Ada'a – Liben Woreda Pilot Learning Site Diagnosis and Program Design

January, 2005

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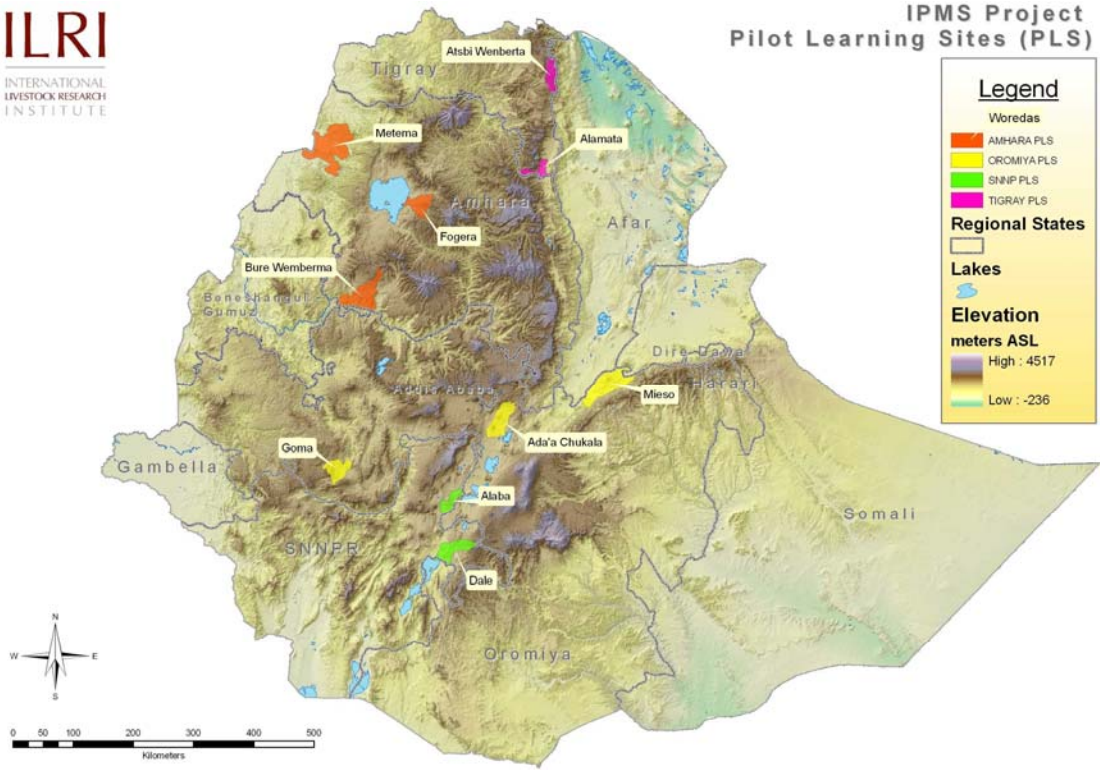
Ada'a-Liben Pilot Learning Site diagnosis and program design

1. Introduction

The International Livestock Research Institute (ILRI) and the Ministry of Agriculture (MoA) initiated a 5 year project in June 2004 with the financial assistance from the Canadian International Development Agency (CIDA). The project, entitled: "Improving productivity and market success" (IPMS) of Ethiopian farmers, aims at contributing to a reduction in poverty of the rural poor through market oriented agricultural development.

The IPMS project will assist by bringing knowledge on technologies generated by International and National Research Institutes as well as from other sources to the attention of the technology transfer agents and the farming community. It will also facilitate the feedback on these technologies. Such assistance will be provided to 10 pilot learning sites (PLS) across the country; (See map 1). Ada'a district is one of the 10 sites selected. To further enhance the utilization of such knowledge and the introduction of technologies, the IPMS project will also provide assistance to extension, input supply, marketing and finance institutions, including cooperatives. Such institutional support will be in the form of technical assistance, capacity building, supply of demonstration and training materials, some limited funds for innovative institutional arrangements and studies aimed at developing innovative institutional arrangements.



Map 1- Pilot learning sites

2. Farming System, Crop and Livestock priorities

2.1 Description of Ada'a-Liben Woreda

Ada'a_Liben woreda is one of the 12 woredas in East Shoa zone and is located about 45 kms south-east of the capital Addis Ababa and is very close to the other major urban centers. The woreda covers an area of 1750 km^2 , stretching east of the Bole International Air Port to the North West of the Koka dam. The human population in Addis Ababa, Adama and Bishoftu create a large market for most agricultural commodities.

According to CACC (Central Agricultural Census Commission, 2003), total agricultural population of the woreda is estimated at 202,276. There are 60 PAs (45 in rural and 15 urban) in Ada'a-Liben woreda. About 78 % of the household population who are over 10 years of age are engaged in full agricultural activities, 19.5 % in partial and 2.6 % in non-agricultural activities.

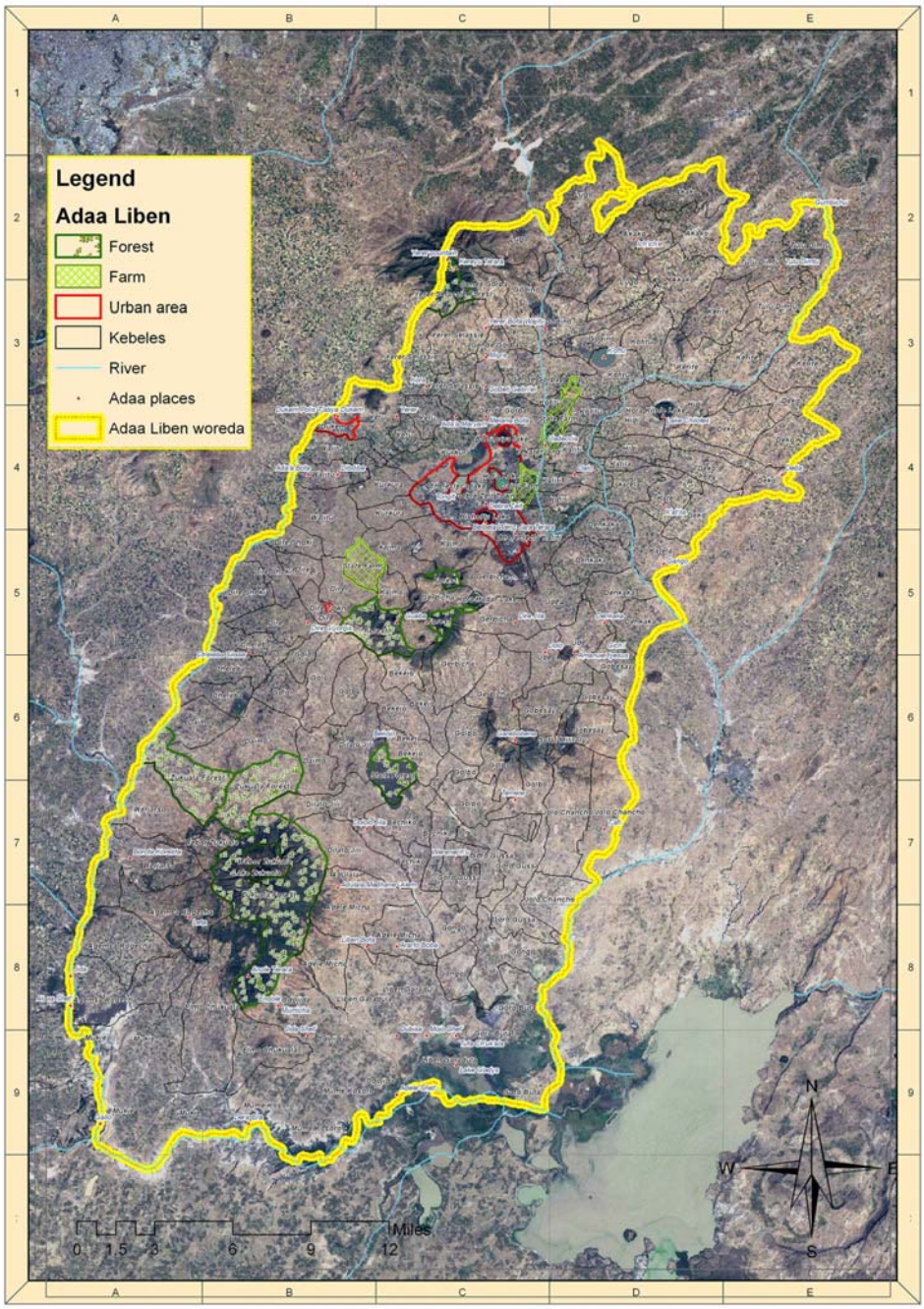
Table 1. Total population by holders in Ada'a_Liben Woreda

Holders	Total Ag. population	Agricultural Holders			
		Crop only	Livestock only	Crop & livestock	Total holders
Rural	194,664	12.847	1,628	27,000	41,447
Urban	7,612	62	1,097	333	1,492
Total	202,276	12,909	2,725	27,333	42,939

Source: Federal Democratic Republic of Ethiopia. CACC (Central Agricultural Census Commission) July, 2003

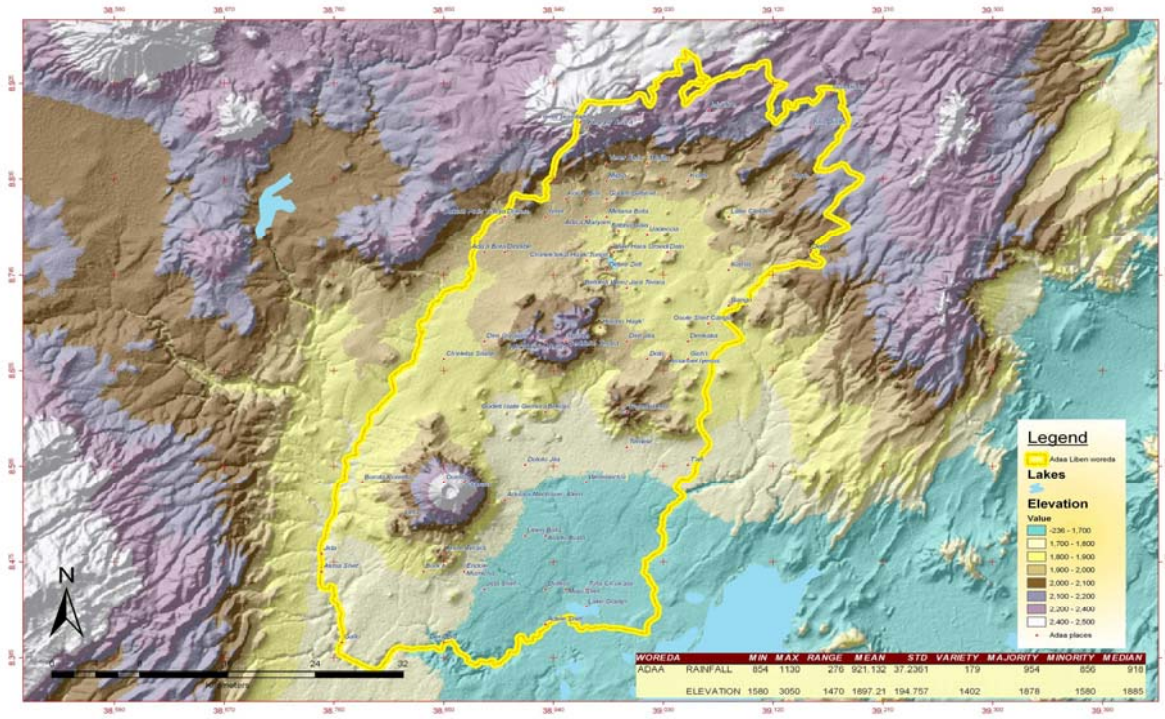
The agro-ecology in the Woreda is best suited for diverse agricultural production. There are a number of rivers and creator lakes that are being used for irrigated agriculture, particularly for horticultural crops production. The Woreda is nationally known for it best quality teff production, which dominates the agricultural production system. Wheat is also grown in sizeable quantities in medium to high altitude areas. Pulse, especially chickpea, is grown in the bottomlands and on residual moisture in selected areas. Lentil is also grown to a lesser extent. Horticultural crops, mainly vegetables, are produced under irrigation. Livestock production is an integral part of the production system. Production of cattle, sheep, goat and poultry is a very common practice and there is an existing market-oriented production system. There is also a fast growing smallholder dairy production system with a strong milk marketing cooperatives which involves aver 800 smallholder dairy farmers. Honey production is another occupation of farmers in specific sites of the Woreda. There are a number of farmers' service cooperatives in the Woreda and they have established a strong cooperative union. Depending on the agro-ecology, there are low, medium to high potential areas in the Woreda.

Infrastructure like telecommunication, electric power, elementary and high schools, The National Veterinary Research Institute, Faculty of Veterinary Medicine, the Debre Zeit Agricultural Research Center etc. contribute to the development of the rural poor, particularly for Debre Zeit farmers and the country in general. Rural roads that branch to different peasant associations and villages have
greatly helped in the supply of inputs and outputs of agricultural products.



Map 2- Classification of the Ada'a-Liben Woreda by peasant associations

Altitude of the woreda ranges from 1500m to over 2000m**.**

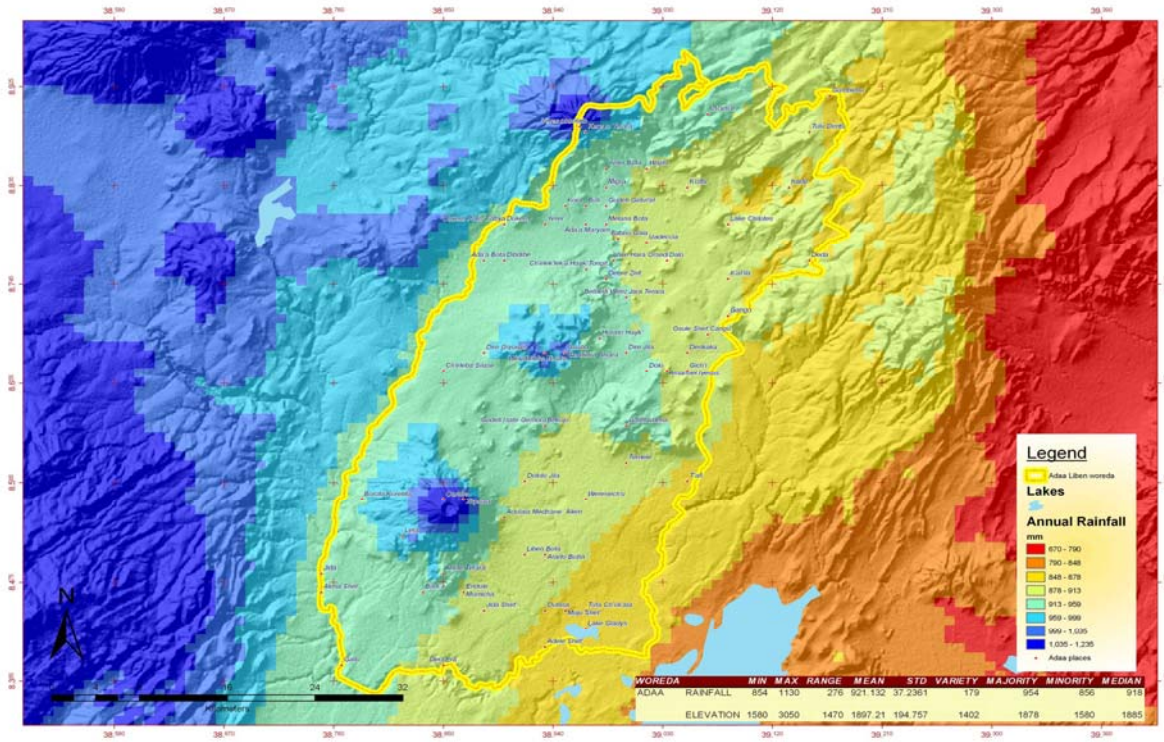


Map 3- Altitude of the Ada'a-Liben woreda

Three agro climatic zones are identified in the woreda**.**

a. The rift valley zone ranges from 1500-1800m, which covers about 600km^2 (34 %) of the area
b. The mountain zone located over 2000m, covering 150km^2, (9 %) of the area.
c. The highland zone extending over 2000 km^2, 57 % of the area at an elevation of 1800-2000 m.

