METEMA PILOT LEARNING SITE DIAGNOSIS AND PROGRAM DESIGN

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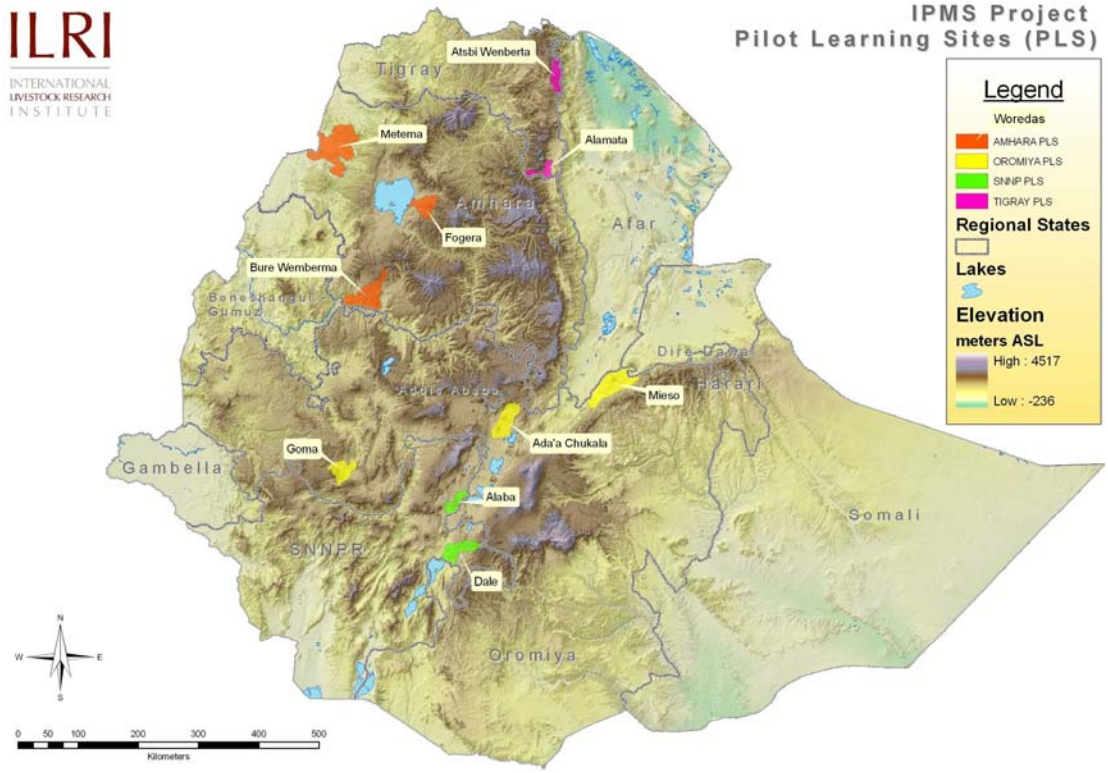
Metema Pilot Learning Site diagnosis and program design

By IPMS Team

1. INTRODUCTION

The International Livestock Research Institute (ILRI) and the Ministry of Agriculture and Rural Development (MoARD) 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) Metema 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

