to the informal farmer to farmer exchange of knowledge and skills.

Specific interventions

Reports of major training and workshops can be found on the project's website. In general, training events were appreciated by the recipients. Key lessons for scaling out are inclusion of practical demonstrations in training events, use of audio visual materials and follow up responding to emerging problems and opportunities.

A study was done to compare various aspects of the 'IPMS FTCs' with other FTCs in the 10 PLWs (Tesfaye Lemma et al. see Annex 2). The support improved responsiveness and effectiveness of training, demonstration, and other information/knowledge sharing activities in the model FTCs. In particular, need based, focused and practical short training were more common at 'IPMS FTCs' than at other FTCs. Most of 'IPMS FTCs' were engaged in demonstration, participatory technology evaluation, and multiplication of improved seeds, including for revenue generation. Also, 'IPMS FTCs' had relatively better linkages and interactions with research, agricultural education and training (AET), and value chain actors.

More attention needs to be given to capacity development, systematization and diversification of the application of audiovisual and IT tools. Further capacity strengthening is crucial to ensure the approach is responsive to specific local needs, is utilized effectively, and can be sustained after project funding ceases. In addition to computer application training, field extension cadres need capacity in communication and audiovisual skills as well as in effective application of ICT tools to improve responsiveness and effectiveness of extension services and enhance service impact on performance of producers.

Considering the long-term capacity development of agricultural staff with the help of Graduate Programs (GP) in local universities, the project conducted a study in which the effectiveness of its support for graduate students was incorporated (IPMS working paper no. 29). IPMS experience has been presented as a showcase regarding where and how a development project could contribute in linking GPs through research to development issues and actors. The experience offers an approach and *modus operandi* important to involve students in demand-driven research, knowledge sharing, development/capacity development activities and practical learning in real-life settings. The experience demonstrated that research by graduate students could be made more relevant and problem-solving by involving employers and/or intended research output users, and by putting in place a mechanism and process for facilitating research priority setting, implementation, knowledge sharing and quality supervision. The lessons imply, on one hand, GPs should be pro-active in creating partnerships with regional and federal governments, and development projects. Public and non-public development actors, on the other hand, should integrate GP research into their development programs/projects.

IPMS had no direct influence, however, on the curricula of the GPs. The achievement in improving the quality of theses was limited. This was primarily due to insufficient skills of the graduate fellows to conduct development-oriented research as well as due to senior staff shortage set against increased enrollment in GPs for quality supervision. Some of the options to overcome the staff shortages may include: i) striking a balance between enrollment and capacity, particularly availability of senior staff, ii) exploring the possibility of integrating e-learning and teaching; iii) creating an enabling environment to facilitate 'brain circulation' to efficiently use domestic skilled and experienced professionals and to attract the Ethiopian diasporas; and iv) mobilizing the support of expatriates with UN agencies and the CGIAR centres based in Ethiopia and forging linkages to solicit the support of overseas voluntary associations.

Gender

To increase women involvement in capacity development activities, the project designed a strategy aimed at a more balanced extension system by encouraging female staff in BSc and MSc education programs. Although the project aimed for 50/50 enrolment, in the end 27% for MSc education and 67% for BSc education was achieved. Involvement of female farmers in capacity development was also actively pursued through couples training, women group training for specific commodities as well as involvement of women in training activities attended by both men and women. It was found that it is important to consider training timing and venue to accommodate women participation (Aregu and Puskur 2010).

Participatory commodity development

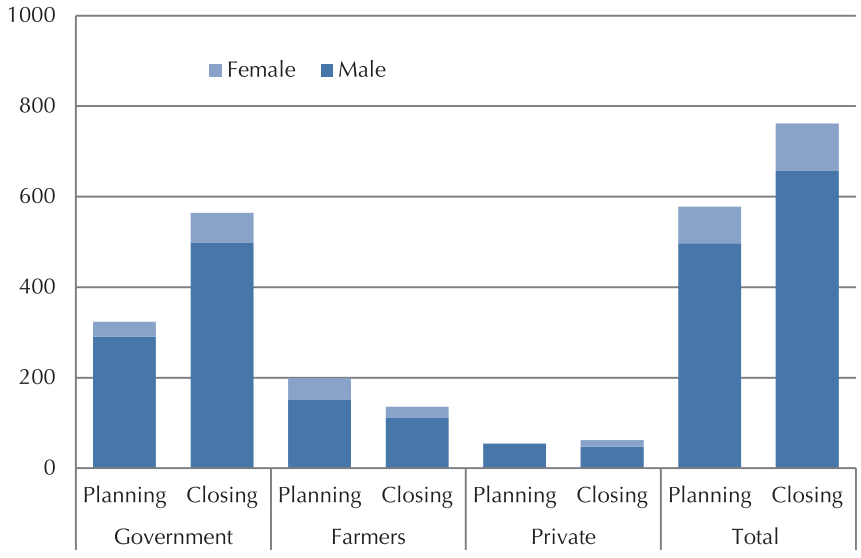
The objective of the project's participatory commodity development pillar was to develop, strengthen and test promotion and adoption of appropriate technologies, innovative input supply, and output marketing services, and financial services.

To identify potential marketable commodities and potential value chain interventions, the project used a participatory planning process with the major partners at various administrative levels.

At the federal level, expert consultation meetings and workshops were held during the project planning phase to agree on approaches and methods as well as selection of PLWs. Following the outcomes of these expert consultations, diagnostic studies were conducted in four of the PLWs in 2004, four in 2005, and two in 2007. The studies were conducted by teams comprised of project staff, regional and district level public sector extension staff and regional research staff. Based on a review of GIS maps, secondary published data, discussions and interviews with focus groups and key informants, farming systems with different development potentials were identified, followed by identification of marketable commodities. For each of the marketable commodities, value chain problems and potential interventions were identified, as well as value chain actors and service providers. These findings were then presented and discussed in district level workshops in which federal, regional and district level public and private stakeholders were represented (see website for the PLW specific studies).

Value chain interventions were then introduced for the selected commodities and M&E took place by members of *WALCs* and subject matter specialists. Regional Advisory and Learning Committee (RALC) also visited occasionally, however, this was not a regular activity. Besides such monitoring, project HQ staff and CIDA external monitor visited the different sites and provided feedback to the project partners. To stimulate follow up planning through learning, most PLWs organized seminars/workshops (see knowledge management) and annual planning and evaluation meetings. Finally, at the closure of the project PLW activities in 2011, workshops were organized to discuss activities, good practices and challenges.

Figure 16. PLW planning and closing workshop participants



Credit innovation fund

As indicated in Figure 1 and in the preceding section of this report, commodity development in the PLWs is driven by knowledge, capacity development of value chain actors and service providers and linkages created between value chain actors and service providers.

Following its business-oriented approach the project provided little or no free/subsidized inputs. Some exceptions were made to initiate/demonstrate selected interventions which were not readily available such as improved seeds, nursery materials, and transport services. All other inputs were either purchased with cash or credit. To accommodate credit needs which were not normally covered by existing programs, the project channeled funds through credit/lending institutions selected in each PLW by the stakeholders/WALC.

Agreements were made between IPMS/ILRI (the owner of the fund) and the selected credit institutions to disburse the funds in accordance with credit proposals developed by each of the PLWs. To minimize the risk of the credit institutions on new financial products, 80% of loans which were legally defaulting needed not to be repaid to the project. A total of ETB 5,910,553 of credit funds was transferred to credit institutions to the four project regions—see Table 1. The amount of funds disbursed and revolved in each of the PLWs varied considerably between the PLWs, reflecting the availability of alternative sources of credit and/or the capacity of the credit institution to handle the funds. An overview of the loan funds transferred to each PLW is shown in the table below.

Table 1. Amount of loan funds transferred and microfinance institution involved by PLWs

PLW	Microfinance institute	Amount
Alamata	Shewit Alamata Union	590,768
Atsbi	Mahibere Bekur Multipurpose Cooperative	343,500
	Tigray Total	934,268
Bure	Amhara Credit and Saving Institution	1,014,200
Fogera	Amhara Credit and Saving Institution	710,200
Metema	Amhara Credit and Saving Institution	700,000
	Total Amhara	2,424,400
Dale	SNNPR's Rural Finance Service Admin Off	304,280
Alaba	Mencheno Alaba Farmers' Union	224,094
Alaba	Omo Microfinance	82,080
	Total SNNPR	610,454
Miesso	Oromia Credit and Saving Share Company	917,750
Ada'a	Erer Farmers' Cooperative	295,181
Goma	Oromia Credit and Saving Share Company	728,500
	Total Oromia	1,941,431
	Grand total	5,910,553

The credit funds were mainly used for i) production interventions, ii) small irrigation schemes, ii) input producers/service providers and iv) agribusinesses.

Production credit included large and small ruminants fattening (animals, feed and drugs), apiculture (hives), dairy (local dairy animals), fishery (boats and engines), coffee (sun drying beds). A total of 1576 farmers benefitted (482 females).

Credit support to small-scale irrigation schemes was provided to groups of farmers to purchase pumps and/or irrigation equipment. A total of 11 small groups (4–10 members each) were financed.

Credit for input production/service included multiplication of bee colonies, production of pullets, private veterinary services, crop spraying services and a private business producing.

Small-scale agribusinesses credit included financing operational capital for cooperatives to purchase and sell agricultural inputs for pulse and cereal crops and improved bean seeds from seed producers. One dairy cooperative also received a loan to finance equipment to expand their marketing operation, i.e. refrigerator and small dairy outlet. Small loans for operational expenses/investments were also provided to a number of private small enterprises including apiculture shop, agricultural tool/input shop, forage seed shop, feed shop and a private teff threshing (see Table 2 for details on beneficiaries).

Table 2. Loan beneficiaries of IPMS credit fund

	Male	Female	Total	Total loan	Average loan
Production interventions					
Fattening large ruminants	387	37	424	2,316,155	5463
Fattening small ruminants	284	429	713	1,158,560	1648
Apiculture	47	1	48	92,908	1936
Dairy	38	4	42	84,000	2000
Fishery	49	0	49	388,379	7926
Coffee	289	11	300	401,000	1336
Total	1094	482	1576	4,441,002	
Input/service suppliers					
Bee colony producers	31	3	34	51,300	1509
Pullet production	0	80	80	90,000	1125
Community health workers	6	0	6	15,000	2500
Crop spraying services	12	0	12	42,600	3550
Egg incubator/pullet producer	4	0	4	24,000	6000
Total	53	83	136	81,600	
Irrigation equipment for groups			11		
Small-scale agribusinesses					
Cooperative input shops			1	100,000	100,000
Bean seed cooperative			1	50,000	50,000
Dairy cooperative			2	28,630	13,315
Private apiculture shop			1	50,000	50,000
Private agri tools shop			5	120,000	24,000
Private seed shop			1	10,000	10,000
Private feed shop			2	6724	3362
Private threshing service			1	16,500	16,500
Commercial poultry production			2	150,000	75,000
Total			16	531,854	

At the time of handing over the project funds, several loans were still in the repayment period and/or revolving to the same or new beneficiaries and/or in the IPMS project account in the lending institution. Less than 1% of the fund was declared non-recoverable at the time of handing over the funds.

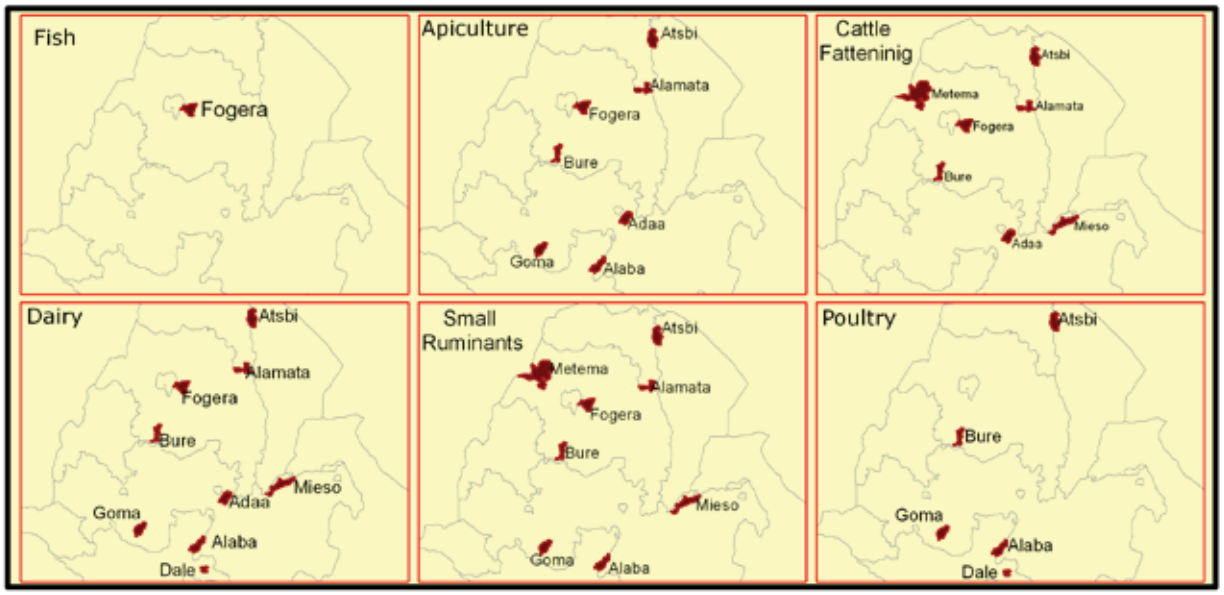
In 2012, ownership of these funds was transferred to the *woredas* for future (revolving) use based on projects by the district Offices of Agriculture/Livestock. The management of the funds will be handled by the same lending institutions,[7] which signed agreements with each of the district Administrations—similar as the ones signed between ILRI and the lending institutions.

7. Lending institutions in Alaba and Dale were replaced because of poor performance (Mencheno Union) or demise of the institution (Rural Finance Administration).

Livestock value chain development

As a result of the initial diagnosis, livestock value chain development was undertaken in several PLWs on large and small ruminants, dairy, poultry, apiculture and fish—see Figure 17. Next is a description of the main livestock diagnosed value chain problems and interventions. Detailed description of the value chain interventions and the results can be found in Annex 2, in particular case studies, commodity value chain synthesis, MSc theses and articles.

Figure 17. IPMS districts with targeted livestock commodities



Fattening of large ruminants

Large ruminants are kept by smallholders in the crop–livestock systems in the highlands mainly as a source of draught power, manure, milk and for reproduction/replacement. Towards the end of their productive lives, cattle are usually sold 'as is', although in some parts of Ethiopia, fattening takes place through stall feeding.

IPMS and partners introduced a system in which own and/or purchased animals were fattened for the market within a 3–6 month period. Simultaneously, diagnosed deficiencies in the input/service delivery system and the marketing system were addressed.

The impact study indicated that the development of the value chain was successful in that number of households increased by nearly 300% and number of female households even increased faster (nearly 600%) and the number of animals fattened grew by 380% and revenues grew by almost 900% in real terms (2005 prices).

Table 3. Diagnosed problems and potential interventions in large ruminant value chains

Diagnosis	Interventions

Low production and productivity of fattened animals as a result of subsistence-oriented production system, seasonal lack of fodder and disease incidence	• Short-term commercial fattening with purchased/own animals
	  • Introduction of 1 or more animals/household per fattening cycle
	  • Improved housing/shelter
	  • Stall feeding
	  • Supplementary feeding with concentrate
	  • Increased use of crop residue
	  • De-worming
	• Testing of improved breeds (Boran)
	• Improved fodder production—back yard planting, grazing area clearance/enclosures
	• Treatment of crop residues (chopping, urea treatment)

Inadequate supply—improved animals, feed, health and credit services	• Introduction of private bull stations • Forage seed/planting materials multiplication in FTCs and private farms (contract farming) • Strengthening district level feed suppliers (private, cooperatives) and linking them with producers and main suppliers • Introduction Community Animal Health Workers (CAHW) • Introduction of credit services/products to purchase animals, develop CAHW system, feed shops • Encourage private forage seed commercial and smallholder producers
Poor market access and transparency, resulting in low, fluctuating prices	• Collective action for sale of animals • Establish linkages between producers and terminal markets (abattoirs) • Monthly market price information

Fattening of small ruminants

Small ruminants are kept by smallholders in the crop–livestock systems for domestic consumption, sale of offsprings and reproduction/replacement of stock.

IPMS and partners introduced a more commercially oriented production system with improved animal management technologies for short term fattening (3–4 months) and breeding. Simultaneously, diagnosed deficiencies in the input/service delivery system and the marketing system were addressed.

As indicated in the project impact study the number of male and female household involved in fattening as well as the number of animals fattened doubled over the project life. However, in general no increase in the number of animals/household was observed, perhaps because credit to purchase animals was limited. Total sale revenues in real terms doubled.

Table 4. Diagnosed problems and potential interventions in small ruminant value chains

Diagnosis	Interventions

Low productivity (off-take) as a result of subsistence-oriented production, seasonal lack of fodder, disease, high mortality	• Short-term commercial fattening with purchased/ own animals
	  • Increased number of animals/household
	  • Improved housing/shelter
	  • Tethering, stall feeding
	  • Supplementary feeding with concentrate
	  • Improved use of crop residue
	  • De-worming
	• Testing of improved breeds (Washera, Bonga, Dorper, Boer)
	• Improved fodder production—backyard planting, grazing area clearance/enclosures
	• Treatment of crop residues (chopping, urea treatment)

Inadequate input/service supply of improved animals, feed, health, credit/risk services	• Introducing community-based breeding system with selected rams • Forage seed/planting materials multiplication in FTCs and private farms (contract farming) • Strengthening district level feed suppliers (private, cooperatives) and linking them with producers and main suppliers • Introducing Community Animal Health Workers (CAHW) • Introducing credit service/products to purchase animals, develop CAHW system, feed shops • Introducing Community-Based Livestock Insurance scheme (CBLIS) to reduce risk
Poor market access and transparency, resulting in low prices	• Collective action for sale of animals • Establish linkages between producers and terminal markets (abattoirs) • Monthly market price information

Dairy

To develop the dairy value chain, three distinct systems were identified, i.e. i) urban dairy system producing fluid milk on specialized farms with little or no land resources for the urban consumers ii) peri-urban dairy system aimed at producing fluid milk on mixed crop–livestock farms for urban consumers and processors and iii) the rural mixed livestock and crop system in which the dairy component is geared to production of domestically processed milk products (butter) and milk for home consumption and calves rearing.