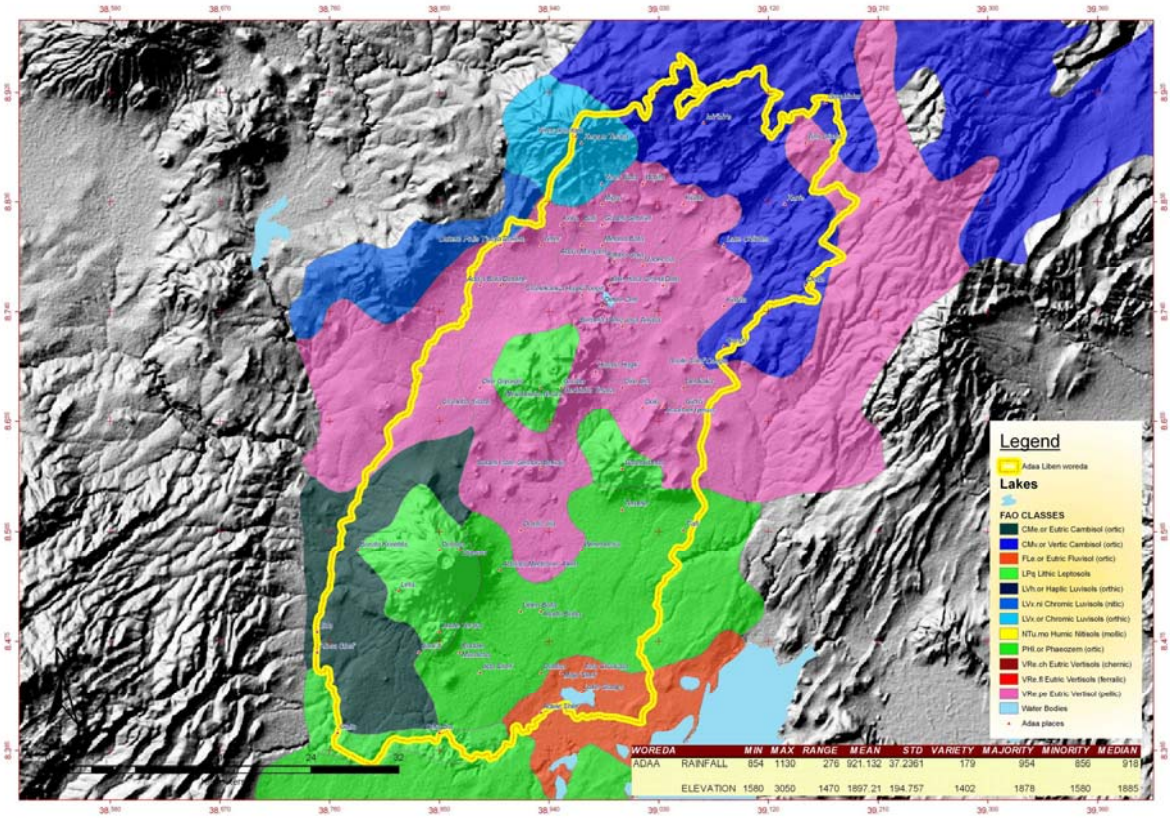
There are two cropping seasons in the area. Belg (short rainy season) from March to April and meher (main rainy season) from June to September. Belg rains are mainly used for initial breaking of the soil for meher crops and animal feed. Meher rains which account for about 74 % of the annual precipitation are the most economically important rains for crop production. (kahsay Berhe, July, 2004). March, April and may are the hottest months and November and December are the coldest months. The long term (1953-2003) average rainfall recorded by ILRI Debre Zeit and EARO Debre Zeit research stations was found to be 839 mm. Mean minimum and maximum temperatures recorded for 27 years ranged from 7.90^c to 28 0^c respectively. Mean annual temperature for the same period was 18.5 0^c



Map 4- Rainfall Distribution

Black clay and red light soils are the dominant type. Specifically, they are called:

- Black clay soil, locally called Koticha
- Light sand soil, hillside soil-locally called Gombore
- A mixture of black and red light soil, locally called Abolse and
- Stony soils, locally called Cheri. Lithosols in Ada'a-Liben are higly degraded infertile soils while vertisols are generally fertile with good moisture holding capacity. They are hard and crack during dry, and sticky when wet (FAO, 1986).



Map 5- Soil Classification

Ada'a_Liben woreda is one of the regularly cultivated areas. Main cereal crops grown in order of importance are: Teff (white, red and mixed), durum wheat (Triticum durum), bread wheat (Triticum aestivum), Barley Hordium vulgarae), Maize Zea mays) and Sorgum (Sorgum bicolor). Important grain legumes are: Chick pea (Cicer arietinum), Horse beans (Vicia faba), Field peas (Pisum sativum), Rough peas (Lathyrus satvus) and Lentils (Lens esculanta). Oil crops like Safflower (carthamus), Niger seed (Guizotia abyssinica), Lin seed, Groundnut, Sesame, Rape seed etc. Crops like Root crops, Spice (Pepper, Fenugreek etc.) and vegetables grow in small quantities.

Total cultivated land account for 64,412 ha. Out of this 64,088 ha is rural and 324 ha is urban. (see annex 1.1 and 1.2) for land allocated by land type and holdings and estimate of area, production and yield per hectare of crops in Ada'a-Liben woreda.

Livestock also play a major role in crop production in the highlands of the Ada'a-Liben.
See annex 1.3 for livestock statistics.

2.2. Priority Farming systems

Discussion with the WALC and subsequent field visits resulted in the following farming system being identified for the IPMS project

Ada'a-Liben can be roughly subdivided in to Rift valley agro-ecology and a mid/high altitude area. The latter area has been identified by the Woreda as the area with the greatest agricultural and market potential.

The project will therefore concentrate its activities in Ada'a-Liben on the mid/high altitude zone. (The lower area of the Woreda may be linked to a similar "Rift valley" PLS such as the cereal/haricot/livestock system in Dale PLS in the SNNPRS.

Table 2. Farming System by Ecological Zone in Ada'a-Liben Woreda

Altitude range (masl)	No of PAs	Dominant crop and livestock
1500-1800	15	teff. maize, chick peas, field peas, faba beans, horticulture, cattle, poultry, goat, sheep, dairy,apiculture
1800- 2000	4	teff, Wheat, maize, chickpeas, faba beans, horticulture, cattle, sheep, apiculture
>2000	26	Wheat, barley, chick peas, faba beans, field peas, chick peas, horticulture, cattle, sheep, apiculture
Total	45	

Source: Ada'a-Liben Woreda, OoA

The farms in the mid/high altitude area are small in size (1-2.5 ha) and family operated with the help of ox power. Farms are mixed in terms of crops and livestock. Major crop components are tef, wheat (mainly bread variety), pulses of which the main one is chick peas which grows at mid altitude, followed by field peas and faba beans (at higher altitudes). Irrigated horticultural crops are emerging as a new opportunity in locations where small scale irrigation potentials are realized.

Livestock on the farms in the mid/high altitude zone consists of cattle/oxen, poultry and small ruminants. Apiculture is emerging in some pockets. In and around the major towns (Dukem/Debre Zeit) and the adjacent rural areas), small scale dairy development is taking place. Large scale commercial broiler and egg production has taken place in or near Debre Zeit town, however this system is not targeted by the IPMS project.

Based on the above, the IPMS project will concentrate its activities on the:

- Tef - livestock based farming system in the rural areas
- Tef –dairy based farming system in and around urban centers and adjacent rural areas

2.3 Priority crop commodities

The major marketable crop commodities identified for the Ada'a-Liben PLS are:

- Tef
- Wheat

- Pulses (in particular chickpeas)
- Horticultural crops

The major crop (about 53% of the arable land) in both farming systems is tef and discussions with farmers and institutional stakeholders indicated that this is likely to remain the case in the foreseeable future. Tef is therefore selected as the priority crop for the IPMS project.

The future for wheat and pulses in both farming systems, in particular chick peas, will depend on the marketing potentials for both crops. Both crops suffer from fluctuating market demands, which result in fluctuating prices from one year to the next. Areas planted often depend on previous years prices. Pulses furthermore play a major role in the sustainability of the farming system since they contribute to soil fertility improvement and pest, disease and weed control. A decline and/or increase in the pulses area will therefore have a major influence on the sustainability of the farming system. A more thorough analysis of the potential for both crops is required to determine its real potential. However following the existing farming systems and the government's strategy both crops will be considered as priority commodities by the IPMS project.

A fourth commodity to be considered in the Ada'a-Liben farming systems are horticultural crops, grown under small scale irrigated schemes. The potential for this niche market was not assessed during this PRA, but will be considered once the project will be operational. The development of such schemes is of importance to female farmers and would be able to provide farm families with income outside the main harvesting periods.

2.4 Priority Livestock Commodities

Major livestock commodities identified for the Ada'a-Liben PLS are:

1. Dairy
2. Poultry
3. Meat production (small ruminants)
4. Apiculture

The only major points of discussion were whether or not meat production is more of a priority than poultry production. Poultry was selected as more of a priority than meat production based on:

a. It's relevance to women headed households
b. The ability to start the operation with relatively lower capital
c. The ability to start the operation with relatively smaller land area
d. And the opportunity to tackle "problem areas" such as improved breed and disease with relatively simpler intervention points than Meat production.
   Dairy applies both to rural farmers and semi-urban farmers and has a ready market from which the farmers can benefit a lot. Improved breed oxen that come out of this sector are also more powerful than indigenous breeds and help in the farming process.

Similarly improved breed poultry production can help many poor farmers and can also be made to resist disease if we liaise with vet clinics and take advantage of vaccines they provide.

Meat production (goats and sheep) as well as cattle fattening is common as a seasonal business – during holiday seasons when the farmers know that they will have ready market. Sheep fattening can also be good for this area. Goats have less of a potential here.

Apiculture production is limited to areas where there are flowering plants/trees abundance.

3. Institutions

3.1 Marketing

Cooperatives

There are 26 primary multipurpose farmer cooperatives in Ada'a-Liben woreda, of which 18 are organized under the new cooperative organization law and are registered. It is estimated that about 62% of households are members of the registered multipurpose cooperatives. The registered multipurpose cooperatives are also members of the Erer Farmers Cooperative Union, which is a union of farmers cooperatives in 3 woredas including Ada'a-Liben. The union organizes market information every week and passes it to its member cooperatives. The union also provides storage services to cooperatives at its headquarters or by building storage facilities in different places. The union has plans to start processing grain.

The registered multipurpose cooperatives are involved in grain marketing. These cooperatives obtain credit for grain marketing from the Ethiopian Commercial Bank. The union also provides credit to the primary cooperatives. The cooperatives buy grain (especially teff and wheat) from their members during harvest time, store it for a while and sell it when prices are higher, usually during April - May.

With regard to grain marketing, cooperatives are engaged mostly in teff marketing, since teff has high market demand and is also easily storable. The cooperatives development bureau provides market information services to the cooperatives through its marketing and credit team, in addition to facilitating grain market credit for the cooperatives. The cooperative office also provides marketing advice to the cooperatives on when to sell, at what price etc. There is a report that an exporter had purchased about 1000 qt of teff for export from Hidi cooperative in the woreda, but it has not been possible to obtain information from the exporter directly. However, this can serve as an indication that teff can be potentially an exportable commodity.

The cooperatives sell the grain to traders who buy in bulk. The cooperatives use auction system; auction bids are posted in Debre Zeit town where most of the traders who buy the grain (mostly teff) come from. Some traders come from Addis Ababa and other towns such as the nearby Dukem.

Although there is no clearly defined modern grades and standards for teff, the local used standards and grades system seems to serve its purpose well. Farmers seem comfortable in using the local classification system. Generally, there are 5 grades of teff used in the woreda: 1st grade white, 2nd grade white, 3rd grade white, mixed and red. Farmers report that the grades are based on the density and colour of the grain.

The marketing credit from the bank is reported to arrive later than the time it is needed. Moreover, the credit need for grain marketing by the cooperatives is much lower than the supply. The term for the marketing credit is one year. Some cooperatives reported interference from the local administration in their marketing activities, such as on their decision on when to sell their grain. Such interference may be detrimental to the business activities of the cooperatives.

In addition to teff, the coops are involved in wheat and pulses (chickpea) marketing. The involvement of the coops in wheat marketing is mostly limited due to storage problems, except for some coops such as Kerfe, and Akako areas around Gimbichu.

In general farmers prefer to sell to traders than to cooperatives, perhaps because traders offer higher prices and pay immediately. However, cooperatives also provide dividends to their members from the profits of their grain marketing business. Farmers feel that the market structure for teff is competitive enough.

Some of the problems associated with grain marketing in the woreda include adulteration by farmers such as mixing teff with sand and soaking the grain with water, old and damaged sacks that do not allow easy loading and unloading, and shortage in the supply of new sacks. The possibility of adulteration in teff has led to the need to unpack the grain to check for quality. The eight multipurpose cooperatives which are not organized under the new cooperative can not be involved in grain marketing. Other marketing problems faced by the cooperatives include shortage of storage facilities, shortage of working capital, and limited experience of staff and management in marketing.

Despite the high potential for milk production in the woreda, problem with market access is limiting production. A dairy cooperative around the town of Debre Zeit is involved in milk marketing, mostly from its members.

Others

Although the cooperatives are involved significantly in teff marketing in the woreda, most of the teff is sold directly to traders. Sometimes, traders purchase the teff in the villages. Most of the marketed wheat and pulses is also sold through private traders. The reason why farmers prefer to sell to private traders is that the traders provide higher prices and pay immediately. The inflexibility of the cooperatives to changing market conditions such as changing prices may be another reason why farmers prefer to sell to private traders. Moreover, low sense of ownership of farmers towards their cooperatives may be contributing to the preference of farmers to sell to private traders.

3.2 Input supply

Multipurpose cooperatives

The agricultural inputs use in the woreda seems to increase with time. For example, commercial fertilizer (DAP and Urea) use has risen up to 60, 000 qt by the 2002/03 cropping year from its level of 53, 000 qt the previous year. The demand for improved seeds is much higher than the current supply.

The woreda office of cooperatives together with development agents estimate farmers input needs (fertilizer, improved seeds and chemicals) for the coming cropping season. The estimation of input demands is done both for those farmers involved in the package extension programs and for those who are not involved. The input is then provided to the cooperatives on credit basis. Companies such as AISCO and Ambassel supply these inputs. The cooperatives distribute the inputs to farmers upon the payment of down payment by farmers, which amounts to 50% of the input price. The cooperatives are also responsible for the collection of the credit repayment from farmers and ensuring the repayment to the input supplier companies.

Others

In addition to fertilizer, improved seeds and chemicals which are distributed to farmers through the cooperatives, there are inputs such as improved dairy cows, poultry etc. which are distributed through other channels. The dairy cows and improved poultry are distributed directly by the woreda office of agriculture. The supply of improved dairy cows and poultry in the woreda is much lower than the need.

Part of the tef and wheat seed supply is organized by farmers (see crop analysis)

3.3 Rural Finance

Micro finance Institutions
The major microfinance institution that operates in Ada'a-Liben is the Oromia Credit and Saving Institutions (OCSI). The institute has a branch office at Debre Zeit town, which is 4 years old. The branch office serves rural areas in the radius of 25 km from the town of Debre Zeit. The institute provides credit to groups of 4 – 6 people, using group collateral system. The credit service focuses on the poor. The groups are organized into centers, which comprise 32 – 60 people. A woreda level credit and saving committee provides information to the branch office regarding the credit worthiness of a peasant association. The centre chief approves loan requests, upon approval by the group leader.

New borrowers can get a maximum of Birr 1000.00 credit, while others can get up to Birr 1500.00. The manual stipulates that a maximum of Birr 5000.00 can be lent to borrowers. The purpose for which credit is given by the OCSI include the purchase of agricultural inputs (fertilizer and seeds), fattening, petty trade, handicrafts, and small businesses. The credit service of OCSI is not linked with the agricultural

extension or the input supply services. However some of the credit is used to pay the down payment for the inputs supplied through the cooperatives. In addition to credit services, the institute also provides saving services. However, the demand for credit is higher than the supply by the institute. Participation by women is low since land holdings are registered under the male's name.

Training of farmers cooperatives in management of credit and finance operations, lack of provision of operating capital, poor credit and saving culture. (farmers spend the loans instead of using for production process), lack of empowerment of livestock farmers to organize themselves in cooperatives and get financial (credit and saving) services have been raised and discussed as an important issues to be tackled in the future.

Farmers engaged in livestock should be organized and represented in farmers cooperatives to empower themselves for better financial (credit & saving) services.

3.3.1 Bank

Banks provide marketing and input credits to cooperatives and the union. It has been reported that although marketing credit is needed during December-January, it usually arrives during February. Moreover, cooperatives get only about 50% of their marketing credit need. The interest rate for the marketing credit is reported to be 7.0%. Cooperatives sometimes receive additional credit from the union.

3.4 Agricultural Extension

As in most parts of Ethiopia, agricultural extension service is provided almost solely by the government. The woreda office of agriculture is mandated to give agricultural extension service in the woreda. The extension service is given through 16 development agents (DA) and 56 co-development agents (co-DA), who are supervised by 3 extension supervisors. The DAs have received agricultural training for 9 months, while the co-DAs were trained for 1-2 months especially on the packages. One extension supervisor supervises extension activities in 11- 18 peasant associations. One extension supervisor supervises 6 DAs and 18 co-DAs. The DA:farmer ration in the woreda is 1:500-600. Eighteen DAs are receiving training in the TVETs, of which about 9 were expected to graduate in July 2004. It was reported that appropriate incentive system for the DAs has not been put in place.