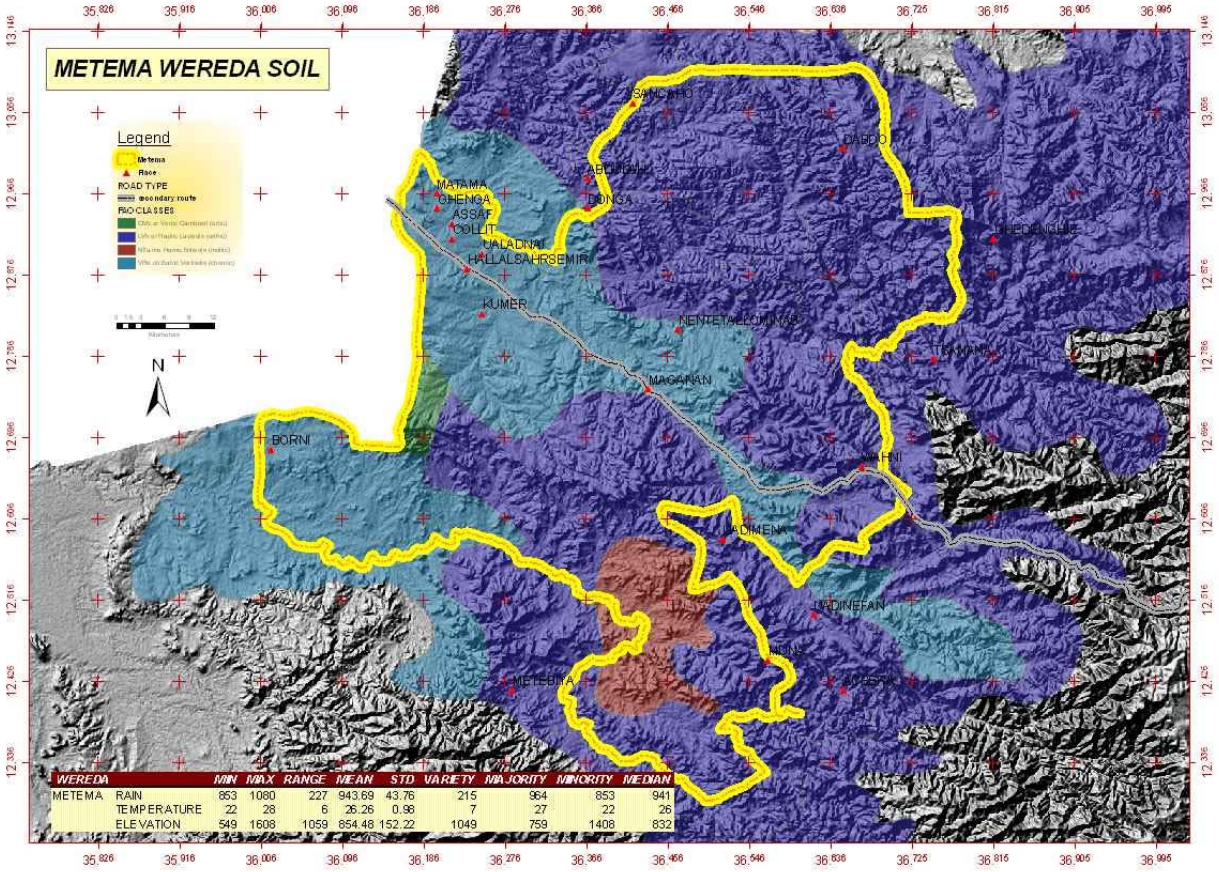
2.1 Description of Metema Woreda

Metema woreda is located about 900 km northwest of Addis Ababa and about 180 km west of Gondar town. Metema is one of the west most woredas of the Amhara Regional State. The woreda has an international boundary of more than 60 km long distance between Ethiopia and Sudan. Metema is found North of Quarra and Alefa, west of Chilga south of Tach Arma Choho woredas and east of Sudan border. It is one of the 18 woredas in North Gondar Zone. According to the woreda Plan for 2004, there are 15,675 rural agricultural households (excluding the newly resettled households) and about 4,991 urban households. According to this estimate, the total population of the woreda is 91,216 people. Out of the total, 3918 are rural and 1497 are urban women households. The original residents of the area are Gumuz. Until recently, they practice slash and burn and hunting wild animals. They produce sorghum as the staple crop and remain to be the major food crop in the area. Since the settlement programmes of the last and current governments, the area is populated and the natives became small in number. They are concentrated in few areas and live close to each other. They are found in only three PAs (Kumer Aftit, Tumet and Shinfa). The total number of the indigenous people would be around 500 households. Hence much of the area is recently settled by new comers from the highlands. During the group's visit to the woreda, it was known that 11,000 settlers would be received during 2004/05. About 3,000 settlers were received when the team was in the woreda.

The altitude of Metema ranges from as low as 550 to 1608 m asl while the minimum annual temperature ranged between 22^{o}C and 28^{o}C. Daily temperature becomes very high during the months of March to May, where it may get to as high as 43^{o}C. Nearly all of the land in the woreda is in the lowlands except some mountain tops which fall outside. At the time of the visit, the temperature was around 36^{o}C. Metema is one of the woredas in the country where the climate is harsh and government allows a 30% hardship allowance.