The number of male and female households involved in improved dairy (with crossbred cows) in peri-urban areas grew steadily (216 and 238% respectively), and the number of improved animal increased by 253%, and the average milk yield by 29% and milk volume by 356%. While these percentages are encouraging, the actual number of households, number of improved cows and volume of milk produced in the peri-urban areas is small. Farmers in the rural production system also benefitted from fodder interventions, however, no detailed assessment was made.

Table 5. Diagnosed problems and potential interventions in dairy value chains

Diagnosis	Interventions

Low milk production and productivity as a result of use of poor breed, fertility management, lack of fodder, feeding and poor cow management	• Strengthening commercially oriented dairy production in (peri-)urban areas
	  • Improved housing/shelter
	  • Increased use of improved breeds (crossbreeds, local—Begait, Fogera)
	  • Improved use of crop residue
	  • Supplementary feeding with concentrates
	• Improved animal husbandry, especially to improve milk quality, disease diagnosis and treatment
	• Improved fodder production—back yard planting (species), grazing area clearance/enclosures
	• Treatment of crop residues (chopping, urea treatment)

Inadequate supply of forage seeds, supply of supplementary feed, veterinary and AI services	• Forage seed/planting materials multiplication in FTCs and private farms (contract farming)
	  • Strengthening district level feed suppliers (private, cooperatives) and linking them with producers and main suppliers
	  • Introducing private AI technician system
	  • Introducing private bull stations
	  • Introducing mobile teams for mass insemination campaigns
	  • Introducing CAHW system
	  • Introducing credit service/products to purchase improved dairy cows, establish CAHW system, feed shops and cooperative dairy shop/storage equipment

Poor milk processing, market access and transparency especially during fasting period	• Strengthening cooperative processing and selling of milk • Milk quality checking • Milk products promotion (restaurants, festivals, schooldays) • Creating linkages with larger milksheds

While most dairy value chain interventions focused on the PLWs, in the final stages of the project, the project, at the request of regional governments assisted in scaling out hormone assisted mass insemination in regionally selected milk sheds.

Poultry

Women and children in many rural households keep a small number of (local) chickens for subsistence purpose and the sale of eggs and chickens. The government in the past has stimulated the use of exotic breeds; however, most farmers still use traditional low input poultry management practices.

IPMS and partners introduced more commercially oriented poultry production focusing on the production of eggs and the input/service supply system, mainly in urban/peri-urban areas.

Table 6. Diagnosed problems and potential interventions in poultry value chains

Diagnosed problems	Interventions

Poor production and productivity due to poor breeds and diseases	• Strengthening semi-commercially oriented poultry production
	  • Increased number of hens (10–400)
	  • Improved housing
	  • Use of improved breeds
	  • Use of supplementary feeding (farm produced or purchased)
	  • Improved disease control

Poor supply of improved breeds, veterinary services and supplementary feed supply	• Testing small-scale hatcheries • Establishment of specialized pullet production system (private, group) • Introducing group-based vaccination system for day old chicks • Creating linkages between producers and feed suppliers • Introducing credit services for production and supply of inputs
Poor market access/transparency	• Use of radio to promote sale of pullets • Link producers to restaurants and shops for sale of eggs and older egg layers

Improved poultry value chain development got off to a slow start because of the threat of Avian Flu in the initial project years. Once started, number of participating male and female households involved in improved poultry increased by 159 and 186%, respectively, while the number of improved hens increased by 163% and egg production and sale revenue (in real terms) by 242 and 291%, respectively. While these results are encouraging, impact of project interventions in local chickens is small but could receive more attention in the future, since improvements in local chicken breeds have recently been achieved by EIAR/ILRI.

Apiculture

Use of traditional hives has been practised by specialized smallholders, mostly as an integral part of their mixed crop–livestock system. As a result of various government programs, modern and transitional hives have been introduced, however, productivity and occupancy of such hives has not resulted in increases in honey production.

IPMS and partners promoted modern apiculture management, including the use of improved hives. Simultaneously, diagnosed problems in the supply of services and inputs as well as the processing and marketing of products were addressed.

The number of male and female households using improved hives and associated management practices grew by 191 and 218%, respectively. The number improved hives occupied with bees grew by 190% and honey production by 121%. On average 34 kg of honey was sold/household per year and revenues from sales increased by 127%. To impose the use of improved hives the project encourage the introduction of the more easily manageable transitional hive.

Table 7. Diagnosed problems and potential interventions in apiculture value chains

Diagnosis	Interventions

Low honey productivity/hive per colony per household as a result of poor management, insufficient bee forage and lack of business orientation	• Introducing improved business-oriented apiculture production system
	  • Housing (hives)
	  • Increased number of colonies/hives
	  • Feeding
	  • Sanitation
	  • Colony management
	  • Strengthening bee forage development

Inadequate supply of colonies, accessories for modern apiculture management	• Introducing specialized bee colony splitting • Establishing apiculture input shops • Linking producers with input shops • Introducing credit services for purchase of hives, colonies and accessories • Establishing input shops and small-scale honey processing units • Training of local carpenters to produce transitional hives
Inadequate market system for quality honey resulting in insufficient price differentiation with low quality honey	• Establishing small-scale honey processing units • Linking honey producers with markets for quality honey

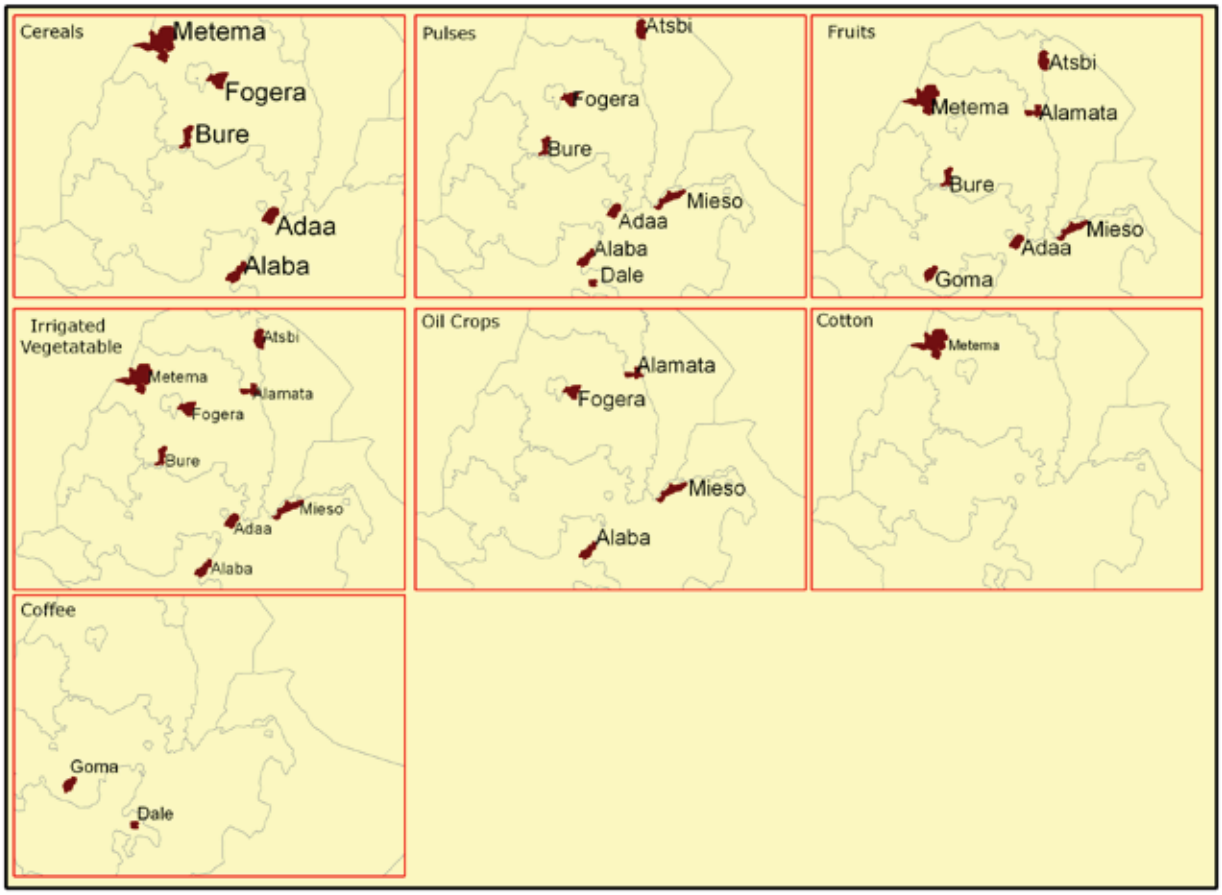
Fish

Fish was identified as a potential marketable commodity for communities bordering Lake Tana in Fogera district. IPMS and partners supported the development of lake fishing by introducing motorized boats and fishing nets with credit provided through the ACSI/IPMS innovative credit fund. Credit was channeled to three groups; however, this arrangement did not work, even though catch and fish price was reportedly excellent. Boats and outboard engines were auctioned off to repay the loans and few individuals purchased them for private use.

Crop value chain development

As a result of the initial diagnosis, crop value chain development was undertaken in several PLWs on fruits, irrigated vegetables, cereals, pulses, coffee, oil crops, cotton—see Figure 18. Next is a description of the main crop diagnosed value chain problems and interventions. Detailed description of the value chain interventions and the results can be found in Annex 2, in particular case studies, commodity value chain synthesis, MSc theses and articles.

Figure 18. IPMS districts with targeted crop commodities



Fruits

Fruits, in particular mango, avocado, papaya, and banana have been grown by smallholders in areas with high rainfall and/or supplementary irrigation. Most varieties are unimproved, of poor quality and tree management was hardly practised. For some time, government and donor funded programs have promoted the use of improved varieties, with seedlings raised in centralized nurseries in the Rift Valley areas. Market assessment studies conducted by partners showed a good potential for high quality fruit in the local (urban) markets.

IPMS and partners promoted the use of commercially oriented fruit development, focusing on the use of higher quality fruits grown from (grafted) improved seedlings at village level. The bulk of the interventions therefore focused on improving the supply of such seedlings, since the existing system was unable to meet the demand.

Since most of the fruit value chain development focused on the introduction of improved grafted varieties, impact at the fruit production level is still limited, with the exception of some fast maturing fruits such as banana and papaya. Spectacular growth in banana production was observed in Metema, most of which was not yet captured by the impact survey which was conducted in 2009, but was reportedly exceeding ETB 50 million in 2012.

Table 8. Diagnosed problems and potential interventions in fruit value chains

Diagnosis	Potential interventions

Low production/productivity of existing fruit trees and neighbouring crops due to poor quality fruits, long maturity period, huge unmanaged tree canopies and height	• Introducing commercially oriented improved fruit tree production systems
	  • Planting of grafted improved seedling varieties of mango, avocado, apple with shorter maturity periods and height
	  • Use of improved banana and papaya varieties
	  • Introducing proper agronomic and irrigation practices for banana and papaya
	• Others

Inadequate seedling supply and nursery inputs	• Establish private, village level fruit nurseries for (grafted) seedlings production • Establish mother trees with nursery operators for future supply of scions and establish linkages with scion suppliers • Establish farmer to farmer banana sucker supply system and establish linkages with external sucker suppliers • Encourage shops to stock inputs for nursery operation and/or create linkages • Establish credit service for input supply nursery operation
Under developed processing/ marketing system for improved fruits	• Encourage introduction of banana ripening facilities • Create linkages/channels with urban markets for high quality fruits • Create linkages/channels with urban markets for high quality fruits • Provide price information in WKCs and FTCs

Irrigated vegetables

Vegetable production with full or supplementary irrigation by smallholder farmers is practised in areas where public and/or private (household) investment in irrigation has/can take place.

IPMS and partners promoted the intensification of the use of existing irrigation investments and household level expansion of pumps for high value irrigated vegetable production. Simultaneously, diagnosed deficiencies in production, input/service delivery system and the marketing system were addressed.

Major improvements were made in the production of onions and tomatoes, however, it was also observed that while number of households grew on average by around 80%, enormous fluctuations could be observed over the years as a result of drought and/or price fluctuations, which made farmers switch to other commodities, in particular to hot pepper which is less water demanding. Introduction of onion seed production and staggered planting of tomatoes were some of the successful interventions.

Table 9. Diagnosed problems and potential interventions in irrigated vegetable value chains

Diagnosis	Potential interventions

Low production, productivity of irrigated vegetable production	• Expanding irrigated vegetable areas through land use changes and expansion of irrigation facilities
	• Introducing new improved varieties
	• Introducing improved agronomic and irrigation practices including
	  • Staggered planting of tomatoes
	  • Furrow irrigation
	  • Optimized irrigation frequency

Inadequate input/service supply in particular seed, pumps and credit	• Encouraging onion seed production by individual farmers • Branding Fogera produced onion seeds • Individual and collective sale system of onion seeds • Establishing potato seed producers • Establishing credit services for purchase of pumps
Inadequate storage and marketing system	• Linkages with projects providing storage facilities for onion • Introducing and demonstrating diffused light storage system for potato • Creating market linkages with potential buyers • Providing price information in WKCs and FTCs

Cereals

Various cereal crops in particular wheat, teff, and more recently rice, are grown by smallholders in the highlands system for subsistence and sale of grains, while the straw and other crop residues (including bran) are used as animal feed.

IPMS and partners promoted the increase in production and productivity of these crops for market purposes using improved varieties and advanced agronomic technologies developed by research. At the same time the use of crop residues was promoted for either dairy or fattening and diagnosed deficiencies in the input/service delivery system and the marketing system were addressed.

Table 10. Diagnosed problems and potential interventions in cereal value chains

Diagnosis	Interventions
Low production and productivity of cereal crops due to insufficient use of improved varieties, poor agronomic practices and labour/draught power intensive land preparation/weeding practices	• Expanding/introducing new cereal crops • Use of improved varieties • Introducing and demonstrating improved varieties resistant to sprouting • Introducing minimum tillage • Promoting improved agronomic practices
Inadequate supply of improved varieties and lack of district level supply for agrochemicals, in particular herbicides	• Introducing/strengthening seed multiplication groups and individuals • Linking village shops/cooperatives to large-scale commercial agrochemical dealers • Providing credit for small-scale processing
Inadequate processing and marketing system in rural areas	• Introducing commercial threshing service providers • Providing price information through ECX and other sources

Introducing improved cereal varieties and associated agronomic practices saw spectacular growth, in particular introducing improved teff varieties by EIAR. Increases in participating households of over 1000% as well as area coverage by 1818% and production volume of 1918% were observed. In Ada'a this led to a replacement of local varieties that resulted in the doubling of yields. Most of this increased production was supported by farmer-based seed multiplication systems. Increases in area coverage in other PLWs resulted from the introduction of conservation tillage. Introducing rice in the highlands of Fogera also saw spectacular increases in area (over 5000 ha) and number of households.

At the request of the ministry, project funds were also used at regional/federal levels to facilitate the purchase of improved cereal/pulses seeds by the Ethiopian Seed Enterprise grown by contract farmers. These seeds were used to facilitate the scaling out of the multiplication/use of improved varieties in the districts.

Pulses

Various pulses are grown by smallholders (especially chickpeas, haricot beans and lentils), for subsistence as well as commercial purposes, and at the same time for crop rotation purposes. Crop residues are instead left on the threshing fields for immediate use only and are not conserved like other cereals.

IPMS and partners stimulated the increase in productivity of these crops through use of improved high yielding (export) varieties and improved agronomic practices. At the same time, increased use of crop residues was promoted for either dairy or fattening. Simultaneously, diagnosed deficiencies in the input/service delivery and the marketing system were addressed at village/district level. However, it is fair to say that most of the processing marketing interventions took place by private investors and ECX which operated at a higher level.

Table 11. Diagnosed problems and potential interventions in pulse value chains

Diagnosis	Interventions
Low production and productivity of pulses due to lack of high yielding varieties, poor agronomic practices	• Introducing high yielding (export) varieties • Introducing treated seeds to combat diseases • Introducing inoculums • Introducing improved agronomic practices
Inadequate supply of improved seeds and crop protection services	• Introducing/strengthening of seed multiplication groups and individuals • Introducing private crop protection services • Providing credit services for cooperatives to purchase seeds
Underdeveloped export processing/marketing system	• Encouraging cooperative to buy and sell seeds and grains • Reducing post-harvest seed/grain losses through fumigation • Creating linkages with exporters, processors and marketing companies • Providing price information through ECX and other sources

Similar as for cereals, replacement of the existing varieties with more market-oriented varieties saw spectacular growth for chickpeas and haricot beans in several PLWs. While yields also increased, haricot bean yields varied from year to year due to fluctuating rainfall conditions.

Coffee

In two of the project districts, Dale and Goma, coffee was grown by smallholders for sale and domestic use. While many efforts have were in the past to introduce new varieties, especially in response to coffee berry disease (CBD), impact on farm income was often limited due to low and fluctuating prices in the world market and low productivity due to emergence of new diseases and poor agronomic management.

To ensure better and more stable prices/income in the future, IPMS and partners stimulated the use of improved varieties from local types which could be used for speciality marketing and the introduction of high yielding hybrid varieties. Simultaneously, IPMS tried to address marketing bottlenecks at the village/district level; however it is fair to say that most of the processing marketing interventions are the result of higher level interventions by the private sector and ECX.