The future extension service is expected to be based on the farmer training centers (FTC). The construction of 5 FTCs has been completed although they have not been equipped yet. These FTCs are expected to start operation during the next cropping season. Each FTC has a demonstration field of about 3 ha.. However, there is no clear guideline on how the FTCs will be organized, managed and operated.

Extension and training materials

There are a number of extension and training materials, manuals prepared for experts and DAs by the Federal and Regional levels. These are based on packages formulated for the different commodities. These materials are about 20 to 30 pages

per commodity and enough copies are not available for distribution for all DAs. Simple extension and training materials with strong messages are needed at the DA and farmers levels. The national research system has produced a number of leaflets, booklets, posters, etc. for specific technologies. These materials have to be translated to various local languages and adequate number of copies have to be produced. Extension and training materials requirement of the Woreda for the selected commodities are presented in the following table.

One DA supervises 60 package participants. Moreover, one DA trains 20 selected farmers, who then are expected to train 10 other package participants each. The DAs submit weekly reports to their supervisors, which are later summarized and submitted to the subject matter specialists on a monthly basis. The extension service focuses on package programs. Moreover, the extension service focuses on crop production, with little attention given to livestock production. The extension service is not linked with the credit service provided by the Oromiya Credit and Saving Institution (OCSI).

Table 3- Number of staff and educational level of the Woreda Office of Agriculture

Department	Level of Education and Number of Staff							
	Primary	Secondary	Certificate	Diploma	BSc	MSc	DVM	Total
Administration			2	1				3
Plan and Info				1				1
Extension and Home Science.			1	1				2
Animal and Fisheries			6	6			2	14
Crop Prod.& Protection.				6				6
Natural Resources			2	5				7
Environ Protection			2	5				7
Cooperatives			2	8				10
Water and Mining		1	2	2	2			7
Rural Road			1	2				3
Irrigation				2	1			3
Horticulture				1	1			2
Input supply and credit			1	4				5
Total		1	19	44	4		2	70

Source: Ada'a-Liben woreda office of agriculture, October, 2004

It was reported that there is no regular DA-farmer contact arrangements. The contact with farmers are held during holidays, social gatherings and in churches during religious holidays. Since input supply is tied to involvement in the package extension programs, farmers get involved in it continuously while they were supposed to graduate.

Some of the problems encountered by the extension system in the woreda include insufficient number of DAs, lack of demonstration materials, lack of practical and applicable knowledge by DAs, and involvement of DAs in non-extension activities such as input distribution and credit collection. Moreover, farmers in the woreda feel that they have better knowledge than the DAs regarding agricultural production. DAs are perceived by farmers as input suppliers. It was also reported that the extension service is not supported by appropriate planning. The use of appropriate extension communication methods is limited. On the other hand, agricultural data generated by the office of agriculture and CSA have problems and there is always discrepancy. In order to bring about consistency in the data generated, improvements in the systems of data collection will be required. In order to do this, strong linkages between woreda agricultural offices and CSA will be a vital.

The need for extension to build the skills and capacity of farmers and extension staff, lack of attention for livestock keepers by the extension system, limited input supply both in quantity and quality, limited knowledge sharing or communication system with the DA are some of the general problems discussed. Currently, there are 5 FTCs constructed and 8 more are planned for 2005 cropping season. The objective of these FTCs is to train farmers in modern farming techniques and equip them to practice the knowledge they acquire in the classes. In order to accomplish this however, the FTCs need adequate critical mass, teaching materials including adequate demonstration materials and the means to do it. For example, during the course of training farmers, classes might take long hours and may even go until dusk which may require a source of energy. In addition, the FTC staff skills need to be upgraded and the woreda office of agriculture need to plan this much ahead of time. For this purpose linkages with agricultural colleges and research institutions will be required. Trainings in some TVET colleges are not consistently up to par. Some colleges don't have the facility to provide sufficient training to DAs.

3.5. HIV/AIDS service

The HIV/AIDS Office is based at the woreda administration office. It only operates in the rural areas. Prior to this however, both the rural and urban activities were managed together from this office. The rural HIV/AIDS office was established in December of 2001. The office operates with three people, but only one of them is a professional (nurse). The rest are an accountant and a secretary. There are regional and zonal HIV/AIDS Prevention and Control Offices (HAPCO) and the woreda HIV/AIDS Office reports to East Shewa zonal HAPCO. The activities of the office include awareness creation, distribution of condoms, mobilization of HIV/AIDS related activities of clinics and health posts, liaising with churches and PA level HIV/AIDS committees on the issue the disease. There are 45 PAs in the woreda and equal number of HIV/AIDS committees and clubs are present. However, only 5-6 clubs are active. The PA level HIV/AIDS Committee members may include teachers (if there is school) and DAs.

One of the services of the woreda HIV/AIDS control and prevention office is to provide voluntary counseling test (VCT). According to the office, out of 1036 people who took VCT between 28 June -18 September 2004, 182 (18%) were found positive. Similarly, out of 680 people who took VCT between 19 September 1996 to

18 December 2004, 143 (21%) were found positive. There are 445 HIV+ patients in the rural areas.

Grant is usually received from the federal HAPCO. There is however no regular budget allocated and this makes planning hard. In association with woreda HIV/AIDS committee members, the woreda office allocates the grant to each PA HIV/AIDS committee. The amount of money allocated is determined by the activity of each PA level HIV/AIDS committee. For example, a total of birr 129,625 was received from the federal HAPCO in 2004. This money was distributed to all 45 PAs. The amount of money distributed to each PA would not exceed 3,000 in total and hence activities are limited accordingly. The PA HIV/AIDS committee allocates the resources for training purposes, supporting youth sport (to buy balls) and covering transport for people who go for voluntary counselling and testing (VCT) among others. For HIV/AIDS orphans who inherited land from their parents, some PA committees also buy fertilizer, sheep, goats and cattle. In addition, support on educational materials and clothing is could also be made.

4. Priority commodity description, analysis and potential interventions

The following tables provide a brief description of production, input supply and marketing aspects of the priority commodities together with areas requiring attention and potential interventions as suggested by farmers and professionals during the woreda planning workshop. In addition, the possible institutions to be involved in executing these activities are also shown.

Table 4 Teff

Production

Farms in Ada are small varying from 1.0 to 2.5 ha. Many farmers also reported to rent land from land owners. Land rent depends on land quality and varies from Birr 700/0.25 ha to Birr 300/0.25 ha). Total area under tef is estimated at 63411 ha
Tef yield average 11 qt/ha. Under good management, under farmer condition, 18-20 qt is possible.
Land is prepared by oxen. Fertilizers are used (100kg DAP and 100kg Urea recommended). However, some farmers use less than the recommended rates - average use per hectare cropped: 40 kg of DAP and 20 kg of Urea. Use of Urea is less after rotation with pulses.
Women assist with food during the land preparation and harvesting. They participate in hand weeding. They do not apply fertilizers and chemicals.
Crop used for cash (white varieties) and food (brown, mixed), straw for livestock
Best grown in areas above 1750 m.a.s.l with good rainfall. Crop can be grown on most soil types

Areas requiring attention	***Potential interventions***	***Responsibility/tasks***
Weeds, especially Tato and grass weeds	Control Tato weed, management Control grass weed - after wheat harvest, rotate first with chickpeas (possible testing in the field sites)	EARO – research on Tato weed OoA/farmer – extension activity
Fertilizer price too high, down payment too high (leads to reduced use)	Introduce alternative soil fertility solutions: crop rotation, mixed use of organic/inorganic fertilizers	Extension/farmer – extension EARO to provide TA for recommendations and capacity building.
Low and inappropriate use of fertilizers	Revisit fertilizer recommendations according to soil type (combined with organic)	EARO - research
Water logging Flooding, washing away of seeds and fertilizers	Drain water through community action Introduce community watershed management (farmer to	OoNRM/community – extension ILRI theme 5 to provide TA for watershed design and capacity building

	farmer experience)	
Lodging of white teff (weak stem)	Selection and breeding	EARO - research
Input supply		
Improved seeds are normally released through EARO and the Ethiopian Seed Enterprise. To multiply non hybrid seeds, use has been made of farmer multiplication schemes. . Farmers commonly purchase the white seeds (Magna) from specialized farmers in the village and pay a premium price Birr 460-500/qt. These specialized farmers grow teff especially for seed. For the brown varieties, farmers use their own seeds. Women are in charge of selecting the best seeds from their own seeds. Fertilizers have been supplied through 26 multi purpose primary cooperatives and the Erer Farmer's Union for the package and regular crop program of the office of agriculture. No fertilizers can be sold through private outlets as of this year. Total fertilizer use per annum 53,000 – 60,000 qt. Herbicide and pesticides are available through the private sector as well as through the cooperatives No new varieties have been released in the past years		
Areas requiring attention	***Potential interventions***	***Responsibility/tasks***
New white variety Kolodima (DZ 196) was released by EARO but quantity not sufficient.	Make more seeds available to Woreda Link exiting farmer to farmer seed supply system for white tef with the new varieties.	EARO - seed supply to Woreda OoA/farmers – extension activity
Fertilizer cost (see production)	Make fertilizer market more efficient	Cooperatives/FU/Bureau of Agr IFPRI provide TA to conduct (regional) study on the fertilizer marketing system with aim of improving efficiency
Marketing		
Tef is sold through the cooperative system (multi purpose primary cooperatives and Farmers Union) and private traders. Cooperatives usually buy when prices are low in order to stabilize the market price. Eighteen cooperatives are engaged in grain marketing and storage. These cooperatives obtain loans from the Erer Farmers Union and CBE. The Woreda Agricultural office guarantees the loan. Most of the finance goes to the purchase of teff. A Cooperative Bank is established in Oromia to provide additional loans to the cooperatives and the Union. As compared to other crops, tef is the most purchased crop by the cooperative system. (90% of the cooperative's purchase budget used is used for teff) After harvest farmer receive Birr 250/qt, after some time 300/qt. White teff (Magna variety) gets highest price. White 300/qt, mixed 260/qt and brown 240/qt. Less price fluctuations between years. Potential contract farm market with Dutch firm (export). Also export to Israel (via private trade system. Teff is easy to store (as compared o other crops) – no major storage pests Women only sell small quantities in the market (it almost feels like steeling)		
Areas requiring	***Potential interventions***	***Responsibility/tasks***

attention		
Lower prices during harvesting period, due to "forced" sales for credit repayment	Develop alternative income generating activities (poultry, gardening, fattening) which provide cash during teff harvesting period.	OoA/farmer - extension (see livestock system and horticulture)
Trader cheating (especially during harvest), Price setting cooperative by committee, not responsive to market	Expand and make the multi purpose cooperative more effective	Cooperative department and cooperatives to IFPRI/ study on cooperatives and FU to identify gaps and develop/support capacity building program)
Limited trade capital cooperatives and FU	Increase capital to cooperatives	Oromia Cooperative Bank, IFAD
Low prices (resulting in poor return to labour.	Develop export market potential.	Regional Bureau – establish agency IFPRI to study export potential, economics of tef production and facilitate linkages
Role of women in marketing is limited and leads amongst others to "wastage" of farm income.	Increase women's role in marketing of teff	Women's desk Provide TA

Table 5: Wheat

Production

Bread wheat is grown for sale and home consumption. Durum wheat is mainly for sale (difficult to prepare at home). Highest potential above 1800m. Durum wheat is usually grown at the medium altitude. Total area 34043 ha (mainly bread wheat)
Bread wheat yield: 25-30 qt/ha. Durum wheat yield (indigenous): 18 – 25/ha. In general no improved varieties are available for durum wheat.
Land preparation is by oxen. Fertilizers and pesticides are used (100kg DAP and 100kg Urea recommended), but less than the recommended rate. Role of women more or less the same as in tef.

Areas requiring attention	***Potential interventions***	***Responsibility/tasks***
Availability of improved varieties, especially for durum wheat	Breeding and selection	EARO/Cimmyt – research, importation of gernplasm (including dwarf varieties for durum wheat)
Rust disease (available chemical too expensive)	Breed resistant varieties and use variety mixtures instead of single	EARO – breeding research EARO/Cimmyt – facilitate importation germplasm from Cimmyt OoA– extension

	varieties and appropriate management practices	
Declining yield of varieties (after 2 years) due to mixing and other factors, handling (moisture content)	Breeding and selection See input supply	See input supply
Post harvest pests (weevils), differences between varieties	Chemical treatment (not expensive). Selection of resistant varieties	EARO/Cimmyt – TA and capacity building on storage. OoA - extension
Amount of fertilizers used is limited (too expensive). Wheat exhausts the soil nutrients.	Combine inorganic and organic soil fertility strategies	EARO - research and TA for recommendations. OoA - extension
Input supply		
Improved bread wheat varieties are supplied through the Cooperatives/Bureau of agriculture through the package program. Birr 273/qt. Improved seeds need to be replaced after 2 years. Farmers purchase some improved seeds from other farmers (second year seed). Price paid is higher (about Birr 10/qt). Women are in charge of selecting the best seeds from their own seeds. Fertilizers are supplied through the cooperatives as part of the agricultural packages CHECK		
Areas requiring attention	***Potential interventions***	***Responsibility***
High price of fertilizers	Make fertilizer market more efficient (for all crops)	IFPRI - Conduct (regional) study on the fertilizer marketing system with aim of improving efficiency
Insufficient improved seed supply	Increase seed supply Strengthen seed producing farmers groups with skills in proper post harvesting seed handling and germination tests. (disease problems) – linked to cooperative	EARO – provide additional seed/varieties to Woreda (see production) EARO/Cimmyt – provide TA for organizing farmers group OoA – organize farmers group
Marketing		
Most of the wheat is sold through the private sector. (Quantity sold through the cooperative system very small). Bread wheat sold on the local market only, no direct linkages with the processing industry. Attempts were made to sell the durum wheat to the agro industry (Kaliti) - quantity too small, quality not acceptable. Price durum wheat 180 -230/qt , bread wheat 160 – 210/qt. There considerable post harvest (storage losses) Women only sell small quantities in the market (it almost feels like steeling)		
Areas requiring attention	***Potential interventions***	***Responsibility/tasks***

Price fluctuation between years, effecting next years planting	Develop contract farming for bread and durum wheat varieties	EARO/Cimmyt/IFPRI - Feasibility study for development of bread and durum wheat.
Lower price during harvest		
Storage problems (weevils) prevents cooperatives from being heavily involved in purchasing of wheat	Seed dressing	EARO/Cimmyt – TA and capacity on storage OoA/cooperative – extension
Cooperatives do not offer a competitive price – traders cheat and fix prices especially during harvest season.	Expand and make the multi purpose cooperative more effective	IFPRI - study on cooperatives and FU, identify gaps and develop/support capacity building program Cooperative department and cooperatives – normal activities
Role of women in marketing is limited and leads amongst others to "wastage" of farm income.	Increase women's role in marketing of wheat	Women's desk TA for recommendations and study

Table 6. Pulses (chickpeas)

Production

Pulses are mainly grown to provide a quick source of cash (before the tef harvest) and to improve soil fertility. Tef yields after a pulse crop are reported to have the highest yields.
Total area 4107 ha chickpea, 4818 ha faba bean
Yield: 14 qt/ha. Research 20 qt/ha
Land preparation is by ox. No use of fertilizers and pesticides. Role of women more or less the same as in tef.

