

**ATSBI WEMBERTA PILOT LEARNING SITE
DIAGNOSIS AND PROGRAM DESIGN**

October 2004

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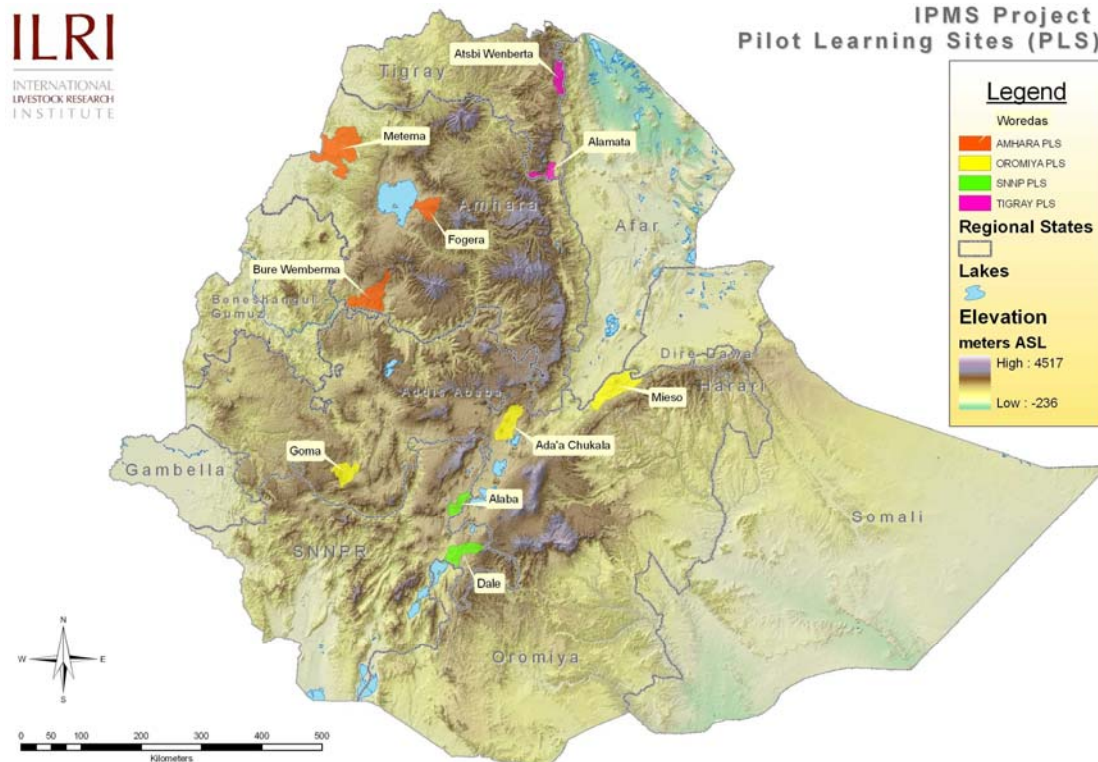
Atsbi Wemberta Pilot Learning Site diagnosis and program design

By IPMS team (names)

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) Atsbi Wemberta 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. Map of Ethiopia with IPMS Pilot Learning Sites (PLS)

2. FARMING SYSTEM, CROP AND LIVESTOCK PRIORITIES

2.1 Description of Atsbi Wemberta Woreda

Atsbi Wemberta is located about 65 km north east of the Tigray Regional State capital of Mekelle. About half of the distance from Mekelle to the capital of the woreda, Endasselassie, is off the main road to the east departing at the town of Agula'e. There are 16 peasant associations and 2 town dwellers associations in the woreda with a combined total of 41,398 household heads. The total population of the woreda was 110578 in 2003/04. Altitude in the area ranges from 918 to 3069 m and 75% of the woreda is upper highlands (2600 masl or above) and only 25% is found in midlands (between 1500 and 2600 masl) and lowlands (below 1500 masl). Lithic Leptosols are the soil types covering nearly 100% in the woreda except in some parts where Vertic Cambisols are also observed. However, the lack of differentiation in the soil types may be due to the scale of the soils map we have used (1:2.0 million).

The total area of the woreda is estimated at 1223 sq. km (Table 1). The areas of the 16 PAs range from 26.5 sq. km. (Hadinet) to 209 sq. km. (Kilesha-Emene).

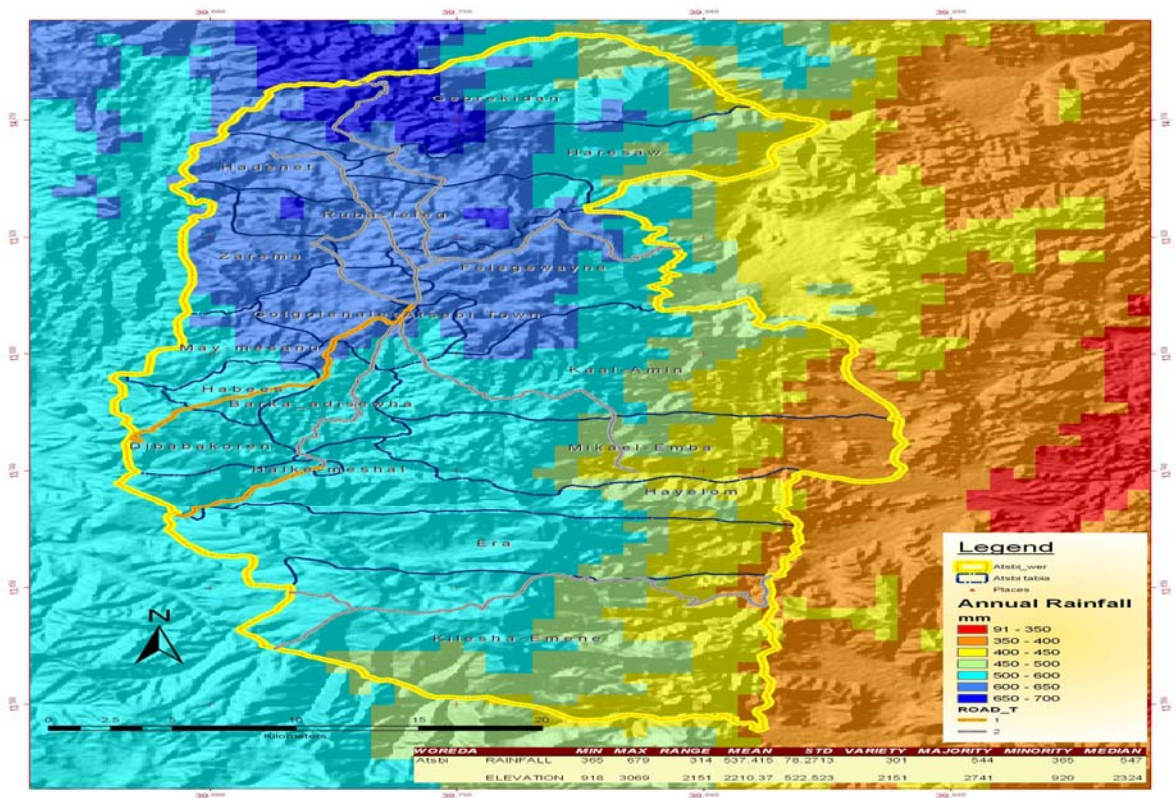
Table 1. Name of Peasant and town association of Atsbi Wemberta Woreda

Number	NAME of PA	Area (km ²)
1	Gebrekidan	117.554
2	Haresaw	72.4274
3	Hadenet	26.4659
4	Ruba-feleg	67.3854
5	Zarema	37.569
6	Felegewayne	75.6813
7	Golgolenalee	45.2806
8	Kaal-Amin	144.064
9	May-mesanu	26.6214
10	Atsebi town	1.00983
11	Barka_adisewha	32.1369
12	Habees	18.7379
13	Dibabakoren	33.2732
14	Mikael-Emba	106.602
15	Hayelom	90.2092
16	Haike-meshal town	1.01707
17	Era	118.122
18	Kilesha-Emene	209.294
	Total	1223.4511

Source: Tigray Bureau of Finance and Economic Development (Planning Department)

Altitude and rainfall increase from south to north and east to west (Map 2 and 3). This woreda is one of those woredas in Tigray that border the Afar Regional State. Shortage of rainfall is a major constraint of agricultural production in the woreda.

Rainfall is usually intense and short in duration. For example, rainfall of 442 mm was recorded for July 2001. The average annual rainfall is (1995/96 to 2002/03) was 642 mm/yr. During 2004, rain started very late, around mid July and only rained for a few days. Under normal conditions, however, rain starts around the last decade of June. As a result of all these, Atsbi Wemberta is one the drought prone woredas in the Tigray region.

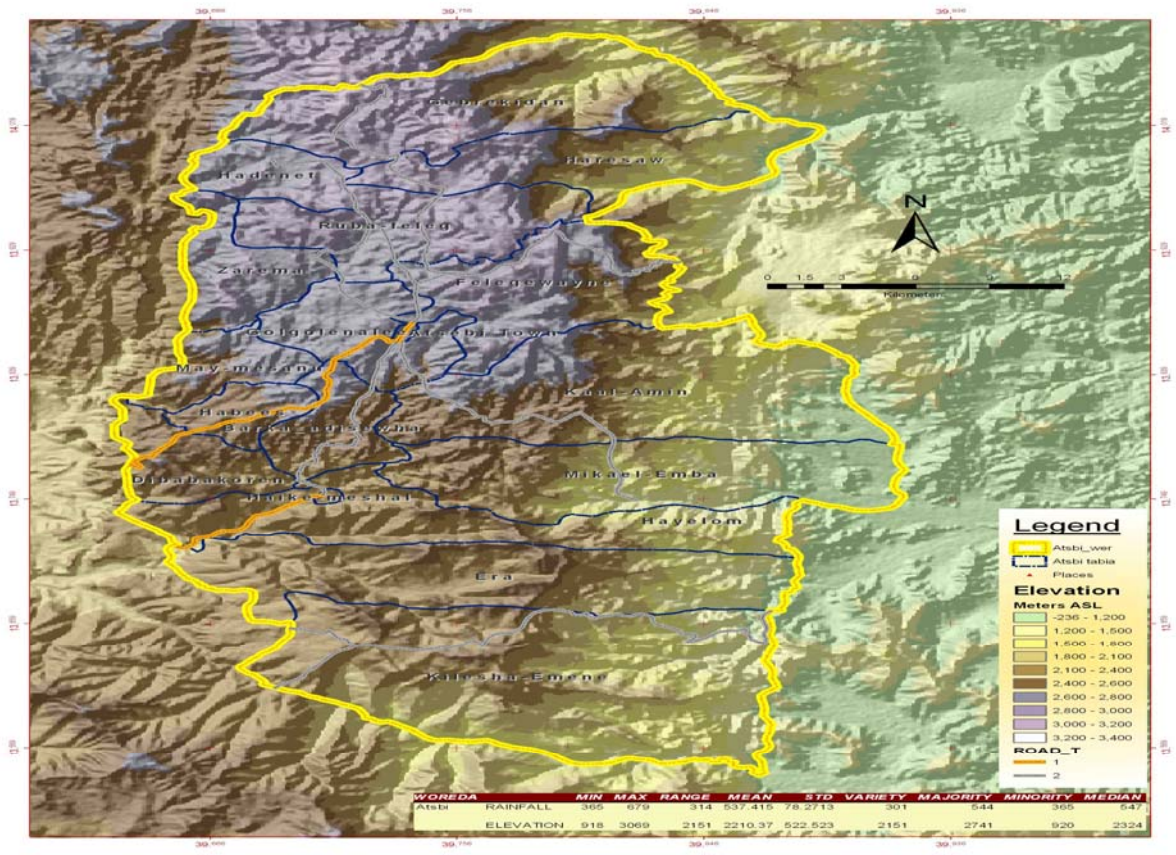


Map 2. Rainfall Map of Atsbi Woreda

The area receives bimodal rainfall: belg (short rains) from November to March and Meher (long rains) from June to September. The short rains are not reliable enough for crop production except for growing short duration barley (locally known as Sae'sa'a), land preparation for the main rainy season and also grass for livestock. The main rains are relatively more reliable than the short rains even though they could also fail as in this year. Nearly all the cereals and legumes are planted during this period.

Livestock are integral component of the farming system. Oxen provide almost the entire traction and threshing power. Despite the large population of livestock, especially sheep, livestock productivity is low as in many other parts of Tigray. As most of the woreda is in the upper highlands, it is suitable for sheep production. Livestock feed is a major limiting factor in the area. However, livestock diseases are also constraints of livestock production in the area, and include pastorolosis, anthrax and black leg on cattle; and lamb skin disease (LSD), external parasite induced diseases like mange mites, stryptotrycosis and demodex on sheep. Of the internal parasites, liver fluke is also a common disease for which farmers usually use tablets.

Each development agent in the woreda specializes in either of the 3 areas of crop production, livestock production or natural resource management. Each PA has 3 DAs (one each for each area). Moreover, twelve of the PAs have home economics agents.



Map 3. Elevation of Atsbi Wemberta

2.2 Priority farming systems

Two major farming systems were identified in the woreda based on observation, secondary data and consultations with farmers and woreda agriculture experts.

1. Barley, wheat, pulses and small ruminants farming system (hereafter referred to as pulse/livestock system)

Nine of the 16 peasant associations belong to this farming system and are found starting from the central southern parts of the woreda to the tip north. Barley is the dominant crop in the area followed by wheat and pulses. For example in 2002/03 cropping season, nearly 50% of the cultivated land was covered by barley and about 25% by wheat. Farmers have developed own could give reasonable yield with only 3-4 showers. The altitude of these PAs in this farming system is mostly around 2600 m asl or higher and as a result of this, frost is one of the major production problems in the area.

The important marketable crop commodities in this area are pulses (faba bean, field pea and lentils, in that order). Sheep fattening, dairy, apiculture (queen rearing) and horticultural crops are also other important marketable commodities in the woreda.

The average household land holding of the area is about 0.5 ha of which about a third of the land area could be covered by the pulses. Lentils fetch higher prices (currently at about 310 birr/100 kg), even though they have lower yield perhaps because they are genetically less productive. Temperate fruits (apple, pear and plum) are also potential fruit crops that could be grown in this farming system.

Regarding livestock production, sheep appear to be more important in this farming system. Goats are also important in the escarpments to the east. Skin and hides are an important commodity in this farming system. Sheep skin comprise of more than 70% of the marketed skin in the woreda. It was reported that the skins in this woreda are of high quality because of their high fiber content. Bee queen rearing is also important in this farming system while honey production is more important in the escarpments to the east. The woreda has a long escarpment of more than 60 km adjacent to the Afar Region. In this farming system it is common to move with beehives in search of feed from the highlands in the west to the mid and lowlands in the eastern escarpments.

2. Teff, wheat, barley, livestock and apiculture system (hereafter referred to as apiculture/livestock system)

This is a farming system where altitude is below 2600 masl and the major crops grown in the area are wheat, teff and barley. This system is found starting from the middle of the woreda to the southern end. There are 7 PAs that belong to this farming system. A good part of the eastern escarpments is known for honey production.

Goat rearing is also a common practice in this farming system, especially to the eastern escarpments but also in the midlands. Apiculture is a common practice in this farming system. Skin and hides is also an important commodity. With the development and increase in the number of irrigation system in the area, horticultural production (tropical fruits and vegetables) is becoming an important activity in this area. New introductions of some mango, papaya and orange fruits are being made. In addition, different types of vegetables are also being introduced to the area. Guava has already been introduced into this farming system and appears to be a potential marketable commodity.