Table 12. Diagnosed problems and potential interventions in coffee value chains

Diagnosis	Interventions
Low productivity and production as a result of poor yielding varieties, diseases, poor management practices and low and fluctuating prices	• Introducing hybrid coffee varieties which are also resistant to CBD • Introducing improved CBD resistant local coffee varieties • Improving disease control—coffee wilt disease • Improving agronomic management—especially weeding and harvesting
Insufficient supply of improved coffee seedlings and insufficient supply of nursery equipment and coffee management tools	• Establishing private hybrid coffee nurseries with mother trees for future supply of scions at smallholder farmer level • Establishing private nurseries for improved local varieties and mother trees for future supply of seeds • Establishing/developing private shops for nursery equipment supply and coffee management tools and drying equipment • Establishing credit service for shops supplying inputs for coffee seedlings/beans production
Low and fluctuating coffee prices	• Arranging coffee marketing groups for high quality coffee • Encouraging raised bed drying for fetching better prices

Oil crops

The project also started work on oil crops, in particular sesame, however, interventions were limited to few sites and some agronomic improvements including use of minimum tillage. The project also started on noug in Fogera, however, the commodity was dropped since incentives for growing the crop in comparison to other crops were low. An attempt to introduce Vernonia in a number of sites failed because the company which would purchase and process the seeds for export lost interest. A small project with SNV's BOAM project to develop an export market for the petals of safflower in Fogera, remained limited in scale.

Cotton

Cotton was identified as a potential marketable commodity in two PLWs, i.e. Alamata and Metema. In Alamata, the commodity was dropped after a year due to lack of marketing/processing opportunities; a ginnery which was planned did not materialize. In Metema, the commodity was grown by larger scale investors, less by smallholders because of a pest. The area cultivated dropped considerably and farmers lost interest. Linkage with private input suppliers (seed) in Middle Awash and agrochemicals in Addis Ababa were made. Recently, because of the introduction of a seed dressing chemical (cruiser) against insect damage at seedling stage and a new high yielding improved variety (Deltapine), cotton production significantly increased, especially by the large-scale farmers. This also triggered better marketing arrangements with a textile factory in Kombolcha. However, the share of smallholder farmers growing cotton is still limited.

Outcomes and lessons learned

An impact survey was conducted in 2010 to determine impact of the various value chain interventions in the value chain performance of selected commodities in the PLWs. The results have been published in a separate IPMS working paper no. 30 and are therefore not repeated here, except for general observations and lessons learned.

Effect of project participatory approach on commodity value chain

The use of the project's participatory, knowledge driven value chain development approach resulted in the identification of new commodities and new value chain interventions, as compared to the traditional production focused technology transfer approach. A good example of new commodity identification is banana in Metema, which was not part of the district development agenda, but was identified by the stakeholders as a potential commodity. After only five years, banana has now grown from zero to a multimillion birr business, produced by farmers in all peasant associations (PAs) with access to river water for irrigation. Another example of a new value chain interventions is the introduction of onion seed production by farmers in Fogera, because of a diagnosed onion seed supply problem. After taking a few entrepreneurial farmers from Fogera on a study tour to Zwai to see onion seed multiplication on private farms, three farmers started producing seeds in 2005/06. By 2010/11 the number of seed producers had risen to 146, and the area covered to 34 ha with a seed production of 20.5 t with an estimated value of ETB 8 million. These farmers are now not only supplying seeds in the *woredas* but also supply certified seed to as far as Alamata, Kobo, Dembia, Bure and some *woredas* in Oromia. A third example is the improved use of communally owned grazing areas, which required continuous participation/discussion/consultations with stakeholders, in order to decide on institutional intervention such as user rights and management structures. As a result of these interventions, fodder productivity of these areas increased fivefold. Also the development of a community-based insurance scheme for accidental death of sheep targeted for fattening required lengthy consultations with the stakeholders to develop by-laws and management structures.

A synthesis of various student thesis studies also indicates that farmers' education strongly influences the uptake of improved inputs across activity areas. Smallholder farmers who used such inputs for commercial production of crops and livestock products are better able to assess market opportunities, have more assets and/or income, and have better access to extension services and credit. However, a large number of factors that influence improved inputs use were technology or location specific. The evidence suggests that transforming subsistence, low input–low output agriculture into market oriented, high input–high output agriculture entails diverse strategies including promoting cross cutting factors like education, infrastructure and participation by women in agricultural development, and equally, targeting interventions like credit to the specific needs of farmers, their local contexts and technological attributes (Seife et al. 2010—see Annex 2).

An important effect of the use of a participatory approach is the enhanced role of value chain actors in the development process—in particular value chain actors driving the development process, after project support phased out. Examples are the production and sale of cereal crops in all PLWs. However, it is also noted that dependency on the public sector extension system continues, especially in districts where food security programs have been implemented over several years and for production technologies which require a high level of skills, e.g. semicommercial pullet and egg production.

Another lesson is that commodity development is a continuous process which requires new knowledge, skills and interventions along the value chains over time. Increasingly, attention needs to be paid to the development of the business support services when marketable volumes increase and demand for new inputs and services increase. As highlighted in IPMS publications, several of such services will develop after some initial linkages between producers and such business development services are created. Excellent examples are linkages created between honey producers and commercial processors and the development of a banana ripening business by private entrepreneurs in Metema.

Value chain interventions

The project's impact in terms of production, area coverage, number of animals produced, household participation and market orientation, benefitted significantly from the input supply and service systems. Notable successful interventions were private seed multiplication for onions, cereals and pulses; and private fruit and coffee nurseries. While the impact of the hormone assisted mass insemination service to increase the number of genetically improved dairy animals is still on going, estrus synchronization was found to be successful, leading to a more effective and efficient AI system. Successful market interventions centred on collective action for marketing of products in particular for milk collection in peri-urban areas and cooperative milk processing by small-scale cooperatives. Collective action and improved linkages between producers and traders facilitated marketing of vegetables and honey. Successful marketing interventions also included quality improvements/higher priced products, through introduction of new varieties demanded by segments of the market, e.g. larger sized fruits, local coffee varieties, haricot bean and export variety chickpeas. Improved processing also led to higher quality products, especially semi-processed honey. Successful production interventions were prominent for cereals, pulses and fruits for which high yielding varieties were introduced. Especially the new teff (Quncho) and chickpeas (Kabuli) varieties developed by EIAR contributed tremendously to the productivity increases. The impact of the improved fruit varieties is still to be seen, however, considerable price differences can be observed between local and improved mango and avocado varieties. Another successful production intervention for cereals and pulses was the introduction of zero tillage with the help of herbicides in PLWs where oxen were scarce and/or (women) farmers had limited access to oxen. Large areas were treated once the technology became known and the supply of herbicides was organized with the help of private shopkeepers and cooperatives. Improved feeding practices of small and large ruminants also showed positive results, however, credit programs to support this development are required to increase the number of fattened animals/farm per fattening cycle.

Credit innovation fund

The project credit component was underutilized, partly as a result of credit being available from regular sources, partly because of lack of interest by the credit institution and offices of agriculture to handle the relatively small amount of the funds in each *woreda*.

Differences were observed between the performances of the credit institutions in terms of loan management. In general, loans channeled through cooperative structures were not handled well, including loan administration, reporting and collection of repayments. The formal micro finance institutions (MFI), in particular the Amhara Credit and Savings Institute (ACSI) reported regularly on all three sites in Amhara Region and managed repayments well. It also took action against defaulters. The loan administration of the Oromia Credit and Savings Company (OCSCo) also suffered from poor record keeping in part due to transfer of staff. It was also noted that cooperatives had difficulties lending funds to non-members, however, flexibility in loan conditions, was greatest in cooperative structures as compared to the official credit institutions. The project emphasized the use of credit funds for women and cooperatives and MFIs allocated funds for women groups/participants in sheep fattening and pullet production.

Gender

Special attention was paid to have a more gender balanced commodity value chain development following a diagnostic process identifying gender related problems and potential interventions. A study was conducted to measure the impact of the project's gender strategy on various commodities. It was observed that processing and selling of butter in the rural dairy system is an income generating activity for women and hence any interventions in this production system contributed to a more gender balanced development. Similarly, women have traditionally focused on poultry production and small ruminants production and the project clearly showed that with improved access to services (extension, credit) incomes could be improved and be used as a stepping stone to additional income generating activities. Involvement of women in less land demanding activities was encouraged for female-headed households, since many have little or no land resources. Successful examples are nurseries to produce fruit, coffee and vegetable seedlings and apiculture.

Introduction of female friendly technologies such as zero tillage also contributed to a reduction of the labour burden on women and expansion of cultivated areas. Another example is modern apiculture with improved hives placed in or near homesteads, which make this enterprise more accessible to women as can be seen in Tigray (Aregu et al. 2011).

Environment

No major environmental problems were encountered as a result of the introduction of project interventions. In some PLWs the use of agrochemicals caused some negative effects on apiculture development, i.e. death of bees, which was discussed in the communities and tackled through spatial separation of activities. The use of herbicides to reduce weeding labour in rice production was successfully applied but in the end not adopted because of potential negative effects/pollution of nearby river/lake waters. The use of ground and river water for irrigated agriculture was monitored in a few places with the help of IWMI. So far, water availability has not been a major problem, however, with the intended expansion of irrigated agriculture, depletion of water resources could become an environmental hazard, which will require careful monitoring and planning. Most of the project's livestock interventions took place in rural areas, where the occurrence of zoonotic diseases was not a major problem, as compared to urban areas. The planned future expansion of urban agriculture, in particular livestock should be carefully monitored and planned to avoid increase in incidence of such diseases.

Positive environmental effects have been observed as a result of project interventions, in particular in relation to grazing area interventions. Not only did these managed communal grazing areas result in higher biomass yields, they also resulted in a more diverse mixture of species, in particular legumes. As a result of the controlled use of the areas, more species flowered which in turn provided a source of pollen and nectar for apiculture.


Local
PLD

Development and promotion of recommendations

The objective of the project's development and promotion pillar is to distill and promote strategies, policy and technology options, and institutional innovations from research and lessons-learned during project implementation.

Research/documentation activities

Diagnostic, action and impact studies were conducted to document new knowledge on targeted commodities and interventions for use in and outside the project areas. The studies were conducted by IPMS staff, National/Regional Agricultural Research Institutes, CGIAR institutes, consultants and MSc students. Completed/published studies are summarized in Annex 2 and MSc studies are summarized in Annex 3. Tables 13, 14 and 15 summarize completed diagnostic, action and impact MSc thesis research.

Table 13. Summary of completed diagnostic MSc thesis research

Value chain component	Theme or commodity	No. of studies	Annex 3—thesis number
Extension system	Approaches	6	3, 15, 16, 24, 29, 83
	Knowledge sharing	5	36, 43, 57, 62, 76
Value chain assessment	Dairy	2	46, 111
	Meat/skins	1	30
	Poultry	2	22, 38
	Apiculture	1	20
	Fruits, vegetables	4	1, 6, 14, 23
	Red pepper	2	9, 88
	Cereals	2	21, 79
	Pulses	1	118
	Cotton, sesame	2	35, 67
Production and marketing system	Dairy/meat	6	3, 27, 37, 64, 91 and 100
	Local poultry	4	34, 51, 72 and 75
	Sheep and goats	5	28, 48, 101, 108, 115
	Apiculture	1	103
	Coffee		17
NRM resources/use	Water	5	49, 58, 84, 86 and 110
	Fodder/grazing	4	90, 99, 104, 116
	Forest/tree	2	96, 107
	Bee forage	1	10
	GIS	3	47, 61, 67

Value chain component	Theme or commodity	No. of studies	Annex 3—thesis number
Input/service supply	Credit	3	2, 87, 92 and 97
	Cooperatives	7	2, 7,12, 40, 50, 63 and 87
	AI	1	44
	Crop inputs	1	65
Gender	Role	4	14, 26, 74, 82
	Access	4	13, 43, 62, 76

Diagnostic studies

The main aim of diagnostic studies is to identify/describe/quantify problems and potential intervention for the development of value chains. IPMS started with rapid participatory assessment studies in each of the 10 PLWs in which diagnosed problems and potential were 'matched' with interventions. Findings were published electronically on the IPMS website. These rapid assessments were followed by more in depth quantitative diagnostic studies.

Extension services

A review of PLW specific rapid assessment studies and available literature resulted in IPMS working paper no. 1 entitled 'Commercialization of Ethiopian agriculture: Extension service from input supplier to knowledge broker and facilitator'. This paper set the scene for the development of the project's overall development strategy and additional studies.

- Diagnostic MSc studies were completed on extension delivery including six studies on extension approaches and five studies on knowledge sharing.

Commodity value chain

Understanding the structure, conduct and performance of location specific commodity value chains were studied with the help of MSc students and project partners.

- A total of 17 MSc commodity value chain studies were conducted—2 for dairy, 2 for poultry, 1 for hides/skins, 1 for apiculture, 4 for fruits and vegetables, 2 for pepper, 2 for cereals, 1 for pulses, 1 for sesame and 1 for cotton
- The Tigray Agricultural Research Institute (TARI) conducted a value chain study on the vegetable value chain in Atsbi PLW.

Market assessment

Knowing the potential markets and market channels for selected commodities is an essential component of the project's strategy. Project partners conducted the following (rapid) market assessment studies on selected commodities:

- World Fish Institute study on Lake fish marketing—working paper no. 2
- ICRISAT studies on production and marketing of Desi and Kabuli chickpea varieties—working paper nos. 3 and 6
- CIAT study on haricot bean marketing—working paper no. 7
- ILRI/IPMS study on crossborder cattle trade—working paper no. 4
- IPMS study on live animal marketing—working paper no. 5 and rapid assessment studies on butter and honey marketing (unpublished)

- ICRAF study on fruit marketing Ethiopia (unpublished)
- Farmer to farmer (FTF) organization studies on milk processing potential in milksheds in Hawassa/Dilla, Ada'a, Bahir Dar and Mekelle (unpublished)
- ARARI study on dried fish marketing from Lake Tana (unpublished).

Production systems

The project also undertook diagnostic studies on the commodity production systems and or components thereof in order to describe/quantify diagnosed problems and potentials.

- Six MSc studies on dairy/meat production systems, four on local chicken production systems, three on sheep/goat, one on apiculture and one on coffee. A working paper no. 24 was produced based on ILRI/IPMS GIS study on the potential for Boran cattle for milk and meat production
- Studies on 'Major animal health problems for market-oriented livestock development' were completed in eight PLWs by DVM students from Addis Ababa and Haramaya universities
- Synthesised production systems studies for sheep and goat, local chickens and dairy were produced in working paper nos. 23, 24 and 31.

Natural resource management

Since natural resource management is the cornerstone for a sustainable production system, the project conducted rapid diagnostic environmental assessment studies in each of the PLWs, which are posted on the IPMS website. More detailed follow up diagnostic NRM studies included:

- Five MSc studies on water resources and use for irrigated agriculture, three MSc studies on fodder/grazing resources, two MSc studies on forest/tree resources/use, and one MSc study on bee forage resources
- Three MSc students conducted GIS studies to determine recommendation domain areas for rice and irrigation
- IWMI conducted detailed assessment studies or irrigation water resources and use in two of the PLWs, i.e. Alamata and Ada'a (see Annex 2).

Input/service supply

The supply of inputs and services was diagnosed as a major bottleneck for the development of commodity value chains as indicated in the rapid assessment studies. These findings were further documented:

- Working paper no. 20 summarizing challenges and opportunities in livestock input supply and service provision. Another working paper no. 15 summarized feed marketing in Ethiopia. CIAT and ICRISAT conducted (unpublished) rapid assessment studies on seed supply systems for haricot bean and chickpeas, respectively
- Seven MSc thesis studies on input/service supply including the role/performance of cooperatives, one MSc study on public sector AI service, one MSc study on crop input supply and three MSc studies on supply of credit.

Gender and HIV/AIDS

The project conducted detailed diagnostic studies on the gender and HIV/AIDS situation for each of the PLWs and selected priority commodities to determine potential interventions. Fact sheets on gender and HIV/AIDS for each of the selected commodities are posted on the new IPMS website.

- The HIV/AIDS studies were summarized in working paper no. 12 entitled 'Dynamics of the HIV/AIDS epidemic in value chain development in rural Ethiopia and responses through market-led agricultural initiatives'
- The gender diagnostic results were summarized in working paper no. 18 entitled: 'Opportunities for promoting gender equality in rural Ethiopia through the commercialization of agriculture'
- More detailed MSc thesis gender studies were conducted including four studies describing access to knowledge/land resource by women, four on roles/empowerment of women in agriculture.

Action research studies

Action research generates qualitative and quantitative knowledge on the development processes and performance of a single or a combination of interventions, which can be used to modify the interventions and/or identify context specific key adoption factors.

Table 14. Summary of completed MSc thesis studies on project actions

Value chain development component	Theme or commodity	No. of studies	Annex 3—thesis number
Extension/knowledge	FTCs	4	33, 52, 66, 113
	Knowledge sharing	2	5, 109
	ICT	2	41, 53
	Adoption	7	8, 25, 32, 55, 85, 94, 112
Livestock production	Dairy	2	4, 102
	Meat	2	80, 90
	Sheep/goat	5	18, 42, 101, 115,117
	Apiculture	1	112
Crop production	Crop introduction	7	8, 25, 31, 32, 55, 85, 89, 94
	Conservation tillage	1	105
	Composting	1	59
	Coffee	1	81
NRM	Fodder	1	19
Input supply	Seed/seedling	3	54, 95, 98
	Pullet	1	55
	Crop spraying	1	69
Marketing	Coffee processing	1	73
	Haricot bean	1	77
	Fattening	1	80

Extension/knowledge management

The project staff produced working papers on extension, in part based on studies and on synthesis of findings observed during the project life. These working papers helped to provide overall strategic direction to the project in particular working paper (WP) 1 (see diagnostic section), WP 11 'Market orientation of smallholder farmers in selected grains in Ethiopia: Implications for enhancing commercial transformation of subsistence agriculture', WP 16 'Integrating innovation systems perspective and value chain analysis in agricultural research for development: Implications and challenges'; WP 17 'Commercialization of dairy and forage systems in Ethiopia; An innovation system perspective'; WP 22 'Commercialization of smallholders: Does market orientation translate into market participation?'; WP 27 'Interdependence of smallholder net market position in crop and livestock markets: Evidence from Ethiopia'; WP 29 'Capacity for knowledge-

based smallholder agriculture in Ethiopia: Linking graduate programs to market-oriented agricultural development: Challenges, opportunities and IPMS experiences'. Knowledge management and capacity development interventions were summarized in a report entitled 'Selected good practices in agricultural knowledge management'. This was also complemented by several posters on knowledge management and capacity development interventions.