Areas requiring attention	***Potential interventions***	***Responsibility/task***
Poor and declining genetic potential	On farm testing and introduction of improved varieties especially for export market	EARO – on farm research ICRISAT/ICARDA/CIAT – provide gemplasm OoA – extension of tested varieites
Cut worm attack (cuts stem) Pod borer (at later stage)	Develop resistant varieties and management practices, including chemical dressing and/or use of chemicals.	EARO - research on resistant varieties ICRISAT/CIAT - germ plasm exchange OoA/farmers - extension
Access rain will result in lodging and poor yields	Appropriate sowing date	OoA/farmers - extension
Low yield	Use of inoculums especially in areas with inappropriate	Cooperatives/NSR – seed dressing National Soils Research Centre- TA and capacity building

	rotation	
Input supply		
No improved seeds available (farmers use their own seeds – women are usually in charge of collecting the best seeds). New varieties are channeled through the cooperatives as part of the agricultural packages. Fertilizers are not used (see production). They are normally distributed through the cooperatives as part of the agricultural packages. Inoculums for different legumes can be made available by National Soils Research at Birr 15-20 kg. Quantity required is 0.5kg/ha Present capacity of the plant is 1000 tons/year. Investment cost Birr 1million. CHECK		
Areas requiring attention	***Potential interventions***	***Responsibility/task***
Improved seed (Kabuli) not available.	Develop farmer to farmer seed multiplication and exchange (disease problems)- linked to cooperative system	EARO/CIAT/ICARDA – TA establishing and capacity building on farm nurseries OoA, cooperative – initiate farmer seed multiplication group
Inoculums supply	Increase supply of inoculums on experimental basis	National Soils Research Center
Marketing		
Pulses are mostly sold through private traders. Cooperatives only buy small quantities. Price after harvest Birr 120/qt. Can go up to Birr 200 when export demand is high. Not easy to store – post harvest losses, mainly weevils. There is a demand for white chickpea varieties for the Pakistan and Indian market (Kabuli variety). Locally the Dessi variety is preferred. Women only sell small quantities in the market (it almost feels like steeling)		
Areas requiring attention	***Potential interventions***	***Responsibility/task***
Low price Price fluctuations between years (depending on demand) – export potential	Identify markets export (for Kabuli type). Increase role of cooperatives	Cooperatives/FU/Regional Bureau ICRISAT/CIAT/ICARDA TA for feasibility study for development of pulses
Storage (weevil) problems and change in color and weight prevents cooperatives from purchasing	Dressing of seeds. Harvesting at appropriate time	CIAT/ICRISAT/ICARDA – TA on proper storage Extension/Coop
Cooperatives do not offer a competitive price – traders cheat and fix prices especially during harvest season.	Expand and make the multi purpose cooperative more effective	Cooperative department and cooperatives – normal activities IFPRI – TA for study on cooperatives and FU, identify gaps and develop/support capacity building program
Role of women in marketing is limited	Increase women's role in marketing of	Women's desk TA for recommendations and study

and leads amongst others to “wastage” of farm income.	pulses	

Table 7. Irrigated horticultural crops

Production

Vegetable is produced in both teff-livestock and teff-dairy farming systems. Production problems related to vegetables are lack of knowledge and high risk due to poor shelf life. Farmer-to-farmer seed supply system need to be strengthened in order to minimise cost of planting materials. In addition, there are a number of diseases and pests that are affecting the productivity of vegetables.

All vegetables are mainly produced using gravitational irrigation from the dam.

Areas requiring attention	***Potential intervention***	***Responsibility***
Shortage of vegetable seeds	Improve seed supply system	Extension/IPMS/EARO
Chemicals against pests, disease. fungus, weeds very expensive	Establish biological control system	Extension/IPMS/EARO
Inadequate knowledge in river diversion and irrigation system	Provide training in modern irrigation system and efficient use of water	IWMI/IPMS/Extension/EARO

Most of the germplasm for vegetable is bought from small shops in the woreda town and are very expensive. There exists no farmer-to-farmer seed supply system. Sometimes however, the produce itself, like the onion tuber, is directly used as a planting material (eg. Potato, onion, etc). The major source of planting material, mainly for onions, is from farmers who specialise in vegetable seed production around Melkasa Research Centre. To increase the supply of vegetable seeds demanded by the farmers, a farmer to farmer seed supply system needs to be developed. Other alternative options should be explored including on farm seed production linked to a cooperative distribution system or otherwise.

Marketing

Ada’a-Liben is on average only 60 kms from the capital Addis Ababa and has a great potential for vegetables marketing. Middlemen have also been reported to cause major problems in marketing vegetables. Strengthening the capacity of service cooperatives for marketing produces of own members or others can be considered as one means to alleviate the marketing problem.

Areas requiring attention	***Potential intervention***	***Responsibility***
Rural roads are not accessible	Examine alternative options for market access	Extension/IPMS
Perish ability of vegetable products	Explore possible market linkages, examine value added option	Extension/IPMS
Low cooperative	Strengthen marketing	Cooperative desk/IPMS

involvement in marketing	cooperatives	

Table 8. Dairy production		
- Rural areas: smallholder, local animal in rural areas, mainly for home consumption and sale (73,145 local cows, 1,071 crosses), 18 F1 heifers distributed in 8 years, yield 1-1.5 liter/day for local; 5 liters/day for crosses –Urban/peri-urban - Crossbreds and high grades cows (>3500 cows), 12 liters/day/cow; Ada'a dairy marketing cooperative –Major feeds – grazing, crop residues (tef straw, concentrates) –One AI technician – 368 AI over 8 years in rural areas, >1000 AI/year in UPU		
Areas requiring attention	**Potential solutions**	**Responsibility**
Difficulty in finding improved breed	Facilitating the provision of improved breed Community based breeding programs such as *Bull stations*. Implementation will depend on agreement with farmers and local institution with pre-arranged agreements for unit costs for each service. Resourceful farmers who want to provide the bull station service can benefit themselves and the community. The bull can be provided as a "loan" to such farmers and they can keep the bull after meeting a certain quota for bull service.	MoARD and D/Z research station provide improved genetic resources
High cost of purchasing improved breed – even when they are available	Facilitate credit services – cross cutting among most areas of concern	Micro finance/cooperative
Lack of feed resources (Nutrition value as well as cost)	Providing improved varieties, grass or fodder Community should take over after getting the kick start from the project	***IPMS/D/Z Research Center***
Animal health services	Training of para-vets. One individual at FTC facility will not be enough. We need to try innovative methods. *Training community members (youth)* Agri Office should takeover the monitoring and follow up task	MoARD/IPMS

Lack of appropriate knowledge in management and operation of modern dairy agriculture	Cross-cutting issue. Training of farmers at facilities such as ILRI in feed resources production, dairy management etc.	MoARD/IPMS
Lack of collective decisions at a household level – women excluded	Training program that address this issue	MoARD/IPMS

Dairy – Input supply related issues		
Areas requiring attention	***Potential interventions***	***Responsibility***
High transaction cost	Organize dairy cooperatives (milk units) or link with existing cooperatives found in DZ town One in town. No cooperative in rural areas	Woreda cooperative /agriculture office
Post harvest loss in milk and milk products	Training in post harvest handling including processing.	Woreda Agriculture office/IPMS
Lack of and/or understanding of quality standards	Training programs on dairy management. Demonstrations at ILRI and other example sites	MoARD/IPMS MoARD/IPMS
Lack of milk processing plant (ready market)	Link between urban and rural dairy production will be to setup a processing plant in the urban area that can absorb the production capacity of the rural dairy producers. E.g. Dairy products from Denkaka cannot be collected unless the community forms a co-operative and be able to supply processing plant in DZ	Cooperatives/IPMS
Credit service regarding dairy enterprise	Cross-cutting issue that will need to be addressed with other related issues of Finance, credit and saving services, and training on how to use credit wisely.	Micro finance/Cooperatives

Dairy Marketing		
Areas requiring attention	**Potential interventions**	**Responsibility**
Lack of ready market	Setting up the market linkages. Identifying buyers for the dairy products and producing with a plan to meat the identified market.	IPMS/Micro finance /Cooperatives/MoARD

	Currently the local cooperative cannot buy milk from rural Ada Liben farmers because it doesn't have the capacity. If a processing plant is setup in DZ, the buyers can absorb the production from the rural farmers. Strengthening the farmers cooperatives will be key in linking rural and urban farmers and thereby giving farmers the muscle and influence on many of the above such as A.I services, feed resources purchasing, etc.	
Lack of knowledge regarding the importance of quality and standards	Training on the value of quality in the market place and in the processes of quality control	MoARD/IPMS

Table 9. Poultry Production:

Rural areas - Scavenging backyard production (eggs/meat) with local chicken
Urban and peri-urban – Exotic chicken, intensive production system (eggs/meat)

Areas requiring attention	**Potential interventions**	**Responsibility**
Lack of improved breed (variety as well as quantity. Birr 27/chick, can only get five hens). No package for poultry meat production Women not involved in this area Resource not used for household consumption	Project can provide improved breed for both egg and meat producing. Sensitizing women to the opportunities in the sector *(EARO DZ has the capacity to hatch 10,000 chicks per cycle)*	MoARD/IPMS MoARD/IPMS MoARD/IPMS
Disease (lack of vaccination, Day-old chickens vulnerable	Training of Para-vets Keep chicks for longer period and distribute after vaccination	EARO/IPMS MoARD
Feed resources – lack of availability	Utilizing farmers' cooperative to provide feed just like crop input supply services	Cooperatives/MoARD

Poultry operations managements	Project can provide training and provision of "package" type materials for lifecycle management. Diversification in poultry operation such as meat as well as egg production	MoARD/IPMS MoARD/IPMS
Developing a culture of innovation and hard work	Train and organize innovative farmers first to set examples to others	MoARD/IPMS

Poultry Input Supply		
Areas requiring attention	**Potential Intervention**	**Responsibility**
Single breed offered in current package	Provisions for better breeds Community based breeding of improved breeding services Assess why breeding centers in Fiche and Ambo are not used to supply input for needs in Ada liben	MoARD/IPMS DZ Research/ MoARD MoARD/IPMS
High price for improved breeds (Birr 27.50 per head)	Provisions of credit services	Micro finance/Coops
Poultry facilities	Training on how to make better facilities	MoARD/IPMS
Poultry market		
Areas requiring attention	**Potential Intervention**	**Responsibility**
Lack of ready and nearby markets	Linking farmers' with a marketing network – both for egg and meat products Teaching change in existing poultry consumption habits to broaden poultry market. (New chicken preparation recopies – other than just "Doro Wot" Encourage/train farmers to consume such resources to increase the health of their family while also broadening the market. Make chicken a food for the masses rather than a holiday-only meal	IPMS/ MoARD IPMS/ MoARD MoARD/IPMS
Lack of processing capacity	Organizing farmers in cooperatives to possibly setup or utilize slaughter services, and modern storage mechanisms to keep products	Cooperatives/IPMS

	longer	

Table 10. Meat production:

There are 37,000 goats, 23,000 sheep, 2 abattoirs in DZ, one in Mojo.
- Cattle fattening mainly old oxen.
- Sheep/goat – no strategic market-oriented production system
–Some sheep fattening operations in urban areas

Areas requiring attention	**Potential Intervention**	**Responsibility**
Improved genetic resources	No major problems in getting breed for fattening. Need to know how to select the better ones from existing indigenous breeds from areas such as Meki, Koka, Nazereth, etc.	DZ Research center/ MoARD/IPMS
	Community based breeding such as setting up within various communities	MoARD/IPMS
	Selecting best time of year to purchase stock (E.g. September better time to buy but not necessarily ideal time for the farmers	
Few women participate in credit this sector	Finance and feed problems during this time	MoARD/IPMS
	Credit facilitations and training	Cooperative desk/IPMS
Feed resources	Training in preparing more nutritious feed resources	IPMS/DZ Research
	Providing better feed varieties	MoARD/IPMS
Animal health	Training of para-vets	MoARD/IPMS
Management	Training in meat production management	MoARD/IPMS

Meat Input supply		
Areas requiring attention	**Potential Intervention**	**Responsibility**
Landless youth Cost of inputs	Training youth on how to utilize available space. (E.g Singapore produces a lot in spite of its size)	MoARD/ IPMS
Feed resources	Training in producing better feed	MoARD/IPMS
Credit supply	Cross-cutting issue that needs to be addressed in a comprehensive way	Microfinance/Cooperatives
Meat marketing		

Areas requiring attention	Potential Intervention	Responsibility
Ada Liben not realizing its potential in this sector	Experience sharing from ILDP project (assisting with credit service to female farmers engaged in breeding and fattening sector)	MoARD/ IPMS
Farmers not benefiting from their production in the marketing process. Traders get most of the profit	Farmers should be trained to anticipate markets and produce and sell with that in mind Cooperatives can help give farmers a stronger voice	MoARD/IPMS MoARD/IPMS

Table 11. Apiculture Production:

Traditional production system, use of local beehives is common, farmer to farmer sale of bee colonies is practiced widely.

Areas requiring attention	*Potential Intervention*	*Responsibility*
Select the best variety between red and black	Training farmers including endogenous knowledge	MoARD/ IPMS
Limited areas with potential for apiculture	Train farmers on the relative value of modern bee-hives from cost/benefit perspective	Cooperatives/Micro finance
Traditional bee-hives are inferior bee-hives don't last long and are less productive	Introduce improved bee hives	MoARD/IPMS
Modern bee-hives are expensive (Birr 216 in 1994, Birr 450 now. Used to be subsidized by Rural Technology Center from Assela)	Credit facilities to help meet the cost	Microfinance/Cooperatives
	Training farmers on how to keep and breed bee colonies	MoARD/IPMS
Honey extractor and Honey press are not easily available	First focus on bee-keepers organized and easily reached for extension type training	MoARD/IPMS
Bee colonies are not easily available (50 Birr to 100 Birr per bee colony)	Identifying and training of farmers on the diversity of products that can be produced from bee-keeping	MoARD/IPMS
"Experts" not trained in bee keeping. The title in the structure but trained personnel is not	Assisting Woreda agriculture office in human resource capacity building Provide training in the management and operation of bee-keeping	MoARD/IPMS

assigned in the position Management problems Farmers engaged in bee-keeping not easily identified and reached. Farmers scattered in large areas Woreda not focused in this area	Create awareness in bee culture of the woreda staff with	MoARD/IPMS
Feed resources	Training and introduction of planned “bee-forage” provision	MoARD/IPMS
Health services		
Apiculture Input Supply		
Areas requiring attention	**Potential Intervention**	**Responsibility**
Shortage of bee colonies	Develop queen rearing system Perform colony split system	Apiculture team/MoARD
Shortage of bee forage	Develop bee forage	
Health services – not a serious problem. (Spiders, etc)		
Bee-hives Molds, Extracting and pressing machines	Credit for acquiring better bee hives	Cooperatives/Microfinance
Apiculture Marketing: Denkaka, Yerer and Zequala farmers want to organize in cooperative to engage in apiculture.		
Areas requiring attention	**Potential Intervention**	**Responsibility**
Broader market outlets	Asses potential for export market Assess potential of product diversification (honey, wax,)	IPMS MoARD/IPMS
Quality & standard. (E.g Product in Dukem area is not trusted by consumers)	Training in the value of quality and standards	IPMS/ MoARD
Processing (wax and other related products)	Organizing farmers in cooperatives	Cooperative desk Ethiopian export promotion agency – document on export market of honey and other products

Skins and hides marketing can be channeled through service coops.

5. Outline of Programme of Work for Ada'a-Liben Woreda PLS

5.1 Priority commodities and natural resource management technologies

During the first year, attention will be focused on innovative technology practices and institutional innovations for the priority commodities and their supporting NRM technologies.
Crops:

- Teff
- Wheat
- Chickpea and lentils
- Horticultural crops

Livestock

- Dairy
- Poultry
- Ruminant meat production (cattle, sheep and goats)

The case of apiculture was deferred until the production/marketing potential of the Woreda is determined through a proper study. It is suggested that Holetta Bee Research Centre, SAP-Tech and ICIPE undertake this study jointly.

Natural resources management issues related to

- Watershed/erosion management
- Collective gravity and pump irrigation
- Bio-fertilizers mainly for pulse crops
- Soil fertility management (including organic production)

Based on the knowledge captured and the lessons learned during the initial implementation of the innovative program some of the priority commodities may be dropped, while others may be added.

5.2 PLS knowledge management – general (RBM code 100 series)

To improve the capturing and sharing of knowledge on priority commodities and the supporting NRM technologies in the PLS, the state of knowledge and knowledge requirements will have to be assessed on a continuous base during the project life. (The initial PRA and the subsequent assessments will form an integral part of this process).

The knowledge will be synthesized and assembled at the federal level in a Resource Information Centre using electronic data base formats.

To share this knowledge with institutions and communities, various processes and mechanisms will be used including the distribution of appropriate printed materials (manuals, training materials, posters, and leaflets in the local language), radio programs, local exhibitions etc.

To link the PLS institutions with the Resource Information Centre, electronic linkages with the Woreda Agricultural Desk will be established. This effort will have to be integrated and synchronized with other activities in this field i.e. Woreda Net, School Net and Agri Net (Ada'a-Liben was one of the test woredas for this project and received computers and staff training). Two of the high schools (Bishoftu Vocational Training School and Ada'a High School) have some trained manpower and are connected to the Educational Media Agency (EMA) in Addis Ababa. However, the trained manpower in these schools does not have the capacity to effectively handle the transmission. In addition, regular power failures and excessive workload have been mentioned as major problems in handling the transmission. The program is a one way (only listening including picture) transmission using plasma TVs for high school students. There are 8 channels and 8 subjects are transmitted. Woreda net is a system where both picture and sound are transmitted to the participants. The system is installed at the office of the woreda administration but is not operational yet. Similarly the Agri Net is also not installed. Simultaneously innovative ways of creating a culture of knowledge capturing and horizontal knowledge sharing between the actors in the PLS and between the actors at PLS and the regional and federal level will have to be developed – see section 3 on capacity building.