According to the available digital data, the mean annual rainfall for the area ranges from about 850 to around 1100 mm. These values are not in agreement with what has been reported by the OoA. Based on this digital data, about 90% of the woreda receives mean annual rainfall of between 850 and 1000 mm. Metema has a uni-modal rainfall. The rainy months extend from June until the end of September. However, most of the rainfall is received during the months of July and August. Rainfall during these months is erratic, combined with the poor workability of most of the soils, farm operations are also affected. The soils in the area are predominantly black and some are soils with vertic properties. Due to the season, soils in most of the areas visited were observed with excessive cracks, which could be as deep as 0.75 m in some places. There are about 9 types of soils in the area where about a quarter of the size of the woreda is Haplic Luvisols and about 22% are Vertisols or soils with vertic properties. On the other hand, Humic Nitosols account for about 6% (Map 2). Seasonal waterlogging, especially during the heavy rainfall months, is so high that the need to use broad bed makers (BBM) becomes essential. On the other hand planting appropriate crop like rice becomes essential. During the visit of the team, it was possible to observe about 5,000 BBMs lying outside of the office of

Agriculture. ILRI developed this farm tool some years ago and a consortium of national institutions and ILRI were involved in disseminating it. With regards to fertility, the soil in this area is believed to be fertile. Consequently, farmers and investors in the area do not apply fertiliser. Farmers in the woreda extensively cultivate sesame, cotton and sorghum and raise mainly goats and cattle.



Map 2. Soils map of Metema Woreda

According to the woreda Office of Agriculture (OoA), the total area of the woreda is about 440 thousand ha. Much of the woreda under acacia dominated forest and grasslands (Table 1).

Table 1. Land use of Metema woreda

Land use type	**Area (ha)**
Cultivated land	(103,908)
• Smallholder	71,324
• Commercial farms	13,908
• Potential cultivable land	18,676
Forest + Grassland	312,300
Uncultivable land	23,877
Total area	**440,085**

The natural vegetation of Metema is predominantly composed of different acacia species with a lot of *hyparrhenia* grass under grown. Metema is one of the woredas where gum and incense is collected. The main specie for incense production is *Boswellia papyrifera*, while *Acacia seyal* and *A. polyacantha* are used for gum production. There is an extensive area covered with the incense specie and there are 3 private companies involved in harvesting incense with a capacity of about 500 qt annually. According to the woreda 2004 plan, the potential harvestable gum and incense of the woreda could be 98,000 qt. The area is also known for growing bamboo. On the way from Gondar to Shekdi (woreda town), one can easily see that many of the houses were made of bamboo. Because of the presence of ticks, farmers burn the *hyparrhenia* grass. Farmers also assume to benefit from new grass growth after fire. Many of the roadside places were on fire whe we travelled to Metema Yohanes (border town) and Gondar. The natural bamboo growing areas are also set to fire and this practice is believed to initiate new growth. Neem (*Azadiracta indica*) plants are abundantly available as roadside plantations in the towns, and as shade plants in the rural areas. The OoA had distributed these neem seedlings in the woreda some years back. These neem trees could be good source of natural agrochemical, particularly against storage pests for sorghum. There are 5 tree nurseries in the woreda and only 1 horticulture seed multiplication. The area of each tree nursery is about 0.5 ha each, while the horticulture nursery is 2.5 ha. In the horticulture nursery there were few types of fruit trees including, avocado, guava, papaya, orange and banana (Kenya type). Provided this nursery is well managed, it could be used as a place where new introductions could be tested and multiplied for dissemination to the area.

There are 19 private fruit and vegetable farms. Out of these, 12 are located very close to the woreda town using Genda Wuha river. These farms operate more than 2 ha on an average. One of these is an irrigation cooperative farming about 5 ha and growing different lowland fruits and vegetables. The three crops cover around 90% of the woreda cultivated area (Table 2). The yield of sorghum is between 18 and 20, while that of sesame is between 4 and 6 qt/ha. Seed cotton from the locally grown varieties could yield about 8 qt/ha, while many of the improved varieties introduced by Amhara Region Agricultural Research Institute (ARARI) and MoA could yield from 15 to 20 qt/ha. In addition to this, ARARI introduced number improved varieties of sesame and sorghum to the area. Other than those introduced by ARARI, the Ministry of Agriculture (MoA) has also introduced a new variety of cotton called *Gedera* from Israel, which have been proven to be well adapted to the area.