Apiculture is an important source of household income in this farming system. Reports indicate that there are farmers who own up to 100 local beehives in these areas. Currently, there are 6729 bee colonies in the woreda, out of which about 2000 are modern hives. About 80% of the modern beehives are found in one peasant association, Hayelom, found in this farming system. Currently, honey production from local hives is about 5 kg/harvest as opposed to the modern hives which can yield about 20-25 kg/harvest and it is possible to harvest twice a year. Price of white honey could range from 25 Birr/kg to 35 birr/kilogram. At the current price of white honey of about 25 birr/kg in the town of Endasselassie, the value of honey production in the woreda would be about Birr 2.7 million (assuming that all the honey is coming from local beehives and it is white). The income of households who adopt modern beehives can be improved significantly as a result of increased volume and better quality honey production. As a result, improving honey production is one of the priorities in the Strategic Management Plan (SPM) of the woreda.

2.3 Priority crop commodities

Currently, faba bean, field peas, lentils and chickpea are most important marketable commodities for Atsbi Wemberta as has also been identified in the woreda strategic plan. Horticultural crop production (fruits and vegetables) is another potential market oriented activity in the woreda.

Currently, there are about 8, 000 ha of cultivated land in the pulse farming system (9 PAs). Assuming that 30% of this could be under pulses (2400 ha) and 70% of this pulse area is devoted for faba bean, then total area under faba bean would be around 1700 ha and at yield of about 20 quintals/ha, the total production from this system would be around 34,000 quintals. If the remaining area is planted under field peas or the other pulses, the total area would be 700 ha and at about 5 quintal/ha, the total yield would be 3500 quintals of pulses. In total there could be around 40,000 quintals of pulse produced in the woreda from only the pulse farming system. Other than the 9 PAs in the pulse/livestock system, the other 7 PAs do also produce pulses even though the production could be lower.

With the number of water harvesting schemes increasing, especially with the construction of small ponds, horticultural crops, mainly fruit trees (temperate fruits in the pulse/livestock system and tropical fruits in the apiculture/livestock system; and vegetables for both systems), are also becoming important commodities. In the pulse/livestock system frost is an important problem. However, there is a potential of growing temperate fruits like apple, pear and plum, which are frost tolerant. Despite the existence of these fruit tree seedlings, there is a serious shortage of planting materials. Currently, it is World Vision and World Food Programme that are attempting to help these efforts in the woreda. Similarly, in the apiculture/livestock system where frost is not a problem, tropical fruits like mango, papaya, orange and possibly grapes are potential commodities. These fruits, except grapes, are already introduced to the area by the NGOs mentioned above. However, the shortage of planting material for these fruits is series in this farming system. Farmers are keen to grow these fruit trees in areas where there are small ponds. In addition, vegetables like, lettuce, spinach, cabbages, pepper and others are becoming important commodities in this farming system. Vegetables, like lettuce, spinach, cabbages, pepper and others are grown around the water ponds. In the apiculture/livestock farming system, tropical fruits like mango, papaya and orange are also being introduced. Currently, guava has established well and farmers are already benefiting from it.

The most important factor for the development of market oriented crop production in the woreda is agricultural water development (*in situ* water harvesting, well development, pond construction, river diversion, and dam construction). In the months of July and August, rainfall can be quite intensive and is even known for damaging crop stands. Due to poor vegetation of the soil, run-off can also be quite high. The water holding capacity of the soil is also very poor. Following these months, heavy winds contribute to low yields and crop failure. Farmers attempt to cope with the problem by growing short duration crops. Some farmers were

observed sowing, a special variety of barley locally called Sa'e sa'a, which only requires a few showers in September. The proportion of draught oxen to farm household heads is relatively very small, indicating for the need for single ox ploughing as an option, especially because the land holding is relatively small and the soils are also light that it will be possible to operate with an ox.

Hence the market oriented priority crop commodities by farming systems may be identified as follows:

1. Pulse/Livestock farming system:

1st: Pulses (faba beans, field peas, lentils and chick pea)

2nd: Temperate fruits (apple, plum, pear) and vegetables

2. Apiculture/livestock system

1st: Tropical fruits (mango, papaya, orange and grape vines)

2nd: Vegetables

2.4 Livestock priorities

The population of livestock in Atsbi Woreda is 48,870, 72,471, 10,427 and 10,000 heads of cattle, sheep, goats and equines, respectively. The number of poultry is estimated at about 44 000. Out of the cattle population, the Woreda has an estimated 16,319 draught oxen. There are 6,729 beehives of which 2,000 are modern ones.

Livestock productivity is very low. Livestock are left to freely graze during the dry season, but are restricted during the main rain season because of crops. During the wet season where livestock movement is restricted because of crop production, cut and carry is practiced to supplement oxen and dairy cows. However, feed is a major limiting factor of livestock production in the area. There are important livestock diseases in the area that also contribute to the poor productivity of the livestock.

The woreda office of agriculture has distributed about 50 crossbred cows to farmers around Atsbi town. These crossbred cows have calved and farmers indicated that the milk yield of these cows range between 10-15 litres per day, while the yield from local cows is 1-2 litres/day. However, there are a number of issues facing the development of dairy in the area, including diseases.

The apiculture/livestock system has a potential for dairy development as pointed by the Livestock Experts of the Woreda. Farmers are keen and interested to get crossbred Friesian cows for milk production.

The potential of sheep fattening in the Atsbi Woreda is envisaged to be more visible in the pulse/livestock farming system while goat rearing will be more beneficial in the apiculture/livestock farming system. According to the OoA Office in Atsbi, the following PAs have been identified (in order of importance) as having the largest number of cattle: Era, Kelesha, Kal Amin, Micheal Amba, Feleg Weyni and Ruba

Feleg. On the other hand PAs with the highest number of sheep (in order of importance) are Golgel Naele, Feleg Weyni, Haresaw and Ruba Feleg.

Skin and hides are also important market commodities in the woreda as indicated in Table 1.

Table 2. Skin and hides sold

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004
Number	33822	9742	16303	5975	5744	14800	25438	47449	34246

More than 70% of the skin and hides shown here are from sheep. The highest number of skin and hides shown for 2002 was because about 11,000 sheep died due to disease outbreak that year. In addition, the presence of Sheba tannery around the nearby town of Wukro may also have facilitated faster off-take and record keeping. Before the establishment of the tannery, skin and hides were graded and sent to one of the tanneries once in about 6 months. This had an impact on the quality of the commodity due to improper storage, which had caused a lot of reject. In general there is an increase in the number of skin and hides in the woreda. It was reported that the skin from the woreda is of high quality because of its high fibre content.

Hence, the market oriented priority livestock commodities by farming system is as follows:

Pulses/livestock farming system

- 1st: Sheep fattening
- 2nd: Dairy
- 3rd: Queen rearing
- 4th: Hides and skins

Apiculture/livestock farming system

- 1st: Apiculture
- 2nd: goat fattening
- 3rd: Dairy goat
- 4th: Skin and hides

3. INSTITUTIONS

3.1 Marketing

Cooperatives

The woreda cooperatives organization office, organized under 3 teams (cooperatives organization, market and credit, and audit and registration teams) is mandated for the organization and promotion of cooperatives in the woreda. The woreda office has also been mandated for issuing legal entity to the cooperatives since 2003. Prior to 2003 the legal certification used to be granted by the regional office of cooperatives.

The office has 8 experts (including the office head) and a secretary. The organization of the coops starts with convincing farmers to form the cooperative, followed by 3 days training on international principles of cooperatives, the development of bylaws etc. Each cooperative has an executive committee of 5 people, plus 3 other committees of 3 members each, viz. audit committee, education/awareness committee, and credit committee. A purchaser, who is not a member but answerable to the executive committee, is elected by the general assembly. The coops are managed by the elected executive committee and not by hired professional managers. However, there seems to be a plan to move towards hiring professional managers.

There is one multipurpose cooperative in each peasant association (PA), for a total of 16 multipurpose cooperatives in the woreda. These cooperatives were reorganized in 2003/04, since they were considered weak. The reorganization task included updating membership list, identification of inheritors and hiring of employees. All of the multipurpose cooperatives are organized under the new cooperatives organization law (i.e. based on share holder basis and so as private limited companies). The value of one share is Birr 10 and a member can buy more than one share. The combined capital of the 16 multipurpose cooperatives is estimated to be only about half a million Birr, indicating that the financial capacity of the cooperatives is very low. The woreda cooperatives office considers 7 of the cooperatives as model cooperatives in the woreda, and provides special focus to them.

Some of the problems faced by the cooperatives in the woreda include shortage of capital, low grain production and so low volume of grain available to buy, money embezzlement, and low sense of ownership by members. For example, in 2004 all multipurpose cooperatives were audited and about Birr 47 000 was found missing, out of which about Birr 18 000 was recovered and the remaining is in the process of collection.

The cooperatives are engaged in consumer goods supply, grain mill services, input supply, grain marketing and honey marketing. However, not all cooperatives are involved in all of these activities. For example, only 2 of the cooperatives are involved in honey marketing.

Cooperatives buy grain from farmers at harvest time, store it and resell it to members when prices are higher. The sale price to members is, however, lower than the market price. Cooperatives attempt to help their members by providing them protection from too high prices charged by traders during April-June. The cooperatives do not sell the grain outside of their PAs. Some coops even purchase grain from outside of the woreda or the Tigray region. The two cooperatives involved in honey marketing are those in Haikimeshal and Aynalem PAs. However, involvement in honey marketing of these cooperatives is very limited, reportedly due to the difficulty involved in honey handling, packaging and transporting.

Others

Traders from the towns of Mekelle, Wukro and Adigrat buy honey, pulses and other products from the 2 towns of Endasselasie and Haikimeshal. It was reported that the

cooperatives have not been able to compete with private traders well. A price of up to Birr 40/kg of honey from improved beehives has been reported in the woreda.

3.2 Input supply

Input supply unit of the Office of Agriculture

The input supply in the woreda is facilitated by the input supply unit of the woreda office of agriculture. Input demand (need) is first estimated by subject matter specialists, DAs, and farmers together. The tabia (equivalent to PA in other regions) administration is also informed of the input need estimate in its tabia. Estimates are made both for the household package and the regular extension programs. The estimates are submitted to the woreda office of agriculture and through it to the regional bureau of agriculture. The input and credit section of the regional bureau of agriculture is responsible to facilitate input supply at the regional level. The DAs are not involved in the distribution of inputs nor in the collection of credit, but follow up the input supply process in order to ensure farmers have access to the inputs in time, and encourage farmers to repay credit.

Commercial Fertilizer

After the fertilizer need estimates are submitted to the regional bureau of agriculture, the bureau makes arrangements with the supplier (eg. AISCO, Ambassel) for it to send the fertilizer to the woreda. Some times, the fertilizer is unloaded at the regional bureau of agriculture, but more often it is sent directly to the woreda. The regional bureau of agriculture informs the woreda about the amount, type and price of the fertilizer the woreda is getting.

After the fertilizer arrives at the woreda, the woreda input supply unit distributes to the input to farmers either on cash or directly to cooperatives. The cooperatives collect the credit repayment from its members and deposit the money directly in the supplier's account. Coupons are not used for fertilizer.

It was reported that there has not been shortage of fertilizer supply since 2000. There were even some years when there was surplus fertilizer transferred to the next cropping season. It was also reported that fertilizer arrived always in time. There is no mandatory down payment for the fertilizer, although the credit bears interest. Inputs are distributed at 2 sales posts in the woreda: Endasselassie and Haikimeshal.

Improved seeds

After the needs estimate is received by the regional bureau of agriculture, the bureau purchases the seed from the seed supply agency and sends it to the woreda. The woreda input supply unit then distributes the seed to farmers in cash, coupons or through cooperatives.

Generally the need for improved seed of teff and pulses (faba beans, and field peas) is greater than the supply. The supply of wheat seeds seems to be equivalent to the demand. The supply of pulse seeds is much lower than the demand. In the year 2003/04, farmers who obtained credit coupons were not able to purchase pulses seeds because of supply problem.

The supply of horticultural seeds is very limited. The available supply is mostly from the World Vision that operates in the woreda. These seeds include tomatoes, cabbage, carrot, beetroot, onion. Some of the horticultural seeds supplied were found to be beyond their expiry date. Almost all horticulture seeds are purchased in own cash (i.e. no credit), and the quantity and value of the seed purchased is very small.

Chemicals and farm equipment

The supply of chemicals is also very limited. Although the demand is small, the available supply is even lower than the demand. Like the horticultural seeds, the chemicals are also bought in own cash. The supply of farm equipment is very low. This year about 250 treadle pumps were supplied. The treadle pumps supplied through the Bureau of Agriculture cost Birr 428, while those supplied by World vision cost about Birr 1361 and Birr 1708. About 15 treadle pumps were sold in 2003/04. Treadle pumps are sold either in cash or in coupon. The distribution of treadle pumps started in 2000 when 6 were distributed, which were produced by the regional technology promotion centre. It was reported that these pumps were soon unfunctional. In addition to treadle pumps, motor pumps have also been distributed in the woreda, although the amount distributed is very low. It was reported that the motor pumps work better for water wells while the treadle pumps work better for water harvesting ponds. The demand for motor pumps seems to be higher than the supply. However, credit repayment appears to be a problem. For example, It was reported that some farmers who received motor pumps on credit in 1996 have not paid back their loans yet. In one tabia, Hayelom, farmers purchased 23 motor pumps individually.

Another farm equipment being distributed in the woreda is improved beehives. An improved beehive costs about Birr 460.00 When all accessories are included the price is Birr 734.00. About 526 improved beehives have been sold in the Endasselasie sales post only. The number of improved beehives sold at the Haikimeshal post is estimated to be more than 800. All improved beehives were sold in coupon, except about 10 beehives which were sold in own cash at the Haikimeshal sales post. The improved beehives are supplied by the regional bureau of agriculture. World Vision also donates beehives to the woreda office of agriculture. A major problem confronted with the supply of improved beehives is that the accessories do not arrive together with the hive, and usually is incomplete. Generally, the demand for improved beehives is greater than the supply.

Other

There are no private suppliers of inputs in the woreda. Cooperatives are involved in the supply of fertilizer and improved seeds. After the woreda cooperatives office submits the input need in the woreda to the regional cooperative bureau, the regional bureau borrows money from the Ethiopian Commercial Bank in the name of the cooperatives. This money is sent to the woreda office of agriculture. The regional Bureau of agriculture sends the inputs to the woreda office of agriculture, The cooperatives receive the inputs from the woreda office and distribute to their members. The cooperatives then collect loan repayment and deposit in the account of the regional cooperatives bureau.

3.3 Rural Finance

Dedebit Credit and Saving Institution (DCSI)

The Dedebit Credit and Saving Institution (DCSI) is the major supplier of credit and saving services for the rural population in the woreda. Four sub-branch offices provide the service to the rural people. One of the sub-branch offices is located at the capital of the woreda, Endassellassie. The sub-branch offices are supervised by the branch office located in the nearby town of Wukro.

The credit given to the rural areas in the woreda can be classified into two types: Regular credit and household package credit. A farmer cannot get credit of more than one type. Moreover, a husband and wife can not get credit at the same time. The activities for which regular credit is given include the purchase of fertilizer and improved seeds, livestock fattening, poultry production, horticultural production, apiculture, handicraft, and small businesses. The household package credit is attached with the household package extension program. The sub-branch offices give loans in cash or coupon. Loan groups (3-7 people) and loan centers (7-9 groups) are formed at the PA level. There can be several centers in one PA. Before the formation of groups, the sub-branch office gives education and awareness creation to farmers regarding the nature of credit, loan and repayment procedures etc.. Up to Birr 2500/head of credit can be disbursed at first cycle.

Regular credit

There is a credit committee in each PA. The committee is chaired by the loan officer and includes the PA chairperson and vice chairperson, and representatives of PA rural development, women's association, farmer's association, and youth association. The PA credit committee approves credit requests of farmers. The sub-branch office then makes further screening of its own before it disburses credit. For example, farmers with outstanding debts may not be approved for new credit.