Table 12. Project support for PLS knowledge management system (first year)

Activities	**Target**	**Responsible**
(100) Continuous assessment of current state of knowledge requirements based on field work (see 5.4) and meetings	Woreda institutions	Woreda institutions involved in extension, input supply, micro finance, cooperatives, marketing under the supervision of project staff
(100) Collection and synthesis of data for PLS (GIS) database	Woreda	Project staff with Woreda Agricultural office
(100) Preparation of extension materials and methods and training materials *	Woreda institutions and farmers	Research and development partners with the help of project funding.
(100) Purchase and installation of computers and hard ware	Woreda Agricultural office	Project staff
(100) Training of staff in electronic knowledge management	Staff member agricultural office.	Project staff

* For details see commodity program described in section 5.4. – indicated with code 100

5.2.1 School and Woreda Net

a. School Net

There are two Schools using plasma TVs. From each school two staff were trained at Zonal level. Ada Model High School has one technician that operates the system as the other one has transferred to another school. The major problems encountering the plasma TV system is that the spare parts are not easily available on the market. The operators knows operating the system but not able to do even simple maintenance. Class rooms which are far away from the dish have a problem of clarity or bad vision encounters.

Bishoftu Vocational and Technical School mentioned no technical problem with regard to plasma TV. There are 4 ITC specialists in the high school and Technical School. There are two Schools in one Compound. One is for the preparatory Students 11 and 12 grade students and the other is Technical and Vocational School. The former is a user of Plasma TV while the latter begin to use Plasma TV next year.

b. Woreda Net

Two people have been trained from the Woreda Capacity Building Office last year. The apparatus is not fully installed, and operation has not yet started.

5.3- PLS public institutional capacity building (RBM code 200 series)

To introduce the project, and to train public institutional staff in innovative technology transfer methods, inter-institutional collaboration and cross cutting themes like gender and environmental assessment, various trainings will be conducted for Woreda staff. (Materials for such training will be prepared by the project with the help of consultants and contributions from the project partners). To stimulate the integration with private institution staff, some of the staff of the private institutions will also be involved in this training. The training will be continuous during the project life and the effectiveness of the training will be assessed regularly. Lessons learned will become an integral part of follow up training events.

Table 13- General capacity building institutional staff	
Crop Production	8
NRM	3
Livestock	6
Horticultural crops	3
Cooperatives	4
Micro finance	3
Women affairs office	1
Rural Women Affairs	1
HIV/AIDS office	1
Total	30

The FTC staff (involved in the program) will be trained by Woreda extension specialist, and some other specialists (gender, natural resource management), and

they will in turn use these concepts during their daily work with the farmers and communities.

Use of these innovative methods by FTC staff will be monitored and evaluated by the project staff and form the basis for adjustment in future trainings.

Besides the building of the capacity of the Woreda and FTC staff in the use of innovative methods and institutional arrangements, technical training on the priority commodities, including new production methods/techniques, farmer/group/ cooperative based input supply and marketing systems will be provided (Materials for such training will be prepared by the project with the help of consultants and contributions from the project partners). Details for such training are included in the PLS sustainable livelihood development activities described in section 5.4.

An integral of the capacity building activities at the Woreda level is the development of the FTCs. In the initial phase the project will support these FTCs with printed materials (see knowledge management) and demonstration materials in support of the priority commodities and supporting NRM technologies.

Table 14- Training program for Woreda experts and development agents

Commodity	**Type of staff**	**Area of specialization**	**Number of trainees**	**Remark**
Teff, wheat, chickpea, lentils	Experts Team leader Supervisors DAs	Agronomy Crop protection Extension expert	1 1 1 27 (13 for lentils)	
NRM	NRM Team leader	Soil conservation expert	2	
Cooperative	Cooperatives Promotion Head Cooperatives expert	Cooperative Union Inputs and credit	4	
Agro-Industry	Agro-industry representatives	Cooperative desk	3	
Horticultural crops	Experts Team leader Crop protection expert Extension expert Supervisors DAs	Horticulture, crop protection, extension	6	
Livestock	Experts	Animal Production Animal Health Forage crops prod.	5	

Poultry	Poultry expert Beekeeping expert	Poultry Beekeeping	1 1	
	DAs Paravets Extension expert AI technician Team Leader Supervisors	Extension expert AI technician Team Leader Supervisors DAs Paravets	1 1 1 3 29 15	

Table 15. Training activities for capacity building

Area of Activity	Target	Remark
Innovations in extension	DAs, research, experts, heads of offices, desk, teams	
Gender and environment	DAs, research, experts, heads of offices, desk, teams	Treat as an integral part of the whole process
Priority commodities	DAs, research, experts, heads of offices, desk, teams	Traders, exporters,
NRM	DAs, research, experts, heads of offices, desk, NRM	
Input/output markets and rural finance	Inputs desk, marketing and technology multiplication, research, rural finance, NGOs,	
Exchange visits to other PLS (within and outside the Woreda)	To be determined later	
Demonstration materials at FTCs (5 are operational with staff assigned – These are Denkaka, Hidi, Kurkura, Dire and Dologilla,)	Define role of FTC – focus on priority commodities, classroom, practical demonstration ; DAs to organize farmers (dairy, poultry) on commodities around the FTC	
♦ Denkaka	Varieties of teff. Wheat varieties (Durum, bread), Chickpea/lentils varieties, Fertilizer trails with priority commodities (vertisols, cumbisols), Fattening (on farm), Forages and ration formulation, Conservation tillage, Poultry	
♦ Hidi	Varieties of teff, Wheat varieties (Durum, bread), Fertilizer trails with priority, commodities (vertisols, cumbisols) Fattening (on farm), Forages and ration formulation, Conservation tillage, Horticultural crops, Poultry,	

	Dairy	
♦ Kurkura	Varieties of teff, Wheat varieties (Durum, bread), Fertilizer trails with priority commodities (vertisols, cumbisols) Fattening (on farm), Forages and ration formulation, Conservation tillage, Poultry Dairy	
♦ Dire – arerti	Varieties of teff, Wheat varieties (Durum, bread), Chickpea, Lentils varieties Fertilizer trails with priority commodities (vertisols, cumbisols), Fattening (on farm) Forages and ration formulation, Conservation tillage, Dairy, Poultry	
♦ Delologila	Varieties of teff, Wheat varieties (Durum, bread), Fertilizer trails with priority commodities (vertisols, cumbisols), Fattening (on farm),Forages and ration formulation Conservation tillage, Poultry, Dairy	

While many capacity building activities have been undertaken for public staff by numerous projects operating in Ethiopia, the actual use of the increased capacity by the staff in their daily work is often minimal because of a host of other bottlenecks and a lack of reward for those staff which have made progress despite the presence of these bottlenecks.

The project will introduce various other capacity building initiatives at the PLS level to alleviate some bottlenecks in order to facilitate the introduction of technologies and institutional innovations. This will include the supply of credit funds and financial and technical support for market studies and linkages for priority commodities and operational cost of experts to supervise and guide the DA staff at FTC level. These activities are integrated in the PLS sustainable livelihood activities.

The project will furthermore set aside some funds for rewarding experts and FTC staff which have been made good progress in technology and institutional innovations. One potential reward may be in the form of visits to places of interest (this will be introduced in the second project year).

Finally, an integral part of the PLS capacity building support is to create a learning system between the region and the PLS and to create an inter-institutional learning system at the Woreda and FTC level. To facilitate this arrangements the project has established Regional and Woreda level Advisory and Learning Committees (RALCs and WALCs). A budget will be made available to use/develop various learning mechanisms including field visits and small workshops. An integral part of this

learning will be the sharing of knowledge between the regions and institutions concerned.

Table 16. Project support for PLS general* capacity building support (first year)		
Activities	**Target**	**Responsible**
(200) Training and follow up in innovative methods	Woreda staff and FTC staff	Project staff and consultants
(200) Training and follow up in gender	Woreda staff and FTC staff	Project staff and consultants
(200) Training and follow up in environmental assessment	Woreda NRM staff and FTC staff	Project staff and consultants
(200) Development of a reward system for institutional staff	Experts and FTC staff	Project staff and WALC and RALC
(200) RALC and WALC learning activities including field visits and workshops	RALC and WALC	Project staff

* Commodity and or technology specific support to Woreda staff institutions and FTCs is described in section 5.4.- indicated with code 200.

5.4 PLS sustainable livelihood development (RBM code 300 series)

The project will concentrate its efforts on introducing innovative technology (practices) and institutional innovations with farmers and communities near Farmer Training Centers (FTC) which have a potential for the identified priority commodities and supporting NRM technologies.

Table 16a FTCs with potential for priority commodities and NRM technologies in both systems								
FTC	**Tef**	**Wheat**	**Chick pea**	**Horticulture**	**Dairy**	**Poultry**	**Beef**	**Sheep and goat meat**
Denkaka	X	X	X	-	X	X	X	X
Hidi	X	X	-	X	X	X	X	X
Kurkura	X	X	-	-	X	X	X	X
Dire-Arerti	X	X	X	-	X	X	X	X
Delologila	X	X	X	-	X	X	X	X

Table 16b. FTCs with potential for priority commodities in both system								
FTC	**Tef**	**Wheat**	**Chick pea**	**Horticulture**	**Dairy**	**Poultry**	**Beef**	**Sheep and goat meat**
Denkaka	X	X	X	-	X	X	X	X
Hidi	X	X	-	X	X	X	X	X
Kurkura	X	X	-	-	X	X	X	X
Dire-Arerti	X	X	X	-	X	X	X	X
Delologila	X	X	X	-	X	X	X	X

Table 16c. FTCs with potential for NRM technologies in both farming system					
FTC	**Irrigation**	**Fertilizer/herbicide/Pesticide**	**Malaria**	Flood	**Soil erosion**
Denkaka	-	X	X	X	-
Hidi	X	X	X	X	X
Kurkura	-	X	X	X	-
Dire-Arerti	-	X	X	X	X
Delologila	-	X	X	X	X

5.4.1 Status of major crop production

Trends in teff production, area harvested, and average yield per hectare have not significantly changed over the years. Teff production has been limited to about 64,000 ha of land in the Ada'a-Liben Woreda and total yield 660,000 qt. indicating an average yield of about 10.5 qt/ha.

Yield improvements as a source of growth were not a dominant factor. The adoption of high yielding varieties such as DZ196 and intensive use of fertilizers could lead to a high production growth rate. The dominant source of production growth could be increased yields. Production growth due to area expansion has been more of less stagnant, thus making the yield parameter the main source of teff production growth.

5.4.2 Production constraints

Despite technological breakthroughs in teff research, farm yield levels are still way below their maximum potential due to biological, technical, physical, socio-economic and policy constraints.

5.4.3 Biological-technical-physical constraints

Genetic material: Teff genetic material produced and released by the EARO Debre Zeit Station have a production potential of over 20 qt/ha. Such yields could be achieved along with recommended soil fertility management and proper cultural practices. However, more research is still continuing to develop high yielding

varieties. One of the major limiting factors for increasing teff yield is lodging problem. There are a number of bread and Durum wheat varieties developed by the EARO Debre Zeit Station. These varieties are high yielding and have high potential for agro-processing. Local chickpea varieties and Kabuli types are available are EARO Debre Zeit. These varieties have great potential to increase yield and attract both local and export market. However, seed multiplication is a major limiting factor to expand production.

Seed contamination: Teff production has more of less remained constant over the years and as such no major leap has happened in terms of production per ha. Seed contamination, loss of soil fertility, weeds, disease and pests along with regular occurrences of floods and erratic rainfall have influenced productivity.

Low technical efficiency: Farmers in general have low technical efficiency relative to the best farmer performance. Also, varieties are not renewed and farmers still use old varieties and there is al lot of seed contamination. Moreover, these varieties produce relatively low yield, poor grain quality, low milling recovery, and poor tolerance to biotic and abiotic stresses. Seeding rates are still high for teff, wheat and chickpeas.

Problem soils and declining soil fertility: There is a need to determine the quality of soils in the Woreda in relation to the various crops grown. In general, one can observe flooding, soil erosion and nutrient loss in most of the high slop areas in the Woreda. There is variation in the quality of soils in different parts of the Woreda. These are classified as low, medium and high potential areas.

5.4.4 Socio-economic constraints

Socio-Economic constraints are composed of farmers' limited management capabilities to make correct decisions to increase their yield levels (hence profit) and the policy environment which may inhibits them from fully optimizing their decision making process.

Limited management skills of farmers: In general farmers have limited skills in making crop farming an agribusiness venture. The relatively low and inappropriate fertilizer use and proper timing of application, accompanied by poor cultural management practices are major sources of inefficiency.

Lack of appropriate and adequate infrastructure: Because of limited access to credit for storage facilities, farmers are forced to sell their marketable surplus during harvest months when prices are low. Farmers cannot wait for a good price because they do not have a place to store their produce. As a result, traders dictate prices.

Cultural barriers: Farmers tend to waste a lot of time on social functions and observing religious ceremonies. In addition, there is a tendency for renting out their land on contractual basis for a limited period of time. This influences the type and amount of input that goes in to improving land quality. Farmers also use unnecessary hired labour for harvesting crops. In addition, there is limited culture of savings.

5.4.5 Opportunities for crop improvement

During the 2003/2004 cropping season, 63,461 ha of land was under teff cultivation and a total of 660,000 qt of teff production is expected. In the 2004/2005 cropping season, there is a plan to increase average yield from 11 qt/ha to 20 qt/ha (3 years) and the projected total yield is 1,200,000 qt from the same ha of land. Is this target achievable? What are the technologies required to achieve this goal?

There are a number of technologies and processes that can help farmers achieve this target. In addition, the Woreda has low, medium and high potential areas for teff production. Accordingly, data have to be collected and disaggregated by potential areas to help monitor progress. Farmers have to strictly follow up the process and apply proper cultural practices. The current seeding rate that farmers use ranges from 30 to 50 kg/ha. There is some information that seeding rate could be reduced to 2.5 kg/ha and teff can be planted in rows. Row planting decreases seeding rate, encourages tillering and increases yield and quality. Planting machines are being modified for this purpose for possible use in flat lands.

The EARO Debre Zeit DZ196 (Magna) variety is preferred, but yield is slightly low compared to other white varieties – New high yielding white varieties will be released by EARO Debre Zeit in the coming two years.
Although the Ethiopian Seed Enterprise supplies limited amount of teff seed, there is an established and well functioning farmer to farmer seed supply system in the Woreda. However, contamination of seed varieties is common (including mechanical) and this affects yield. Strengthening of the farmer based clean seed production and multiplication system is required. This could be popularized for market opportunities outside the Woreda.

There is an increasing domestic demand and export opportunity for teff. In 2003/4, about 18,000 qt of teff was exported to Israel, Dubai, USA, etc. New market opportunities are also emerging particularly in Europe and USA for consumers who are allergic to wheat gluten. In a month time a Dutch company will sign an with the GoE to export teff to the Netherlands. In addition, there is an opportunity to produce organic teff for the export market. Organic teff could be produced by specialized farmers. Although lower yield is expected from organic teff production, prices could be high for such products. Teff planted after chickpea, lentils, rough pea, which increases the opportunity for organic teff production. New teff based products such as spaghetti and macoroni are being exported to Europe.

Project should support farmers to perform better in the current practice they are doing. There is need to:

- Educate farmers on new knowledge
- Address lodging problem
- Attitude of farmers - Education, training, financial benefits.
- Working culture has to change.
- Improve poor cultural practice by farmers.

The following sections deal with activities on the priority commodities which are envisaged to be accomplished within the firs year of the project 's life.

5.4.6 Teff

Production

The present emphasis in teff production is to increase average yield from 10 q/ha to 20 q/ha. There are opportunities for organic teff production. This requires training of farmers and DAs on compost making and manure utilization techniques.

Table 17. Project support for teff production

Activity	Target	Responsibility
(200)TOT on soil management (conservation tillage, water logging problems), general teff agronomy management and weed and diseases control	Woreda production team, 3 FTC staff	EARO research station
(200) TOT on Watershed management to control flooding	Woreda experts, 3 FTC staff	EARO/ILRI/CIAT
(200) TOT in organic teff production	Woreda production team , 3 FTC staff	EARO research station
(200) Supply of demonstration materials on diseases, management (EARO)	5 FTCs	Project in collaboration with EARO and MoARD
(300) Farmer training in (organic teff production, variety demonstration) manure management, compos making, fertilizer application system	Farmers in or near the 5 FTCs	FTC staff guided and supervised by TOTs and EARO research station
(200)TTOT on farmer based seed production, seeding rate, soil fertility management, seed contamination	Woreda experts, 5FTC staff	EARO/CIAT
(200) TOT on Varietals demonstration, organic teff production, compost making, manure management, fertilizer application system	Woreda experts, 5 FTC staff,	EARO/project staff/ILRI
(200) Soil cresting – soil	Woreda experts,	EARO/ILRI

and water management		

Input supply

The major problem in input supply is shortage of improved varieties and timely availability and high price of fertilizers

Table 18. Project support input supply

Activity	Target	Responsibility
(400) Study the existing farm input supply system and identify potential areas for improvement (including gender and environment)	Farmers near 5 and around 5 FTCs and DA posts	Project staff in collaboration with Woreda experts and EARO
(200) Demonstration materials for input supply	5 FTCs	EARO and project
(300) Facilitate supply of improved seed from EARO DZ centre	Farmer served by FTCs	Support Woreda input supply with funds provided by the project.
(300)Provide credit fund for on farm seed multiplication	Farmer served by FTCs	Micro Finance with project funds

Marketing

To contribute to improving the marketing of teff with a strategy on improving quality. At the farm level, improved knowledge shall be transferred through the FTCs on good agricultural practices and proper post harvest handling.