The total area of the woreda is estimated at 4,400 sq. km (Table 1) and subdivided into 18 PAs and 2 town associations. There has been no digital data with PA boundary made as for the PLS in Tigray.

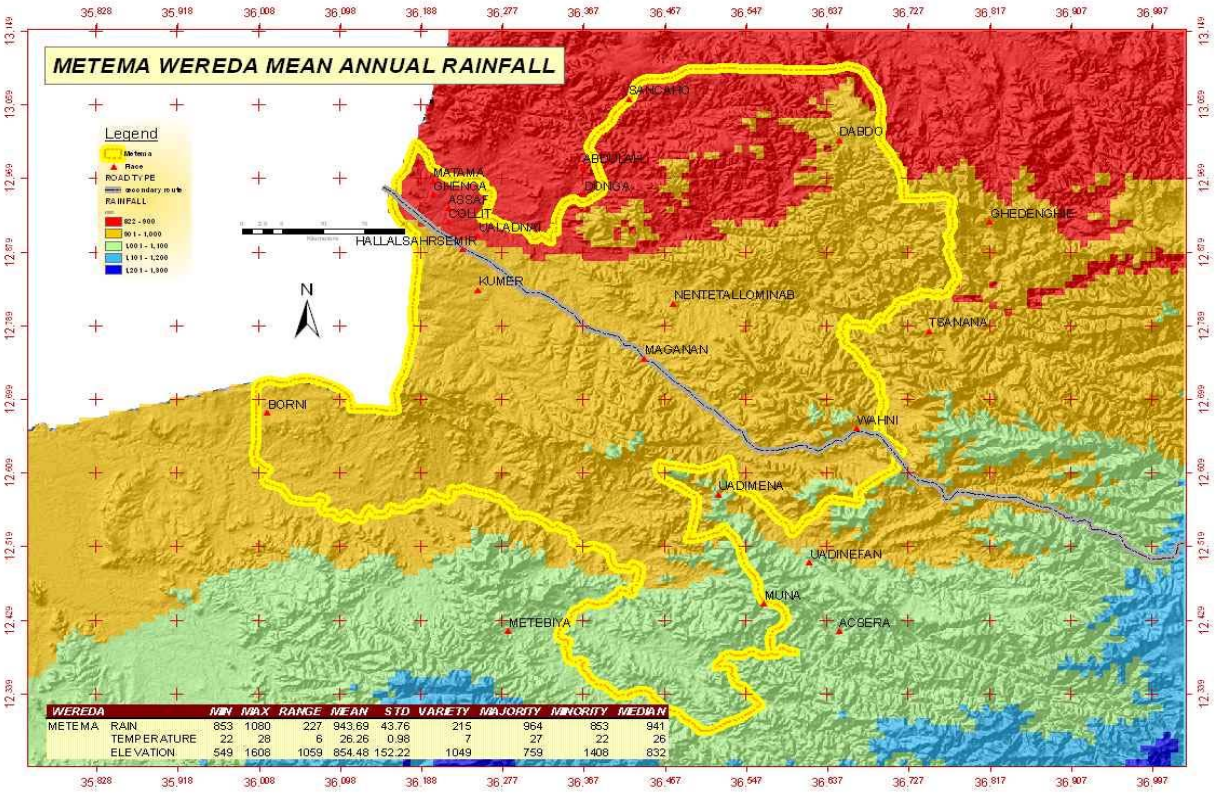
Table 2. Name of Peasant and town association of Metema Woreda