After loan request is approved, disbursement document is prepared. The term of the credit is 1 – 2 years, with interest rate of 15%. At third cycle, a borrower can get a loan of Birr 25001 – 5000. The maximum loan in rural areas is Birr 5000. A mandatory saving of 5% of the principal plus Birr 2/month saving is required of borrowers. The savings are now being important sources of loanable fund. It seems that there is no shortage of loanable fund in the woreda.

There is no loan insurance system used. Family members are responsible for loan repayment in case of death of the borrower. The group together with the sub branch office work to get defaulters repay their loans. It was reported that legal litigation has not been found to be effective in loan repayment, as much as social pressure is. The repayment rate of the regular credit to date (for the last 10 years) was estimated to be more than 89%.

The only ineligible category of population for loan are those under the age of 18. Every body else is eligible for loan provided that the person fulfils the requirements of DCSI. The landless and singles can also get credit. However, not all members of a group may be landless.

The Household Package Credit

This credit is tied to the household package extension program. The office of agriculture gives training to volunteer farmers who opted to be involved in the household package extension program. Up to five production activities are included in one package. There is no group formation requirement for the package credit. Farmers take the credit individually. It was reported that 30% of the collateral is provided by the woreda and 70% by the regional administration. The fund for the credit also comes from Dedebit (50%) and the Regional Food Security Desk (50%).

At the Tabia level, a steering committee is established composed of the tabia chair and vice chair, representative of the rural development and the loan officer. The loan committee approves the credit request. The sub-branch office then makes further screening before final approval. Credit given in coupons is used for the purchase of improved beehives, treadle pumps, improved seed and improved poultry. The sub-branch office provides the farmers with the coupon and farmers get their input from the office of agriculture input supply unit.

Cash credit is given for the purchase of dairy cows, bee colony, fattening, fertilizer, local seed, local poultry, and local seed. There is a purchase committee organized at tabia level responsible for ensuring that farmers who got cash credit have in fact bought the inputs for which the credit was intended. The sub-branch office is mandated for the collection of credit repayments and pay to the regional bureau of agriculture. The term of the household package credit is 2 – 4 years, with an interest rate of 9%. The only ineligible category are those under 18 years of age. Currently there are 1950 active clients of the household package credit. There is no mandatory saving associated with this credit. It was reported that there was no shortage of loan fund for the package credit yet.

The credit is expected to be repaid over time. For the 4 years credit, no payment is expected during the first year, only interest is expected to be paid during the second year, interest plus half of the principal is expected to be paid during the third and fourth years each. Simple interest rate is applied, as opposed to the compounded one. Some of the problems encountered by the credit service include lack of transportation facilities, unwillingness of borrowers to pay their loan in time, migration of some borrowers.

The sub-branch offices used to give credit to the cooperatives, However, this credit service has now been terminated.

3.4 Agricultural Extension

The woreda office of agriculture provides agricultural extension services in the woreda. The office has 3 teams: Crop production, livestock production and natural resources management teams. The crop production team also includes the input supply expert, an irrigation expert and an home economics agent, in addition to other experts of crop production. The livestock production team includes experts in quality control (hides and skins, and dairy), an apiculture technician, and an AI technician, in addition to other livestock production experts. The natural resources management

team includes soil and water conservation experts, a biological soil conservation expert, forestry and agro-forestry expert.

Currently each PA has 3 DAs: one each in crop production, livestock production and NRM. Twelve of the PAs also have home-economics agents. Most of the DAs have diplomas and certificates. Fifteen new graduates of TVETs have just joined the office of agriculture. The household package requires that the DAs work in a coordinated manner since a package selected by a household is likely to have components of crop production, livestock production and NRM.

There has not been an extension team organized at the woreda office of agriculture. It was reported that the absence of such a team has resulted in weak supervision, control and follow up of the extension services. Now an extension team leader position has been approved and will be responsible for coordinating the extension activities. There will also be at least 3 extension supervisors who will supervise 5 – 7 DAs each.

There appears to be a tendency to move towards the strategy of getting farmers to adopt technologies completely voluntarily. It has been reported that DAs and Tabia administrators (5 of the tabia council executives) tour house to house to convince farmers to join the household package extension program. Farmers who opted to join will then be given training at the tabia by the subject matter specialists and DAs. Watershed development approach is used in planning the extension activities, because NRM activities in part of a watershed may have implications for other activities in the same watershed. There is a plan to involve 88% of the total 36 098 households in the extension program until 2006. In 2004, 5000 households were involved in the extension program, while the plan was to accommodate 4400. The focus of the extension service currently is on the household packages extension program, based on which the plan is to bring the annual household income to Birr 18, 000 by 2006. Constructing a pond or a water well or having access to irrigation is an integral component of the household extension package. It was reported that the ground water potential in Atsbi may be high. However, technical investigation is needed to confirm it. Further there is no possibility for partial adoption in the household package.

The extension activities are planned on a quarterly basis. During quarter 1 (July – September), impact assessment of the previous extension activities is conducted. During quarter 2 (October – December), activities to convince new farmers to join the extension package is conducted. During quarter 3 (January – March), trainings to volunteer farmers and preparatory practical activities such as constructing ponds, barns etc. by these farmers is carried out. During quarter 4 (April – June), credit delivery and input distribution and related activities are carried out.

Some of the problems faced by the extension system in the woreda include low capacity of experts and DAs, Lack of or shortage of transport facilities, and serious shortage of operational budget. Reluctance of farmers to embrace new and modern technologies was also mentioned as a significant problem. However, it is important to note that farmers usually have real practical and economic reasons for not adopting technologies.

3.5 HIV/AIDS Services

The HIV/AIDS desk was based at the woreda administrator's office but since 2004 the desk has moved to the Health Centre in the woreda. There is a regional HIV/AIDS Prevention and Control Office (HAPCO) and the woreda HIV/AIDS Desk reports to it. The office is operating with only one professional staff (a nurse) and a financial assistant. The activities of the desk include awareness creation, distribution of condoms, mobilization of HIV/AIDS related activities of clinics and health posts, liaising with churches and PA administrations on HIV/AIDS issues. The woreda HIV/AIDS Desk provides budget to school HIV/AIDS clubs, for training of teachers and students; and PAs for HIV/AIDS related activities.

The woreda Health Centre has HIV/AIDS testing clinic, which was established with the help of World Vision-Ethiopia. The spread of the disease is seen deep in the rural areas. The major cause for the spread of the disease in the woreda is mainly prostitution and circumcision of boys and girls using unsterilized equipments. The frequent abduction girls is another cultural practice contributing to the spread of the disease. It seems that the awareness of the HIV/AIDS disease is high but the behavioural change is low. Currently, there are about 30 HIV/AIDS patients identified upon voluntary counselling test (VCT). They plan to volunteer and teach people. However, there is no support for self-support livelihoods of HIV/AIDS orphans and no food supplements to HIV/AIDS patients.

World Vision-Ethiopia (an international NGO) is contributing to the establishment of VCT Centre and the supply of examination equipments and some reagents, training of VCT staff, education of prostitutes and street children and government employees. The NGO has put HIV/AIDS awareness posters deep in the villages and all along the road to Agula and Wukro towns. At present, all PA administrations in the woreda are requiring HIV/AIDS test before marriage. In the woreda, both the priests and Sheiks show strongly resistance against the use of condoms.

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 3. Pulses (Faba bean, field peas, lentils and chick pea)		
Production		
<p>The average land holding in the woreda is around 0.5 ha. The proportion of land under pulses is dependent upon the onset of rainfall. Early onset of rain (May) increases proportion of land under pulses whereas delayed onset of rain decreases land area allotted to pulses. This is because longer period is required by pulses, especially faba bean. For example in 1998, rainfall started around mid July and the proportion of land under pulses was 11%, whereas in 2002, rainfall started early in the season and the proportion of the land under pulses was 21%. However, farmers visited in two peasant associations (Hadnet and Felege Weyni) told us that pulses could cover as high as 30% of the crop land. The over all area under pulses is also small because farmers are facing problems with using these crops as sources of feed. Feeding cattle on sole pulse causes diarrhea and hence are fed to equines instead. On the other hand the straw yield from any of the pulses is also very low. In addition to all other factors, these problems also cause farmers to produce less of it. This proportion could increase provided that the season is favourable, improved seeds are introduced and crops earn better prices.</p> <p>Yield levels of pulses also vary with the seasonal amount and distribution of rainfall. Moisture stress during the reproductive stage (flowering and grain filling) is reported to be critical for yield levels of pulses. For example, in the early days farmers reported that the yield of faba bean could reach up 60 qt/ha during good seasons. Currently however, the average yield is about 20 qt/ha. Seed rate for faba bean is 200 kg/ha. The yield of the other pulses is much lower than faba bean. For example, field pea is reported to yield around 4-6 qt/ha at a seed rate of 60-80 kg/ha. The yield of the other legumes, mainly lentils, is very low because of poor yield and small land allocation in addition to poor soil fertility, bird damage and unreliable rainfall. Weeding is not a common practice, especially with field peas, because of shading of flowers, which will lead to no, or poor seed development. At the same time, field pea plots are not well prepared; they are instead planted at the first ploughing.</p> <p>The over all yield of pulses is very low and this might be attributed to low soil fertility and moisture in the soil, planting of late varieties, which become susceptible to frost, diseases, weeds and insect pests. There has been research on use of inoculums for growing faba bean for some time with EARO/National Soil laboratory.</p>		
Areas which need to be addressed	Potential interventions	Responsibilities/tasks
Abiotic factors (frost and hail)	Development of resistant varieties and/or Use of chemicals	TARI/EARO ICARDA OoA – extension
Soil moisture (excess or shortage)	<i>in situ</i> water harvesting/supplementary irrigation	TARI/EARO

	Drainage mechanisms Develop draught/water logging varieties	ICARDA
Poor yield	Introduce high yielding improved varieties	TARI/EARO
Poor soil fertility/Urea responses when inoculum is insufficient	Use of bio fertilizer, use of DAP	TARI/EARO, OoA
Insect pests (aphids, cut worms and boll worms)	Development of resistant varieties	TARI/EARO ICARDA
	Replacement with new varieties (short duration varieties)	TARI/EARO ICARDA OoA – Extension
	Environment friendly control techniques (eg. farmers use garlic/soap mix spray for aphids, etc.)	ICIPE OoA – Extension ICARDA IPMS- TA
	Use of bio fertilizer	EARO/NSL
Diseases (rust, root rot, chocolate spot and late blight)	Development of resistant varieties	TARI/EARO ICARDA
Bird damage	Use of bird scared	OoA - Extension
Poor cultural practices	Proper seed rate (faba bean), land preparation (field pea and lentil) and weeding (field pea and lentil)	OoA-Extension ICARDA IPMS- TA
Poor post-harvest management	Improvement of storage facilities, use of bio-pesticides	TARI/EARO OoA - extension

Input supply

In general, many of the farmers, development agents and woreda agronomists fully understand the over all lack of improved seeds in the area. There has been an attempt to introduce wheat varieties of which one is performing well (Paven 76). Some 4 km north of the woreda town (Felege Weyni), there was an attempt to demonstrate some big faba bean varieties in a tree nursery. Farmers had asked for the new variety but extension could not avail it. On the other hand one variety of field pea (Tegegneh) was introduced to very few farmers in 2004 cropping season but performance is very poor because of the season and other factors. However, in 2004 cropping season, the Office of agriculture has distributed improved varieties of faba bean (CS 20 Decay), field pea (Tegegneh), chickpea (Marye) and lentil to farmers. The performance is still not known as the crops are not harvested. Furthermore, four improved varieties of faba bean (Tesfa, Mesele, Degaga, Bulga and CS Decay as control) were sown in some FTC for popularization and the basic seeds of improved varieties were obtained from TARI/EARO. Other than this, there have been no improved pulses seed. The government strategy is to increase the production of grain pulses that are acceptable by the export market. Increasing productivity entails the supply of inputs such as fertilizers, seed of improved varieties and other essential inputs (see institutions and policy). Moreover, farmers have also developed own selection mechanisms where by big seeded faba bean (Italian faba bean, no relation to the name but only because the seed size is big) are selected from own fields and further multiplied for the following season. Use of fertilizer on pulses is not a common practice.

Areas which need to be	Potential interventions	Responsibilities/tasks
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addressed		
Lack of improved germplasm	Contract seed multiplication and farmer to farmer seed supply	Seed Enterprise TARI/OoA-extension
Local seed sources are of poor quality (mixture of big and small seeds)	True to type supply of improved seed Increase farmer knowledge on production of quality and true to type seed for next planting season	TARI/EARO Seed Enterprise OoA- extension
No use of fertilizer	Strengthen the already existing techniques of composting	OoA – extension IPMS - TA
	Introduce and supply inoculum for seed dressing	EARO/National Soil Laboratory

Marketing

Cereals are the major crops grown in the area and some of these cereals are also sold in the market but prices are much lower than pulses. Hence pulses are the major sources of cash in the highland areas. After retaining some (for seed and use), they are sold in local markets. The amount of pulses produced is dependent up on rainfall pattern and productivity per unit area is also very low and hence most marketing of these crops is done individually. Private traders do the marketing of pulses and sell to Mekelle, Adigrat and Shire. There are 16 service cooperatives in the woreda and all 16 are registered. The total number of households covered by these cooperatives is 13,742, of which 8253 (60%) are male headed and 5489 (40%) are female headed. These cooperatives have an aggregate capital of about birr 542,016. The capital of the cooperatives is very small which may have contributed to low involvement in marketing of commodities. Over all, the big issue here is however that the woreda is a food deficit area and hence produces are very low. In order to obtain marketable commodities, efforts will be needed to introduce new high yielding varieties along with appropriate technologies. There is no excess grain produced that would go outside of the woreda, except for some pulses. Showing that the area is food deficit.

Prices of the different pulses vary between harvesting (lower) and planting time (higher), but are generally high. For example the price in 2004 was around 230 birr/qt for faba bean and field pea while 310 birr/qt for lentils and linseed, in the woreda. Farmers acknowledge that big seeded faba bean is high yielding and more expensive in price than small seeded ones.