- Project staff conducted special studies on the effectiveness of the graduate program support (findings incorporated in Working Paper 29. http://cgspace.cgiar.org/handle/10568/16385)
- Two MSc studies looked at new knowledge/information provision, seven MSc studies looked amongst others, at the role of extension in adoption, two MSc studies looked at the use of ICT in extension
- Performance of FTCs was studied and documented by IPMS and four MSc studies—Table 14
- The effectiveness of Participatory Agricultural Radio Series (PARS) was assessed by Farm Radio International and their reports have been uploaded on the IPMS website.

Commodity value chains

Following the diagnostic studies, value chain interventions were introduced for the selected commodities. The intervention process, interventions, results and lessons learned were documented in commodity case studies. Sources of information for the case studies were the baseline survey, 6-monthly progress reports, and thesis and impact studies. Group discussions were held in the PLWs to obtain additional information on processes and linkages created. Subsequently, the project organized a writeshop to prepare and review first drafts. A total of 21 PLW specific commodity studies were completed, of which 19 were electronically published on the ILRI and IPMS websites and 2 were produced in the IPMS working papers no. 8 and 28. Based on these individual case studies the project produced five brochures synthesising the findings of the case studies of dairy, small and large ruminants fattening, apiculture, fruits and vegetables. To facilitate the use of these brochures by field staff, each brochure was translated into Amharic.

Besides case studies, the project also produced value chain development posters for each of the selected commodities, including cereals, teff, pulses, haricot beans, coffee, fruits, apiculture, dairy, livestock fattening, poultry and apiculture. All posters have been posted electronically on the IPMS website.

Production

- Production interventions are incorporated in each of the commodity value chains case studies
- Additional livestock production interventions were documented in MSc studies including two on dairy, two on cattle fattening, five on sheep/goats and one on beekeeping
- Additional crop production interventions included seven studies on selection and adoption of crop varieties/packages; one on conservation tillage, one on vermicomposting, and one on coffee de-stumping technology.

NRM studies

- Several grazing area interventions are included in the commodity case studies together with negative and positive environmental effects
- Project staff also summarized some key NRM interventions in working paper no. 21 entitled 'Sustainable land management through market-oriented commodity development; Case studies from Ethiopia'
- One fodder intervention was documented in an MSc study
- A consultant conducted a study on biomass quantity and diversity in communal grazing areas with improved management in Atsbi, Fogera, Bure and Miesso (see Annex 2).

Input/service supply studies

- Improved input/service supply interventions are incorporated in the commodity case studies
- Four additional MSc thesis studies were completed, one on private crop spraying services, two on farmer seed/seedling production and one on pullet production by women groups
- Project staff also prepared papers on fruit nursery, pullet production and hormone assisted mass insemination for national and international conferences.

Marketing studies

- Two marketing assessment studies were made by MSc students, i.e. one on the marketing of chickpea varieties and one on processing/qualities of different coffee varieties.

Gender studies

- The gender strategy interventions in knowledge management, capacity development and commodity development have also been summarized in a brochure entitled 'Empowering women through value chain development: Good practices and lessons from IPMS experiences'. This brochure has also been translated into Amharic for easy access by field staff.

Impact studies

Impact studies were conducted by the project to assess the impact of scaled out interventions in participation, production and income and identify causal factors which contribute to the observed impact. This knowledge can be obtained from qualitative and quantitative studies employing various statistical tools.

Table 15. Summary of completed MSc studies on impact related topics

Theme or commodity	No. of studies	Annex 3—thesis number
Input/output	3	11, 56, 106, 114
Apiculture	3	70, 71, 93,
Fodder/livestock	3	39, 60, 78

Three major impact studies were conducted by the project:

- In 2009, a study was conducted on smallholder commercialization in all 10 districts, based on 1192 sample farmers. The results of commodity specific impact were incorporated in the location specific commodity case studies, conference papers and working papers (see Annex 2)
- In 2010 the project conducted an impact study using focus group discussions, key informants interviews, and available statistics in all peasant associations in the 10 districts—750 in total. Indicators were based on the projects' PMF and data were collected on the status of these indicators in 2010 as well as in previous years to measure progress. The results of this survey were published in working paper no. 30 entitled 'Summary report of market-oriented developmental changes in the IPMS Pilot Learning *Woredas*'
- To measure the impact of the project's gender strategy, a special study was conducted on the effect of knowledge management/capacity development and value chain development. A total of 311 households in 10 PLWs were interviewed. The results are summarized in a paper which was presented during the agri-gender workshop in 2011, i.e. 'Strategies in increasing women's participation in commodity value chain development: Experiences from IPMS' .

MSc students also conducted impact studies, especially during the final stages of the project.

- Four studies focused on impact assessment of input/output development interventions in Goma, Atsbi, Bure and Miesso districts
- Three studies were conducted on impact of apiculture development and three on fodder and livestock development
- MSc studies were analysed in an IPMS commissioned paper entitled, 'Farmers use of agriculture inputs and practices; review and synthesis of research in Ethiopia'. http://cgspace.cgiar.org/handle/10568/5437.

Promotion

To promote project approaches and interventions beyond the PLWs for national and international stakeholders, the project used the following strategies/tools:

- ILRI/IPMS websites
- Distribution of hard copies of project publications, CDs and DVDs
- Project co-organized conferences and workshops
- Presentations in conferences, workshops, seminars
- Publications in national and international journals
- Radio and TV broadcasts
- Policy, program and strategy development
- Infrastructural support at federal, regional levels.

IPMS and ILRI website

To influence and enhance the process of knowledge sharing and exchange in market-oriented agriculture development, IPMS set up a project website, together with the web team of ILRI-Addis (see knowledge management). Visitors of the site have full access to all documentations and publications of IPMS.

The top viewed and downloaded documentations on the website are working papers and MSc theses. On average, the site entertained 9000 visits/month in 2011, of which half were new visitors. IPMS project is a pioneer in availing full MSc theses of students on its website, and very recently, Addis Ababa and Haramaya universities followed in its footsteps.

To realize its aim of sharing knowledge to and with wider audiences, IPMS used ILRI's publication repository (http://mahider.ilri.org/handle/10568/177) to link project outputs and experiences documented on the website. RSS feeds are enabled to help users get regular updates and other news from the site via email.

Distribution of IPMS documentation

An overview of reproduced IPMS outputs is shown in Table 16.

Table 16. Production of IPMS outputs

Output	Type	Number of hard copies		
		English	Amharic	Total
Working papers (31)	Publication	58000		58000
Gender toolkit (1)	Manual	500	3500	4000
HIV/AIDS toolkit (1)	Manual	500	3500	4000
Mainstreaming gender (1)	Manual		500	500
RBM training material (1)	Manual	1500		1500
Water training (1)	Manual	1000		1000
Bee keeping (1)	Manual		500	500
Community breeding (1)*	Manual	1000		1000
IPMS approach/interventions	Brochure	1500		1500
Gender idea sheet	Brochure		1000	1000
HIV/AIDS idea sheets	Brochure		1000	1000
Gender synthesis (1)	Brochure	1000	1000	2000
Commodity synthesis (5)	Brochure	6000	5000	11,000
HIV/AIDS	Poster		2000	2000

*Produced by ICARDA for their community-based breeding project, reproduced by IPMS.

Distribution took place through ILRI's KMIS Unit which has a standard list of names of Ethiopian stakeholders, including project partner institutions at federal, regional and district levels. Additional distribution took place during workshops and conferences as well as visitors to the project.

At the end of the project, standard sets of IPMS documentation were prepared for scaling out to LIVES zonal and district offices as well as to educational institutions and projects.

To test the usefulness of e-readers for extension staff, the project also uploaded relevant project under the document relevant on 120 e-readers which were distributed in consultation with the MoA. If successful, these e-readers will be introduced at a wider scale in the MoAs extension system.

IPMS co-organized workshops and conferences

In June 2004, the MoA/ILRI organized a two day 'Technology exhibition and workshop' followed by an 'IPMS launching and planning workshop' for research and development stakeholders at the ILRI campus. During the project life, two national advisory and learning committee workshops were held in conjunction with value chain exhibitions organized by the regional BoAs in Tigray (March 2006) and Amhara (December 2008). In 2011, the project organized a final workshop 'Market-oriented smallholder development; IPMS experience sharing workshop' and value chain exhibition at the ILRI campus for project partners and stakeholders.

To highlight the project's gender focus, two workshops were held to enable project partners and stakeholders to share experiences, i.e. in 2008 'Workshop on practical experiences of mainstreaming gender and HIV/AIDS in market led agricultural development' the 'agri-gender' workshop (co-organized with ILRI's gender unit) in 2011. Reports on each of these events and powerpoint presentations/posters can be found on the IPMS website.

In 2010, the project started to actively scale out its approaches and interventions to stakeholders in neighbouring districts through workshops and field visits. Project staff in some PLWs also responded to requests from neighbouring districts for technical assistance.

The project also made a specific effort to promote the use of EAP through a series of seminars organized in the regions and zones.

Figures 19 and 20 provide an overview of the number of participants in the scaling out workshops and the EAP promotional events.

Figure 19. EAP seminar participants

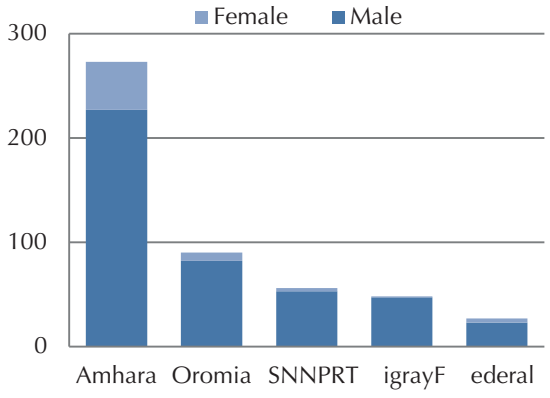
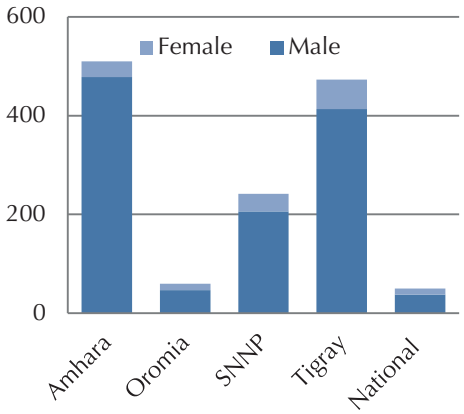


Figure 20. Scaling out event participants



Presentations in workshops/conferences/meetings/platforms

During the project life, staff made presentations highlighting the project's approaches and interventions. Most of these presentations were made in Ethiopia. Particular emphasis was given to presentations in professional associations such as the annual Ethiopian Society of Animal Production (ESAP), Ethiopian Society of Agricultural Economics (ESAE) and the newly established extension association. Presentations were made by IPMS staff, partners and MSc students, based on thesis research conducted with IPMS sponsorship/supervision.

The project also co-sponsored/organized several events during which presentations were made, including regional BoA workshops on smallholder commercialization in Tigray and Amhara regions; SNV/FAO/EMDTI/IPMS dairy forum workshop; MoA/EIAR/IPMS workshop on genetic improvement of livestock. Knowledge fair includes: ILRI Livestock exchange, African knowledge fair, FAO African knowledge fair, and CTA value chain conference.

Internationally, the project prepared paper and poster presentations in a number of conferences, amongst others the annual Tropentag conferences in Germany and the tri-annual International Agricultural Economics Association (IAEA).

Publication in national and international journals, proceedings

A total of 30 articles based on IPMS supported studies have so far been published by IPMS staff and/or partners in journals and/or book chapters and it is expected that individual staff and partners will continue to publish on the IPMS project in the foreseeable future (see Annex 2).

During the project life, 46 articles/abstracts of presentations made in workshops/conferences were published in workshop proceedings—see Annex 2.

Radio and TV broadcasts

Federal and regional radio and TV have covered many of the project activities and events at HQ and in the different PLWs. While most of such broadcasts were made on the initiative of the broadcast companies themselves, IPMS also actively encouraged ETV to film some activities in the PLWs by sponsoring their travel, including women field day in Ada'a and value chain development in Metema.

The project engaged the services of Gelila Media and Advertizing to develop a series of four broadcasts on women empowerment based on the work in three of its PLWs (Bure, Goma and Atsbi). These shows were

broadcasted as part of a women focused weekly magazine format program called 'Egna' in November and December 2012.

The PARS series developed with the help of FRI on honey development in Atsbi and on fruit development in Dale were broadcasted over a six week period by the local radio stations, i.e. DimtseWoyane in Tigray and Sidama radio in SNNPRS in the second half of 2011.

Policy/program/strategy development support

The project also contributed to the development of policies, strategies, programs in support of market-oriented agricultural development, through budgetary and/or staff time support.

Federal livestock development strategy

Earlier attempts by the MoA to develop a livestock master plan with the help of a consultancy company had resulted in a draft livestock master plan. At the request of the Minister, the project and ILRI provided consultancy support to the MoA, to jointly develop a broadly defined livestock development strategy based on the previously mentioned draft plan and developments, which had taken place in the past years. Based on this strategy, bankable projects for livestock development can be planned (see Annex 2).

AGP gender strategy

At the request of the AGP coordinator, IPMS gender staff provided assistance for jointly developing a gender strategy for the AGP program in collaboration with the MoA's Women's Affairs desk. In addition, the project provided assistance to this effort by jointly organizing consultancy support for translation of the strategy and facilitating a strategy review workshop for AGP/MoA gender coordinators.

Apiculture strategy Amhara Region

At the request of the Amhara BoA, IPMS project staff in Amhara Region joined forces with other key actors (ARARI) to develop a draft strategy for apiculture development in the region. The strategy has been uploaded on the EAP for use by Amhara and other regions (see EAP).

Development of genetic livestock improvement strategy

The project initiated hormone assisted mass insemination intervention was well received by the MoA and led to a national (MoA, EIAR, IPMS) workshop developing strategies for the genetic improvement of different livestock components. IPMS staff provided input for the workshop and the project also provided part of the financial support for the workshop.

Fishery development strategy

At the request of the MoA, IPMS provided support for the development of fishery assessment studies in three regions (Afar, Gambella and Benshangul Gumuz). The studies were based on value chain concepts developed by the project. The studies were conducted by staff of the ministry and regional research institutes. IPMS also financed a workshop to present the study findings (see EAP).

Development of National Dairy Board

IPMS staff contributed to the organization and content of the National Dairy Forum Workshop, which was organized by several stakeholders to initiate the development of a National Dairy Board.

Import/export guidelines for animals

At the request of the MoA, the project provided budgetary support for local consultants to develop a comprehensive set of 'Guidelines for import and export of animals and genetic materials'. This initiative was led by the MoA and the USAID funded LOL dairy development project.

Pulses value chain development strategy

At the request of IFPRI and the Bill and Melinda Gates Foundation (BMGF) project, IPMS staff provided technical inputs in the assessment of the present and future pulses value chain development, based on its experiences gained in the PLWs and the studies conducted by partner institutions.

Web-based agricultural content development

The project actively participated and contributed to the Ethiopian Mapping Taskforce (a community of practice [CoP] that includes several international organizations, government bodies, NGOs, and other interested contributors). The goal of this CoP is to enhance access to geographical information and knowledge by simplifying and harmonizing spatial data being developed about Ethiopia by various regional, national, international, and government projects.

The project also actively participated in the development of the RED&FS database which brings together information on different projects operating in Ethiopia.

Development strategy for linking graduate programs to development

To scale out the IPMS experience with graduate students, the project co-hosted with the Hawassa University, a workshop from 23 to 24 October 2008 entitled 'Forging partnerships to enhance the relevance of graduate research in agriculture'. Besides IPMS staff, the workshop was attended by 41 representatives of the Federal Ministry of Agriculture, Federal Ministry of Education, Agricultural universities, National and Regional Research Institutions, IFPRI and ILRI.

Strengthening capacity—Public sector institution

IPMS contributed by advising agricultural universities in developing their livestock curriculum in particular Haramaya and Hawassa universities.

Drs Berhanu Gebremedhin and Gebremedhin Woldewahid furthermore contributed to the capacity building of the Tigray Agriculture Research Institute (TARI) by organizing a support group known as Tigray Agricultural Research for Development Advisory Panel (TARDAP) in 2007. This group is chaired by Dr Berhanu, while Dr Gebremedhin acts as secretary, and provides TARI with advisory and promotional support and capacity building.

At the request of the MoA, IPMS also provided financial assistance for a long-term local consultant charged with the responsibility of developing a coffee testing laboratory to improve coffee quality for the export market.

Dr Azage, as a founding member of the Ethiopian Academy of Sciences, and member of the Agriculture Working Group, organized the first conference on 'Advances in agricultural sciences' workshop at ILRI campus.

To institutionalize value chain capacity development in Ethiopia, the project also conducted an inventory of on-going and intended capacity development activities by mandated educational institutions and projects and programs (see Annex 2).

Infrastructure support for scaling out

At the request of the project partners, budgetary support was provided for market-oriented value chain development including the following.

Ethiopian Commodity Exchange

At the request of MoA/CIDA, the project supported the purchase of electronic price tickers, PABX and other equipment such as faxes, scanners, computers and printers for the newly established Ethiopian Commodity Exchange. This initiative complemented the project's knowledge management component in that it facilitated a more transparent system for trading and better access to market information.

Lime crushers

At the request of the MoA, IPMS assisted in the purchase and installation of five lime crushers and generators—two for Oromia and one each for the other three regions. These crushers will contribute to improving productivity of acid soils by applying lime.