Number	NAME of PA	Households			Total population		
		Male	Female	Total	Male	Female	Total
1	Kokit	1445	55	1500	2735	2691	5426
2	Mender 6, 7, 8	743	243	986	832	1052	1884
3	Metema Yohanes	749	1333	2082	2845	3509	6354
4	Das Gundo	1010	240	1250	1063	1315	2378
5	Kumer Aftit*	478	183	661	807	752	1559
6	Genda Wuha	446	88	534	1132	976	2108
7	Meka	530	108	638	862	1220	2082
8	Agam Wuha	618	119	737	1278	1104	2382
9	Shinfa*	863	232	1095	1824	1729	3553
10	Tumet Menduka*	889	167	1056	1318	1958	3276
11	Zebach Bahir	809	79	888	1225	1678	2903
12	Awlala	369	91	460	-	-	1871
13	Gubae Jejebit	615	81	696	1124	917	2041
14	Lencha	395	41	436	747	910	1657
15	Shashge	679	62	741	1428	1262	2690
16	Kemechela	419	28	447	1190	1015	2205
17	Awasa	2169	271	2440	2347	2854	5201
18	Achera	511	30	541	1394	1338	2732
19	Shehdi 01**	-	-	-	-	-	-
20	Shehdi 02**	-	-	-	-	-	-
Total		13,737	3,451	17,188	8,230	8,296	52,302

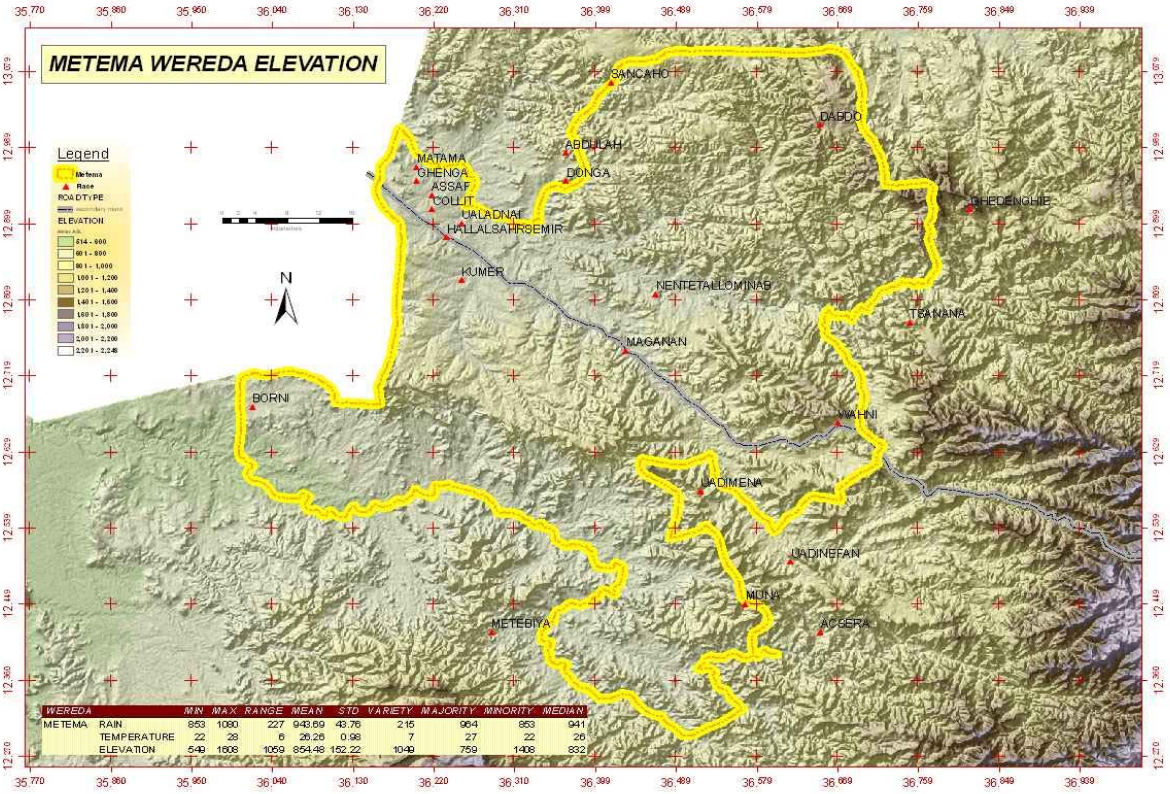
* PAs where the natives live
** Town associations