Areas which need to be addressed	Potential interventions	Responsibilities/tasks
Unreliable production due to climatic fluctuations	Contract farming with exporters through Service Cooperative	Exporters (traders) OoA- Extension and TA IPMS - TA
Lack knowledge about export market potentials	Assess export market (including demand for different varieties)	TAMSA (Tigray Agricultural Marketing Support Agency) to study export potential IPMS - TA
Lack linkages with market partners and marketing arrangements missing	Facilitate linkages of farmers with private exporters and develop contract farming with	TAMSA with Regional to organize workshops/meetings

	private sector through service cooperatives	with private sector and facilitate contract farming IPMS - TA
Poor quality grain: problems occur as a result of mixing different sized seeds and early harvesting resulting in poor prices	Train farmers on seed production techniques. Introduce export quality varieties and practice optimum harvesting time	TARI (Mekelle Research Centre) OoA – extension on appropriate harvesting and threshing
Storage problems (weevils)	Assess and introduce different storage technologies	TARI/EARO/ICARDA – technology assessment OoA/Coop – extension
Insufficient capacity of service cooperatives and small traders to enter pulse business	Strengthen the capacity of the service cooperatives and traders to purchase and sell pulses, including collection and storage facilities Link small traders with exporters through organization of guaranteed market and availing loans	TAMSA/Dedebit Coop. Dept to facilitate capacity building and business planning Credit and saving institution to provide loans to purchase crop and finance required infrastructure IPMS - TA

Table 4. Other potential commodities – (temperate fruits - apple, pear and plum), tropical fruits –(mango, papaya, orange, grape vines) and vegetables): - both systems

Production		
<p>There are 2638 small ponds, 3 dams and some river diversions in the woreda, which are used as the main source of irrigation in the area. Prior to the introduction of household ponds in Atsbi, gravity irrigation was the major source of water for vegetables, but presently the small ponds are also used for irrigating vegetables and at the same time the newly introduced fruit trees. According to OoA these are irrigating about 185 ha of land. It is hoped that this will increase with the increase of the small ponds. In support of this effort, World Vision International - Ethiopia (WVI-E) has introduced 4600 seedlings of temperate fruits (apple, pear and plum), which are believed to be frost tolerant. Frost is a major production problem for many crops in the area. In addition to the seedlings, WVI-E has also distributed about 80 kg vegetable seeds which could be grown during the dry season using the existing small ponds, dams and river diversions. Many of the potentially important fruit trees and vegetables were introduced recently along with the introduction of irrigation schemes in the area. World Food Programme (WFP) is also involved in the delivery of horticultural input even though data is not available.</p>		
Areas which need to be addressed	Potential interventions	Responsibilities/tasks
Newness to the technology and lack of knowledge of fruit management	Practical training of DAs and farmers experience exchange programmes (eg. Chenchu and Selale for apple), increased on-farm introduction, evaluation of potential commodities. Introduce appropriate management practices	EARO/ICRAF/WVI-E on farm research, including economic assessment OoA – extension
Lack of technical backstopping and horticultural nursery mainly for fruits in the woreda	Capacity building of staff and farmers, establishment of nursery and identification of experienced farmers from within.	EARO/ICRAF OoA-Extension
Use of small ponds (Horeye) for irrigation difficult	Introduction of efficient Treadle pumps essential	OoA/WVI-E IPMS - TA
Frost is a problems	Knowledge in proper timing of planting to escape frost damage required	OoA
Input supply		
<p>Currently, seedlings are produced in government nurseries with support from WVI-E. The support of WVI-E and WFP in obtaining different planting materials is also acknowledged by the OoA in Atsbi. World Vision alone distributed substantial amount of planting materials in the area (see production) to farmers. For example, during 2003/04 there were over 4600 seedlings of temperate fruits distributed to farmers by WVI - E. Vegetables seeds are very expensive in the area, and at times a kilogram of garlic seed costs more than 400 birr. However, grafted seedling of both the temperate and tropical fruit trees are sold at about 2 birr a seedling, but still demand is not fulfilled.</p>		

Areas which need to be addressed	Potential interventions	Responsibilities/tasks
Lack of sufficient planting materials (seed, seedlings)	Introduce and test different types of new varieties	EARO/ICRAF/WVI-E supply of improved germplasm (see production) OoA – extension
Supply of high quality planting materials (on farm evaluation and market assessment)	On-farm program of multiplication of planting material (fruits)	EARO/ICRAF – TA for establishing cooperative/on farm nurseries system and capacity building including grafting
Marketing		
All the fruits are newly introduced and will require some time before they are ready for marketing. However, market potentials for vegetables may need to be assessed because there will be high number of vegetable growers in the future. Currently marketing of vegetables is done on an individual basis. The marketing of vegetables will also depend, especially up on the longevity of the small ponds built by individual farmers. As at now, because the amount of vegetables produced is not much market may not be a problem.		
Areas which need to be addressed	Potential interventions	Responsibilities/tasks
Lower prices of products as a result of planting at the same time and harvesting at the same time in order to escape frost damage	Strengthen water harvesting and market oriented planting Contract farming for assured prices	TAMSA and Cooperatives to organize contract farming OoA for promoting water harvesting
Market potentials for all fruits and vegetables	Review the existing and potential market for the commodities (fruits, vegetables)	TAMSA and Cooperatives Offices to conduct studies EARO/ICRAF to provide TA OoA
Linkage with market partners	Facilitate linkage between producers, cooperatives and private sector	TAMSA and cooperatives to organize workshops with private sector
Marketing system	Form horticultural market groups and develop contract farming.	Cooperative Department, OoA to facilitate group formation EARO/ICRAF to provide TA on temperate fruits

Table 5. Apiculture**Production**

At Atsbi Woreda there are 6729 bee colonies and are found in all the 16 PAs in the Woreda. The Pulse/livestock areas are known for the multiplication of bee colonies while the apiculture/livestock system is known for the production of honey. Most of the colonies in the apiculture/livestock farming system are bought from the pulse/livestock farming system. Just in the two PAs of Barka Adisubaha and Hayelom, the number of bee colonies number 2200. The number of modern beehives in the same two PAs are 1600 while the rest 600 are the traditional type. The honey production from the modern beehive average from 20-25 kg while 5-8 kg of honey is expected from the traditional beehive. As the queen bee cannot move into the top layer of the modern beehive, the honey is of a higher quality than the honey from the traditional beehive due to the pupa development in the comb.

The quality of the honey from the apiculture/livestock farming system honey in Atsbi Woreda is higher and costs 35 birr per kg, which is higher than the honey produced in the same manner at Wukro Woreda (both from modern beehives), which fetches much less. The lower moisture content of the honey produced from the honey in Atsbi, probably due to the forage type fed by the bees, could be the reason for the higher quality. In a good year of abundant rainfall, the income for a farmer with four modern beehives in the mid-altitude area of Atsbi is estimated to be 3600 birr while his income from the crops (from 0.5 ha land) would be estimated to be 1700 birr. Even though most farmers feel that specialization in bee farming would increase their income they do not want to abandon cultivation of crops and rearing of livestock to minimize risk of failure with just one enterprise. The table below shows the marketing, production, input supply and credit of the honey produced in the mid-altitude areas of Atsbi.

Areas which need to be addressed	Potential interventions	Responsibility/tasks
Bee pests and diseases affecting production	Training of the communities and DAs in the identification and treatment of diseases & pests Study fungus problem on bee forages that affects honey quality (often associated with late harvesting and season)	ICIPE IPMS
Carrying capacity (of forages) for bee colonies not clearly known	Training the communities and DAs about feed management of bees	ICIPE, IPMS, OoA
Queen rearing not properly done thus Bee diseases and pests are problems lower the genetic material of bees	Proper training and skill development for DAs and communities	ICIPE, IPMS
Timely availability of honey extractor during harvesting time affects honey yield,	Organize honey producers cooperatives	Cooperatives OoA
Distance to water source (eg. Tebeb and others major indigenous forages	Improve water and feed availability close to the beehives	OoA

Migration of colonies during drought	Improve water and feed availability Sowing/planting different plant species; supplementary feeding system and strategy, particularly during the dry season (sugar, shuro, etc)	OoA
Honey colony – expensive, current price is about 450 Birr/hives – about 689 Birr with accessories	Train best queen rearing methods to farmers	ICIPE/SOS-Sahel
Bee forages not properly identified to develop management and utilization schedule	Sowing/planting different plant species; supplementary feeding system and strategy, particularly during the dry season (sugar, shiro, etc)	OoA
Lack of strong colonies (50,000 – 80,000 is best). Black and Red species found. Black is strong and drought tolerant, however, yield is higher in red and lacks drought and disease resistant	Other management – proper housing system, adequate protection Identify the best bee types appropriate for the area	ICIPE/SOS-Sahel
Agro-chemicals killing bees	Allocation of specially delineated areas for apiculture production to minimize losses due to agro-chemicals	ICIPE/SOS- Sahel

Marketing

Marketing of honey in the area is carried out individually. Honey traders from the town and other places come to buy honey from Atsbi. There are no honey producers' and marketing cooperatives to facilitate the sell of honey. Plastic and nickel containers are commonly used for handling honey in the area. Color of honey (red, white, medium; red is sour, white is good) is also one of the means of checking the quality of honey in addition to location, taste and consistency in Atsbi.

Areas which needs to be addressed	Potential intervention	Responsibility/tasks
Due to quality, lower prices for honey produced in traditional beehives	Change traditional beehives to the modern ones	OoA
As quantity of honey increases, local markets might not be sufficient	Improve the extraction, the processing and packaging for export possibilities	OoA, ICIPE/SOS-Sahel, IPMS
Other beehive by products such as bee wax, pollen, bee venom not marketed	Build knowledge and skills in extracting, processing and packaging new by products	ICIPE/SOS-Sahel, OoA IPMS
No organized marketing system	Organize honey processing and marketing cooperatives Avail extractor for honey from local hives	OoA ICIPE/SOS-Sahel IPMS - TA
Traders adulterate honey (adding	Ensure proper packaging system to	ICIPE/SOS-Sahel

sugar and besso (flour from roasted barley), mixing with other types of honey, marmalade, banana, fat)	minimize adulteration, mixing Brand name – Atsbi-Womberta Organic, highland honey	IPMS - TA
Consumers suspicious about quality of honey from modern hives	Ensure proper packaging system to minimize adulteration, mixing	ICIPE/SOS-Sahel IPMS - TA
Lack of quality control and standards	Brand name – Atsbi-Womberta Organic, highland honey.	ICIPE/SOS-Sahel IPMS - TA
Poor quality (traditional) of product, Honey from mud hive is poor quality and fetches low price, honey from modern hive attracting much higher price per kg	Ensure price is responsive to market demand and situations Extractor available for honey from local hives	ICIPE/SOS-Sahel OoA IPMS - TA
Input supply		
Six PAs are known for producing honey in Atsbi woreda. Modern beehives are supplied either by the OoA or WVI-E. There are 2000 modern beehives that have been distributed to farmers in the area, mainly through the OoA. There is a well established queen supply system between the highlanders (pulse/livestock system) and the midlanders (apiculture/livestock system) in the woreda.		
Areas which need to be addressed	Potential interventions	Responsibility/tasks
Lack of modern equipment (extractor, queen excluder, smokers, etc)	Establish service cooperatives; establish honey & wax board	OoA IPMS - TA
High price of modern beehives and timely availability has been a problems	Develop local capacity for producing beehives & associated accessories	OoA, IPMS
Hive smoking plant development	Assist farmers' (cooperatives) to have own smoking plant	Cooperative OoA
Bee forage seed/germplasm system; water availability	Selecting the right place when putting beehives; Plant high quality of plant species for bee forage	OoA ICIPE/SOS-Sahel
Post harvest handling, processing, storage system and equipment (Honey extractor)		ICIPE/SOS-Sahel
Credit		
Dedebit saving and credit Institute is the only institute available. There are four independent sub-branches located in the woreda.		
Areas which need to be addressed	Potential interventions	Responsibility/Tasks
Credit limited to 5,000 Birr only and also farmers can not borrow unless repayment is completed		Dedebit (DCSI) IPMS - TA
Group collateral – regular extension (>3 people), HH available for individuals (farmers worried about group collateral)	Avail individual loans	DCSI OoA

Credit process – long, due to shortage of manpower who process, repayment of groups has to be complete, otherwise can not do this on individual basis	Increase manpower to give and help facilitate repayment of loans.	DCSI
There is no insurance if the bee colony disappears.	Modern queen rearing will improve availability	ICIPE/SOS - Sahel OoA
Credit is available but high interest rate (HH – 9%; Regular 12.5%) – limits farmers	Avail other types of loans with lesser interest	DCSI IPMS

Table 6. Dairy		
Marketing		
Milk production is local cow based and is very low. Milk sell is not common because of cultural barriers; instead butter is the marketable commodity. The milk cooperative is very small and very young (small capital).		
Areas which needs to be addressed	Possible intervention	Responsibility
Cultural prohibition of selling milk in the area	Continuous training and discussions with the community that milk can be a better source of income	OoA
As the number of crossbred cows increase Atsbi market will be saturated	Strengthen dairy cooperatives and develop milk processing units; Market study on potential demand and supply of milk	OoA, IPMS - TA
Difficulty with selling male calves from the crossbred cows	Improve off take to other areas and develop fattening schemes	OoA and IPMS
Milk cooperative new and small	Increase number of milk cooperatives for better milk take off	Cooperative Office OoA
Quality control and standards of milk	Training in milk handling, processing and marketing	OoA and IPMS
Production		
Production is local cow based but productivity of these local cows is very low (1-2 l/day). The apiculture/livestock system of Atsbi has a potential for dairy development as pointed out by the Livestock Experts of the Woreda. Farmers are also keen and interested to get crossbred Friesian cows for milk production. There are about 50 crossbred cows that were distributed by the OoA and WVI-E. These crossbred cows have calved and farmers pointed out the milk from these cows range between 10-15 litres per day. But there are a number of issues facing the development of dairy in the area. There is a cultural prohibition of selling fluid milk while other products such as butter are sold.		
Areas which need to be addressed	Possible intervention	Responsibility
Shortage of improved crossbred cows	Strengthen bull stations and improve supply improved breeds	OoA and IPMS
Feed and concentrate shortage for the crossbred cows	Integrate quality forage production with the food crops	OoA IPMS - TA
Animal stocking rates are high	Alternatives for reducing draught animal population should be developed	OoA and IPMS
External and internal parasites are problems (ticks, liver fluke, Pastoroiosis, anthrax and black leg on cattle)	Training and improve skills of the community in the management of dairy animals	OoA and IPMS

Input supply		
Farmers are keen and interested to get crossbred Friesian cows for milk production. The OoA and WVI-E has already distributed about 50 crossbred cows to farmers around Atsbi town. There is shortage of improved cow supply in the area. In addition, there are no bull stations but there are two AI technicians in Atsbi.		
<i>Areas which need to be addressed</i>	<i>Possible intervention</i>	<i>Responsibility</i>
Inadequate veterinary services	Develop community based animal health services	OoA and IPMS
Shortage of crossbred cows	Develop efficient cooperative system for input supply	
If available, crossbred cows are very expensive	Develop efficient cooperative system for input supply	

Table 7. Sheep and goats fattening/rearing		
Production		
Sheep rearing is a common exercise in Atsbi Wemberta and particularly in the pulse/livestock system. There are about 72,471 sheep in the woreda. The potential of sheep fattening in the Atsbi Woreda is envisaged to be more visible in the high altitude areas while goat rearing will be more beneficial in the lower altitude areas. Goats are also important marketable animals in Atsbi, especially in the apiculture/livestock farming system and the escarpments to the east bordering the Afar Region. The total number of goats in the woreda are currently estimated to be 10,427 animals.		
<i>Areas which need to be addressed</i>	<i>Possible intervention</i>	<i>Responsibility/tasks</i>
Poor genetic base	Examine selecting and introducing better local breed	TARI/OoA IPMS - TA
Diseases, lamb skin disease (LSD)	Improve veterinary services Training of paravets and improve skills of the community in the management of sheep	OoA
External parasites	Training of paravets and improve skills of the community in the management of sheep	OoA
Feed and water shortage	Develop and strengthen feed resources and Increase number of small dams	ILRI/OoA/TARI
Poor feeding system and technology	Training including women	EARO/ILRI to provide knowledge/capacity building support Woreda agriculture desk - extension
Marketing		
Sheep are marketed in the local market at Atsbi on an individual basis. The high number of sheep indicates the high market potential for sheep marketing.		
<i>Areas which need to be addressed</i>	<i>Possible intervention</i>	<i>Responsibility/task</i>
Traditional production system, not market oriented by most farmers	Training of farmers on better sheep management techniques	TAMSA OoA
Lack of market information	Develop market information systems	
Limited linkages with traders	Increase linkages with local export market system	TAMSA IPMS - TA
Poor quality of animals for export	See production possible intervention	TARI/OoA
Input supply		
The area is of high potential for sheep rearing, but there are some constraints to develop this industry.		
<i>Areas which need to be addressed</i>	<i>Possible intervention</i>	<i>Responsibility/task</i>

Inadequate veterinary services (shortage of drugs, etc.)	Develop community based animal health services; Provision of loan funds	OoA and IPMS
Lack of better breeds with faster weight gains	Research institutions awaited	TARI/OoA

Table 8. Skin and hides		
Production		
Skin and hides are also important commodities, out of which sheep skin comprises of more than 70% of the marketed skin in the woreda. Traditional processing and handling is the common practice in the area. The presence of Sheba tannery, very close to the woreda, has contributed the increase in take off. As opposed to what was happening prior to establishment of Sheba tannery, skin and hides are graded faster and taken away to the factory. Skin and hides were graded and sent to one of the tanneries in central Ethiopia once in about 6 months and this was affecting the quality. The skin from the area is also of high quality because of high fibre content.		
Areas which need to be addressed	Possible interventions	Responsibility
Poor quality product (lack of knowledge)	Training of farmers and traders, involve Sheba Tannery Establish linkages between producers and Sheba Tannery	Ooa/Sheba Tannery, IPMS - TA
Most products used in the house	Increased number of man power Training of farmers	OoA IPMS - TA
External parasites (LSD)	Increased animal health services	OoA, IPMS TA
Absence of abattoirs	Introduction of village abattoirs	OoA, IPMS - TA
Input supply		
There is shortage of necessary chemicals and tools, which could help, improve the quality of the skin and hides. Salt used for drying the skin and hides are supplied by small traders in the area.		
Areas which need to be addressed	Possible interventions	Responsibility
Slaughter equipments like mobile frames not sufficient	Involvement of cooperatives and Sheba Tannery	OoA Sheba Tannery
Supply of DDT and/or other chemicals to minimize post harvest damage is not available	Improve supply of vet drugs, salt and other relevant chemicals Improve animal health services	OoA
Manpower and spray equipments	Training of paravets (farmers) Improve supply of vet drugs, salt and other relevant chemicals	OoA
Marketing		

As to the other commodities, marketing of skin and hides is made individually. There are no cooperative that buy and deliver to the factory. It is small traders who carry out this activity. The other problem with skin and hides is its seasonality. Most of the skins and hides are produced during holidays as in other areas in the country.