Sericulture and dairy processing equipment and supplies for educational institutions

At the request of the MoA, IPMS assisted in the purchase and installation of sericulture processing equipment for Alage Agricultural TVET, which has federal level responsibility for building the capacity for sericulture development. The Alage ATVET was furthermore supported with equipment/supplies for its capacity development activities for dairy development, in particular for its practical training.

Outcomes and lessons learned

The expected outcome from the project's documentation and promotion component is a contribution of the project's approaches and interventions beyond the immediate project area.

The project's documentation/research component has resulted in a considerable number of publications, which are much appreciated by the development community. A limited number of publications was produced for the scientific community, of which several were published in journals and presented in conferences. Involvement of students was found to be very effective, and this model can be used to increase the national research capacity. Involvement of international, national and regional research partners in conducting project research had mixed results, which sometimes resulted in delayed or non-delivery of expected outputs. For future projects, models of joint implementation should be pursued. Further improvements in the project documentation can be obtained by prioritizing topics to be studied and synthesised across multiple locations.

Many changes in agricultural development can be observed in Ethiopia today as compared to a decade ago. The words 'knowledge management' and 'value chains', almost unknown at the start of the project are now the focus of attention, even though there is differences of opinion in interpretation of the meaning of these concepts.

The GoE launched a Growth Transformation Plan (GTP), which has put considerable emphasis on commercialization of agriculture, especially livestock and irrigated agriculture. Governments/donors also launched the Agricultural Growth Program (AGP), which puts emphasis on value chain development and targets districts with market potentials.

The development of the livestock strategy is an on-going process by the Ministry of Agriculture, in which IPMS staff/consultants participate and contribute. It is noted that value chain concepts and the improvement of genetic resources using hormone assisted mass insemination for dairy and meat animals has been incorporated in the plan.

It is clear that while IPMS has made a contribution to some of these strategic developments, it is acknowledged that many other programs and projects have also contributed to this development.

Gender and value chain development

As illustrated in the different project pillars, IPMS mainstreamed gender in the value chain development process. Since the extension system was seen as the prime facilitator of change, emphasis was put on capacitating the extension staff at different levels. The capacitating process started with the development of a methodology/toolkit for assessing gender roles, relationships, access and control of productive assets and decision making power in commodity value chains using different wealth categories. The methodology was then used to assess the selected commodity value chains in the project districts. The results were summarized in fact sheets, which formed the basis for identifying 'gender constraints/opportunities' along the value chains. Women only assessment activities were carried out in order to capture women's ideas and views. These included separate group discussions with men and women community members.

The findings of these analyses were shared with many stakeholders at district level. This was followed by awareness creation and cascading TOT training of district level staff on mainstreaming gender; based on a manual developed by the project. An integral part of the training was the use of idea sheets for gender mainstreaming, which were subsequently used to guide gender sensitive value chain development in the districts. The idea sheets provided suggestions and entry points for extension workers to ensure women's increased participation in the value chain development supported by the project.

The project strategy to increase women participation in commodity value chain development followed a flexible and stepwise approach with an initial focus on commodities which have traditionally been the domain of women. The approach emphasized capacity development and allowed women beneficiaries not only to increase their income but also to acquire the necessary experience and confidence to venture into more non-traditional and profitable business ventures. IPMS facilitated this process by providing access to a credit innovation fund especially for the (semi) commercial production of small ruminants, eggs, pullets and seedling production. This improved access to credit by female farmers proofed to be a crucial factor in engendering the control of cash from the sale of animals and seedlings.

Project and other studies demonstrate that knowledge acquired by male farmers in training is not necessarily imparted to female members of the household. In order to acquire knowledge equitably, the project therefore encouraged the involvement of female farmers in field days and promotional events whereby awards were given to successful female farmers as recognition of their success. This also contributed to building the confidence of female farmers. In addition, IPMS promoted the participation of female farmers in experience sharing tours; in commodity specific training, technology demonstration and practical exercises. To further enhance women's involvement in training the project carried out these activities at times and venues suitable and accessible to female farmers. It also introduced a husband and wife (couples) training strategy to create not only gender equity but also to sustain the households agricultural work when husbands are not able to stay in the family due to death or temporary migration. This approach enabled female farmers to acquire skills to successfully engage in men dominated type of farm activities especially women in male-headed households. During project implementation, gender awareness creation activities continued and lessons learned were shared during internal seminars, workshops and field days with key stakeholders. Anecdotal evidence suggests that the combination of these activities contributed to a change in attitude in many stakeholders.

To institutionalize gender issues, at district level, the Women Affairs Office was included in the *Woreda* Advisory and Learning Committee (WALC) to enable these offices to follow up gender issues and also to maintain linkage between the Office of Agriculture and the Women Affairs Offices. One visible output from this institutional linkage was the involvement of these offices in the organization of events highlighting women achievements in the PLWs. Also staff had an increased feeling of ownership since they had been involved in

planning and implementing interventions. Another project activity aimed at longer term institutionalization of gender in the research and development community was supporting formal MSc and BSc education of female staff of the Ministry of Agriculture and Regional Agricultural Research Institutes.

Knowledge generation/documentation on gender was carried out by project staff, MSc thesis studies, a gender outcome study conducted in 2010 (Lemlem Aregu and Ranjitha Puskur) and a brochure synthesizing good practices and lessons from IPMS empowering women through value chain development. A working paper (no. 18) was published on opportunities to promote gender equality in rural Ethiopia through commercialization of agriculture, based on lesson learned in the 10 PLWs. In addition, basic gender related documentation of the project was translated into Amharic to create access to knowledge for district level front line development agents and literate farmers. All project documentation on gender, including tool kits and manuals were provided to the *Woreda* Knowledge Centres.

IPMS also promoted and scaled out gender related knowledge at a national and international levels using a number of different approaches. At the national level, the project organized two workshops to share findings and contributed with presentations in workshops organized by other projects and programs. Participation was high and demand for IPMS documentation on gender lessons learned was also significant. So far, over 10,000 hard copies of the gender related IPMS documentation has been distributed.

Project staff also contributed to the development of the gender strategy and capacity development of the Agricultural Growth Program (AGP). The AGP is the Government of Ethiopia's main program to promote agricultural growth with investments totaling USD 281 million. It is currently operating in over 83 districts across the country.

Another national promotional activity was the commissioning and broadcast of four short TV programs on gender value chain development based on interventions carried out in three of its PLWs. The broadcast was viewed on Ethiopian National Television (ETV) and telephone/SMS follow up by listeners indicated positive reactions especially the fact that women were able to be involved in innovative value chain interventions.

Also numerous presentations were made on the IPMS gender strategy and interventions at the request of relevant projects/programs in Ethiopia including Oxfam UK, ACDI/VOCA, AGP, SNV's BOAM and the AGRIHUB working group on gender.

At international level, presentations/contributions on IPMS gender activities were made in a number of conferences, including the international ILRI/IPMS agri-gender conference in Addis Ababa and the CIDA–UN conference on women's economic empowerment in 2011. An article on a female sheep fattener in Goma was highlighted internationally by the CGIAR system in 2011 at the occasion of International Women's Day (over 1100 views on the internet). Of note is also that the IPMS gender analysis toolkit was integrated into the ILRI gender toolkit developed recently for use in all ILRI projects. Finally gender related documents were uploaded on the project website as well as the Ethiopian Agricultural Portal.

The outcome of these activities in the PLWs is ultimately measured through a more gender-balanced commodity value chain development, resulting in improved income and livelihoods for both male and female farmers. In 2010 a household survey was conducted by the project to assess outcomes (not impact) in the project PLWs. Some individual impact case studies describing livelihood changes for women were summarized in the project's gender brochure. The project's final impact study also summarized some short-term impact data on gender, however, it should be clearly understood that many of the project's interventions with impact will be further emerged in the longer term. Overall, it was clear that the approach adopted by IPMS resulted not only in improved income for female farmers but also in increased entrepreneurship of women through their increased knowledge, experience, ownership and confidence.

Considering the gender achievements in the different commodities, the initial gender analysis, divided commodities into different categories the first one being commodities in which women hold more stake such as poultry and dairy. In the surveyed PLWs, most women are heavily involved in the production of poultry and dairy products and also have some control over the income of the sale of egg and chickens as well as the proceeds from the sale of milk and butter. To transform the poultry system from a traditional-based practice to an advanced production system, a special attention was therefore given to women poultry producers through introducing productive egg laying chickens, improved poultry management, vaccination and rearing of day old chicken. Of the sampled women, 38% raised day old chickens, 98% used improved

poultry management, 49% used vaccination (mainly for day old chick rearing) and 12% used/purchased 3 month old improved chickens. The project's overall study on changes (IPMS working paper 30) indicates that the number of female-headed households involved in improved poultry production grew by 186%, while the revenues (at constant prices) from poultry quadrupled by male and female farmers as a result of increased egg productivity (29%).

For dairy development, women benefited from the introduction of improved breeds, supplementary feed, improved production management and market linkages. No special assessment was made of the rural butter system, in which women benefitted from the project's fodder interventions.

The second category includes commodities which require a lower amount of resources (e.g. labour, capital or land) such as fruits. The gender analysis revealed that the role of women in fruit production varies considerably across PLWs and also with the state of commercialization i.e. small-scale sale are handled by women but on more commercialized farms, merchants tend to buy from the farm and men tend to take over the marketing activities from the women. The survey results show that 94% of the women introduced new varieties, 53% raised (improved) seedlings, 12% practised grafting of seedlings and 43% practised improved banana growing. A case study described in the IPMS gender brochure indicated that a woman farmer in Goma managed to grow and sell 300 grafted avocado seedlings in December 2010, resulting in an income of ETB 7500.

The third category includes commodities in which responsibilities are shared across gender but not the benefits, which mainly go to male household members, e.g. small ruminants and irrigated vegetables. In all PLWs, women were excluded from the selling of small ruminants; it is the men who sell and control the income. The project therefore provided capacity and confidence building and also stimulated access to credit and markets for female farmers (in groups) in most locations. The survey also showed that 53% of the sampled women farmers started stall feeding, 83% practised supplementary feeding, 68% selected animals for fattening based on a set of criteria. In Goma district 43% of the sampled female farmers participated in the community-based livestock insurance scheme. A case study on small ruminants fattening (IPMS gender brochure) illustrates the case of a woman farmer in Goma, who was able to fatten 12 sheep in 2 cycles on credit and she was able to control the income from the sale, which greatly increased her standing in the community. Another example are women farmers in Mieso who managed to have net profits between ETB 1000 to 1600/household from fattening with credit over a 6 month period and become independent goat fatteners by controlling the purchase and sale of animals. Some used the newly earned cash and 'freedom' to engage in cattle fattening and large ruminant trading.

Irrigated vegetable production is usually labour and capital intensive, and many women therefore share crop and/or rent out their land. To break this pattern, IPMS used again its strategy of improved access to knowledge and skills for both women in male and female-headed households. The household survey showed that 80% of the sampled women farmers introduced new varieties and 100% adopted improved management practices. The project's overall impact study did show an increase in the number of women involved in vegetable production over the life of the project; however, growth rates were below that of male farmers.

Commodities which are more male dominated include apiculture, partly because of the traditional production system which involves hanging of beehives on trees, usually in areas far away from the homestead. However, in the advanced beekeeping systems, the modern and the traditional hives can be kept around the homestead, where women can potentially manage the day to day management. IPMS therefore encouraged women farmers to engage in modern beekeeping and supported this through capacity development/knowledge management and access to credit. The household survey showed that women responded positively in 100% of the sampled women farmers used improved hives, 93% used supplementary feeding, 63% introduced bee forage and 63% was involved in colony splitting. The project's intervention impact study showed that the number of women involved in modern beekeeping increased by 218% over the life of the project. A case study of a woman farmer in Ada district showed sales of around ETB 8500/annum.

Another strategy to increase women involvement in commodity development adopted by IPMS involved addressing constraints experienced by women farmers, such as lack of draught power and labour. Lack of sufficient draught power and/or (hired) labour often results in women renting out and share cropping their land and or avoiding producing labour intensive commodities. The project therefore stimulated the use of conservation tillage, combined with the use of herbicides in two PLWs through field days/demonstration and practical training on agrochemical spraying. This was complemented by encouraging local input suppliers to stock the necessary herbicides and linking them to the national agencies. A case study on a woman farmer in

Bure illustrates that adopting these labour saving technologies and sharing tasks between husband and wife increased their income from ETB 4000 to 24,000/annum.

Based on IPMS experiences, 10 recommendations are suggested for promoting gender equality and promoting more equitable sharing of income through agricultural development.

1. Change mindsets
Men and women at all levels need to change their traditional ways of working and need to begin to acknowledge the potential and the need for actively involving women in Ethiopia's rural development. Such a change must be understood as a process in which multiple activities and a high level of commitment are required to progressively shift existing attitudes.

2. Incorporating gender goals in performance appraisal
Although extension service agents can be made more gender aware and be equipped with a number of tools to promote participation by women, it is important to incorporate gender objectives in the development agents' performance evaluation criteria.

3. Set high, but realistic gender targets
At the beginning of the project, high but realistic (achievable) gender targets were set for the numbers of women to be reached through the interventions.

4. Work with both men and women
Include both the head of the household and spouse in all gender development works so that men and women together can learn and give each other support in increasing household income, which should then give them both real incentives for increasing the decision-making power of the women.

5. Take a stepwise and flexible approach to gender issues
Projects targeting women should start with a focus on commodities such as dairy, small ruminant production, poultry raising, beekeeping and backyard fruit production, which have traditionally been the domain of women; as their incomes raise and capacity is built, they may then take on other more profitable enterprises such as cattle fattening.

6. Tailor training for women
When designing capacity building strategies aiming to increase women's participation in markets, take into account that women often lack the time, confidence, skills and networks that make it possible for them to participate in the training. Also, it is important to recognize that building confidence is as important as building capacity.

7. Facilitate input and services provision in the value chain
Government should promote gender balanced private sector and rural entrepreneur's development to provide inputs and services.

8. Link women to markets
Create opportunities that involve women as well as men in market-led agricultural activities by, for example, engaging them into relevant discussions; responding to their concerns, needs and ambitions; and ensuring in particular that those ready to enter markets have the links, tools and the mentoring they need.

9. Change self-perceptions and promote leadership
Help women to realize that they are a vital link in the agricultural value chain. As in many other parts of the world, rural Ethiopian women typically view themselves more as farm labourers than as household providers and income-earners. To change this will require women accessing more and better-quality information, being part of stronger networks as well as women who are entrepreneurial role models.

10. Scale out successes by adapting them to particular contexts
Agricultural interventions and options that work in one place will often not work in another unless the approach to the innovation as well as a given technology is also adapted appropriately to the new given context.

Conclusions and recommendations

- The project impact survey clearly indicates that using a participatory market-oriented commodity value chain development approach has resulted in increased agricultural production, productivity, sales value and market participation/orientation by Ethiopian smallholder farmers in the 10 Pilot Learning *Woredas*.

- Participatory methods to identify an initial set of commodities and interventions for market-oriented development, should continue to be used during the implementation phase to learn and respond to failures and new opportunities.

- Value chain development of commodities for the local market was mostly successful, including cereals (teff, wheat and rice), pulses, banana, live animals, dairy, vegetables and apiculture products. However, some district specific failures were observed because of lack of agribusinesses/ markets (e.g. cotton in Alamata) and/or insufficient economic incentives for the producers (e.g. noug in Fogera).

- Increasing production of existing and new products for new export markets had mixed results, i.e. production of new export varieties for chickpeas and haricot beans was very successful, while production of new products like Vernonia and safflower petals for export markets failed due to lack of agribusiness markets and/or insufficient economic incentives for the producers.

- While most crop value chains benefitted significantly from the widespread introduction of better performing varieties, livestock value chain development was hampered by the lack of improved livestock breeds and/or inefficient multiplication systems for improved breeds. Considerable attention needs to be paid to breed improvement of local and exotic dairy, meat and poultry breeds, as well as development of community breeding programs and hormone assisted mass insemination.

- Developing alternative input and service supply systems for commodity value chain development proofed to be a crucial intervention for several commodities. Commercial demand for such inputs and services resulted in economically viable small-scale businesses. Increasingly, private sector actors, including cooperatives, can take over the role of the government in supplying improved inputs and services at commercial prices.

- While using the holistic value chain approach, IPMS put emphasis on district level producers of inputs and outputs and created linkages with medium- and large-scale service providers and value chain actors at regional and federal levels. By having this district level focus, several products and marketing channels within a commodity are considered. Most other value chain projects focused on a few agribusinesses for which raw or semiprocessed products were to be supplied by a select group of smallholders. While both approaches are valid, the IPMS approach tends to reach more market-oriented farmers, thus influencing the livelihood of more farmers. Synergies between both approaches can be achieved by creating linkages between production-oriented value chain projects like IPMS and agribusiness-focused value chain projects.

- IPMS also focused on innovations in knowledge management and capacity development, since the existing service system was hypothesized to be inadequate to provide knowledge and skills for market-oriented value chain development. Using new extension innovations is crucial for the public sector support system to enhance uptake of production, input/service and marketing interventions.

Such innovation capacity and knowledge management development for value chain development requires the involvement of actors, such as traders and agribusinesses.

- While formal capacity development activities contributed to a better understanding/skills of value chain actors and service providers in market-oriented commodity development, the use of hands-on coaching/mentoring by project staff in the districts was found to be especially effective. Follow-up capacity building activities in the field is essential for learning as well as addressing problems/opportunities emerging as a result of the continuous development of the value chain.

- Capacitating staff to obtain a degree was found to be very effective, not only because better qualified staff can support market-oriented agriculture development in the long run, but also because universities and staff become involved in development driven research—a model which has been promoted by the Ethiopian born and educated World Food Prize winner, Professor Gebisa Ejeta.

- The introduction of various knowledge management interventions greatly facilitated access to knowledge at different levels for service providers. Project studies furthermore suggest that farmer to farmer knowledge sharing activities, facilitated by the project partners, significantly increased uptake of technologies, market-orientation and participation.

- In rural areas, where access to advanced information technologies is still limited, experiences in some of the IPMS sites as well as experiences from other countries indicate that use of such technologies (e.g. e-extension) can contribute to increased capture and access to knowledge.