Source: Office of Agriculture Metema, 2005

Except for the very small areas under vegetables and fruits, crops in all farms (smallholder and commercial) are grown under rainfed conditions. There is no belg (short rains) in the woreda but the *Meher* rains start in June and last until the end of September. Last year rainfall was relatively small and also started late and many farmers have been affected as a result. Evaporation rates are high in Metema. Mean annual rainfall is estimated to be between 700 and 900 mm, while the mean annual temperature is 31^{o}C (according to the OoA). Erratic and some times shortage of rainfall are the major constraints of agriculture in the woreda. On the other hand, when the rainfall is heavy, waterlogging is another crop production problem. Rainfall is usually intense and short in duration even though the rainy months seem to be extended. There is a newly set up weather station (about 4 years), but was difficult to obtain weather data from the station. It should however be possible to buy the data from the National Meteorology Service Authority (NMSA) in Addis Ababa. Based on available digital data, the rainfall pattern of Metema woreda is shown on map 3 below.



Map 3. Rainfall map of Metema Woreda



Map 4. Elevation map of Metema woreda

Livestock resources and production system

Livestock production is an integral part of the production system. Production of cattle (milk, meat), goat (meat) and poultry is a common practice. Cattle are exported to the Sudan while goats are mainly used for the local market. There is a smallholder milk and butter production system mainly for the local market. Transhumance cattle production system is a common phenomenon with highland cattle moved to the lowlands during the main rainy seasons from June to October in search of feeds. Honey production is another common practice in the Woreda mainly in the forest areas. There is a huge feed resource in the Woreda and hay making has recently been introduced in some selected PAs.

Table 3. Livestock population in the Metema Woreda

Species	**Number**	**Remark**
Cattle	124,000	Mainly under extensive grazing system and transhumance mode of production by highland farmers
Small ruminant	34,655	>75% goats
Donkeys	7,000	All Senar male donkeys for transportation
Camel	592	All male for oil extraction
Poultry	64,799	
Bee colonies	23,789	Mostly wild, up to 80 beehives per household)

Source: Metema Woreda OoARD, 2005

The cattle population in the Woreda is quite high. The major cattle breed is Fogera zebu crossbred. The Rutana cattle originally from the Sudan and Fultata cattle fro Niger and Nigeria are minor cattle breeds. There is preference to the Rurana cattle due to their larger frame, better milk yield and traction power. Fulata cattle are humpless and have small dewlap. Cattle are used for traction, meat, and milk production. There is no information on the number and distribution of these cattle breeds/types. There is a plan to introduce Barca and Fogera cattle for milk production from the highlands. An ox fetches about 1,500 and a cow about 1,200 Birr. Milk is sold at about 4 Birr a liter. Butter fetches about 25 Birr/Kg during the dry season and about 16 Birr/Kg during the wet season. Local cheese or '*Ayib*' production is not common, but farmers sell the 'buttermilk', locally known as '*Wegeme*t' at about 1 Birr/liter. Theft of cattle is a common problem and animals are sold in the Sudan after crossing the border illegally. As a result, hiring herdsmen is a common practice. Children herd calves and in return are paid in kind with the produce of a cow's milk per week which they accumulate and process into butter for sell in the local market.

The main small ruminant resource is goat production. Rutana goats are preferred by the community due to their large size. This goat breed/type is hairy at the back. There is a small proportion of sheep population locally known as the 'Gumuz sheep'. Goat production is based on extensive grazing and are sold at local markets. Prices range from 200 to 500 Birr per goat, and about 250 Birr per sheep. The Office of Agriculture plans to distribute about 6,250 goats per year.

There is a substantial poultry resource in the Woreda. Production is predominantly smallholder backyard scavenging type of system using local chicken. The local price is about 20 Birr for female and 35 Birr for male chicken. The price of an egg is about 50 cents. There are no exotic breeds and there is no large scale commercial poultry production in the Woreda. The Woreda per capita egg production is estimated at 3, and there is a plan to increase this by one egg to four. The Office of Agriculture plans to increase egg production by 45,000 per year and there is a plan to introduce about 300 female and male exotic chicken, mainly RIR breed, annually.

There are about 14,000 bee colonies under traditional production system. Due to the extensive forest cover of the Woreda, most colonies are wild and as such are kept on trees. Very few farmers keep beehives in the backyard. There are about 860 transitional beehives. The current per capita production of honey is estimated at 1.54 kg per year and there is a plan to increase this to 2.6 kg. The Office of Agriculture plans to increase the number of transitional beehives to 2,185 and the number of bee colonies to 10,000 per year.