Table 19- Project support for teff quality/marketing improvement

Activity	Target	Responsibility
(400) Study on teff seed quality at farm level	Farmers, near 5 FTCs and DA posts	By EARO staff collaboration with Woreda experts
(200)TOT in quality improvement at the farm and marketing levels	Woreda experts, 5 FTC staff	By EARO staff
(200) Supply demonstration materials on varieties, seeding rate, fertilizer application and agronomic work	5 FTCs	By EARO
(300)Farmer training in quality improvement	Farmers in or near 5 FTCs and DA posts	FTC staff guided by woreda experts

(400) Development of marketing information system	Farmers near 5 FTCs and DA posts	Project staff, woreda experts, cooperatives

5.4.7 Wheat

Production

The present emphasis in wheat production is to increase average yield from 15 to 35 q/ha. There are opportunities for contract farming with local ago-industries. This requires establishing linkages and training of farmers on the quantity and quality requirements of the agro-industries.

Table 20- Project support for wheat production

Activity	Target	Responsibility
(200) TOT on soil management, general wheat agronomy management and weed and diseases control	Woreda production team, 5 FTC staff	EARO research station
(200) Supply of demonstration materials on diseases, management (EARO)	5 FTCs	Project in collaboration with EARO and MoARD
(300) Demonstration of quality for agro-processing, soil management, importance of quality seed, fertilizer application	Farmers in or near the 5 FTCs	FTC staff guided and supervised by TOTs and EARO research station
(200)TOT of farmer based seed supply system, avoiding seed mixing, etc	Woreda experts, 5 FTC staff	EARO/CIAT
(400)Development of linkages with agro-industries	Traders, agro-industries	EARO, extension, IPMS
(200)TOT in fertilizer application including K application	Woreda experts, 5 FTC staff	EARO, extension

Input supply

The major problem in input supply is shortage of improved varieties and timely availability and high price of fertilizers

Table 21- Project support for wheat input supply		
Activity	Target	Responsibility
(400) Study the existing farm input supply system and identify potential areas for improvement (including gender and environment)	Farmers near 5 FTCs and DA posts	By project staff in collaboration with Woreda experts and EARO
(200)Demonstration materials for input supply	5 FTCs	EARO and project
(300) Facilitate supply improved seed from EARO DZ centre	Farmers near 5 FTCs and DA posts	Support Woreda input supply with funds provided by the project.
(300) Provide credit fund for on farm seed multiplication	Farmers near 5 FTCs and DA posts	Micro Finance with project funds

Marketing

To contribute to improving the marketing of wheat with a strategy on improving quality with emphasis on agro-industrial use.

Table 22 . Project support quality improvement		
Activity	Target	Responsibility
(400) Study on wheat seed quality at farm	Farmers near 5 FTCS and DA posts	By EARO staff in collaboration with Woreda experts
(200)TOT in quality improvement at the farm and marketing levels	Woreda experts, 5 FTC staff	By EARO staff
(200) Supply demonstration materials on varieties, seeding rate, fertilizer application and agronomic work	5 FTCs	By EARO
(300) Farmer training on market oriented production with special emphasis on varieties which give high value	Farmers in or near 5 FTCs and DA posts	FTC guided by woreda experts
(400) Development of marketing information system and linkage with agro-industry	Farmers near 5 FTCs and DA posts	ILRI theme 3/ Project staff, woreda experts, cooperatives

(200)Training on quality, storage systems	Experts, , 5 FTC staff	EARO, extension/project staff

5.4.8 Pulses (Chickpeas/lentils)

Production

The present emphasis on chickpea production and focuses on both local and export market opportunities. However, there is also a potential to expand lentil production in the Woreda.

Table 23- Project support for chickpea production

Activity	Target	Responsibility
(200)TOT training on soil management, general wheat agronomy management and weed and diseases control	Woreda production team, 5 FTC staff	EARO research station/project staff
(200) Supply of demonstration materials on diseases, management (EARO), new varieties for export	5 FTCs	Project in collaboration with EARO and MoARD
(300) Farmer based seed supply system	Farmers near 5 FTCs and DA posts	EARO/CIAT/input supply and co-opeative desk
(300) Development of linkages with pulse crop exporters	Woreda experts, , traders, agro-industries	EARO, extension, IPMS
(200) TOT on disease and pest control, storage management systems	Woreda experts, 5 FTC staff	EARO, CIAT
(400) Study potential chick pea production	Farmers near 3 FTCs and DA posts	EARO, IPMS, Experts

Input supply

The major problem in input supply is shortage of improved varieties and timely availability and high price of fertilizers

Table 24- Project support for input supply

Activity	Target	Responsibility
(400) Study the existing farm input supply system and identify	Farmers near 5 FTCs and DA posts	By project staff in collaboration with Woreda experts and

potential areas for improvement (including gender and environment)		EARO
(200) Supply demonstration materials on varieties, seeding rate, fertilizer application and agronomic work , posters leaflets	5 FTCs	By EARO
(300) Facilitate supply improved seed from EARO DZ centre and examine private sector involvement with an out-grower scheme for smallholder farmers	Farmer near 5 FTCs and DA posts served by FTCs	Support Woreda input supply with funds provided by the project.
(300) Provide credit fund for on farm seed multiplication	Farmer near 5 FTCs and DA postsserved by FTCs	Micro Finance with project funds
(200) TOT on disease and pest management	Woreda expets and 5 FTC staff	EARO/ consultants/project staff
(300) Farmer training on disease and pest management	Farmers in or near 5 FTCs and DA posts	FTCs guided by woreda experts

Marketing

To contribute to improving the marketing of chickpea with a strategy on improving quality. Emphasis will also be put on the export market.

Table 25- Project support for market/quality improvement

Activity	Target	Responsibility
(400) Study on seed quality/production potential/supply and demand issues	Farmersnear 5 FTCs and DA posts	ILRI theme 3/ EARO/project staff in collaboration with Woreda experts
(200) TOT in quality improvement at the farm and marketing levels	Woreda experts, 5 FTC staff	By EARO staff
(300) Development of marketing information system and linkage with exporters	Farmers near 5 FTCs and DA posts	Project staff, woreda experts, cooperatives
(200) TOT on quality and storage systems	Experts, , cooperatives	EARO, extension/project staff

5.4.9 Irrigated vegetables

Production

There are a number of rivers and creator lakes in the Woreda. Horticultural crops production has been a tradition in about 6 PAs. These are Hidi, Koftu, Godino, Lugo, Goro Guta and Liben Gadula. There is need to improve the capacity of the Woreda staff and farmers in water use efficiency, use and maintenance of irrigation equipment and marketing.

Table 26- Project support for production and NRM

Activity	Target	Responsibility
(200) TOT on vegetable husbandry	Woreda horticulture experts (3) and staff from 6 FTCs	EARO
(200) TOT on irrigation technology, pump repair and maintenance	Woreda irrigation expert (2), horticulture expert (3) and staff from 5 FTC s	IMWI staff
(300) Training on vegetable husbandry, pump repair and follow up program (in FTCs/DA posts) on vegetable husbandry and irrigation	Interested farmers around 5 FTCs/DA posts	FTC staff guided by Woreda/project and IMWI/EARO
(100/200) Supply of demonstration/training materials for FTCs/DA posts including treadle pumps and drip irrigation equipment	6 FTCs/DA posts	Various research organizations, private suppliers

Input supply/credit

At present farmers grow their own planting material and purchase seeds from private shops in Debre Zeit and or Addis Ababa. Farmers use motor pumps and flood irrigation. Innovations will be made for the supply of water lifting (watering cans, treadle pumps) and water distribution systems (drip irrigation). The Woreda has organized about 16 cooperatives. Capacity building in various aspects of horticultural crops production and terms of business operation and credit facilities shall be major activities

Table 27. Project support input supply system irrigated vegetables

Activity	Target	Responsibility

(400) Study to develop innovative input supply system for irrigation water management and distribution technology system	Cooperatives	IMWI/students and project staff
(300) Facilitation of the introduction of the input supply system with capacity building and credit facilities	Cooperatives and or private business	IMWI and project staff with project funds.

Marketing

The marketing of vegetables is for the local market in Debre Zeit and Addis Ababa. A supply and demand study for the vegetables should be made to quantify the potential economic scope for this commodity since an oversupply can easily lead to a drop in prices. To improve the farmers negotiating powers and share of the income derived from the products, innovative methods for organizing farmers into groups (especially women) will be introduced by the project. Improvement in quality, grading and storage shall be introduced.

Table 28 Project support vegetable marketing

Activity	**Target**	**Responsibility**
(400) Study of market supply and demand and market mechanisms for vegetables	Farmers around 6 FTCs/DA posts	Project staff/students with EARO
(200) Training in group formation , quality grading, packing and product storage	Woreda staff (2) and staff from 6 FTCs	Project staff/consultants/
(300) Training on quality grading, packing and product storageand follow up program (in FTCs) in group formation for marketing of vegetables	Farmers (in particular women) around 6 FTCs/DA posts, cooperatives	FTC staff , guided by Woreda and project staff

Table 29. Plan for farmers training by PA and crop commodity

	PA		Teff	Wheat	Chickpea	Lentil	Horticulture
1	Bekojjo		60	60	40		
2	Daimoo		60	60	60		
3	Cheleba Selassie		60	60	60		
4	Dire Sheki		60	60	60		
5	Dire Ararti		60	60	40		

6	Golo		60	60	40		
7	Kajima		60	60	20		
8	Kurkura		60	60	60		
9	Yato		60	60	60		
10	Wajito		60	60	60		
11	Garbicha		60	60	60		
12	Gitche		60	60	40		
13	Udae		60	60	60	20	
14	Gobesay		60	60	20		
15	Denkaka		60	60	60	20	
16	Kaliti		60	60	60	40	
17	Hidi		60	60	60	40	20
18	Katila		60	60	60	40	
19	Deko		60	60	60	40	
20	Kerfe		60	60	60	50	
21	Tulu Dimto		60	60	60	50	
22	Koftu		60	60	60	40	30
23	Godino		60	60	60	30	30
24	Genda Gorba		60	60	60	30	
25	Lugo		60	60	60	40	20
26	Akako		60	60	60	50	
27	Yerer Selassie		60	60	30	20	
28	Goro Guta						20
29	Liben Gadula						20
30	Dulolo Jilo						

5.4.10 Livestock Production

5.4.10.1 Dairy production (butter/milk systems)

Production

In the rural areas, there is a tradition of butter production and marketing at the local markets. In urban and peri-urban areas and in areas where PAs are located along the main road, there is a strong culture of milk production. In addition, the Ada'a-Liben Dairy Marketing Association is playing a key role in strengthening the urban-rural linkage in milk and milk products marketing. The focus shall be to strengthen the dairy association and develop rural dairy production with a strong linkage with urban markets. The Woreda plans to develop the dairy sector in 12 PAs, provide support for the Ada'a-Liben Dairy Marketing Cooperative and establish a strong urban and rural linkage. The PAs to be involved are Yato, Wayetu, Kurkura, Kajima, Dire 1, Gerbicha, Ude, Dekaka, Sirba, Kaliti, Genda Gorba and Godino

Table 30- Project support for dairy production		
Activity	**Target**	**Responsibility**
(200) TOT on dairy cattle management, feed resources development, feeding systems and diseases control	Woreda production team, 5 FTC staff	EARO, ILRI, FVM
(300) Develop a milk processing unit in Debre Zeit town	Ada'a-Liben dairy marketing association	IPMS support
(200) Supply of training materials on dairy production and management	Woreda experts, DAs, FTCs	EARO, ILRI and MoARD
(200) TOT in forage production	Experts, DAs, Farmers in or near the FTCs	ILRI, EARO, CIAT
(200) TOT in basic animal health	Paravets, experts, , 5 FTCs	ILRI, FVM
(300) Farmers training on dairy cattle management, forage production, basic animal health	Farmers near 5 FTC and DA posts	FTCs guided by woreda experts
(300) Develop farmer based animal genetic improvement program	Farmers near 5 FTC and DA posts,	ILRI, EARO
(400) Study the dairy production system and potential for development	Farmers near 5 FTCs and DA posts	IPMS, students
(300) Strengthen feed production and marketing system	Farmers near 5 FTCs and DA posts	Support Woreda input supply and cooperative desk with funds provided by the project.

Input supply

The major problem in input supply is shortage and high price of improved genotypes, shortage of feeds and water, lack of drugs and adequate veterinary services and lack or inadequate handling, processing and storage equipment.

Table 31- Project support input supply		
Activity	Target	Responsibility
(400) Study the existing farm	Farmers near 5 FTCs	By project staff in

input supply system and identify potential areas for improvement (including gender and environment)	and DA posts	collaboration with Woreda experts and EARO
(200) Supply demonstration materials for input supply (improved churner, processing equipments, posters, leaflets)	5 FTC and DA posts	EARO and project
(300) Facilitate supply forage germplasm from ILRI and EARO DZ centre	Farmer near 5 FTCS and DA posts	Support Woreda input supply with funds provided by the project.
(300) Provide credit fund for animal genetic improvement	Farmers near 5 FTCs and DA posts	Micro Finance with project funds
(300) TOT in animal health issues	Selected Para Vets near 5 FTCs and DA posts	Support Woreda animal health experts with funds provided by the project.

Marketing

To contribute to improving the marketing of milk and milk products through formation of strong milk units and cooperatives and strengthening the Ada'a-Liben dairy cooperative to establish a milk processing plant. Emphasis will also be put on increasing productivity per animal and quality and standard of produce for the marketing of high quality dairy products.

Table 32- Project support on marketing milk and milk products

Activity	Target	Responsibility
(400) Study on the dairy production and marketing system	Farmers near 5 FTCs, Da posts	EARO/ILRI staff collaboration with Woreda experts
(200)TOT training in quality improvement at the farm and marketing levels	Woreda experts, 5 FTC staff	EARO/ILRI staff
(300) Farmer training on animal production, milk handling and processing	Farmers in or near 5 FTCs, DA posts	Experts, DAs
(300) Provision of credit to expand dairy production, processing for interested farmers	Farmers near 5 FTCs and DA posts	Project
(300) Establish/strengthen farmers cooperatives for production,	Farmers near 5 FTCs and DA posts, cooperatives	Cooperative desk/

processing and marketing of dairy products		

5.4.10.2 Poultry

Production

In the rural areas, there is a large poultry resource in the Woreda. Production is traditional using local chicken. There is an attempt to introduce improved chicken (RIR) breeds under smallholder conditions for both egg and meat production. The Woreda plans to include this activity in 29 PAs. Marketing is often done at local markets in Debre Zeit and smaller rural markets. The focus in poultry production shall be to strengthen the production and marketing aspect.

Table 33- Project support for poultry production system improvement

Activity	Target	Responsibility
(200) Training in commercial poultry production	Woreda poultry expert and staff from 5 FTCs .and other DA posts	EARO
(300) Farmer training and follow up in FTCs/DA posts on commercial poultry production	Interested farmers in and around 5 FTCs and other DA posts	FTC staff guided by Woreda/ project staff and EARO

Input supply/credit

A major bottleneck for the on farm poultry production is the supply of improved genetic materials, diseases control and the supply of feed. There is limitation in availability of improved breeds. The current poultry package is provision of five chicken per household at 27.50 Birr per chicken and a down payment of 25%. In order to alleviate this problem, the possibility of chicken supply from the EARO Debre Zeit Research centre shall be examined. The station has a capacity to produce about 10,000 chicken per cycle. The project proposes to introduce the Hay box brooder and a supply system will have to be established (the project in the first year may introduce this on a demonstration basis, together with the day old chicks). Some new vaccines have recently been developed which do not require cold chain. (I2 and AV2 and AV4). These vaccines should also be supplied through a private drug supplier (in the first year they may be supplied by the project on a demonstration basis). Training of paravets shall provide the basis for efficient animal health services. An option to be considered for the supply of feed is a private and/or cooperative system.