Areas which need attention	Possible intervention	Responsibility
Poor quality product	<p>Include Sheba tannery in the development plan Training, exchange programs, visits, linkage with tanneries, exporters, etc.</p> <p>Involving cooperatives in marketing of skins and hides Involving private sector and cooperatives in collection, processing and marketing</p>	<p>OoA</p> <p>Cooperatives</p>
Lack of market information and lack of negotiating power	<p>Develop market information system, Inclusion of Sheba Tannery and traders in the development plan</p>	<p>Woreda Administration, OoA, Sheba Tannery, IPMS - TA</p>
Inability to collect all skins and hides produced	<p>Involve cooperatives in rural areas in the buying and selling of skins Educate through posters, leaflets and market information around clinics, FTCs, markets Performance based Incentive and reward system to coops</p>	<p>OoA, Sheba Tannery, IPMS - TA</p>
Lamb skin disease (LSD)	<p>Continued training of farmers, availing necessary medicines</p>	<p>OoA</p>
Lack of knowledge of pre, peri and post slaughter of animals on quality of skins produced	<p>Continued training of farmers</p>	<p>OoA</p>
Poor storage facilities	<p>Improved storage facilities Increased take off by Sheba tannery</p>	<p>Ooa</p> <p>Sheba Tannery</p>
Unstable prices	<p>Undertake market studies and develop market information systems</p>	<p>TAMSA to create mechanism of sharing information</p>

5 Outline of program of work Atsbi Wemberta PLS

5.1 Priority commodities and natural resource management technologies

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

Pulses/Livestock farming system

Crops: Pulses (faba bean, field peas, lentils), temperate fruits (apple, plum, pear, grape vine), vegetables (Onion, cabbage, spinach, tomato).

Livestock: Sheep fattening, dairy, bee queen rearing, hides and skins

NRM technologies: soil and water conservation, soil fertility (esp. inoculums for pulses), irrigation water development (wells, ponds, river diversion). The ground water potential in the Woreda was reported to be relatively high and so the prospect for developing ground water for irrigation in this farming system was emphasized.

Apiculture/Livestock farming system

Crops: Tropical fruits (mango, papaya, orange, grape vine), Vegetables (Onion, tomato, cabbage, pepper)

Livestock: Apiculture, Goat fattening, dairy goat, hides and skins)

NRM technologies: soil and water conservation, soil fertility and irrigation water development (wells, ponds, river diversion). The ground water potential in the Woreda was considered to be relatively high and so the need for developing ground water for irrigation in this farming system was also emphasized.

Based on the knowledge captured and the lessons learned during the initial implementation of the innovation program some of the priorities 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. Several information gaps that deserve attention have already been identified in relation to each priority commodity. Annex 1 presents the knowledge gaps pertaining to each priority commodity.

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, 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 Development Sector 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. Woreda Net and Agri Net in Atsbi Wemberta Woreda are not operational because of lack of equipments and lack of trained manpower. There was a plan to train some people for the Agri Net recently but did not materialise. There is a high School with an operational school-Net programme. It is receiving lessons from Educational Media Agency (EMA) in Addis Ababa. There are 20 plasma TVs but only 8 are operational. Transmission of the programme started around September 2004. The remaining 12 plasma TVs lack amplifiers and regulators and not functional. As a result, teachers are working on shifts to fill the gap. Two people were trained for this purpose and are also expecting additional training soon. The school also has 2 computers.

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 9. Project support for PLS knowledge management system

Activities	Target	Responsible
(100) Continuous assessment of current state of knowledge requirements based on field work 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 institutions	Project staff with Woreda Agriculture 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, credit institution, cooperatives office, natural resources development office, and rural infrastructure development office	Project staff
(100) Training of staff in electronic knowledge management**	Office heads, OARD sector heads, extension team leaders, extension supervisors,,	Project staff

* For details see commodity program described in section 5.4.

** Training is suggested on basic computer utilization, data management including introduction to GIS, communication systems and technical support.

Some extension and training materials exist, especially at the regional level. However, they need to be customized to the priority commodities and the PLS level

situation, including the use of inoculums. Moreover, since the focus of the extension work for the priority commodities will be the FTCs, new extension and training materials need to be developed that fit the requirements and operation of the FTCs. Annex 2 presents the type of demonstration materials required for each commodity.

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

In order to introduce the project, and to train 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 staff from 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. One of the critical trainings to be given will deal with innovative methods of agricultural institutional service delivery.

Table 10. Potential Woreda and Regional staff (Training of Trainers) to be included in the innovative methods training

	Number
Woreda Offices	
-Extension supervisors	3
-Office head of OARD	1
-OARD team leaders	4
-OARD sector heads	4
-Input supply experts	4
Cooperatives office	3
Micro finance institutions	4
Women affairs office*	1
Women's association*	1
HIV/AIDS office*	1
Land use planning and environmental protection*	1
Home agents*	17
Regional Office	
Experts at the Extension Department of the regional Bureau of Agriculture and Rural Development	4
Research and extension liaison of TARI/MRC	1

* These trainees are to be included only in the training on gender, HIV/AIDs and environment.

The trained Woreda staff (TOTs) are expected to introduce the innovation concepts to the Development Agents in the FTCs, who in turn will use these concepts during their daily work with the farmers and communities (see section 5.4). Use of these innovative methods by FTC staff will be monitored and evaluated by the project staff and form the basis for adjustment in the TOT 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.

Table 11. Potential Woreda staff to be included in technical training of priority commodities

Office	Priority commodity	Number
Agricultural Development Sector	Pulses, fruits and Vegetables	5
Agricultural Development Sector	Goat and sheep fattening	5
Agriculture development sector	Apiculture, bee forage	3
Agricultural development sector	Hides and skins	3

Natural resources management is crucial in the woreda. In addition to the innovative methods and technical aspects training, specialized training will be given to appropriate Woreda staff on sustainable management of and development of natural resources, including soil and water conservation, soil fertility management (including inoculums), water resources development and conservation for irrigation (ponds, wells, river diversions).

Table 12. Potential Woreda staff to be included in NRM training

Office	Number
Land use planning and environmental protection	7
Agricultural development sector	2
Water resources development office	6

An integral component of the capacity building activities at the Woreda level is the development of the FTCs. In the initial phase the project will support selected FTCs with printed materials and demonstration materials (see 5.2) in support of the priority commodities and supporting NRM technologies (see section 5.4 for details).

While many capacity building activities have been undertaken 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 (see section 5.4).

The project will furthermore set aside some funds for rewarding experts and FTC staff which have 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 arrangement 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 13. Project support for PLS general capacity building support*

Activities	Target	Responsible
(200) TOT training and follow up in innovative methods	Woreda and FTC staff	Project staff and consultants
(200) TOT training and follow up in gender	Woreda and FTC staff	Project staff and consultants
(200) TOT 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 series 300)

The project will concentrate its efforts on introducing innovative technology (practices) and institutional innovations with farmers and communities near Farmer Training Centres (FTC) which have a potential for the identified market oriented priority commodities and supporting NRM technologies. These potentials were identified by Woreda staff during the national planning workshop and will be (re-) assessed during the project's initial implementation phase with the farmers near the FTCs.

Table 14 FTCs with potential for priority commodities and NRM technologies in the pulses/livestock system

FTC	Pulses/NRM	Sheep fattening	Dairy	Horticulture	Hides and skins	Queen rearing
May Mesanu	X	X	X	X	X	X
Golgel Nael	X	X	X	X	X	X
Zarema	X	X	X		X	X
Felegeweyni	X	X	X	X	X	X
Ruba Feleg	X	X	X	X	X	X
Hadinet	X	X		X	X	X
Gebrekidan	X	X			X	X
Haresaw	X	X			X	X
Habes	X	X	X		X	X

Table 15 FTCs with potential for priority commodities in Apiculture/livestock system

FTC	Apiculture /NRM	Goat fattening	Dairy goat	Horticulture	Hides and skins
Kaal-Amin	X	X	X	X	X
Barka Adisewha	X	X	X	X	X
Mikael Emba	X	X		X	X
Hayelom	X	X	X	X	X
DibabKorem	X	X		X	X
Era	X	X		X	X
Kileshe-Emene	X	X		X	X

Five FTCs have been selected for concentrated effort in training and other interventions in the Woreda. In the pulses/livestock system, FTCs at Atsbi, Derea and Habes have been selected. In the apiculture/livestock system FTCs at Haikimeshal and Desea have been selected. The most important NRM interventions required in the Woreda include soil and water conservation; soil crusting, water harvesting; small scale irrigation development; soil fertility management, especially the use of inoculums for pulses, feed resources and grazing land management; and afforestation. Due to the severe degradation of the land resource throughout the woreda, NRM technologies that could address these problems are required across all the FTCs. The selected five FTCs will be used as the focal points for the introduction of the NRM technologies, since the project will not be able to reach out to all the 16 FTCs in the woreda.

It is important to note that an initial set of potential interventions regarding the market oriented priority commodities were determined during the Woreda planning workshop (see chapter 4) and an initial set of activities was designed with regional and woreda representatives and partner institutions in the national planning workshop. However, a further (re-) assessment of these activities will take place with the farmers as an integral part of the PLS initial implementation program.

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

5.4.1 Pulses (faba beans, field peas, lentils and chickpea) (Pulses/livestock system)

Marketing

Since pulses fetch higher prices than cereals in the woreda, pulses are major sources of income for households in the Pulses/livestock system. Farmers sell significant proportion of their pulse produce. Marketing of pulses is operated mainly by private traders. A major marketing problem of pulses is related with the low quality of the produce. In order to improve the marketing of the pulses, therefore, innovations in the marketing system and in improving quality will be pursued together with a strategy for increasing the share of marketed produce. Clustering of farmers and lining them with markets including export markets will be the general strategy pursued. Existing cooperatives will have to be strengthened through the provision of funds for marketing, construction of storage facilities, and training of cooperative staff in pulses marketing. The training will be financed by the project.

At the farm level, improved knowledge (using innovative methods) is to be transferred through the FTCs on improved agricultural practices, including (post) harvest handling. A study of the market requirements and marketing practices of farmers together with the, existing pulses quality, and the export market potential will be conducted to design innovations and a capacity building program for Woreda and FTC staff and farmers. .

Table 16. Project support for pulses marketing

Activity	Target	Responsibility
(400) Study on pulses marketing, quality requirements, and export potential in order to develop innovative marketing strategy	Private traders, farmer cooperatives, pulses and oil seeds exporters association	Project staff, TAMSA, CIAT, EARO IFPRI, students
(200) Training in community based marketing system (using ERI method)	Woreda cooperatives office staff (9), staff of 3 FTCs	CIAT, EARO, MRC
(300) Farmer and cooperative staff training and program follow up (in FTCs) on community based marketing	Farmers and cooperatives in and around the 3 FTCs	FTC staff guided by woreda/project staff and CIAT, EARO, MRC
(200) Training of cooperative staff in purchasing and storage of beans (year 2)	Woreda cooperatives office and staff from 9 cooperatives	CIAT, MRC, EARO and project staff
(300) Facilitate the provision of marketing funds and storage	2 cooperatives	Woreda cooperative office and project staff

facilities through government funds		
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Input supply/credit

Except for the limited effort made to introduce improved varieties of pulse seeds in the woreda, the use of improved pulse seeds is very low. The improved seeds are distributed through the woreda office of agriculture. Increasing pulse production and improving quality requires a steady supply of good quality pulse seeds. Farmer to farmer seed supply will be introduced in selected PAs. Frost is an important production problem for pulses in the woreda. Improved seeds will have to deal with this problem. There is no supply of inoculums for pulse production in the woreda.

In order to increase the supply of pulse seed varieties as required by the market, innovative farmer based seed supply system will have to be developed. The development of new supply system will be based on a study of the current system.

Table 17. Project support for pulses input supply

Activity	Target	Responsibility
(400) Study the existing input supply system	Regional, woreda input supply offices, cooperatives, farmers	Project staff, CIAT, MRC students
(400) Study the need for inoculums	Farmers in and around 3 FTCs	EARO (National Soils Laboratory)
(300) Facilitate supply of improved pulse seeds	Farmers in and around 3 FTCs	MRC, EARO, CIAT, ICARDA, woreda input supply, Project staff.
(300) Facilitate supply of inoculums, if required	Farmers in and around 3 FTCs	EARO-NSL, Project staff
(200) Training in organizing farmer/cooperative seed production system	Woreda crop production team (1 office head, 1 team leader, 5 experts), cooperative input supply (3) and staff from 3 FTCs	CIAT, MRC, EARO, Project staff
(300) Farmer training and program follow up at FTCs in farmer/cooperatives seed supply	Farmer in and around 3 FTCs	FTC staff supervised and guided by Woreda staff, MRC, EARO, CIAT, ICARDA
(300) Provide credit fund for farmer/cooperative seed supply, if required	Farmer in 3 FTCs	Dedebit Micro Finance with project funds
(300) Supply of demonstration materials for farmer/cooperative input supply	3 FTCs	MRC, CIAT, ICARDA EARO

Production and natural resource management

The production of pulses in the woreda is beset by a host of factors. The most notable problems include frost and hail, insect pests (aphids, cut worms and boll worms), and diseases (rust, root rot, chocolate spot, and late blight). Drought/moisture stress is an overarching problem of crop production in the woreda. The project will provide support to contribute to the alleviation of these production problems.

Table 18. Project support for pulses production

Activity	Target	Responsibility
(400) Study existing production constraints	Farmers in and around 3 FTCs	MRC, EARO, CIAT, ICARDA, students
(200) Training on agronomic management (including application of inoculums), diseases and pest control and improved storage	Woreda crop production team (1 office head, 1 team leader, 5 experts) plus staff from 3 FTCs	MRC, EARO, CIAT, ICARDA
(200) Training on soil and water management	Woreda NRM staff (3) and staff from 3 FTCs	MRC/ILRI
(300) Farmer training and program follow up at FTCs in agronomic management of pulse production, including pest disease control; use of bio fertilizers and quality improvement	Farmers in or around 3 FTCs	FTC staff guided and supervised by Woreda, MRC, CIAT, EARO, CIAT, ICARDA staff
(200) Supply of demonstration materials on diseases, pests, cultural practices, and quality control	3 FTCs	MRC, EARO, CIAT, ICARDA and project staff

5.4.2 Fruits (Temperate fruits: apple, plum, pear, in the Pulse/livestock system; and Tropical fruits: mango, papaya and orange, in the Apiculture/livestock system)

Marketing

Fruit production is a new introduction in the area. Hence, there is not much activity in marketing of fruits currently. Before pursuing a commercialisation strategy for fruit production, feasibility study of the production of fruits needs to be conducted. Then, methods to increase the bargaining power of farmers needs to be devised, such as by organizing marketing groups. Support can be given to strengthen such groups. Once these initiatives have started, training will have to be provided on quality improvement (to start in the second year). In this regard strengthening farmer cooperatives will be accorded attention.