- Gender mainstreaming, based on diagnosis and action planning in knowledge management, innovation capacity development, and promotion leads to increased participation by women in value chain development. However, behavioural changes are required and will take time and hence realistic targets needs to be set. A stepwise approach starting with awareness creation based on gender analysis of commodities, followed by including women in capacity development and knowledge management activities, followed by targeted women friendly commodities and technologies is required. The later should include better access to services and inputs (including credit) as well as creating market linkages.

- Environmental monitoring considered potential hazards identified during the initial assessment such as ground water depletion, negative impact of agrichemicals on human and animal health and zoonotic diseases. None of these hazards reached critical levels, with the exception of negative effects from the use of agrichemicals for crops in some locations. Corrective measures to reduce negative effects on bee keeping and lake water pollution were discussed with communities. Mentoring also resulted in identifying positive environmental effects as a result of interventions introduced by the project, in particular in grazing areas.

- While each of the project pillars, i.e. knowledge management, innovation capacity development, value chain development and promotion have contributed to the market-oriented commodity impact indicators in and outside the project target areas, the IPMS approach implies that it is not one single pillar/intervention; rather it is the combination of context specific interventions in and over time which lead to impact.

Annex 1 IPMS partners and staff

IPMS Board members

Name	Organization	Years	Function
H.E Aberra Deressa	MOARD	2006–2010	State Minister (chairman)
Carlos Sere	ILRI	2006–2010	Director General
Marc-Andre Fredette	CIDA	2006–2007	Director CIDA Addis
John Jackson	CIDA	2007–2009	Director CIDA Addis
Edmond Wega	CIDA	2009–2010	Director CIDA Addis
Tsedeke Abate	EIAR	2006–2008	Director General
Solomon Assefa	EIAR	2008–2010	Director General
Dirk Hoekstra	ILRI/IPMS	2006–2010	Project manager (secretary)

IPMS steering committee members

Name	Organization	Years	Function
John McDermott	ILRI	2005–2011	Chairman
Iain Wright	ILRI	2012	Chairman
Dirk Hoekstra	IPMS	2005–2012	Secretary
John Jackson	CIDA	2005–2008	Member
Andrew Spezowka	CIDA	2008–2009	Member
Maarten de Groot	CIDA	2009–2010	Member
Stefan Paquette	CIDA	2010–2012	Member
Ibrahim Mohammed	MoA/ext	2005–2007	Member
Wondirad Mandefro	MoA/ext	2008–2009	Member
Edmealem Shitaye	MoA/ext	2010–2012	Member
Aster Estifanos	MoA/pln	2005–2006	Member
Techane Adugna	MoA/pln	2006–2010	Member
Assefa Mulugeta	MoA/market	2006	Member
Amare Worku	MoA/NRM	2006–2007	Member
Hussein Kebede	MoA/NRM	2008–2009	Member
Fassil Kelemework	EIAR	2006–	Member
Dawit Alemu	EIAR	2009–	Member
Mulugeta Fetene,	SNNPR	2005–2007	RALC chair
Daniel Dauro	SNNPR	2008–2011	RALC chair
Negussie Dana	SNNPR	2011–2012	RALC chair
Berhe Fisseha	Tigray	2005–2010	RALC chair
Fisseha Bezabih	Tigray	2011–2012	RALC chair
Aynalem Gezahegn	Amhara	2005–2012	RALC chair

Mohammed Hassen	Oromia	2005	RALC chair
Aliyi Hussien	Oromia	2005–2006	RALC chair
Diriba Kuma	Oromia	2006	RALC chair
Damenu Tulu	Oromia	2006–2008	RALC chair
Abebe Deriba	Oromia	2008–2009	RALC chair
Tirfu Hideto	Oromia	2009–2012	RALC chair
Ahmed Mohammed	CIDA/ECCO	2006–2009	Resource person
Muderis Abdulahi	CIDA/ECCO	2007–2008	Resource person
Etenesh Bekele	CIDA/ECCO	2010–2012	Resource person
Azage Tegegne	IPMS	2005–2012	Resource person
Berhanu Gebremedhin	IPMS	2005–2012	Resource person
Ermias Sehai	IPMS	2005–2011	Resource person
Ranjitha Puskur	IPMS	2006–2009	Resource person

IPMS WALC chairpersons

Name	Region	PLW	Year
Getnet Tarik	Amhara	Bure	2007–2011
Ayehu Zerihun	Amhara	Fogera	2005/2006
Tewabe Getu	Amhara	Fogera	2006/2007
Moges Asfaw	Amhara	Fogera	2007
Worku Mulat	Amhara	Fogera	2008–2011
Mezgebe Tegegne	Amhara	Metema	2005
Tesfaye Tamiru	Amhara	Metema	2006–2007
Dessie Teshager	Amhara	Metema	2008
Girma Aweke	Amhara	Metema	2009
Gizat Anteneh	Amhara	Metema	2010
Adane Dessalegne	Amhara	Metema	2011
Assefa Diribsa	Oromia	Ada'a	2005
Dechassa Aboyie	Oromia	Ada'a	2005/2006
Fekade Mekonnen	Oromia	Ada'a	2006
Mengistu Sorri	Oromia	Ada'a	2007
Bekele Seboka	Oromia	Ada'a	2007/2008
Hailu Megersa	Oromia	Ada'a	2008/2009
Gudissa Debere	Oromia	Ada'a	2009
Dejen Hailu	Oromia	Ada'a	2009/2010
Tsegaye Umeta	Oromia	Goma	2005–2011
Saladin Ahmed	Oromia	Mieso	2005/2006
Abdi Seid	Oromia	Mieso	2006/2007
Tadesse Ferdisa	Oromia	Mieso	2007/2008
Tsedeke Kebede	Oromia	Mieso	2008/2009
Fuad Mohammed	Oromia	Mieso	2009–2011
Alemayehu Deneke	Oromia	Mieso	2011
Temesgen Kedir	SNNPR	Alaba	2006
Nuredin Mohammed	SNNPR	Alaba	2007–2010
Mohammed Habib	SNNPR	Alaba	2010–2011
Futessa Shega	SNNPR	Dale	2004–2005

Anissa Gubaro	SNNPR	Dale	2006–2007
Daniel Dekemo	SNNPR	Dale	2008
Shitaye Yumura	SNNPR	Dale	2010
Belayneh Baramo	SNNPR	Dale	2011
Aynekulu Teklay	Tigray	Alamata	2005
Gebremedhin Tesfay	Tigray	Alamata	2006
Adugna Gesesse	Tigray	Alamata	2007
Afera Kebede	Tigray	Alamata	2008/2009
Mebrat Abebe	Tigray	Alamata	2010/2011
Mehari Gebremedhin	Tigray	Atsbi	2005
Hailay Berhane	Tigray	Atsbi	2006–2008
Teklay Gebru	Tigray	Atsbi	2009
Alemayehu Fekadu	Tigray	Atsbi	2010/11

IPMS staff

Name	Position	Employment date	Separation date
HQ Addis Ababa			
Abebe Mesgina	Senior Research Assistant	7 January 1984	1 July 2006
Abraham Getachew	Monitoring and Evaluation Officer	15 November 2006	01 April 2011
Aklilu Bogale	Database Analyst	01 July 1996	31 December 2012
Azage Tegegne	Scientist and Deputy to the Director General's Representative–Ethiopia	1 January 2004	31 July 2012
Berhanu Gebremedhin	Scientist	October 1998	31 December 2012
Berhanu Mengesha	Driver	13 November 2008	31 December 2012
Birke Eneyew	Administrative Assistant	01 November 1992	01 July 2011
Dirk Hoekstra	IPMS Project Manager	1 May 2004	31 March 2014
Ephrem Tessema	Gender Specialist	17 July 2006	27 March 2007
Ermias Sehai	Knowledge Management Expert	1 January 2005	30 September 2011
Fanos Mekonnen	Knowledge Management and Communications Officer	01 July 2007	31 December 2012
Kahsay Berhe	Research Officer	01 July 1987	31 December 2012
Kebede Assefa Desta	Driver	01 June 2004	31 December 2012
Ketema Samuel	ICT Technical Solutions Officer	01 October 2006	22 January 2009
Lemlem Aregu	Gender Expert	12 July 2007	01 October 2011
Moti Jaleta	Post-Doctoral Scientist–Market Economist	15 February 2008	14 February 2011
Muluhiwot Getachew	Program Management Officer	03 December 2001	31 December 2012
Noah Kebede	GIS Officer	01 December 2003	01 July 2011
Parmilia Yeshitella	Program Assistant	06 June 2011	31 December 2012
Ranjitha Puskur	Agricultural Innovation Specialist	1 August 2005	29 February 2012
Rebeka Ameha	Monitoring and Evaluation Assistant	24 October 2006	01 April 2011
Samson Jemaneh	Research Assistant	19 July 2007	01 April 2011
Selome Kebede	Communications Officer	20 November 2007	01 August 2008
Teressa Adugna	Research Officer	19 September 2005	24 August 2006
Tesfaye Lemma	Post-Doctoral Scientist–Innovation Systems Research	1 March 2008	28 February 2011
Tilahun Moges	Driver/Field Assistant	01 August 1995	04 January 2010
Yasin Getahun	GIS Technician	15 November 2004	31 December 2012

Ada'a PLW			
Alemu Gemeda	Driver	22 April 2005	01 October 2011
Hailu Gudeta	Research and Development Assistant	17 July 2006	01 May 2009
Nigatu Alemayehu	Research and Development Officer	01 December 2004	31 December 2012
Alaba PLW			
Abebe Shiferaw	Research and Development Officer	08 March 2005	01 October 2011
Bereket Dindamo	Research and Development Assistant	21 October 2005	01 October 2011
Bizuayehu Adera	Driver	23 March 2006	01 October 2011
Kassahun Yehualashet	Driver	01 June 2005	18 December 2005
Alamata PLW			
Abraham Gebre Hiwot	Research and Development Assistant	25 July 2005	01 October 2011
Gebreyohannes Berhane	Research and Development Officer	01 February 2005	28 February 2010
Tsegaye W/Mariam	Driver	08 February 2006	31 December 2012
Atsbi PLW			
Dawit Woldemariam	Research and Development Assistant	16 June 2005	01 October 2011
Gebre Selassie Alemayehu	Driver	01 November 2005	01 October 2011
Gebremedhin Woldewahid	Research and Development Officer	01 December 2004	31 December 2012
Bure PLW			
Mesfin Eshetu	Driver	01 April 2007	20 September 2010
Teshome Dersso	Research and Development Assistant	15 September 2005	01 October 2011
Yigzaw Dessalegn	Research and Development Officer	27 April 2007	31 March 2010
Yohannes Mehari	Research and Development Assistant	24 September 2007	01 February 2009
Dale PLW			
Asfawosen Haile	Driver	16 May 2005	01 January 2012
Dessalegn Ayele	Research and Development Assistant	01 September 2006	01 April 2011
Ketema Yilma	Research and Development Officer	14 March 2005	31 December 2012
Fogera PLW			
Habtamu Wondimu	Driver	01 July 2005	31 October 2005
Tilahun Gebey	Research and Development Officer	25 January 2007	31 December 2012
Tsegaye Demissie	Driver	01 August 2006	31 December 2012
Yirgalem Assegid	Research and Development Officer	01 December 2004	01 January 2007
Goma PLW			
Diriba Diba	Research and Development Assistant	16 July 2007	16 April 2008
Mekasha Tadesse	Driver	01 April 2007	30 September 2010
Yishak Baredo	Research and Development Officer	09 February 2007	01 October 2011
Metema PLW			
Million Getaneh	Research and Development Assistant	28 April 2009	01 October 2009
Solomon Legesse	Research and Development Assistant	15 June 2007	01 February 2008
Teklehaymanot Seyoum	Driver	10 May 2005	01 October 2011
Worku Teka	Research and Development Officer	01 February 2005	01 October 2011
Miesso PLW			
Adgo Tassew	Driver	17 May 2005	31 December 2012
Gemechis Jaleta	Research and Development Assistant	12 May 2009	01 October 2011
Zewdu Ayele	Research and Development Officer	14 March 2005	01 October 2011

Annex 2 IPMS publications and reports

IPMS working papers

Working Paper No. 1—Berhanu Gebremedhin, Dirk Hoekstra and Azage Tegegne. 2006. Commercialization of Ethiopian agriculture: Extension service from input supplier to knowledge broker and facilitator.

Working Paper No. 2—Ann Gordon, Sewmehon Demissie Tegegne and Melaku Tadesse. 2007. Marketing systems for fish from Lake Tana, Ethiopia: Opportunities for improved marketing and livelihoods.

Working Paper No. 3—Bekele Shiferaw, Richard Jones, Said Silim, Hailemariam Teklewold and Eastonce Gwata. 2007. Analysis of production costs, market opportunities and competitiveness of Desi and Kabuli chickpeas in Ethiopia.

Working Paper No. 4—Elias Mulugeta, Berhanu Gebremedhin, Dirk Hoekstra and M. Jabbar. 2007. Analysis of the Ethio-Sudan cross-border cattle trade: The case of Amhara Regional State.

Working Paper No. 5—Berhanu Gebremedhin, Dirk Hoekstra and Samson Jemaneh. 2007. Heading towards commercialization? The case of live animal marketing in Ethiopia.

Working Paper No. 6—Bekele Shiferaw and Hailemariam Teklewold. 2007. Structure and functioning of chickpea markets in Ethiopia: Evidence based on analyses of value chains linking smallholders and markets.

Working Paper No. 7—Shaun Ferris and Elly Kaganzi. 2008. Evaluating marketing opportunities for Haricot beans in Ethiopia.

Working Paper No. 8—Melaku Girma, Shifa Ballo, Azage Tegegne, Negatu Alemayehu and Lulseged Belayhun. 2008. Approaches, methods and processes for innovative apiculture development: Experiences from Ada'a-Liben *woreda*, Oromia Regional State, Ethiopia.

Working Paper No. 9—Sintayehu Yigrem, Fekadu Beyene, Azage Tegegne and Berhanu Gebremedhin. 2008. Dairy production, processing and marketing systems of Shashemene–Dilla area, South Ethiopia.

Working Paper No. 10—Workneh Abebe, Ranjitha Puskur and Ranjan S. Karippai. 2008. Adoption of improved box hive in Atsbi Wemberta district of Eastern Zone, Tigray Region: Determinants and financial benefits.

Working Paper No. 11—Berhanu Gebremedhin and Dirk Hoekstra. 2008. Market orientation of smallholders in selected grains in Ethiopia: Implications for enhancing commercial transformation of subsistence agriculture.

Working Paper No. 12—Clare Bishop Sambrook. 2008. The dynamics of the HIV/AIDS epidemic in value chain development in rural Ethiopia and responses through market-led agricultural initiatives.

Working Paper No. 13—Kadija Hussen, Azage Tegegne, Mohammed Yousuf Kurtu and Berhanu Gebremedhin. 2008. Traditional cow and camel milk production and marketing in agro-pastoral and crop–livestock mixed systems: The case of Miesso district, Oromia Region, Ethiopia.

Working Paper No. 14—Azage Tegegne, Tesfaye Mengistie, Tesfaye Desalw, Worku Teka and Eshete Dejen. 2009. Transhumance cattle production system in North Gondar, Amhara Region, Ethiopia: Is it sustainable?,

Working Paper No. 15— Berhanu Gebremedhin, Adane Hirpa and Kahsay Berhe. 2009. Feed marketing in Ethiopia: Results of rapid market appraisal.

Working Paper No. 16— Ponniah Anandajayasekeram and Berhanu Gebremedhin. 2009. Integrating innovation systems perspective and value chain analysis in agricultural research for development: Implications and challenges.

Working Paper No. 17—Tesfaye Lemma Tefera, Ranjitha Puskur, Dirk Hoekstra and Azage Tegegne. 2010. Commercializing dairy and forage systems in Ethiopia: An innovation systems perspective.

Working Paper No. 18—Lemlem Aregu, Clare Bishop-Sambrook, Ranjitha Puskur and Ephrem Tesema. 2010. Opportunities for promoting gender equality in rural Ethiopia through the commercialization of agriculture.

Working Paper No. 19—Belete Anteneh, Azage Tegegne, Fekadu Beyene and Berhanu Gebremedhin. 2010. Cattle milk and production and marketing systems and opportunities for market-orientation in Fogera *woreda*, Amhara Region.

Working Paper No. 20—Azage Tegegne, Berhanu Gebremedhin and Dirk Hoekstra. 2010. Livestock input supply and service provision in Ethiopia: Challenges and opportunities for market-oriented development.

Working Paper No. 21—Berhanu Gebremedhin, Gebremedhin Woldewahid, Yigzaw Dessalegn, Tilahun Gebey and Worku Teka. 2010. Sustainable land management through market-oriented commodity development: Case studies from Ethiopia.

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Working Paper No. 26—Aynalem Haile, Noah Kebede, Tadelle Dessie and Azage Tegegne. 2011. Breeding strategy to improve Ethiopian Boran cattle for meat and milk production.

Working Paper No. 27—Moti Jaleta and Berhanu Gebremedhin. 2011. Interdependence of smallholder net market position in crop and livestock markets: Evidence from Ethiopia.

Working Paper No. 28—Gebremedhin Woldewahid, Berhanu Gebremedhin, Kahsay Berhe and Dirk Hoekstra. 2011. Shifting towards market-oriented irrigated crops development as an approach to improve the income of farmers: Evidence from North Ethiopia.

Working Paper No. 29—Tesfaye Lemma Tefera, Azage Tegegne and Dirk Hoekstra. 2011. Capacity for knowledge-based smallholder agriculture in Ethiopia: Linking graduate programs to market-oriented agricultural development: Challenges, opportunities and IPMS experience.

Working Paper No. 30—Berhanu Gebremedhin, Dirk Hoekstra, Aklilu Bogale, Kahsay Berhe and Azage Tegegne. 2012. Summary report of market-oriented developmental changes in the IPMS Pilot Learning *Woredas*.