Table 34- Project support for poultry input supply

Activity	Target	Responsibility
(200) TOT in the use of hay brooders, and vaccines (paravets)	Woreda livestock experts and 5 FTC staff	EARO, project staff

(300) Farmer on the use of hay brooders and vaccines.	Interested farmers around 5 FTCs/DA posts	FTC/DA posts guided by Woreda/project staff and EARO staff.
(300) Supply of hay brooders, day old chicks and vaccines for demonstration purposes	Interested farmers around FTCs/DA posts	Project staff
(200) Supply of demonstration materials including hay brooders.	5 FTCs	Project staff
(300) Credit for interested farmers	Farmers near 5 FTCs and DA posts	Project/microfinance institutions

Marketing

Poultry production (egg and meat) is proposed for 5 FTCs and 24 DA posts. Market for these products are in Debre Zeit, Nazareth and Addis Ababa. A study will be conducted to determine how the existing private market system can be improved, expanded. Group formation may follow depending on the outcome of the study. The project will furthermore introduce some improved egg storage facilities for demonstration purposes.

Table 35- Project support for poultry marketing

Activity	Target	Responsibility
(400) Study existing supply and demand and market mechanism with aim of developing a more detailed market strategy	Farmers and private traders around 5 FTCs and DA posts	ILRI/Project staff/consultant
(200) Training in (women) group formation to improve marketing	Woreda poultry expert (1), staff from 5 FTCs and DA posts	Project staff/consultants
(300) Farmer training and follow up in FTCs/DA posts for group formation	Interested farmers around 5 FTCs	FTC staff guided by Woreda/project staff
(200) Supply of egg storage facilities	5 FTCS	Project/cooperative desk

5.4.10.3 Meat Production (cattle, sheep, goats fattening)

Production

The plan is to fatten 32,344 cattle, 6,168 and 4712 sheep and goats respectively and mainly targeted for the major holidays (Christmas, Easter and New Year). Activity has already started in 29 PAs. The major markets are Debre Zeit, Nazareth and Addis Ababa. However, there is a need to improve quality of produce in order to remain competitive with the nearby Woredas.

Table 36- Project support for meat production		
Activity	**Target**	**Responsibility**
(200) Training in market oriented production	Livestock experts (5) and staff from 5 FTCs	EARO, ILRI and project staff
(300) Farmer training and follow up in FTCs in market oriented production method	Interested farmers in and around 5 FTCs and DA posts	FTC staff guided by Woreda, EARO and project staff
(200) Supply of demonstration/training materials on meat production including posters and leaflets	5 FTCs and DA posts	EARO/ILRI/project staff

Input supply/credit

Input supply systems envisaged for year 1 include provision of forage seed/germplasm, provision of supplies for paravets and credit access for farmers interested in fattening.

Table 37- Project support for meat input supply		
Activity	**Target**	**Responsibility**
(200) Training in fattening	Woreda livestock experts and 29 FTC/DA post staff	EARO, project staff
(300) Farmer training and follow up in FTCs on the use of concentrate feeds .	Interested farmers around FTCs/DA posts	FTC/DA posts guided by Woreda/project staff and EARO staff.
(300) Supply of forage seeds, germplasm demonstration purposes	Interested farmers around FTCs/DA posts	Project staff/EARO
(200) Supply of demonstration materials.	5 FTCs	EARO/ILRI/Project staff
(200) TOT in in livestock disease, withdrawal period after spraying or application of drugs and vaccines, clinical sign	Experts, 5 FTCs	EARO/ILRI/Project staff
(300) Training of farmers in livestock disease, withdrawal period after spraying or application of drugs and vaccines, clinical sign	Farmers near 5 FTCs and DA posts	FTCs guided by woreda experts/EARO/Project staff
(300) Credit to purchase feed, drugs etc for interested farmers	Farmers near 5 FTCs and DA posts	Rural finance/Project

Marketing

The local demand for live animals is considerable in the major urban centres. Simultaneously, the supply of animals should be assessed. Based on this information a marketing strategy will be developed between traders and the farmers. Groups of farmers will be formed to increase the negotiating power of the individuals.

Table 38- Project support on meat marketing		
Activity	**Target**	**Responsibility**
(400) Study the market supply and demand of live animals and market mechanism with traders	Farmers and traders	ILRI/project staff
(200) TOT in the formation of marketing groups	Woreda promotion staff and staff in FTCs/DA posts	Project staff/consultants
(300) Farmer training and follow up (in FTCs) in the formation of marketing groups	Interested farmers around FTCs/DA posts	DA/FTC staff guided by Woreda/ project staff

5.4.10.4 Apiculture

There is a reasonable resource of apiculture in the Woreda. Areas in and near Mount Zequala and Mount Yerer produce a lot of honey. Much of the produce is sold on individual basis directly to consumers in Debre Zeit and Addis Ababa. Some farmers have requested support to develop apiculture

Table 39- Problems and gap in apiculture		
Problem	**Gap**	**Option**
Is this limited to the Zequala-Yerer Axis? What are the species used.	Market study on apiculture	OARI Holetta Bee research centre/ICIPE/Sap-Tech/SOS
Lack of adequate knowledge in apiculture	No qualified expert in apiculture, (Home agent assigned on apiculture), DAs not trained -	Training
No supply of improved beehives, and equipment	Examine possibility of improving apiculture production	EARO/OARI

Table 40- Number of farmer training by PA and livestock commodity							
No	PA	Paravets	Fattening				
			Dairy	Cattle	Sheep	Goats	Poultry
1	Bekojjo	2		50	50	50	50
2	Daimoo	2		50	50	50	50
3	Cheleba Selassie	2		50	50	50	50
4	Dire Sheki	2	50	50	50	50	50
5	Dire Ararti	2		50	50	50	50
6	Golo	2		50	50	50	50
7	Kajima	2	50	50	50	50	50
8	Kurkura	2	50	50	50	50	50
9	Yato	2	50	50	50	50	50
10	Wajito	2	50	50	50	50	50
11	Garbicha	2	50	50	50	50	50
12	Gitche	2		50	50	50	50
13	Udae	2	50	50	50	50	50
14	Gobesay	2		50	50	50	50
15	Denkaka	2	50	50	50	50	50
16	Kaliti	2	50	50	50	50	50
17	Hidi	2		50	50	50	50
18	Katila	2		50	50	50	50
19	Deko	2		50	50	50	50
20	Kerfe	2		50	50	50	50
21	Tulu Dimto	2		50	50	50	50
22	Koftu	2		50	50	50	50
23	Godino	2	50	50	50	50	50
24	Genda Gorba	2	50	50	50	50	50
25	Lugo	2		50	50	50	50
26	Akako	2		50	50	50	50
27	Yerer Selassie	2		50	50	50	50
28	Goro Guta	2		50	50	50	50
29	Liben Gadula	2		50	50	50	50
30	Dulolo Jilo	2		50	50	50	50
31	Sirba	2	50	50	50	50	50

5.5 Recommendations on innovative technology (practices) and institutional innovations (400 series)

A number of studies have been proposed (see RBM code 400 series) to assess technologies, and input output marketing aspects of priority commodities. During the project life the introduction of these innovations will be closely monitored (see 300 activities) to enable the project and its partners to draw up recommendations on technologies and public and private institutional innovations.

Most of the studies on technologies and institutional innovations cut across several PLS and the findings of the studies will be synthesized across these sites. These will be used to draw lessons on the uptake and impact of technology innovations as well

as institutional innovations for marketing (in particular marketing studies and clustering of small farmers with linkages to the larger trade bodies) and the supply of inputs for crops and livestock. Particular attention will be paid to the impact of these innovations on gender and environment. The synthesized findings will contribute to policy recommendations at the federal and regional level.

Besides the studies already indicated, the project will undertake a baseline and follow up study on some key indicators. Such base line data will be gender disaggregated and also include environmental indicators. Guidelines for the baseline data collection can be found in Project implementation Plan.

The project will also prepare environmental briefs for each of the PLS as well as HIV/AIDS and gender studies in 2 Kebelles of each farming system. Guidelines for the preparation of the briefs and the gender and HIV/AIDS studies were prepared by the project consultants and are included in the Annexes attached to the project implementation plan. Planning workshops will be held to present and discuss the findings of the HIV/AIDS and gender studies.

Annex 1. Baseline data

Annex 1.1 - Total land allocated by land type and holdings

Land type	Rural (hectare)	Urban (hectare)
All crop lands	64,088	324
Temporary crop land	59312	321
Permanent crop land	256	3
Grazing land	1495	-
Fallow land	218	-
Wood land	57	-
Other land	2750	-

Source: Federal Democratic Republic of Ethiopia. CACC (Central Agricultural Census Commission) July, 2003

Annex 1.2- Estimates of Area, Production and Yield of Temporary Crops (Meher Season), 2001/02

Crop	Area		production		Yield
	Hectare	%	Quintal	%	Qt/ha
Total	59,115.01	100	778,995.63	100.00	*
Cereal	49,035.48	82.76	658,118.20	82.69	*
Teff	31.572.51	53.25	322,602.53	40.51	10.22
Barley	1,225.83	2.07	16,739.81	2.10	13.66
Wheat	9,803.23	16.53	170,477.95	21.41	17.39
Maize	5,699.93	9.61	138,163.06	17.35	24.24
Sorghum	733.98	1.24	10,134.85	1.27	13.81
Pulses	10,018.28	16.90	114,037.43	14.46	*
Horse beans	2,403.02	4.05	32,453.39	4.08	13.51
Field peas	1,595.25	2.69	15,438.34	1.94	9.68
Haricot beans	1,145.78	1.93	13,753.88	1.73	12.00
Chick peas	3,782.13	6.38	43,706.64	5.49	11.56
Lentils	87.25	0.15	680.47	0.09	7.80
Vetch	837.00	1.41	8,004.71	1.01	9.56
Fenugreek	167.85	0.28	*	*	*
Vegetables	61.25		6,840.24	0.86	*
Green pepper	16.21	.03	1,621.23	0.20	100.01
Root crops	*	*	*	*	*
Garlic	8.13	.01	1,219.41	0.15	149.99

Source: Federal Democratic Republic of Ethiopia. CACC (Central Agricultural Census Commission) July, 2003

***** = Information not available

Annex 1.3- Major livestock holding by holders

Livestock type	Rural	Urban	Total
Total cattle	157,208	3489	160,697
Sheep	20143	2038	22181
Goat	37292	218	37510
Horses and assess	1575	85	1660
Mules	2689	-	2689
Poultry	186,429	4951	191,380

Source: Federal Democratic Republic of Ethiopia. CACC (Central Agricultural Census Commission) July, 2003

Annex 1.4- Problems, knowledge gaps and possible solutions/options for primary crop commodities

Teff			
The current total area under teff cultivation is 63.461 ha and a total of 660,000 qt of harvest is expected. In 2004/5 the Woreda has planned to increase yield to 1,200,000 qt. using the same area of land.			
	Problem	**Gap**	**Options**
	Seed contamination	Need for clean seed supply system	Support farmer-based seed supply system (CIAT)
	Requires heavy cultivation, 6-8 plowing,	Examine application of conservation tillage	Extension to train farmers
	Weeds are serious problems and crop requires intensive hand weeding	Hand weeding, herbicides for broad leaf weeds	Extension follow-up
	Lodging problem	Adjusting planting time, reduced seed rate (opportunity to increase tillers and reduce seeding rate (research has shown that 15 to 50 kg seeding rate/ha - no effect on yield), reduces lodging	Train farmers on low seeding rate, techniques, demonstration to farmers on reduced seeding rate (IPMS to support)
	Lack of high yielding varieties	New varieties to be released in two years time	Support FTC demonstration of new varieties
	Organic teff	Compost making,	Training

	production	manure use	
	Shortage and high cost of fertilizer, inappropriate application of fertilizer	Demonstration on fertilizer application, Cost benefit analysis, site specific soil testing and development of recommendations	Demonstration at FTCs, farmers fields, fertilizer application test
	Soil cresting – problem and farmers increase seed rate	Compacting, leveling	
	Teff requires 6 –7 times plowing in the traditional system; with minimum tillage, no difference on yield. herbicides need to be applied, farmers worried about cost and availability of herbicides	Minimum tillage – plowing once with fertilizer (conservation tillage) – 98 farmers involved in demonstration; field days organized	Herbicide application to contain broad leaved weeds; Economic studies on minimum tillage plus herbicide application
	Blanket fertilizer application rates	Site specific soil test based fertilizer application	Disaggregate yield date on ago-ecology (low, mid and high potential PAs)
	Input supply system to increase production	Organization of the input supply system (fertilizer, seeds, etc) to ensure proper use and application	Examine farmer based seed multiplication system
Wheat			
About 34,000 ha, and 90% of the produce is bread wheat (paven variety – good baking quality, but attacked by rust); An estimated 34,000 ha of land is used for wheat production. There is a great opportunity to expand Durum wheat production. However, farmers complain that the local varieties are low yielders and the price is low. The EARO station has produced new varieties (semi dwarf varieties) that can yield about 3.5 tones per ha and have no lodging problem			
	Problem	Gap	Options
Durum	Lack of knowledge about new varieties, use of different varieties for disease risk	Demonstrate on-farm or at FTCs	Educate farmers on these new varieties, advantages of different mixed
	Poor quality for industrial use, However, interest from East African, Kality, Dire Dawa have high demand, farmers would prefer	D. Wheat should be well drained soils, Ada best location, avoid mixing in the field, Training and education of farmers about quality of	Extension, Research and IPMS to assist and educate farmers

	contractual arrangement, Key for Durem is linkage with agro-industry	produce, establishment of linkage with agro-industries	
	Lack of new varieties and shortage and availability of seed supply (EARO – DZ multiplying these new varieties),	Lack of seed multiplication system	Develop farmer based seed multiplication system, strengthen cooperatives for seed supply
	Lack of contractual arrangement with agro-industry	Strengthen linkages	connect farmers, demonstration on farmers, FTCs
	Seed mixing	Create awareness, train	Training farmers, traders, formation of cooperatives
	Fertilizer rate – below recommendation, no fertilizer; K application	Follow up of field visit and strengthen extension	Research

Chickpeas:
Strategic plan is to increase average yield from 14 to 25 qt/ha in 3 years; Farmers are encouraged to produce the Kabuli varieties due to its export potential. Currently, 30 ha for seed production (Kabuli varieties) -

	Problem	Gap	Options
Chick pea	Farmers use local variety, New varieties require improved management and pesticides	Improved varieties are available at EARO, DZ. All Kabuli (white, smooth) types - Arerti (18-47 qt/ha), Shasho (20 – 40qt/ha), Harbu and Cheffee (25 –40 qt/ha) 100 seed weight 35 g or above (1 tone is 1000 USD; – fetches best price) – potential varieties available Arerti – resistant to fungal diseases, farmers prefer this variety Export opportunity for Dessi types (golden type) 1 tone – 300 USD	Research to provide additional Kabuli germplasm that fulfill the export requirements > 35 g/100 seed
	Lack of seed multiplication system	Knowledge and organization in farmer based seed multiplication system	Support and establish farmer based seed multiplication system
	Diseases, pests,	No resistant varieties are available; management with respect to planting date, some pesticides are available	Research

	Low yield	Plant early using BBM to increases production, but BBM is effective on dry soil, oxen can not pull under wet conditions, late coming weed problem	Popularize, training, BBF, technology, ridge and furrow??
	Lack of contractual arrangement with traders for seed production	Lack of farmer organization to handle this problem	Link farmers with traders and exporters
Lentils	Limited production in Ada'a-Liben, but a lot of potential	Expansion as an alternative	Examine if this is due to shortage of land shortage or markets??
Horticultural Crops (Irrigated) Horticultural crops production (mainly vegetables) is being undertaken in 6 PAs; these are Hidi, Koftu, Godino, Lugo, Goro Guta and Liben Gadula. Farmers use water from rivers and lakes for irrigation. Production system is not coordinated, marketing is poorly handled and there is a loot of wastage. Price fluctuations are critical issues The Woreda has recently organized 16 marketing cooperatives.			
	Problem	Gap	Options
	Shortage and high price of good quality seed	There is a need to provide clean and high quality seed	Link with potential suppliers
	Market problems and price fluctuations	Lack of appropriate study and linkages	Create linkages with potential buyers, value added options, adjust planting time
	Poor irrigation water management	Train farmers and on the job training of experts	
	Shortage/lack of pumps	Involvement of Microfinance and cooperatives	Involve private investors
	Lack of knowledge in pump repair and maintenance	Linkages with private investors	Work with private investors
	Lack of grading, quality control system	Sustainable supply of seed system	Training farmers experts and FTC staff
	Lack of proper storage facilities	Improvement of supply system	Expand Credit system
	Lack of market information	Create linkages	Develop information newtwork
	Transportation problem	Improve rural road	Look for value added options
	Disease and pests	Cultural practice	Use chemical
	Lack of contractual arrangement	Linkages with potential buyers	Strengthen cooperatives and farmer groups