Livestock are important sources of both power and cash for the smallholder farmers. Commercial farmers use tractors for ploughing. Oxen are used to plough fields for all crops and to thresh sorghum, while donkeys are used for transporting produces and water for the smallholder farmers. Despite the large population of livestock, especially cattle and goats, productivity is low as in many other parts of Ethiopia. Unlike the other PLSs so far investigated, experts in this PLS believe that livestock feed is not a limiting resource in the woreda. However, the farmers in the woreda do not exercise hay making and dry season feed will remain to be a problem. This is especially so because farmers burn grasses for eliminating ticks and initiating new grass growth during the rainy season. The proportion of cattle to the number of households is smaller than the small ruminants, especially goats in the woreda. This could be because the area is extensive and feed is not limiting. The major source of livestock feed is grass in the bushes, mainly *hyparrhenia* spp. Highlanders from other neighbouring woredas also bring their livestock in search of feed. This may contribute to disseminating diseases from the neighbouring highlands and vice versa. There are a number of livestock diseases reported in the area and both the farmers and experts consider them more limiting than feed shortage.

Important livestock diseases in Metema include Black Leg (during rain season), *Bovin Pastureolosis* (during the transition period between dry and wet season), Anthrax, Pests (ticks), Lumpy skin disease, *Streptotrycosis* (Fungal), Tick born disease (*Anaplasmosis, Babisiosis*). For sheep and goats, internal and external parasite (Menge, ticks, etc), Antrax, *Ovine Pasteorolosis*, goat Pox, *Streptotrycosis*, Orf (viral disease around mouth and leg) are the common diseases reported. Newcastle disease, coccidiosis, avian pox and hystomoniasis are common poultry diseases.

The human resource at the Woreda Livestock Development and Health Desk is shown in the following table..

Table 4. Livestock Development and Health Desk staff in Metema woreda

Expertise	**Number**
Veterinarian (Desk representative)	1
Animal Health Assistant	1
Skins and Hides Technician	1
Animal Breeding Expert	1
Livestock Feeds Development t	1
Apiculture Junior Expert	1
Total	**6**

2.2 Priority farming systems

Except under few instances, altitudinal differences are not significant (Map 4). However, some areas in the southwest seem to have lower elevations. It was difficult to identify distinct farming systems as in the other previous PLSs. However two farming systems were identified.

1. Cotton, rice/livestock farming system

2. Sesame, cotton, sorghum and livestock based farming system (hereafter referred to as sesame, cotton, sorghum, livestock cotton/livestock system)

Farming systems

1. *Cotton, rice/livestock farming system*

Four out of the 18 PAs belong to this farming system. They are Meka, Awlala, Genda Wuha and Kemechela. They are found northeast of the woreda. These PAs predominantly grow cotton followed by sorghum and sesame in few areas. Crops grown are similar in the whole woreda. The PAs in this farming system have some different features in terms of suitability for crop production and amount of rainfall received. These PAs are relatively colder in temperature, have higher in altitude and rainfall and soils are black and waterlogging is a problem. Farmers in these PAs practice slightly early planting of crops.

Majority of the soils in this farming system have vertic property. Many of the areas are also flat. As a result majority of the soils are only suitable for growing cotton and rice. Cotton is grown in bigger plots year, while sorghum and sesame are planted in very smaller areas. Some 10 years ago, rice was a well accepted crop and was widely grown in these PAs including Kokit and Agam wuha from the other farming system. At that time, there was 1 polisher in Shehdi (the woreda town) where all farmers bring and polish their rice. However, the polisher was transferred somewhere else and farmers were discouraged to grow rice. During the PRA, farmers said that if they get a polisher they would be happy to grow rice again. During the last day of the group's stay in the woreda, it was found out that a new polisher is already in the woreda since two years but farmers were not aware about it. There will be a need to inform that the instrument is available so that they will start growing rice. This kind of problems could be avoided if private polishers come into picture.

There are few perennial rivers in this farming system, among which Genda Wuha is one. This river is used for irrigation by few small-scale commercial farmers near Shehdi town. As the river passes through the PAs in this farming system, it could be used by others as well. Different fruits and vegetables could be grown using this river. The remaining 14 PAs can grow any of the three dominant crops (sesame, cotton and sorghum) depending on the market values and season. These PAs have soil which is suitable to grow any of the three main crops.