Table 19. Project support for improving fruit marketing

Activity	Target	Responsibility
(400) Conduct feasibility/profitability study of fruit production	Farmer in and around 5 FTCs	MRC, ICRAF, project staff, students, Melkassa Research Centre
(400) Study on fruit marketing, including market chain study	Farmers in and around 5 FTCs, surrounding markets including Mekelle	MRC, ICRAF, project staff, TAMSA, students
(200) Training on group marketing (importance and organization)	Woreda cooperative office staff (5) and staff of 5 FTCs	Project staff, consultants, TAMSA
(300) Training and follow up of program (in FTCs) in marketing group formation	Farmers in and around 5 FTCs	FTC staff guided by Woreda/project staff

Input supply

Once market demand for the various fruits is known, the supply of improved planting material has to be organized. Currently, the supply of planting materials is much lower than the demand. The public nurseries at the Woreda and nurseries of the regional Bureau of Agriculture and Rural Development will be used during the first year as sources of planting materials. However, following the input supply privatisation strategy, emphasis will be put on farm seedling production. This will require training of farmers in nursery management and propagation techniques.

Table 20. Project support for input supply fruits

Activity	Target	Responsibility
(400) Study existing input supply system	Woreda office of agriculture, regional bureau of agriculture, farmers in and around 5 FTCs	Project staff, ICRAF, students, Melkassa Research Centre
(200) Training on improvement of nursery management, grafting and other new propagation methods	Woreda nursery experts (3) and staff of 5 FTCs	ICRAF, Mekelle Research Centre (MRC), Regional Bureau of Agriculture (RBoARD), Melkassa Research Centre
(300) Demonstration materials for input supply – nursery management (grafting equipment, watering can, posters, leaflets)	5 FTCs	Melkassa Research Centre, ICRAF
(300) Facilitate supply of	Farmer nurseries around	Woreda input supply

improved seed from various partners	5 FTCs	desk and project research partners, project staff
(300) Training and program follow up at the FTCs in improved nursery management, grafting and other new propagation methods	Interested farmer around 5 FTCs	Woreda nursery expert under supervision and guidance of by Woreda, and MRC/ICRAF/EARO staff
(300) Provide credit fund for on farm nursery, if required	Farmer nurseries around 5 FTCs	Dedebit Credit and Saving Institution with project funds

Production

When the commercialisation of fruit production progresses, issues of produce quality will become more important. These would relate to pest and disease control, and quality of planting materials and their varieties.

Table 21. Project support for improving fruit production

Activity	Target	Responsibility
(400) Study existing fruit production system in particular nursery and fruit arrangement	Farmers in and around 5 FTCs	MRC/ICRAF and project staff, students
(200) Training on pest and diseases and improved fruit production	Crop protection specialist (2) and fruit tree specialist (3) and staff of 5 FTCs	MRC, EARO
(200) Supply demonstration materials including posters and leaflets	5 FTCs	ICRAF, RBoARD, MRC
(300) Training of farmers and program follow up at FTCs for improved crop husbandry	Farmers in and around 5 FTCs	FTC staff guided by woreda experts and project staff

5.4.3 Irrigated vegetables (Pulse/livestock system: Onion, cabbage, Spinach, Tomato and Apiculture/livestock system: Onion, tomato, Cabbage and Pepper)

Marketing

The limited expansion of vegetables in the woreda has a lot to do with the development of water harvesting technologies (ponds and wells) and small scale irrigation schemes (river diversion, small dams). Currently the marketing of vegetables is done on individual basis. Since farmers harvest vegetables at about the same time, prices fall significantly during harvest time. The project will help conduct feasibility study of the commercial production of vegetables. If feasible,

project support for production, input supply and marketing will be provided, as needed.

Table 22. Project support to improve marketing vegetables

Activity	Target	Responsibility
(400) Conduct feasibility study of commercial production and marketing of vegetables	Farmers around 5 FTCs, nearby market towns including Mekelle	Project staff, MRC,, students
(200) Training on marketing group formation, and vegetable marketing	Woreda cooperative staff (4) and staff of 5 FTCs	Project staff, consultants
(300) Farmer training and program follow up (in FTCs) on marketing group formation and vegetable marketing	Groups, cooperatives to be formed	FTCs staff and cooperative promotion desk with the help of project staff
(200) Supply of demonstration/training materials on post harvest handling	5 FTCs	MRC, EARO, Project staff

Input supply

There is no regular supply of vegetable seeds currently. Seeds are supplied in the form of aid by an NGO operating in the woreda- World Vision International-Ethiopia. The woreda office of agriculture also supplies very limited amount of seed through its input supply unit. Small shops also involved in supply of vegetable seeds but are very expensive. In addition quality of seeds has been identified as a major problem of the seed supply of vegetables. Establishing a regular supply of seeds will be the primary task that the project will help put in place. Supply of irrigation equipments is also limited in the area.

Table 23. Project support to improve input supply of vegetables

Activity	Target	Responsibility
(400) Conduct study of input supply (seed, irrigation equipment) system to develop innovative methods	Farmers around 5 FTCs, cooperatives, woreda input supply unit,	Project staff, IWMI, students
(300) Facilitate the supply of inputs (different vegetable seeds, treadle pump, etc)	Farmers in and around 5 FTCs, cooperatives	Woreda input supply, project staff, EARO-NSL
(200) Facilitate the	Woreda vegetable	MRC, EARO, project staff

introduction of improved input supply system, including training	production experts (3), staff of 5 FTCs	
(300) Training and program follow up (in FTCs) in farmer seed production	Farmers in and around 5 FTCs and cooperatives	FTC staff under guidance and supervision from MRC, EARO, project staff

Production and NRM

Since vegetable crops production is relatively new in the area capacity of staff and farmers on vegetable production will have to be improved. Before starting a program of capacity building a study will be conducted on the existing production system.

Table 24. Project support to improve production of vegetables

Activity	Target	Responsibility
(400) Study of existing vegetable production system	Farmers around 5 FTCs	Project staff with MRC staff, students
(200) Training on improved vegetables production, including pest, disease control	Woreda vegetable experts (3) and staff of 5 FTCs	MRC, EARO, project staff
(200) Training on improved water/irrigation management (ponds, wells, river diversions, dams)	Woreda NRM experts (3), and staff of 5 FTCs	ILRI (theme 5), IWMI, project staff
(300) Training of farmers and program follow up (in FTCs) in improved vegetable production, and water management	Farmers in and around 5 FTCs	FTC staff under the guidance and supervision of Woreda and MRC staff, IWMI

5.4.4 Apiculture (Apiculture/livestock system); Queen rearing (Pulses/livestock system)

Marketing

It is reported that Atsbi produces relatively good quality honey in the region of Tigray. However, the honey from traditional beehives is much lower than the honey from modern beehives. Honey is an important source of income for farmers in this farming system. Honey marketing is done predominantly on individual basis, except for the very limited involvement of 2 farmer cooperatives. The project will provide support in organizing group marketing of honey, and training in handling and marketing skills of farmers and cooperatives.

Table 25. Project support to improve honey marketing

Activity	Target	Responsibility
(400) Conduct study on honey marketing	Farmers in and around 3 FTCs, nearby market town, including mekelle, private traders	Project staff with ILRI Theme-3, TAMSA
(200) Training on marketing group formation and organization	Woreda cooperative staff, woreda apiculture experts, and staff of 3 FTCs	Project staff, consultants, SOS-Sahel
(300) Training of farmers and follow up (at FTCs) in group marketing of honey	Farmers around 3 FTCs	FTC staff under the guidance and supervision of project staff, Woreda cooperative and apiculture experts
(200) Training on honey handling, processing and packaging	Woreda apiculture experts and staff of 3 FTCs	Project staff, ICIPE, SOS-Sahel
(300) Training of farmers and follow up (at FTCs) in honey handling, processing and packaging	Farmers around 3 FTCs	FTC staff under the guidance and supervision of project staff, Woreda cooperative and apiculture experts

Input Supply/credit

One of the most important inputs for honey production is bee colony. Modern beehives have started to be supplied in the woreda. However, problems ranging from quality to unavailability of accessories are real concerns of farmers. The shortage of bee forage was also mentioned as an important constraint. The project will provide support in alleviating the input supply problem faced by honey producers.

Table 26. Project support for improving honey input supply

Activity	Target	Responsibility
(400) Conduct study on the existing input supply system (beehives and accessories, bee colony, bee forages etc.) to develop innovative methods of input supply	Farmers in and around 2 FTCs, woreda input supply, cooperatives	Project staff, students
(300) Facilitate the supply of inputs (bee hives and accessories, forages, honey processing, etc.)	Farmers in and around 2 FTCs	Cooperative office, woreda input supply, project staff
(200) Facilitating the introduction of input supply system, including training	Woreda input supply, cooperative office, and staff of 2 FTCs	Project staff, consultants

(300) Farmer training and program follow up in the introduction of improved input supply system	Farmers in and around 2 FTCs, cooperatives and private businesses	FTC staff under guidance and supervision of woreda experts and project staff
(200) Training in appropriate queen rearing and farmer to farmer supply	Woreda apiculture experts and staff of 2 FTCs	ICIPE, MRC,
(300) Training and program follow up on improved queen rearing practices and farmer to farmer supply	Farmers in and around 2 FTCs in the Pulses/livestock system	FTC staff under guidance and supervision of woreda experts
(200) Supply demonstration materials like bee forages, improved bee hives, manuals on honey and wax utilization, processors, extractors, casting, mould, uncapping fork, protective etc.	Farmers in and around 2 FTCs	SOS Sahel/ICIPE/MRC/Woreda Office of agriculture/IPMS project

Production and NRM

The major production constraints of honey production in the woreda include pests and diseases and shortage of bee forage. Other constraints include shortage of improved beehives and accessories, and colonies. The project will provide support to contribute to the alleviation of these constraints.

Table 27. Project support for improving honey production

Activity	Target	Responsibility
(400) Conduct study on the existing honey production system	Farmers in and around 2 FTCs.	Project staff, ICIPE, MRC, SOS-Sahel, Students
(200) Conduct training on improved honey production and management (including pests and diseases management, bee forage development, honey harvesting, extraction, processing, ,etc.)	Woreda Apiculture experts (3), and staff of 2 FTCs	ICIPE, MRC, SOS-Sahel
(300) Farmer training and program follow up on improved honey production and management, and honey extraction and processing	Farmers in and around 2 FTCs	FTC staff under supervision and guidance of project staff, ICIPE, and SOS-Sahel

5.4.5 Dairy (Cattle: Pulses/livestock system; Goats: apiculture/livestock system)

Marketing

There is potential for the commercialisation of milk and meat products in and around the capital of the woreda, Endassellassie. Potential to develop dairy goat production also exists in the apiculture/livestock system. A dairy cooperative exists in the woreda capital, although its activities are limited. Local cows are used for milk production. Limited effort has been made to introduce crossbred dairy cows. It was reported that a milk processing plant would be established in Mekelle town to serve milk producers within the radius of 100 km from Mekelle. Atsbi falls within this radius and would benefit from the establishment of the plant. Project will make contributions to improve the marketing of milk and milk products in the woreda.

Table 28. Project support for dairy marketing

Activity	Target	Responsibility
(400) Feasibility study on milk supply and demand and processing, including possible market mechanisms and structures	Farmers/cooperatives in and around 5 FTCs, and the planned milk processing plant	ILRI-Theme 3/students and project team
(200) Training on milk collection, processing, and handling including transporting	Woreda livestock experts (5) and staff of 5 FTCs	ILRI, project staff
(300) Training and follow up program (in FTCs) for milk collection, processing, and handling including transporting	Farmers in and around 5 FTCs/cooperative staff	FTC staff guided by Woreda and project staff
(300) Facilitate loans for purchasing of collection and processing equipments (year 2)	Farmers in and around 5 FTCs/Cooperative structures in 5 FTCs	Cooperative promotion office and project staff (project may consider funding part of the credit through existing institutions)

Input supply/credit

The supply of inputs and services for the dairy system are mainly in the hands of government and the project will aim at introducing/strengthening of innovative systems for input and service supply. Since production is based on local cows, milk yield is very low. The supply of improved dairy breeds or crossbred cows is very limited. Innovative ways of input supply, including breed supply, is critical to improve dairy production in the woreda.

To improve the supply of drugs and veterinary services for dairy and other animals, the existing input supply system will be studied during the first year. Innovative approaches for privatization of these services will be introduced/supported in the second year, including the sale of drugs and veterinary services from private (licensed) shops or cooperatives. The project may also support these innovative activities (if required) through capacity building of staff from cooperatives and/or the private sector.

Feed is one of the major problems of dairy production in the woreda. In order to improve the supply of (protein rich) feed for the dairy animals the project will support innovations in the seed multiplication system. The supply of concentrates for animals is also very limited; project will attempt to facilitate the supply of concentrates.

Table 29. Project support input supply dairy system

Activity	Target	Responsibility
(400) Study the existing supply of dairy cows (both local, improved and crossbred) in order to develop innovative ways of supply	Farmers in and around 5 FTCs, cooperatives	ILRI/ students and project staff
(200) Facilitate the establishment of improved supply of dairy breeds, including, if required bull stations	Woreda input supply experts, Cooperatives	Woreda office of agriculture, cooperatives office, project staff
(300) Provide credit funds for expansion of bull station, if required (year 2)	Future private bull station owners in and around the 5 FTCs	Dedebit Micro Finance with project funds
(400) Study the potential for privatisations of the supply of drugs and veterinary service based on potential demand	Existing program and farms in and around 8FTCs	ILRI/ students and project staff
(300) Facilitate the establishment of private/cooperative vet. drug and services, if required	Private business, cooperatives	Cooperative office, project staff, woreda administration
(400) Study the existing fodder multiplication system with the aim of developing an innovative system involving farmers and cooperatives and or private enterprise	Farmers involved in the multiplication of fodder seeds and planting materials	ILRI/CIAT/students project staff
(200) Training in on farm production of fodder species	Woreda input supply desk (1) and staff of 5 FTCs	ILRI/CIAT project staff
(300) Supply of fodder species	Farmers in and around 5 FTCs	ILRI/CIAT with project funds
(300) Training of farmers and cooperatives (in FTCs) in the development of a farm based	Farmers in and around 5 FTCs, cooperatives	FTC staff, guided by Woreda/project staff

fodder seed multiplication scheme		
(300) Provide credit funds for the purchase of forage seeds by cooperatives (if required)	Dairy cooperative	Dedebit microfinance with project funds

Production

To commercialise dairy production, attention will have to be paid to pest and disease control (also important for the quality of the hides), feeding, housing and post harvest processing and storage. The project will support this activity through capacity building program. Capacity will also be build for the integration of fodder species into the existing farming system. A study will be conducted to assess the present practices.