Working paper No. 31—Azage Tegegne, Berhanu Gebremedhin, Dirk Hoekstra, Berhanu Belay and Yoseph Mekasha. 2012.Smallholder dairy production and marketing in Ethiopia: IPMS experiences and opportunities for market-oriented development.

IPMS commodity case studies and syntheses

1. Vegetables value chain development in Fogera district: Experiences from IPMS project approach. T. Gebey, K. Berhe and D. Hoekstra. 2010.
2. Beekeeping development using value chain approach in Fogera district: Experiences from IPMS project interventions. T. Gebey, K. Berhe and D. Hoekstra. 2010.
3. Increasing economic benefit from apiculture through value chain development approach: The case of Alaba special district, southern Ethiopia. A. Shiferaw, M. Jaleta, B. Gebremedhin and D. Hoekstra. 2010.
4. Smallholder apiculture development in Bure, Ethiopia: Experiences from IPMS project. Y. Dessalegn, D. Hoekstra, K. Berhe, T. Derso and Y. Mehari. 2010.
5. Commercialization of vegetable production in Alamata *woreda*, northern Ethiopia: Processes and impact. G.

Berhane, A. Gebrehiwot, K. Berhe and D. Hoekstra. 2010.

6. Irrigated vegetable promotion and expansion: The case of Ada'a *woreda*, Oromia Region, Ethiopia. N. Alemayehu, D. Hoekstra, K. Berhe and M. Jaleta. 2010.
7. Apiculture commodity development in Goma district. Y. Baredo, D. Hoekstra and K. Berhe. 2010.
8. A farmer-based fruit seedling supply system Dale Pilot Learning *woreda* (PLW): Experiences from IPMS. K. Yilma, K. Berhe, B. Gebremedhin, D. Hoekstra, D. Ayele and K.M. G/Hawriat. 2010.
9. Tropical fruit production through value chain development approach in Alamata *woreda*, northern Ethiopia: Experiences from IPMS. G. Berhane, A. Gebrehiwot, T. Gebrezgiabher, K. Berhe and D. Hoekstra. 2010.
10. Smallholder fruit development in Bure district, Ethiopia: Experiences from IPMS. Y. Dessalegn, K. Berhe, D. Hoekstra, Y. Mehari and T. Derso. 2010.
11. Improving elements of haricot bean value chain in Alaba special district, southern Ethiopia: Experiences from IPMS. A. Shiferaw, K. Berhe, M. Jaleta, B. Gebremedhin and D. Hoekstra. 2010.
12. Fruit commodity development in Goma district through farmer-based improved fruit seedling supply system: Experiences from IPMS. Y. Baredo, K. Berhe and D. Hoekstra. 2010.
13. Innovative haricot beans (*Phaseolus vulgaris*) seed system for smallholder farmers in Dale district, Southern Ethiopia: Experiences from IPMS. K. Yilma, K. Berhe, D. Hoekstra, M. Jaleta, F. Alemayehu, K. Gebrehawriat and D. Ayele. 2009.
14. Rice value chain development in Fogera *woreda* based on IPMS experience. T. Gebey, K. Berhe, D. Hoekstra and B. Alemu
15. Pullet production and supply business development by women's groups in selected *kebeles* of Dale pilot learning *woreda*: Experience from IPMS. K. Yilma, A. Tegegne, D. Hoekstra and M. Gizaw.
16. Participatory smallholder dairy value chain development in Fogera *woreda*, Ethiopia: Experiences from IPMS project interventions. T. Gebey, T. Lemma, D. Hoekstra, A. Tegegne and B. Alemu
17. Market-oriented beekeeping development to improve smallholder income: Results of development experiences in Atsbi-Womberta district, northern Ethiopia. G. Woldewahid, B. Gebremedhin, D. Hoekstra, A. Tegegne, K. Berhe and D. Woldemariam.
18. Smallholder dairy value chain development: The case of Ada'a *woreda*, Oromia Region, Ethiopia. N. Alemayehu, D. Hoekstra and A. Tegegne.
19. Sheep fattening value chain development in Goma Pilot Learning *Woreda* (PLW): IPMS experience. Y. Baredo, T.T. Lemma, A. Tegegne and D. Hoekstra.
20. Apiculture: A synthesis of IPMS value chain development experiences.
21. Fattening of small and large ruminants: A synthesis of IPMS value chain development experiences.
22. Dairy: A synthesis of IPMS value chain development experiences.
23. Fruits: A synthesis of IPMS value chain development experiences.
24. Vegetables: A synthesis of IPMS value chain development experiences.
25. Gender: A synthesis of IPMS value chain development experiences.

Published articles/abstracts in proceedings

1. The rural HIV/AIDS epidemic in Ethiopia and its implications for market-led agriculture development. Clare Bishop-Sambrook, Nigatu Alemayehu, Yirgalem Assegid, Gebremedhin Woldewahid and Berhanu Gebremedhin.
2. Improving the competitiveness of agricultural input market in Ethiopia: Experiences since 1991. Berhanu Gebremedhin, Dirk Hoekstra and Azage Tegegne.
3. Rural–urban linkage in market-oriented dairy development in Ethiopia: Lessons from the Ada'a district. Azage Tegegne, Berhanu Gebremedhin, Dirk Hoekstra and Nigatu Alemayehu. In Gete Zeleke, P. Truman and Aster Denekew (eds).

4. Agricultural knowledge management in Ethiopia—Challenges and opportunities. Ermias Sehai.
5. Input supply system and services for market-oriented livestock production in Ethiopia. Azage Tegegne, Berhanu Gebremedhin and Dirk Hoekstra.
6. Partnership for enhancing market-led innovation process—Experiences and lessons from IPMS-Ethiopia. Ranjitha Puskur, Ponniah Anandajayasekeram, Kahsay Berhe and Dirk Hoekstra.
7. Input supply system and services for market-oriented livestock production in Ethiopia. Azage Tegegne, Berhanu Gebremedhin and Dirk Hoekstra.
8. Urban and peri-urban farming systems and their utilisation of the natural resources in the north Ethiopian highlands. Yitaye Alemayehu, Maria Wurzinger, Azage Tegegne and Werner Zollitsch.
9. Market orientation of smallholders in staple food crops in Ethiopia: The case of teff, wheat and rice. Berhanu Gebremedhin and Dirk Hoekstra.
10. Exploring innovation capacity in the Ethiopia dairy systems. Tesfaye Lemma, Ranjitha Puskur, Azage Tegegne and Dirk Hoekstra.
11. Moving Ethiopian smallholder dairy along a sustainable commercialization path: Missing links in the innovation systems. Tesfaye Lemma, Azage Tegegne, Ranjitha Puskur and Dirk Hoekstra.
12. Does the future hold for transhumance cattle production system in northwestern Ethiopia? Azage Tegegne, Tesfaye Mengistie, Tesfaye Desalew and Eshete Dejen.
13. Cow and camel milk production and marketing in agropastoral and mixed crop–livestock systems in Ethiopia. Kedja Hussen, Azage Tegegne, Mohammed Yousuf and Berhanu Gebremedhin.
14. Challenges and opportunities for market-oriented apiculture development: The case of Ada'a-Liben district, Ethiopia. Melaku Girma, Azage Tegegne, Shifa Ballo, Negatu Alemayehu.
15. Innovation in banana value chain development in Metema district, northwestern Ethiopia: IPMS experiences. Kahsay Berhe, Ranjitha Puskur, Worku Teka, Dirk Hoekstra and Azage Tegegne.
16. Forging partnership to enhance the relevance of Ethiopian graduate schools research in agriculture. Ermias Sehai and Tesfaye Lemma.
17. Towards pluralistic livestock service delivery system for the commercialization of smallholder livestock agriculture in Ethiopia: Evidence from smallholder dairying in Debre Zeit milkshed. Anteneh Girma, Tesfaye Lemma and Ranjitha Puskur.
18. Analysis of household specific transaction cost factors in livestock input markets in Ethiopia. Berhanu Gebremedhin, Moti Jaleta, Samson Jemaneh and Aklilu Bogale.
19. Availability of livestock feed resources in Alaba *woreda*, southern Ethiopia. Yeshitila Admasu, Tessema Zewdu and Azage Tegegne.
20. Utilization of feed, livestock unit versus dry matter requirement in Alaba *woreda*, southern Ethiopia. Yeshitila Admasu, Tessema Zewdu and Azage Tegegne.
21. Opportunities for exploiting underutilized feed resources to enhance market-oriented animal production in northwestern Ethiopia. Tesfaye Desalew, Azage Tegegne, Lisanework Negatu and Worku Teka.
22. Matching genotype with the environment using indigenous cattle breed: Introduction of Boran cattle from southern Ethiopia into the lowlands. Azage Tegegne, Eshete Dejen, Dirk Hoekstra and Worku Teka.
23. Smallholder-based fruit seedling supply system for sustainable fruit production in Ethiopia: Lessons from the IPMS experience. Kahsay Berhe, Yigzaw Dessalegn, Yisehak Baredo, Worku Teka, Dirk Hoekstra and Azage Tegegne.
24. Linking natural resource management with market-oriented commodity development: Case studies from the Ethiopian highlands. Berhanu Gebremedhin, Gebremedhin Woldewahid and Yigzaw Dessalegn.
25. Changes in response to integrated interventions in the value chain of vegetable at Atsbi-Womberta district of Tigray region, northern Ethiopia. Gebremedhin Woldewahid, Berhanu Gebremedhin, Kahsay Berhe and Dirk Hoekstra.
26. Fluid milk and butter production and marketing systems in Fogera district, Amhara Region, Ethiopia. Belete Anteneh, Azage Tegegne, Fekadu Beyene and Berhanu Gebremedhin.
27. Sustainable land management through market-oriented commodity development: Case studies from Ethiopia.

Berhanu Gebremedhin, Gebremedhin Woldewahid, Yigzaw Dessalegn, Tilahun Gebey and Worku Teka.

28. Farmer innovation and market-oriented livestock production in Ethiopia—Key to sustainable natural resources management. Azage Tegegne, Gebremedhin Woldewahid, Zewdu Ayele and Kahsay Berhe.
29. Linking graduate research to market-oriented agricultural development: IPMS experience with Ethiopian higher learning institutions. Tesfaye Lemma Tefera, Azage Tegegne and Dirk Hoekstra.
30. On-farm evaluation of the effect of concentrate and urea treated wheat straw supplementation on milk yield and milk composition of local cows. Adebabay Kebede, Firew Tegegne, Zeleke Mekuriaw and Azage Tegegne.
31. Status of artificial insemination service in Ethiopia. Desalegn G/Medhin, Merga Bekana, Azage Tegegne and Kelay Belihu.
32. A web portal on Ethiopian agriculture: IPMS experience. Fanos Mekonnen, Ermias Sehai, Azage Tegegne and Dereje Tsegaye.
33. Innovative haricot beans *(Phaseolus vulgaris)* seed system for smallholder farmers—Experiences from Dale *woreda* (district), Sidama zone, southern Ethiopia. Ketema Yilma, Fitsum Nigussie, Kidanemariam Gebrehawariat and Desalegn Ayele.
34. Market orientation, diversification and market participation of smallholders: Evidence from Ethiopia. Berhanu Gebremedhin and Moti Jaleta.
35. Crop–livestock interaction in smallholders' market participation in Ethiopia. Moti Jaleta and Berhanu Gebremedhin.
36. Women group-based pullet supply business development in selected *kebeles* of Dale PLW. Ketema Yilma, Azage Tegegne, Lemlem Aregu, Dirk Hoekstra, Tesfaye Lemma and Mulugeta Yigzaw.
37. Analysis of household specific transaction cost factors in livestock output markets in Ethiopia. Berhanu Gebremedhin, Moti Jaleta, Samson Jemaneh and Aklilu Bogale.
38. The role of gender in crop value chain in Ethiopia. Lemlem Aregu, Ranjitha Puskur and Clare Bishop-Sambrook.
39. Strategies in increasing women's participation in value chain development: Experiences from IPMS. Lemlem Aregu and Ranjitha Puskur.
40. Farmers innovations in livestock feeding and management in semi-arid areas of Ethiopia. Azage Tegegne, Zewdu Ayele and Dirk Hoekstra.
41. Intensification of crop–livestock framing systems through market-orientation in Ethiopia. Azage Tegegne, Dirk Hoekstra, Berhanu Gebremedhin and Kahsay Berhe.
42. Analysis of household specific transaction cost factors in livestock input markets in Ethiopia: Implications for private sector development. Berhanu Gebremedhin, Moti Jaleta and Samson Jemaneh.
43. Innovative approaches of knowledge management in agriculture: Case of IPMS-Ethiopia. Fanos Mekonnen, Ermias Sehai and Dirk Hoekstra.
44. Impact of change in land use and land cover on feed resources in the Ethiopian highlands. Kahsay Berhe, Zerihun Woldu, Don Peden, Dirk Hoekstra and Alemayehu Mammo.
45. Technological options and approaches to improve smallholder access to desirable animal genetic material for dairy development: IPMS experience with hormonal oestrus synchronization and mass insemination in Ethiopia. Azage Tegegne, Awet Estifanos, Asrat Tera and Dirk Hoekstra.
46. Watershed conservation-based market-oriented commodity development: A move towards resilient farming? Gebremedhin Woldewahid, Berhanu Gebremedhin, Dirk Hoekstra and Azage Tegegne.
47. Market orientation and market participation of smallholders in Ethiopia: Implications for commercial transformation. Berhanu Gebremedhin and Moti Jaleta.

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1. John McDermott, K. Rich, B. Gebremedhin and H. Burrow. 2010. Value chains and innovation. In: F. Swanepeol, A. Stroebel and S. Boyo. The role of livestock in developing communities: Enhancing multifunctionality. CTA Wageningen.
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29. Alemayehu Nigatu. Farmer Training Centres (FTCs) in Ethiopia—IPMS experiences. In: Forthcoming book by the Royal Institute of the Tropics—Netherlands.

30. Berhanu Gebremedhin, Dirk Hoekstra and Azage Tegegne. Promoting agro-enterprises in the highlands of Ethiopia through improved institutional support services: Experiences of market-oriented dairy and fattening development. Pre-conference paper. This paper will be published as a chapter in a book volume sponsored by FAO and Cornell University.

Technical/consultancy reports

1. Tesfaye Lemma Tefera, Azage Tegegne and Dirk Hoekstra. Capacity for knowledge-based smallholder agriculture in Ethiopia.

2. Richard Jones, Patrick Audi, Bekele Shiferaw and Eastonce Gwata. Production and Marketing of Kabuli Chickpea Seeds in Ethiopia: Experiences from Ada'a District.

3. Godswill Makombe and Krishna C. Prasad. Addressing Irrigation Needs of Alamata Farmers: Options and Scope.

4. Seleshi Bekele. Assessment of water resources and recommendation to improve water resources management.

5. Tesfaye Lemma Tefera, Ermias Sehai and Dirk Hoekstra. Knowledge Centers in the Pilot Learning Woredas of Improving Productivity and Market Success of Ethiopian Farmers' Project: Utilization, Relevance and Effectiveness.

6. Tesfaye Lemma Tefera, Ermias Sehai and Dirk Hoekstra. Status and Capacity of Farmer Training Centers (FTCs) in the Improving Productivity and Market Success (IPMS)Pilot Learning Woredas (PLWs).

7. IPMS. Selected Good Practices in Agricultural Knowledge Management.

8. IPMS. Empowering women through value chain development: Good practices and lessons from IPMS experiences.

9. Abate Tedla. Observation on Native Pastures in Atsibi PLW.

10. Abate Tedla. Observation on Native Pastures in Bure and Fogera PLWs.

11. Abate Tedla and Abule Ebro. Field Visit and Observation made in the Pastoral Areas of Mieso Woreda.

12. Eyob Mihretab/Farm Radio. Assessment Report on IPMS-Farm Radio Participatory Agricultural Radio Series' in Ethiopia.

13. Siefe Ayele and Caroline Bosire. Farmers' use of improved agricultural inputs and practices: review and synthesis of research in Ethiopia.
14. Lemlem Aregu, Ranjitha Puskur and Clare Bishop Sambrook. The role of gender in crop value chain in Ethiopia.
15. Lemlem Aregu and Ranjitha Puskur. Strategies in increasing women's participation in value chain development: Experiences from IPMS.
16. Bezabih Emana. Agricultural Value Chain Development Training in Ethiopia: Training Needs and Capacity Assessment.
17. Barry Shapiro edited: Background sections for the livestock master plan.
    - Review of Livestock Past Policies and Strategies in Ethiopia
    - Vision and Strategies for Animal Production
    - Extension Strategy
    - Animal Health strategy
    - Apiculture Value Chain Vision and Strategy
    - Dairy Value Chain Vision and Strategy
    - Hides, Skins and Leather (HSL) Value Chain Vision and Strategy
    - Live Animals and Meat Value Chain and Strategy