Annex 1.5- Problems and possible solutions for primary livestock commodities

Dairy. The plan is to develop the dairy sector in 12 PAs, provide support for the Ada'a-Liben Dairy Marketing Cooperative and establish a strong urban and rural linkage. The PAs to be involved are Yato, Wayetu, Kurkura, Kajima, Dire 1, Gerbicha, Ude, Denkaka, Sirba, Kaliti, Genda Gorba and Godino		
Problem	**Gap**	**Options**
Poor potential of local animals for milk production	Shortage and price of improved genetic resources for dairy development	Develop community based genetic improvement program, Strengthen AI, bull services, consider farmer AI technicians; examine role of government ranches; strengthen the Ada'a dairy coop to supply improved animals
Feed resources and feeding system	Develop forage feed resources, examine the use of alternative feeds (urea-molasses, multi-nutrient blocks, etc), develop feed conservation systems	Train farmers, provide start-up seed, planting material, develop rural urban linkage in developing feed markets
Poor reproductive performance of cows, poor AI delivery system	Shortage of AI technicians and supplies	Study AI technician requirements, Explore use of bull stations, private AI technicians; improve efficiency of AI technicians through training
Selection of local breeds for crossbreeding	Lack of training of farmers on selection, improvement program	EARO DZ station and ILRI DZ to collectively provide training
Lack of knowledge in improved dairy production	Lack of organized training program for farmers on dairy development	Training in dairy cattle management, milk hygiene, handling, processing, marketing
Shortage of skilled labor,	Knowledge in dairy production and milk handling	Training programs, training materials (focus on women farmers)
High level of product wastage, poor quality, price fluctuations	Lack of linkage with markets, absence of milk collection schemes and processing technology	Training, support from IPMS
Poor animal health services and shortage of drugs	Limited animal health staff, lack of transport and shortage of drugs	Training, organizing, paravets,
Poor and inefficient butter system/milk system	No extension service to improve efficiency of butter production	Examine how we can exploit the genetic make up of the local animals, provision of

	and linkage with market	improved butter churns, organization of market groups
Collective decision and training of men and women	Absence of involvement of both men and women in dairy development programs	Train both women and men
Poultry Plan is to supply 30,000 pullets for egg production (2004/05), Package is 5 pullets/household), so far 7,000 have been supplied, at 27.50 Birr/pullet, down payment is 25%;		
problem	Gap	Option
Shortage of genetic material	Limitation in supply of chicken	Examine IPMS support the multiplication of chicken, hay box, farmer to farmer multiplication of Fayome chicken; examine EARO DZ capacity to provide chicken – (has capacity for 10,000 chicken per cycle)
Supply of limited number of day old chicken and pullets	MoARD is distributing hybrid chicken – problem; Fahome breed can be supplied, hay box technology is available	Any possibility to diversify breeds – RIR, white leghorn, Fayome
Shortage of feed resources	Lack of knowledge on improved feeding practices for egg and meat production	Recommendations on formulae feeds, feeding systems available in EARO
Product quality	Yolk color in commercial eggs not preferred by local consumers	Technologies for improving yolk color available at EARO – eg. Inclusion of pepper spent at 4%
Poor animal health services	Problem of health delivery system, shortage of vaccines	Training of paravets, pilot testing of feed based vaccines
Cost effectiveness unknown to attract more farmers	Lack of knowledge on cost effectiveness of the current poultry package	Examine cost effectiveness of the current poultry package
Reluctance of farmers to joint in poultry package	Targeting specific producers	Focus on specific clients Women, unemployed, landless, disabled, disadvantaged; training
Lack of organized and stratified production system	Lack of knowledge and organization on specialized approach	Organize chick growers, fertile egg producers, paravets (Australian V4, I2 vaccine – using barley/wheat as carriers),

Farmers interested in poultry meat production (broiler) package (day old chick)	Not included in the package; the hay box technology broiler type chicken do n	EARO has a package recommendation on feeding, hay box, health care, use of charcoal,
Improving efficiency of multiplication centre	Study production efficiency	IPMS
Low hatchability of fertile eggs (egg package by the Bureau of Agriculture)	Fertile eggs of RIR from Nazareth have low hatchability. There is no inbuilt insurance system and farmers were penalized Poor management of eggs, time of dispatch of eggs after day 7 reduces hatchability, Thick shell from RIR requires more heat and is difficult for the local chicken to provide, possibility of inbreeding.	Effective egg distribution system, examine farmer based fertile egg production system, Fayome breed could be more fertile
Lack of training for farmers and DAs	Examine training needs of the farmers, experts, DAs	Production of training materials for DAs and farmers
Ruminant Meat Production (cattle, sheep, goats) The plan is to fatten 32,344 cattle, 6,168, 4712 sheep and goats and target the major holidays (Christmas, Easter and New Year). Activity has already started		
Problems	**Gap**	**Options**
Highland goat – good skin quality, but meat darkening, exporters prefer lowland breeds, scale and number available determines, Opportunity for local market	Fattening for local market – opportunity exists	Formation of groups, cooperatives, development of fattening programme, examination of support through provision of credit facility
Limited experience in sheep fattening exists, but technical support required	Lack of knowledge on fattening	Train farmers, DAs on fattening techniques
Health services are weak, liver fluke, gastrointestinal parasites	Improve animal health services	Train paravets
Shortage of feed resources development, molasses, forages,	Lack of adequate supply of feeds for fattening	Organize farmers, involve private sector to supply feeds
Selection of the right genetic materials for fattening mainly from Meki area	Lack of training	Train farmers and DAs on selection of appropriate types of animals for fattening
Experience in cattle (oxen) fattening exists, but market is the limiting factor	Farmers sell on individual basis, traders benefit	Develop market information system, organize farmers, connect with appropriate traders, exporters

Lack of Innovative system of fattening, integration with crop systems –	Training at expert level, DAs, farmers, on technical methods, record keeping	Production of leaflets, booklets, posters, market information system, quality, exchange programs, visits, Market studies for meat production
Poor extension	Lack of proper training materials, manuals,	introduce rewards systems, exhibition etc on fattening,
Changing the mind set in the extension system and planning of targets for fattening	Examine mechanisms and innovative methods in developing plans, feed balance Formulate package for fattening ruminants including the economics	Result shall be available in 2005
Lack of quality and quantity of forages	Examine introduction of forages	EARO-DZ, ILRI – undertake studies

Annex 2. Program of visit to PLS

Annex 2.1- Methodology of PLS plan development

The first step in the PLS planning was the introduction of the IPMS staff with the regional Ministry of Agriculture officials, regional research staff and RALC members. The next step was the introduction of the IPMS team with the woreda office of agriculture administration and technical staff, followed by the creation of a woreda Advisory Learning Committee (WALC), see annex 2.2. The next step was the identification of the major farming systems in the PLS and the potential market commodities within them, together with the WALC members and based on the commodities identified in the strategic plans prepared by the regional and *woreda* agricultural staff. Farming systems and potential commodities were then discussed with the various *Woreda* agricultural service institutions (crop, livestock, natural resources, cooperative department, women affairs and HIV/AIDS officials)[1]. This was followed by field visits to the selected farming systems by teams (two to three) consisting of project staff, project research partners and *Woreda* staff. During these field visits, semi-structured interviews were conducted with field staff (DAs and supervisors) and community members (male as well as female) to explore the nature of the farming system, to identify the major marketable commodities and their production methods/problems (including natural resource management), input supply and marketing arrangements. Problems associated with the production to marketing continuum of the identified commodities were also discussed. Triangulation technique was used in order to validate information. The suitability and possibility of introduction of new commodities was also explored and discussed[2]. The findings of this initial PRA were then summarized, presented and discussed in a 2-day PLS planning workshops (one in each PLS) which were attended by representatives from

the RALC, WALC, *Woreda* experts, DAs, community representatives, male and female farmers, NGOs, and national and international research partners.

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[1] To facilitate this process the project staff had collected/prepared secondary data on the PLS, including GIS referenced maps with bio physical and socio economic data.
[2] The project team prepared guidelines for these PRA of institutions and community members as well as some notes on the different methods to be used for the PRA.

Annex 2.2 List of WALC members and telephone address.

No	Name	Title	Telephone
1	Ato Bekele Soboka	Head, Ada'a-Liben Woreda office of agriculture, chair	333652
2	W/o Birkenesh Wolde	Women's affaire member	
3	Ato Dechasa Aboye	Agricultural and natural Resource Development	338954
4	Ato Solomon Assefa	EARO Debre zeit	338765
5	Ato Assefa Diribsa	Bureau of Agriculture and rural Development	338566
6	Ato Ato Tesfaye Zerfu	Cooperative promotion office	338178
7	Ato Kassahun Abera	Erer Cooperative Union	330191
8	W/o Yeshi Dilgassa	Agricultural and Rural Development	338566
9	Ato Aliye Hussen	Oromiya Agricultural research Institute, member	02-128419
10	Ato Negatu Alemayehu	PLS Research and Development Officer, member	574379/09653945

Annex 2.3. Ada'a-Liben PLS Work Plan Development Workshop Program , August 24-25, 2004. Debre Zeit Town

Date	Time	Topic	Speaker
August 24,04	8.30 - 9:00	Registration of participants	organizers
	9:00 - 9:15	Welcome and Introduction	Mr. Dirk Hoekstra
	9:15 – 9:35	Crop production & marketing	Mr. Dirk Hoekstra
	9.35-9:50	Discussion	Participants
	9:50- 10:10	Livestock production and marketing	Dr. Azage Tegegne

	10:10 - 10:25	Questions/Discussion	Participants
	11:25 - 10:55	Coffee break	Participants
	10:55 - 11:15	Credit	Dr. Berhanu
	11:15 - 11:35	Discussion	Participants
	11:35 - 11:55	Knowledge management	Ermias Sehay
	11:55 - 12:10	General discussion	Participants
	12:10 - 12:30	Capacity building	Ato Berhane Giday
	12:30 - 12:45	Discussion	Participation
	12:45 - 2:00	Lunch	Participation
	2:00 - 2:10	Working group formation	Dr. Berhanu
	2:10-3:30	Working group deliberation	Working group
	3:30 - 4:00	Coffee break	Participants
	4;00-5:00	Working group deliberation continue	Working group
August 25, 04	9:00 -9:20	Crop production and marketing working group report	Working group
	9:20 - 9:40	Discussion	Participants
	9:40 -10:00	Livestock production and marketing working group report	Working group
	10:00 - 10:20	Discussion	Participants
	10:20 - 10:50	Coffee break	Participants
	10:50-1:00	Tour of Debre Zeit research station	Organizers
	1:00 - 2:00	Lunch	Participants
	2:00- 3:30	Work plan development	Participants
	3:30-4:00	Coffee break	Participants
	4:00-5:00	Summing up	Participants

Annex 2.4- Ada'a-Liben PLS Planning Workshop Participants (24 -25 August, 2004)

Sr. No.	Name	Sex	Institution/Position
1	Ato Asfaw Hailemariam	M	EARO
2	Ato Birhane Ayano	F	Farmer
3	Ato Merkiba Debele	F	Farmer/ Dire Arariti
4	Ato Desalegne Mideksa	M	Farmer/Cooperative Chairperson/Dirbote
5	Ato Tesfaye Zerfu	M	Farmer/Cooperatives
6	Ato Taddese Teferra	M	Farmer/Cooperatives Chairperson/ Tirura Chalo
7	Ato Abdi Kebelo	M	Farmer/Cooperatives Chairperson/Denkaka
8	Ato Lemma Wordofa	M	Farmer/Cooperatives/Hidi
9	Ato Taddese Wolde	M	Farmer/Cooperatives/Kurkura Dembi
10	W/o Emebet Kassaye	F	Farmer/DA/Hidi
11	W/o Bogalech Shegena	F	Farmer/DA/Tedecha
12	W/o Tsige Lemma	F	Farmer/Denkaka
13	W/o Mulu Teklemariam	F	Farmer/Hidi
14	W/o Shiwaye Fetawoke	F	Farmer/Hidi
15	Ato Mekonnen Alemu	M	Farmer/Kebele Chairperson/Denkaka
16	Ato Mesfin Yeshitila	M	Farmer/Kebele Chairperson/Hora
17	Ato Wogi Dirro	M	Farmer/Kebele Chairperson/Tedecha
18	Ato Dinku Dadi	M	Farmer/Tedecha
19	Ato Sisay Mersha	M	Farmers Union/Erer
20	W/o Yeshi Dilgassa	F	Home Science
21	Mr. P. Anandajayasekeram	M	IFPRI
22	Ato Erimias Sehai	M	ILRI
23	Mr. Dirk Hoekstra	M	IPMS
24	Dr. Azage Tegegne	M	IPMS
25	Dr. Berhanu Gebremedhin	M	IPMS
26	Ato Abebe Misgina	M	IPMS
27	Ato Kahsay Berhe	M	IPMS
28	Ato Fikadu Tilahun	M	MoARD
29	Ato Berhane Ghidey	M	MoARD
30	Ato Girma Tessema	M	MoARD

31	Ato Aliye Hussen	M	OARI
32	Ato Tamirat Teshome	M	Office of Agriculture
33	Ato Assefa Diribssa	M	Office of Agriculture
34	Bekele Soboka	M	Office of Agriculture
35	Dechassa Aboye	M	Rural Development and Natural Resources
36	Etenesh Legesse	F	Teacher

Annex 2.5 List of farmers and peasant associations visited during the PRA process in Ada'a_Liben PLS

No.	Farmer Name	Peasant Association	Farming System
1	Mekonen Hailu	ERER cooperative union	Vice president
2	Abadi Regassa	Kurkura Denbi	Teff-wheat
3	Getachi Dadi	Kurkura 2	Teff-wheat
4	Berhanu Bedada	Dembi 1	Teff-wheat
5	Alemu Abadi	Kurkura 1	Teff-wheat
6	Tufa Leta	Kurkura 2	Teff-wheat
7	Bekele Gemeda	Dembi 1	Teff-wheat
8	Taddese	Dire	Teff-wheat

Annex 2.6 List of institutions and officials visited during the PRA process in Ada'a-Liben PLS

No.	Farmer Name	Peasant Association	Farming System
1	Negede Admassu	Woreda Administration	V/Administrator
2	Asefa Deresa	Rural Development Bureau	Head
3	Alye Hussen	OARI	Director General
4	Bekele Seboka	OoA	Head
5	Birknesh Wolde	Office of woman's affairs	Head
6	Dechasa Aboye	Natural resource, land use and administration	Head
7	Dr. Solomon	D/Z Research Center	Manager
8	Yeshi Delgassa	OoA	Home Agent

Annex 2.7- Consultation Workshop on Pilot Learning Site, October 19-21, 2004 ILRI, Addis Ababa, Ethiopia

Objective : is to share the findings of previously selected priority commodities at the woreda level and outline specific action plan of work for selected commodities and identified natural resource management activities in four PLSs (Fogea, Atsbi Wenberta, Ada'a-Liben and Dale).

IPMS staff, Mr. Dirk Hoekstra, Ato Kahsay Berhe, Dr. Azage Tegegne, Dr. Berhanu G/M, Ato Ermias Sehai presented results obtained during the PRA process in the above PLSs.

Mr. Jerry Rogers, Mr. David Mac Donald, Misses Clare Bishop Sambrook also gave presentations on result based management, environmental impact assessment and gender and HIV/AIDS respectively.

Working Group

After the deliberations, participants were divided in to PLS groups according to their area of interest and from which PLS they come from. Activity sheet was prepared for discussion by IPMS team on which each group discussed and recorded action plan to be undertaken in the coming one year. These activities had focused on knowledge management, capacity building for institutions, sustainable production and livelihoods and development for each priority commodity. David MacDonald went around the four PLS group and collected some basic information regarding environmental issues and Clare Bishop Sambrook clarified about HIV/AIDS issues in the activity sheet. Dr. Azage Tegegne and Ato Aklilu Bogale led the Ada'a-Liben group. See section 5.4.6-5.4.10.3 of the document "Ada'a-Liben Woreda Pilot Learning Site, Diagnosis and Program Design, January, 2005".

List of sub Working group workshop participants on Ada'a-Liben PLS (19-21 October, 2004), Addis Ababa

Name	Institution
Dr. Azage Tegegne	ILRI/IPMS
Ato Aklilu Bogale	ILRI/IPMS
Ato Million Tefera	EARO
Ato Nigatu Alemayehu	ILRI/IPMS
Ato Asfaw Hailemariam	EARO/NSRC
Ato Aliye Hussen	OARI
Ato Solomon Assefa	EARO
Dr. Mohammed Jabbar	ILRI
Ato Desalegn Debelo	EARO
Ato Bekele Seboka	OoA/Ada'a-Liben
Ato Asefa Dirribsa	OoA/Ada'a-Liben
Dr. Alemu Yami	EARO
Ato Shifa Bollo	Sap-Tech
Dr. Seleshi Bekele	IWMI
Dr. Tadelle Dessie	ILRI
Dr. P. Anandajayasekeram	IFPRI
Ato Abate Tedla	ILRI