Table 30. Project support for dairy production

Activity	Target	Responsibility
(400) Study on the existing dairy production system	Farmers in 5 FTCs, dairy cooperative	ILRI, project staff
(200) Training in improved dairy production including pest and disease management	Woreda livestock experts (5) and staff of 5 FTCs	MoARD/ ILRI, project staff
(300) Farmer training and program follow up (in FTCs) for improved dairy husbandry	Farmers in and around 5 FTCs	FTC staff guided by Woreda/project staff and MoARD /ILRI staff
(400) Study of existing on farm fodder production system in particular spatial arrangements	Farmers in and around 5 FTCs	MRC/woreda livestock experts, students and project staff
(200) Training in improved on farm fodder production	Woreda livestock experts (5) and staff of 5 FTCs	RBoARD/MRC, ILRI
(300) Farmer training and program follow up (in FTCs) for improved on farm fodder production	Farmers in and around 5 FTCs	FTC staff, guided by Woreda/project staff and MoARD, MRC, and ILRI.
(200) Supply of demonstration materials including posters and leaflets on dairy production	5 FTCs	ILRI

5.4.6 Fattening (Sheep: Pulses/livestock system; Goats: apiculture/livestock system)

Atsbi is an important supplier of sheep and goat for meat for the nearby towns of Wukro and Adigrat, and the town of Mekelle. The quality of sheep and goat from Atsbi is considered high in the region of Tigray. However, the supply of sheep and goat for meat from the woreda is facing important marketing, input supply and production constraints. The project will attempt to provide support to contribute to the alleviation of these constraints.

Marketing

Sheep and goat are marketed in the local market. Private traders buy animals from the woreda for sale in nearby towns, including Mekelle. However, the production system can not be described as adequately market oriented. The project will provide support for the improvement of sheep and goat marketing from a commercial orientation point of view.

Table: 31. Project support for improved marketing of sheep and goats

Activity	Target	Responsibility
(400) Conduct study on sheep and goats marketing system, including export potential	Farmers in and around 5 FTCs, Cooperatives	ILRI, TAMSA, students, Project staff
(200) Training on market oriented production	Woreda livestock experts (5), staff of 5 FTCs	ILRI, RBoARD,
(300) Farmer training and program follow up (in FTCS) on market oriented production of sheep and goat	Farmers in and around 5 FTCs, cooperatives	FTC staff supervised and guided by woreda experts, and staff of RBoARD, ILRI
(300) Develop linkages with traders and potential exporters	Farmers in and around 5 FTCs, cooperatives	TAMSA, Project staff
(200) Training of group formation for sheep and goat marketing, if required	Woreda livestock experts (3), Cooperative office	Consultants, project staff
(300) Farmer training and program follow up (in FTCs) in group marketing of sheep and goat	Farmers in and around 5 FTCs, cooperatives	FTC staff supervised and guided by woreda experts and project staff

Input Supply/credit

As in the dairy sector, the sheep and goat fattening is based on local breeds. There is inadequate supply of inputs such as veterinary services and drugs, fodder seeds,

and improved breeds. The project will attempt to provide support to the alleviation of these constraints.

Table 32. Project support for input supply/credit sheep and goat production

Activity	Target	Responsibility
(400) Study the input supply system in order to develop innovative improvements	Farmers in and around 5 FTCs	Project staff, woreda input supply
(300) Facilitate improved input supply, including improved breeds	Farmers in and around 5 FTCs	Woreda input supply unit, cooperative office, project staff
(200) Training on community based livestock health services	Woreda livestock experts (5), staff of 5 FTCs	ILRI, RBoARD, Project staff
(300) Farmer training and program follow up (in FTCs) on community based livestock health services	Farmers in and around 5 FTCs	FTC staff supervised and guided by ILRI, staff of RBoARD, and project staff

Production

The production constraints of the sheep and goat production in the woreda include poor genetic base, diseases and parasites, and feed shortage. Project will attempt to intervene in these areas in order to help establish an improved and market oriented production system.

Table 33. Project support for sheep and Goat production

Activity	Target	Responsibility
(400) Conduct study on the current production system	Farmers in and around 5 FTCs	ILRI, RBoARD, Project staff
(200) Training on improved sheep and goat production, including disease and pest management, and feed production	Woreda livestock experts (5), Staff of 5 FTCs	ILRI, RBoARD, Project staff
(300) Farmer training and program follow up (in FTCs) on improved sheep and goat production	Farmers in and around 5 FTCs	FTC staff under supervision and guidance of ILRI and project staff and staff of RBoARD
(300) Farmer training and program follow up (in FTCs) on on farm fodder production	Farmers in and around 5 FTCs	FTC staff supervised and guided by ILRI and project staff, and staff of RBoARD

5.4.7 Skins and hides (Sheep skins: Pulses/livestock system; Goat skins: Apiculture/livestock system)

Marketing

In order to improve the income generated from the sale of skins, the quality of the skins need to be improved (see production) and the negotiating power of the farmers need to be improved. At present all skins are sold through private traders which sell them to tanneries in the nearby Sheba Tannery near the town of Wukro or to traders in Mekelle. Involvement of cooperatives in the purchase and sale of skins will help farmers strengthen their negotiating power. This can be done first by organizing hides marketing groups, and then help them link up with buyers, including the tanneries. To do this market study needs to be conducted.

Table 34. Project support for hides and skins marketing

Activity	Target	Responsibility
(400) Conduct study on the hides and skins marketing, including quality requirements by local abattoirs and export market	Farmers in and around 5 FTCs, traders, abattoirs	ILRI, TAMSA, Project staff
(200) Training on group formation for hides and skins marketing, and group marketing	Cooperative office staff, and staff of 5 FTCs	Consultants and project staff
(300) Farmer training and program follow up on group formation and group marketing	Farmers in and around 5 FTCs, cooperatives	FTC staff under supervision by project staff, cooperative staff
(300) Facilitate establishment of marketing groups, if required	Farmers in and around 5 FTCs	Cooperative office, project staff

Input supply/credit, and preservation and processing of hides and skins

The input supply for hides and skins relates mostly to the preservation activities of the hides and skins. Most of the hides and skins are sun-dried, and wet processing is almost non-existent. Quality problems are reported with dry processing methods. Depending on the quality requirements of the markets, which will be known through the market study, improved input supply system may need to be established. Hence, project will provide support in input supply based on the outcomes of the market study.

Table 35. Project support input supply hides and skins, and preservation and processing

Activity	Target	Responsibility
(400) Study the current preservation and processing system of hides and skins, in relation to market requirements	Farmers in and around 5 FTCs	ILRI/students, project staff
(200) Training on improved preservation and processing techniques	Woreda livestock experts, and staff of 5 FTCs	Project staff/consultants
(300) Farmer training and follow up (in FTCs) on improved preservation and processing techniques	Farmers in and around 5 FTCs	FTC staff guided by Woreda/ project staff
(300) Facilitate supply of preservation and processing inputs	Farmers in and around 5 FTCs, and Cooperatives	Cooperative office and project staff
(200) Demonstration materials for preservation and processing, and external parasite control	5 FTCs	Project staff
(300) Facilitate input supply against external parasites that damage hides and skins on live animals	Farmers in and around 5 FTCs	Woreda input supply, cooperative office, project staff

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

A number of studies have been proposed (see RBM code 400) 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. Summary of knowledge gaps in relation to priority commodities

Commodity	Knowledge gap	Commodity	Knowledge gap	Commodity	Knowledge gap
Pulses	Market information* Extension communication means Mitigation of drought and frost Available varieties Available agronomic practices Post-harvest handling N-fixation Pulses as bee forages IPM Crop water requirements, irrigation Water holding capacity of soils Indigenous knowledge on water management Alternative feed sources	Sheep and goat fattening	Market information* Potential for wool production Potential of indigenous breeds for fattening Availability, type and variation of feed supply New introduction of feed resources Innovative animal husbandry practices Control of internal and external parasites	Dairy	Market information* Potential of indigenous breeds Availability and type of feed resources Appropriate Processing equipment Animal health and disease control
Apiculture	Market information* Availability and type of bee forages (both new and indigenous) Processing technology for honey Queen rearing methods Adoption of improved beehives and constraints Types of bees and ecological requirements Pests and disease control	Hides and skins	Market information* Quality control	Fruits	New introduction, so whole package of new knowledge required
Vegetables and flower	Market information* Management techniques New varieties Seed production and supply Post harvest handling Feasibility of new introduction Pest and disease control Propagation methods				

* Market information refers to information about the functioning of markets in general. It includes market potential, quality requirements, marketing channels, price behaviour etc.

Annex 2: Summary of demonstration materials identified as required for the priority commodities

Commodity	Demonstration material	Commodity	Demonstration material
Pulses	<ul style="list-style-type: none"> • Varieties • Inoculants • Moisture conservation techniques and equipment • Tillage implements (tie ridger, row planter, inter-row weeder, • Irrigation implements (treadle pumps, drip irrigation, sprinkler irrigation, water pumps, shadouf) • Storage equipment • Display of pulse seed types • Frost protection techniques 	Fruits	<ul style="list-style-type: none"> • Varieties • Nursery practices • Tree management practices • Post harvest handling
Vegetables	<ul style="list-style-type: none"> • Seed and propagation materials • Improved varieties • IPM • Seed bed preparation and management • Propagation methods (fruits) • On farm water management • Fertility management • Post-harvest handling 	Apiculture	<ul style="list-style-type: none"> • Improved beehives and accessories • Bee-forages and management • Queen rearing techniques • Bee predators and controlling techniques • Pest management and control • Diversified bee products and by-products • Honey storage and handling
Sheep and goat fattening	<ul style="list-style-type: none"> • Feed types • Fattening practices 	Dairy	<ul style="list-style-type: none"> • Husbandry practices • Processing equipment (eg. Churner) • Cooling equipment • Containers • Milk preservation methods
Hides and skins	<ul style="list-style-type: none"> • Poster supported branding techniques • Preservation stands and frames • Samples of skins and hides • Preservation techniques • Pest management of skins and live animals 		

Annex 3. Baseline data of Atsbi Wemberta woreda

Annex 3.1. Land use (ha), soil type and fertility (%) by PA

PA	Total area ¹	Forest	Grazing land	Potential cultivable	Cultivated land	Soil types (%)					Status of soil fertility (%)			Altitude at PA office	Distance from wereda town (km)
						Black	Loam	Sandy	Red	Sandy loam	Fertile	Medium	Shallow		
Hadnet	6451.5	1112	2700	1612	1027.5	14	15	11	35	25	10	35	55	2765	21
G/kidan	13258	7986	160	4394	718	25	65	10			50	20	30	2800	20
Haresaw	12345.625	10794	279.5	643	629.125		75		25		15	25	60	2500	18
Ruba Feleg	5804.42	1987	90	2731	996.42		85	15			10	25	65	2500	11
Zarema	4868.66	1245	158	2763	702.66	25	30	20	10	25	16	32	52	2500	10
Feleg weyni	14189.57	10515	420	1929	1325.57		7	28	10	55	12.22	39.91	49.89	2067	4.5
Golgol Naele	12131.048	8563	556	2093	919.048		79	6	10	5	13	17	70	2570	15
May Mesanu	7492.375	1122	648	4906	816.375		85	5	10		20	45	35	2300	5
Kal Amin	14521.25	11191	648	1827	855.25		30	45	25		1	39	60	2600	11
Habes	903.25	389	35	50	420.25		80		20			50	50	2250	12
Barka Adisubaha	5068.75	1156	300	3004	608.75		35	50	15		10	35	55	2400	7
Micheal Emba	13801	10585	644	1990	582		65	25	10		1	39	60	2675	14
Hayelom	6643.56	2058	126	3519	940.56		39	61			5	85	10	2000	18
Dibab Koren	3951.44	1225	85	2111	530.44		80	10	10		60	40		2400	18
Kelesha	14640.5	12003	392.5	1123	1122	40	10			50	30	50	20	2600	44
Era	10220.28	7254	1500	610	856.28	40	15			45	50	40	10	2500	28
Total	146291.228	89185	8742	35305	13050.228										

Source: Atsbi Wemberta Office of Agriculture

¹ There is discrepancy in size of most PAs and their subsequent land use categories compared to data generated at ILRI using GIS (Table 1).

N.B Up to date land use and land cover categories will be generated for each PLS once relevant remote sensing data is received by the project's GIS group

Annex 3.2 Crop types, area cultivated (ha) by production (qt) and rainfall data for 1998/99 to 2002/03

Crop	1997/98		1998/99		1999/000		2000/01		2001/02		2002/03	
	Area (ha)	Production	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
Barley	8599	60092	6885.3	22604	5560.3	24466	3717.3	35319	4999.5	15478.5	6121.8	35026.3
Wheat	5346.7	33672.9	4785	19249	3831.5	11246.3	2149.3	21547.25	2753.8	8261.3	3081	15618.5
Hanfetse (barley+wheat)	96.8	616.15	172	688	107.2	470.8	41	426.5	141.3	424.5	260.8	1112.5
Tef	427.3	2391.75	535	2140	497.8	2231.9	711.8	5907.5	1229.3	3755	863.5	2891
Demhay (smooth barley)	25	150	185	647.5	0	0	0	0	0	0	0	0
Faba bean	940	3751.6	1194.5	5973.5	1168.5	4359	1385.3	9682.75	1492.8	4481.5	996	3034.5
Field peas	653	3592.2	641	2884.5	687.3	1914	557	5570	655.9	1644.8	585.3	1794.8
Lentils	255.7	768.7	215.5	646.5	386	772	248.2	1243.8	293.9	603.4	165	257.4
Lin seed	229.5	888.5	226	678	207.4	332	205.5	986.4	224.3	692.5	145.8	291.5
Maize	151	755	33	66	0	0	0	0	70	182	0	0
Finger millet	42	210	0	0	0	0	0	0	0	0	61	526
Oats	0	0	0	0	0	0	0	0	0	0	0	0
Total	16452.5		14388		12446		9015.4		11860.8		12280.2	
Rainfall	728		500.7		878.9		776.1		562		561.2	

Source: Atsbi Wemberta Office of Agriculture

Annex 3.3 Type and quantity of input distributed to farmers by the Atsbi Wemberta Office of Agriculture

Type of input	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
Fertilizer								
DAP	174	184.5	584.065	1331.14	1335.86	855.63	225.35	444.74
Urea	26.38	72.25	206.31	976.68	970.23	650.25	141.13	283.1
Improved seed¹								
Wheat	4216.74	377.9	937.05	792.14	284.88	212.21	161.16	1068.25
Tef (Cross 37)	2.7	4.43	11.77	0.68	11.2	0.83	0.90	16.8
Pulses¹								
Chick pea	35.3						22.75	
Field peas								8.06
Faba bean								10
Braven Alemaya								3
Vegetable seeds²								
Onion					15.29	21.52	17.88	17.18
Tomato					0.14	3.61	0.85	5.80
Cabbage					2.3	5.13	2.02	3.85
Kosta					7.71	15.68	1.82	16.5
Beet root					0.38	1.05	1.65	1.75
Lettuce								7.55
Carrot								18.43
Pesticides								
Liquid ³		3		1	2.28	4.88	6.79	
Powder ²		3	21.33	6.75	23.91	27.55	20.68	

¹ Quintal, ² Kg, ³ liters

Source: Atsbi Wemberta Office of Agriculture

Annex 3.4 Total population of PAs Atsbi Wemberta woreda in 2003/04

PA	Male headed HHs	Female headed HHs	Total HHs	Total population
Hadnet	1194	1330	2524	5903
G/kidan	1313	1622	2935	7514
Haresaw	821	1063	1884	5386
Ruba Feleg	1181	1452	2633	6265
Zarema	1036	1215	2251	6845
Feleg weyni	1870	2092	3962	7666
Golgol Naele	1198	1505	2703	6877
May Mesanu	1632	1768	3400	7090
Habes	598	724	1322	3584
<i>Barka Adisubaha??</i>	1032	1138	2170	6463
Kal Amin	1293	1468	2761	8847
Micheal Emba	1021	1061	2082	5800
Hayelom	1189	1140	2329	5863
Dibab Koren	791	829	1620	4861
Kelesha Emni	584	661	1245	4371
Era	721	759	1480	4889
Endaselasie (woreda town)	868	1196	2064	6286
Hayki Meshal	816	1217	2033	4249
Total	19158	22240	41398	110578

Source: Atsbi Wemberta Office of Agriculture

Annex 3.5 Names of Service cooperatives, their members and total capital

Name of cooperative	Members		Total capital
	Male	Female	
Aynalem	796	250	66750
Lemlem	843	480	48353
Fre Seweat	458	534	24847.10
Takele	572	271	16355.50
Mahber Bokru	707	516	75169.50
Dedebit	629	351	24356.15
Habes	333	239	13833.86
Hinset	652	386	39296.55
Haile Manjus	498	531	32392.05
Buhele Adi Shim Akob	531	369	17340.77
Sur Anbessa	404	355	64117.30
Kokeb Tsibah	554	434	81,690.85
Hadnet	468	319	14560.53
Mahber Selam	362	223	9201.22
Debre Selam	226	124	7212.00
Desa	220	107	6540.00
Total	8253	5489	542,016.38

Source: Atsbi Wemberta Office of Cooperatives

Annex 3.6 Soil and water conservation activities in the last three years (2003)

SWC activities	Free mobilization ¹	World Food Program	Irish Aid
<i>Cultivated land</i>			
Trench bund	144680 m	-	
Stone faced soil bund (SFSB)	53430 m	-	
Soil bund	1258.5 m	-	
Stone bund	2197 m	-	
<i>Non cultivated land</i>			
Trench bund	45599 m	-	128190
Stone faced soil bund	91766.5 m	7289 m	-
Maintenance of SFSB	-	13350 m	-
Hill side terrace (HST)	20175.5 m	42360 m	81500 m
Maintenance of HST	-	25170 m	-
Stone check dams	13206.75 m ³	612 m ³	-
Household pond	-	5	-
Composting	-	50	-
Community hand dug well and reservoir	-	-	1
Loose stone check dam		-	2889 m ³
Gabion check dam		-	232 m ³

¹ All households in the woreda contribute 20 days/year of free labour on soil and water conservation activities.