Annex 3 Overview of MSc thesis research

No.	Name	University	Title
1	Abay Akalu	Haramaya	Vegetable market chain analysis in the ANRS: The case of Fogera *woreda*
2	Abebe Mijena	Haramaya	Determinant of credit repayment and agricultural inputs use marketed through primary cooperatives: The case of Ada'a district East Shoa Zone
3	Addis Alemayehu	Haramaya	Dairy extension and adoption of dairy package in Fogera
4	Adebabay Kebede	Bahir Dar	Characterization of dairy production systems, marketing and on-farm evaluation of the effect of feed supplementation on milk yield and composition at Bure district
5	Adugna Gela	Haramaya	The role of farmer to farmer knowledge sharing in innovation process: The case of dwarf Cavendish banana production technology in Metema *woreda*
6	Adugna Gesesse	Haramaya	Analysis of fruit and vegetable marketing chains: The case of Alamata *woreda*
7	Alema Woldemariam	Mekelle	Analysis of the role of cooperatives in agricultural input and output marketing in southern zone, Tigray Region
8	Alemitu Mulugeta	Hawassa	Assessment of factor affecting adoption of improved haricot bean varieties and its agronomic practices in haricot bean production
9	Alemnew Abay	Haramaya	Market chain analysis of red pepper: The case of Bure *woreda*
10	Alemtsehay Teklay	Wondo Genet University	Seasonal availability of common bee flora in relation to land use and colony performance in Atsbi Wenberta *woreda*
11	Alemu Toleamariam	Haramaya	Impact assessment of input output market development interventions by IPMS Project: The case of Goma *woreda*
12	Almaz Mesfin	Mekelle	Comparative analysis of the performance of dairy cooperatives input supply and output marketing in Atsbi and Alamata and Enderta *woreda*
13	Almaz W/Tensaye	Addis Ababa	Women's land use rights and implications for market-oriented agriculture
14	Ametemariam Gebremichael	Mekelle	Role of women in value-chain systems of vegetables and spices, in Atsbi Wemberta *woreda*
15	Amsalu Bedasso	Haramaya	Determinants of farmers innovativeness in Alaba Special *woreda*
16	Anteneh Girma	Haramaya	Dairy services delivery and analysing options to develop pluralistic service delivery in the dairy sector
17	Anwar A/Sambi	Jimma	Assessment of coffee quality problems in Jimma Zone
18	Asefu Gizachew	Haramaya	Comparative feedlot performance of Washera and Horro sheep fed different roughage to concentrate ratio: The case of Bure *woreda*

19	Ashagre Abate	Haramaya	Effects of nitrogen fertilizer and harvesting stage on yield and quality of natural pasture in Fogera
20	Assefa Abebe	Haramaya	Market chain analysis of honey production in Atsbi Womberta district
21	Astewil Takele	Haramaya	Analysis of rice profitability and marketing chain: The case of Fogera *woreda*
22	Awol Zeberga	Haramaya	Analysis of poultry market chain: The case of Dale and Alaba Special *woreda*
23	Ayelech Tadesse	Haramaya	Market chain analysis of fruits in Goma *woreda*
24	Babur Damtie	Haramaya	Effectiveness of farmer field schools (FFS) in promoting coffee management practices: The case of Jimma and Sidama Zones
25	Bayisa Gedefa	Haramaya	Adoption of improved sesame technology in Miesso *woreda*
26	Bedru Hassen	St. Mary College	Practice and challenges on economic empowerment of rural women in Halaba Special *woreda*
27	Belete Anteneh	Hawassa	Cattle milk and meat production system in Fogera *woreda*: Production systems, constraints and opportunities for development
28	Belete Shenkute	Hawassa	Production and marketing of sheep and goat in Goma district
29	Berhane Hailu	Wageningen	The impact of agricultural policy involvement on smallholder innovation: The case of household level irrigation schemes in Eastern Tigray.
30	Berhe Arkebe	Addis Ababa	Assessment of hides and skins marketing in Atsbi Womberta
31	Birhanu Bayeh	Bahir Dar	Assessment of bread wheat production, marketing and selecting of N-efficient varieties for higher grain yield and quantity at Bure district
32	Biruhalem Kassa	Addis Ababa	Analysis of challenges and opportunities for innovation in rice value chain technological, institutional and organizational options: The case of Metema *woreda*
33	Biruk Tefera	Haramaya	Effectiveness of modular training and farmers' training centres: The case of Miesso woreda
34	Bogale Kibret	Haramaya	*In situ* characterization of local chicken eco-type for functional traits and production system in Fogera
35	Bosena Tegegne	Haramaya	Analysis of cotton marketing chains in Metema
36	Daniel Tadesse	Haramaya	Access and utilization of agricultural information by resettler farming households: The case of Metema *woreda*
37	Daniel Tewodros	Haramaya	Cattle production systems and offtake by export abattoirs in Ethiopia
38	Dawit G/Egziabeher	Haramaya	Market chain analysis of poultry: The case of Alamata and Atsbi Womberta
39	Dawit Woldemarim	IGNOU	Changes in the value chain of dairy development in response to integrated extension interventions: The case of Atsbi-Womberta district, northern Ethiopia
40	Demeke Tilahun	Haramaya	Performance of coffee farmers marketing cooperatives and members satisfaction in Dale *woreda*
41	Dereje Tsegaye	Louhborough	Congestion control mechanism for internet traffic
42	Deribe Gemiyu	Hawassa	On-farm performance evaluation of indigenous sheep and goats in Alaba
43	Deribe Kaske	Haramaya	Agricultural information networks of farm women and the role of agricultural extension: The case of Dale *woreda*
44	Desalegn Gebremedhin	Addis Ababa	Assessment on problems associated with artificial insemination service in Ethiopia: Case study in selected areas of five regions
45	Dessalegn Molla	Haramaya	Social networks in tech diffusion of agricultural innovation: The case of sorghum technology package in Metema *woreda*

46	Embaye Kidanu	Haramaya	Analysis of butter marketing chains: The case of Atsbi Womberta and Alamata *woreda*
47	Endaweke Assegid	Addis Ababa	Scenario analysis of the proposed upland rice production through GIS and RS techniques in Fogera *woreda*
48	Endeshaw Assefa	Hawassa	Production systems, marketing and carcass evaluation of goats at Dale district
49	Ephrem Assefa	Addis Ababa	Impact assessment of rainwater harvesting technologies: The case of Tigray
50	Eshetu Tefera	Haramaya	The role of dairy cooperatives in stimulating innovation and market-oriented smallholder development: The case of Ada'a dairy cooperatives
51	Fisseha Moges	Hawassa	Study on production and marketing system of local chicken ecotype in Bure *woreda*
52	Fisseha Teshome	Haramaya	Factors affecting the status of farmers training centres: The case of Ada'a *woreda,* East Shewa Zone
53	Fraol Lemma	Unity University	The role of ICT on agricultural knowledge management challenges and opportunities in Ethiopia
54	Gezahegne Walelign	Haramaya	Determinants and role of farmer's seed and seedling multiplication in the SNNP Regional seed system
55	Guy Innes	University of Sanfrancisco	Factors determining improved poultry production intervention in Dale *woreda*
56	Habtamu Yesigat	Haramaya	Impact evaluation of input and output market development interventions: A case study in Bure *woreda*
57	Habtemariam Assefa	Addis Ababa	Agricultural knowledge management and its implication for local development: The case of dairy production in Bure *woreda*
58	Hailay Berhane	Haramaya	Water resources assessment and sustainability of ground water utilization
59	Hailu Kinde	Mekelle	Effects of vermicom posting of rice husk, cow dung and fresh bio solid with different carbon to nitrogen ration on onion production
60	Ibrahim Ahmed Umer	Haramaya	Impact evaluation of forage development for market-oriented livestock production in Miesso district
61	Jemal Abass	Addis Ababa	Spatial analysis of farming systems: The case of Bure *woreda*
62	Jemal Kuru	Haramaya	Access and utilization of agriculture knowledge and information by women dairy farmers: The case of Ada'a district
63	Jemal Mahamud	Mekelle	Analysis of the role of cooperatives in agriculture input and output marketing in Tigray Region
64	Kadija Hussen	Haramaya	Characterization of milk production systems and opportunity to market orientation: Case of Miesso *woreda*
65	Kassu Kubayo	Haramaya	Analysis of agricultural input supply system: The case of Dale *woreda*
66	Kebede Ganole	Haramaya	GIS-based irrigation potential assessment of river catchment for irrigation development in Dale *woreda*
67	Kindie Aysheshum	Haramaya	Sesame market chains: The case of Metema *woreda*
68	Luchia Tekle	Haramaya	Relevance and effectiveness of modular-based training at FTC: The case of Alamata *woreda*
69	Mathewos Muke	Haramaya	Opportunities and challenges for private service delivery: The case of private crop protection spray and community animal health service delivery in Alaba Special *woreda*
70	Meaza Gebreyohannes	Mekelle	Socio-economic analysis of market-oriented beekeeping in Atsbi Womberta, Eastern Tigray Zone
71	Mehari G/Medhin	Mekelle	Apiculture development in Atsbi Kilete Awlalo *woreda*
72	Mekonnen G/ Egziabeher	Hawassa	Characterization of the smallholder poultry production and marketing system in Dale *woreda*

73	Mekonnen Hailemichael	Hawassa	Influence of genotype and processing methods on quality of Yirgacheffe and Sidama Coffee, Dale
74	Mesay Tegegne	St. Mary College	Assessment of the role of women in agriculture in SNNPR: The case of Halaba Special *woreda*, Ethiopia
75	Meseret Molla	Jimma	Characterization of village poultry production and marketing system in Goma *woreda*
76	Mikinay Hailemariam	Haramaya	Social networks and gender dimension in use of irrigation by farmers in Alamata *woreda*
77	Mitiku Demessie	Haramaya	Marketing of kabuli and Desi chickpea by smallholder farmers in East Shewa
78	Mizan Gebremichael	Unity University	Economic analysis of forage development market-oriented livestock development in Atsbi Womberta *woreda*
79	Mohammed Urgessa	Haramaya	Market chain analysis of teff and wheat production in Alaba *woreda*
80	Mulu Diress	Haramaya	Organizational options to promote collective cattle fattening and marketing the case of Bure *woreda*
81	Mulugeta Arega	Haramaya	Determinant factors and intensity of adoption of old coffee stumping technology on coffee farmers in Dale *woreda*
82	Muzeyin Hawas	Addis Ababa	Household food security and women's pivotal role in the context to market-oriented agricultural development
83	Ousman Surur	Haramaya	Effectiveness of agricultural development training program for teff and livestock farmers
84	Rahel Deribe	Addis Ababa	Institution for irrigation water management in Atsbi and Ada'a
85	Rahmeto Negash	Haramaya	Determinants of adoption of haricot bean technology package in Alaba Special *woreda*
86	Rebeka Amaha	Addis Ababa	Impact assessment of rain water harvesting ponds
87	Redae Berhane	Haramaya	Analysis of performance and innovation capacity of private dairy farms and dairy cooperatives in Alamata *woreda*
88	Rehima Mussema	Haramaya	Analysis of red pepper marketing chains, Alaba
89	Seleshi Delelegn	Jimma	Evaluation of elite hot pepper varieties (Caspicum species) for pod yield and yield components at multi locations in Jimma area
90	Shitahun Mulu	Mekelle	Assessment of the major feed resources availability and performance evaluation of cattle fattening practice and market system in Bure
91	Sintayehu Yigrem	Hawassa	Dairy production, processing and marketing systems: Shashemene, Dila area
92	Sisay Yehuala	Haramaya	Determinants of smallholder farmers access to formal credit: The case of Metema *woreda*
93	Solomon Kebede	University of Hohenheim	Economic impact of IPMS improved apiculture: A case of Alaba *woreda*, Ethiopia
94	Tadesse Adgo	Haramaya	Farmer evaluation and adoption of improved onion production package: The case of Fogera district, South Gondar
95	Tadesse Tewoldeberhan	Mekelle	Introduction of community-based garlic (*Allium sativum* L.) seed production: Varietal test and farmers perception in Atsbi Womberta *woreda*
96	Tafesse Kebede	Mekelle	Current production system of frankincense from *Boswellia papryifera* tree: Its implication on sustainable utilization of the resource in Amhara Region, North Gondar Zone
97	Teka Gebretekle	Mekelle	Members' saving behavior and determinants of savings in rural savings and credit cooperatives in Alamata *woreda* and Ofla *woreda*
98	Tesfaye Alemu	Haramaya	Effectiveness of upland rice farmer-to-farmer seed production exchange system: The case of Fogera district

99	Tesfaye Desalew	Haramaya	Characterization of rangeland condition and assessment of feed resources in Metema district
100	Tesfaye Mengiste	Hawassa	Characterization of production processing and marketing system of dairy and meat products of cattle in Metema district
101	Tesfaye Tsegaye	Haramaya	Characterization of goat production and marketing systems and on farm evaluation of the growth performance of grazing goats supplemented with isonitrogenous protein sources in Metema *woreda*
102	Teshome Derso	Bahir Dar	On-farm evaluation of urea treated rice straw and rice bran supplementation on milk yield and composition of Fogera cows, Fogera
103	Tessega Belie	Bahir Dar	Honeybee production and marketing systems, constraints and opportunities in Bure *woreda*
104	Tigeneh Shiferaw	Haramaya	Pastoralists' perception about range resource utilization and their traditional range management techniques in Miesso district
105	Tigist Petros	Haramaya	Adoption of conservation tillage technologies in Metema *woreda*
106	Tihitina Abebe	Haramaya	The impact of input and output market development intervention of the IPMS project: The case of Miesso *woreda*
107	Tirhas Mebrahtu	Mekelle	The role of community forest in conserving biodiversity and understanding the community forest management institutions in Alamata *woreda*
108	Tsedeke Kocho	Hawassa	Production, marketing system and performance potential of sheep in Alaba, southern Ethiopia
109	Tsegay Okubay	Mekelle	Accessibility and utility of market information for market-oriented commodities in Alamata and Atsbi Womberta
110	Wakena Totoba	Arba Minch	Operation analysis of the cascaded Wadecha–Belbela reservoir system in Ada'a *woreda*
111	Woldemichael Sunamo	Haramaya	Dairy marketing chains analysis: The case of Shashemene, Awassa and Dale districts' milkshed in southern Ethiopia
112	Workneh Abebe	Haramaya	Determinants of adoption of improved box hive in Atsbi Womberta *woreda*
113	Wuletaw Mekuria	Haramaya	Analysis of the effectiveness of modular training at farmer training centre: The case of Fogera district
114	Yemisrach Getachew	Haramaya	Impact assessment of input and output market development interventions of the IPMS Project: The case of Dale and Alaba *woredas*
115	Yenesew Abebe	Haramaya	Characterization of small ruminant production systems and on farm evaluation of urea treated teff straw and concentrate feeding in sheep body weight change in Bure *woreda*
116	Yeshitila Admassu	Haramaya	Efficiency of livestock feed resources utilization and forage development in Alaba *woreda*
117	Zelalem Tamirat	Haramaya	Adoption of small ruminants fattening package in agropastoral areas, Miesso *woreda*
118	Zeleke Agid	Haramaya	Analysis of haricot bean marketing chains: A case study of Dale and Alaba *woredas*

Completed DVM attachment students

No.	Name	University	Title
1	Aklilu Feleke	Haramaya	Major animal health problems in market-oriented livestock development in Bure *woreda*, Amhara
2	Ezana Getachew	Haramaya	Major diseases of export-oriented livestock in export abattoirs in/around Ada'a Liben *woreda*, Oromia
3	Gebremedhin Abraha	Addis Ababa	Major animal health problems of market-oriented livestock development in Atsbi Womberta *woreda*, Tigray
4	Getahun Assebe	Addis Ababa	Major animal health problems of market-oriented livestock development in Mieso *woreda*, Oromia
5	Gizachew Bayleyegne	Addis Ababa	Major animal health problems of market-oriented livestock development in Metema *woreda*, Amhara
6	Kasaw Amsalu	Addis Ababa	Major animal health problems of market-oriented Livestock Development in Fogera *woreda*, Amhara
7	Kuastros Mekonnen	Addis Ababa	Major animal health problems of market-oriented Livestock Development in Alaba *woreda*, SNNPR.
8	Yohannes Tekle	Addis Ababa	Major animal health problems of market-oriented Livestock Development in Alamata *woreda*, Tigray

Annex 4: Training materials and guidelines

English

1. Clare Bishop-Sambrook. Toolkit for conducting HIV risk and AIDS vulnerability assessment at the *woreda* level (also available in Amharic).
2. Clare Bishop-Sambrook and Ranjitha Puskur. Toolkit for gender analysis of crop and livestock production, technologies and service provision. (Also available in Amharic).
3. Anandajayasekeram Ponniah, Ranjitha Puskur, Sindu Workneh and Dirk Hoekstra. Concepts and practices in agricultural extension in developing countries—A source book.
4. Seleshi Bekele Awulachew, Philippe Lemperiere and Taffa Tulu. Training material on agricultural water management with 6 modules.
5. Lemlem Aregu, Clare Bishop-Sambrook, Ranjitha Puskur, Aresawum Mengesha, Ephrem Tessema and Zahra Ali. Gender and HIV/AIDS mainstreaming in a market-oriented agricultural development context: A training manual for frontline workers. (Also available in Amharic).
6. Anandajayasekeram Ponniah, Ranjitha Puskur and Elias Zerfu. Applying innovation systems concept in AR4D.
7. Berhanu Gebremedhin, Abraham Getachew and Rebeka Amha. Results-based monitoring and evaluation for organizations working in agricultural development: A guide for participants.
8. Berhanu Gebremedhin, Samson Jemaneh, Dirk Hoekstra and Ponniah Anandajayasekeram. A guide to market-oriented extension service with special reference to Ethiopia.
9. Aynalem Haile, Maria Wurzinger, Joaquin Mueller, Tadele Mirkena, Gemeda Duguma, Okeyo Mwai, Johann Solkner and Barbara Rischkowsky. Guidelines for setting up community-based sheep breeding programs in Ethiopia.

Local languages

10. CIAT. Participatory marketing extension. (Oromiffa).
11. IPMS Ada'a PLW. Urban dairy training manual. (Amharic). 1998 E.C.
12. Clare Bishop-Sambrook and Ranjitha Puskur. Toolkit for gender analysis of crop and livestock production, technologies and service provision. (Amharic). 1999 E.C.
13. Clare Bishop-Sambrook. Toolkit for conducting HIV risk and AIDS vulnerability assessment at *woreda* level. (Amharic). 1999 E.C.
14. Kerealem Ejigu and Tilahun Gebey. Apiculture training manual. (Amharic). 1998 E.C.
15. Tilahun Gebey and Kerealem Ejigu. Beekeeping training manual (Amharic).
16. SAP-Tec. Apiculture training manual Ada'a PLW. (Amharic). 1998 E.C.
17. IPMS. Market-oriented participatory extension: Part I. (Amharic).
18. IPMS. Approaches to linking producers to markets: Part II. (Amharic).
19. IPMS. Agricultural commercialization and diversification: Process and policies: Part III. (Amharic).
20. IPMS. Gender and HIV/AIDS mainstreaming in a market-oriented agricultural development context. (Amharic). 2009.






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