Source: Atsbi Wemberta Office of Natural Resources

Annex 4 Program of Visit to PLS

Annex 4.1 Methodology of PLS plan development

The first step in the PLS planning was the creation of a Woreda Advisory Learning Committee (WALC) (Annex 4.2), followed by an introduction of the project to the WALC members. 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 (Annex 4.5). 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 discussed². 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 (Annex 4.3; Annex 4.4).

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 4.2 List of WALC members and their address

No.	Name	Institution	Tel.
1	Mehari G. Medhin	Office of Agri and Rural Devt.	04-406704 04-407144
2	Hailay Berhane	Head, Agriculture Desk	04-410285
3	Gidey Halefom	Natural Resource Desk	04-410285
4	Mesfin Negash	Head, Rural Infrastructure Devt. Desk	04-410285
5	Abraham Woldearegay	Cooperatives	04-410285
6	Hafetemariam Gebrehiwot	HIV/AIDS Focal	04-410342
7	Tesfay Asfaha	World Vision	04-406721/ 04-409302
8	Abraham Tsegay	Dedebit Atsbi Sub-Branch	04-410285
9	Fetlework Abebe	Women's Affair	04-406704 04-407144
10	Dr. Gebremedhin Woldewahid	PLS Research & Development Officer	09-707461

Annex 4.3. Atsbi Wemberta PLS planning workshop program, Sep. 28-29, 2004

Endaselassie town

Date	Time	Topic	Speaker
Sep. 28, 2004	9:00 - 9:30	Registration	Kahsay Berhe
Moderator - Ato Berhe Fiseha			
	9:30-9:45	Welcome and Introduction	Ato Mehari G.medhin (Wereda Ag. And Rural Development, Head, WALC Chair)
	9:45 - 10:00	Project Background	Mr. Dirk Hoekstra
	10:00 - 10:10	PRA Process	Dr. Berhanu Gebremedhin
	10:10 - 10:30	Coffee break	
Chair Person – Ato Amare Belay			
	10:30 - 10:50	Crop Production	Ato Kahsay Berhe
	10:50 - 11:00	Questions/Discussion	
	11:00 -11:20	Animal Production	Ato Kahsay Berhe
	11:20 - 11:30	Questions/discussion	
	11:30 - 11:50	Institutions	Dr. Berhanu Gebremedhin
	11:50 - 12:00	Questions/discussion	
	12:00 - 1:00	General discussion	
	1:00 - 2:00	Lunch break	
	2:00 - 5:30	Breakup session	
		Group 1. Crop production	Chair: Ato Amare Belay Secretary: Ato Kahsay Berhe
		Group 2. Livestock production	Chair Dr. Azage Tegegne Secretary: Ato Abera G/amlak
		Group 3. Institutions	Chair Dr. Berhanu Gebremedhin Secretary: Dr. Gebremedhin W/wahid
Sep. 29, 2004	9:00 - 10:00	Breakup session continued	
	10:00 - 10:30	Coffee break	
	10:30-12:30	Group Discussion	
	1:00 - 2:00	Lunch break	
Chair Ato Berhane Gidey			
	2;00-2:20	Group 1 Crop report	Ato Kahsay Berhe
	2:20 -2:40	Questions/discussion	
	2:40 - 3:00	Group 2 Livestock report	Ato Abera Gebreamlak
	3:00 -3:20	Questions/discussion	
	3:20 - 3:40	Group 3 Institutions report	Dr. Berhanu Gebremedhin
	3:40 - 4:00	Questions/discussion	
	4:00-4:50	General discussion	
	4:00 - 5:00	wrap up and the way forward session	Mr. Dirk Hoekstra
	5:00	Closing	Ato Misgina W/selassie, Atsbi Wembert Wereda Administrator

Annex 4.4 Atsbi Wonberta PLS Planning Workshop Participants, September 28-29, 2004

No	Name	Sex	Institution/Position
1	Tsegay Tesfay	M	Agronomist – Atsbi
2	Yonas Gebru	M	Agronomist – Atsbi
3	Abraham Woldearegay	M	Animal P. expert-Atsbi
4	Gebrekidan Gberehiwot	M	Woreda Office of Agriculture
5	Nigusse Hailu	M	Bee expert
6	Hailay Berhane	M	Woreda Office of Agriculture
7	Alemayehu Fekadu	M	Woreda Office of Agriculture
8	Gebreyohannis Gebremedhin	M	Woreda Office of Agriculture
9	Gebre Kiros Gebreegziabher	M	Woreda Office of Agriculture
10	Dr. Gebregiorgis Ashebir	M	Woreda Office of Agriculture
11	Berhe Arkebe	M	Regional Bureau of Agriculture
12	Tewodros Gebremedhin	M	Woreda Office of Agriculture
13	Abera Gebreamlak	M	Regional Bureau of Agriculture and Rural Development
14	Habtu Desta	M	DA –Atsbi
15	Yohannes Gebremeskel	M	Dedebit Credit and Saving Institution(DECISI)
16	Teklay Belay	M	Development Agent
17	Priest Itay Haftu	M	Farmer – Hadinet
18	Amare Teare	M	Farmer- Hayelom
19	Mulugeta Gebremariam	M	Farmer/Cooperatives Head
20	Gebremariam Birhane	M	Farmer/PA-Chairman, F. Weyni
21	Haileselassie Tesfay	M	Farmer-Barka Adisubha
22	Kidanewold Gebriel	M	Farmer-Barka Adisubha
23	Buruk Demwoz	M	Farmer-Barka Adisubha
24	Masho Atsbha	F	Farmer-Barka Adisubha
25	Yemane Hagos	M	Farmer-Barka Adisubha
26	Woldegebriel Gesessew	M	Farmer-Barka Adisubha
27	Azmera Abay	F	Farmer-Feleg Woyni
28	Teklay Hailu	M	Farmer- Feleg.Woyni
29	Solomon Habteselassie	M	Farmer- Feleg.Woyni
30	Kahsay Intahbu	M	Farmer-Hadinet
31	Gebremedhin Gebreselassie	M	Farmer-Hadinet
32	Asefa Gebru	M	Farmer-Hayelom
33	Kahsa Atsbha	F	Farmer-Hayelom
34	Kebede Abrehe	M	Farmer-Hayelom
35	Gebremeskel Hailu	M	Forester - Atsbi
36	Gebremariam Gebrehawariat	M	HIV/AIDS Coord.
37	Hiwet Gebretsion	F	Home Science - Atsbi
38	Getachew Tikubet	M	ICIPE
39	Abiye Astatke	M	ILRI/PLE
40	Azage Tegegne	M	IPMS
41	Kahsay Berhe	M	IPMS
42	Dr. Berhanu Gebremedhin	M	IPMS

43	Mr. Dirk Hoekstra	M	IPMS
44	Ato Teklay Belay	M	Woreda Office of Agriculture
45	W/o Fetlework Abebe	F	Woreda Office of Agriculture
46	Ato Zeratsion Fesseha	M	TAMSA
47	Mesfin Negash	M	Rural Infrastructure Dev.
48	Kahsay Gebremedhin	M	Regional Cooperatives Office
49	Girmay Gebre egziabher	M	Journalist, Mekelle
50	Berhe Fiseha	M	Regional Bureau of Rural Dev.
51	Ato Amha Desta	M	Woreda Office of Agriculture
52	Ato Abraham W/aregay	M	Woreda Office of Agriculture
53	Ato Abraha Tsegay	M	DCSI, Endasselassie Sub branch
54	Ato Mahari Gebremedhin	M	Woreda Rural Dev. (WALC chair)
55	Ato Amare Belay	M	TARI, Mekelle
56	Ato Beyene Dimtsu	M	TARI, Mekelle
57	Ato Bereket Haileselassie	M	TARI, Mekelle
58	Dr. Gebremedhin Woldewahid	M	TARI, Mekelle
59	Dr. Gebreyohanes Berhane	M	Mekelle University
60	Dr. Tilahun Amde	M	CIAT
61	Ato Hadish Teka	M	Farmer, Hadnet PA
62	Ato Kahsay Entehabu	M	Farmer, Hadnet PA
63	W/o Alganesh Gebremedhin	F	Farmer, Feleg Weyni PA

Annex 4.5 List of Farmers and PAs visited

No.	Name of farmer	Sex	Name of PA	Farming system
1	Haileselassie Tesfay	M	Barka Adisubaha	Apiculture/Livestock
2	Kidanewold Gebriel	M	Barka Adisubaha	Apiculture/Livestock
3	Buruk Demwoz	M	Barka Adisubaha	Apiculture/Livestock
4	W/o Masho Atsbha	F	Barka Adisubaha	Apiculture/Livestock
5	Yemane Hagos	M	Barka Adisubaha	Apiculture/Livestock
6	Woldegebriel Gesessew	M	Barka Adisubaha	Apiculture/Livestock
7	Azmera Abay	F	Feleg Weyni	Pulse/Livestock
8	Teklay Hailu	M	Feleg Weyni	Pulse/Livestock
9	Solomon Habteselassie	M	Feleg Weyni	Pulse/Livestock
10	Gebremariam Birhane	M	Feleg Weyni	Pulse/Livestock
11	Kahsay Intahbu	M	Hadnet	Pulse/Livestock
12	Gebremedhin Gebreselassie	M	Hadnet	Pulse/Livestock
13	Asefa Gebru	M	Hayelom	Apiculture/Livestock
14	Kahsa Atsbha	F	Hayelom	Apiculture/Livestock
15	Kebede Abrehe	M	Hayelom	Apiculture/Livestock
16	Hadish Teka	M	Hadnet	Pulse/Livestock
17	Kahsay Entehabu	M	Hadnet	Pulse/Livestock
18	W/o Alganesh Gebre-medhin	F	Feleg weyni	Pulse/Livestock

Annex 4.6 List of Institutions and officials visited

No.	Name of person	Institution	Responsibility
1	Ato Amare Belay	TARI	Director
2	Ato Berhe Fiseha	Regional Bureau of Agric. And Rural Dev	RALC Chair
3	Dr. Kindeya Gebrehiwot	Mekelle University	Officer, Research and Publications
4	Ato Girmay Tesfay	Mekelle University	Economist, Ph. D. student
5	Ato Zekarias Gebremedhin	GTZ Office, Mekelle	Agronomist
6	Ato Misgina W/selassie	Atsbi Wemberta Admin.	Administrator
7	Ato Mulugeta	Woreda Coop. Office	Head of Cooperatives off.
8	Ato Eshetu Anito	World Vision (Atsbi)	Project Coordinator
9	Ato Abraha Tsegay	Dedebit Credit and Saving Institute (DCSI)	Manager, Sub-branch
10	Ato Mehari Gebremedhin	Office of Agriculture and Rural Development	Head
11	Ato Hailay Berhane	Woreda Office of Agric.	Head of the office
12	Ato Tsegay Tesfay	Woreda Office of Agric.	Agronomist
13	Ato Berhe Asfaw	Woreda Meat Inspector	Technician
14	Ato Alemayehu Fekadu	Woreda Livestock Prod.	Expert
15	Ato Berket H/selassie	Mekelle Research Centre	Manager
16	Ato Gebreyohanes G/medhin	Woreda Input supply	Head
17	Ato Gebrekiros Gidey	HIV/AIDS Desk	Head
18	Ato Abraha Gebru	DCSI, Wukro	Cashier
19	Ato Yohannes Gebremeskel	DCSI, Mekelle	Planning Head
20	Ato Abera Gebreamlak	BoARD, Mekelle	Head, Capacity Building
21	Ato Kiros Tikue	TAMSA, Mekelle	
22	Ato Kahsay Gebremedhin	Cooperative Bureau, Mekelle	
23	Ato Gebremedhin Berhe	BoARD, Mekelle	Irrigation expert

Annex 4.7 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 Wemberta, 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, Dr. Asfaw Hailemariam (National Soils Laboratory) and Ms. Clare Bishop Sambrook went around the four PLS groups and collected some basic information regarding environmental issues; HIV/AIDS and bio-fertilizer issues, respectively, in the activity sheet. Dr. Berhanu Gebremedhin and Noah Kebede led the Atsbi Wemberta group

List of consultation workshop Atsbi wemberta PLS working group, October 19-21,
2004

No	Participant name	Responsibility	Address	
1	Ato Amare Belay	TARI DG	04-408028 E-mail: tari@telecom.net.et	04-407723
2	Ato Beyene Dimtsu	Director for Crops (TARI)	04-407902 E-mail: demtsu@yahoo.com	04-407723
3	Ato Bereket Haileselassie	MRC, Centre Manger	04-407900/408030 E-mail: yalem03@yahoo.com	04-407723
4	Ato Gebreyohanes Gebre gziabher	Director for Livestock (TARI)	04-407902	04-407723
5	Ato Aberra Gebreamlak	Tigray Bureau of Agric.	04-400898 E-mail: aberagwwuhneh@yahoo.co m	04-403710
6	Ato Mehari Gebremedhin	WALC Chairman	04-407144/406704	
7	Ato Hailay Berhane	Atsbi Wemberta Office of agric.	04-410285	
8	Dr. Berhanu Gebremedhin		G.Berhanu@cgiar.org	463215 AA
9	Dr. Gebremedhin Woldewahid	TARI, Researcher	g.woldewahid@cgiar.org	09-707461
	Ato Noah Kebede	GIS Expert	N.kebede@cgiar.org	463215 AA
	Ato Berhe Fiseha	RALC Chair		04-409078 /04-406700
10	Mr. Jerry Rogers	IPMS consultant, RBM	E-mail:Rbmg@istar.ca	
11	Mr. David MacDonald	IPMS consultant, environment	819-772-0196 e-mail: dmacdonald@symbatiko.ca	
12	Misses Clare Bishop- Sambrook	IPMS consultant, HIV/AIDS and Gender, Consultant	E-mail: clarebishopsambrook@yah oo.com	
15	Dr. Asfaw Hailemariam	EARO, Soils	508300 E-mail: asfawhm@yahoo.com	