In general, land is not a problem in Metema woreda. Previously settled and the indigenous farmers officially have 5 ha, but many farmers cultivate more than this. Some farmers have even reported that they have up 30 ha. For the newly settled farmers however 1 ha of land is given at arrival and another 1 will be given in the second year.

Livestock production, mainly cattle and goats are important. Cattle meat, apiculture, small ruminants, and poultry are important marketable commodities. Milk was raked as the last marketable commodity by the woreda experts. However, there is no a cultural barrier on the sale of milk. Milk during the rainy season is sold at less than 1.50 per litre, while it is very difficult to get milk during the dry season. Currently, milk is sold at about birr 4 per litre, while butter is sold at birr 23/lt. In the middle of the dry season cattle move to far away places in search of feed and water and milk becomes unavailable or very expensive. During the fasting periods (April), butter is sold at 14-15 birr/lt. Livestock production is similar in both farming systems. Among the livestock commodities, apiculture is one the most untapped potentials in the area. It is considered as the second most important priority commodity among livestock commodities in the woreda. However, bee colonies sometimes become wild and too difficult to harvest on the traditional beehives.

2. *Sesame, cotton, sorghum and livestock based farming system (hereafter referred to as sesame, cotton, sorghum, livestock cotton/livestock system)*

Fourteen PAs belong to this farming system. Sesame, cotton and sorghum are the major crops in this farming system (in order of importance). A farmer could grow any one of these crops. The environmental conditions are equally suitable for these crops. The choice is set by the farmer upon observation of the season, high or low rainfall and possible market prices. Altitude and rainfall in this farming system is lesser than the other farming system. Some literatures indicate that rainfall ranges between 700 and 900, but the digital data indicate that it is more than this (Map 3). Whatever the case may be, this farming system would receive rainfall at the lower range. The altitude range for this farming system would also be between 550 and 700 m asl (personal observation). Farmers and agriculturists believe that the underground water table is high. In some places sufficient amount of water could be obtained at less than 10 m deep. The government is developing deep wells for the newly arriving settlers in the woreda. The maximum depth of the newly dug wells is about 82 m. this being the case, the under ground water resource could support the development efforts, especially for growing tropical fruits. As a result of the temperature, evapo-transpiration is extremely high. Therefore, this requires efficient and appropriate irrigation system in place. On the other hand, two of the three rivers are found in this farming system making it more potential for fruit and vegetable

development. This area is also extensive and is the place where the natural plantations for gum and incense are located.

Currently, the price of sesame is about birr 520 per qt while cotton is sold at birr 220/qt. Sorghum is an important crop in the area because the relevance of these two crops cannot be realised without sorghum. Sorghum is sold at birr 160/qt. All commercial and smallholder farmers grow sorghum because the flour is the main food crop for all households and labourers. Labour is in short supply especially during peak weeding, harvesting and incense and gum collection periods of the year. Labourers come from the highlands of Gondar and even from Tigray. These labourers require the supply of food (sorghum flour) from the farm owners (Smallholder or commercial farms) during the major farm operations. Sorghum flour is considered part of daily wage in Metema. Sorghum is not only planted as a household source of food but also as an indirect source of cash. Hence, sorghum is an important commodity and will be hard to de-emphasise it. However, the activities needed for sorghum from the project may not be much. The continued importance of sesame and cotton can not be realized without due emphasis on sorghum. On the other, the area under sorghum is substantial (14,822 ha). If high yielding and striga tolerant varieties are grown, some of the land could be released for the other commercial crops.

2.3 Priority crop commodities

Sesame, cotton and sorghum are currently the important marketable crop commodities in Metema. However, research results from ARARI indicate that soybean is an important potential crop for the area. This crop has been tested in the area and yielded about 18-23 qt/ha. Rice was grown in the woreda on about 400 ha some 10 years ago. Currently, rice is not widely grown in the area because the variety that was grown in the woreda was affected by shortage of rainfall. In addition to this, the absence of polisher further discouraged farmers from growing rice. As a result, only 8 ha were under rice in 2004. However, there is a workshop in Bahir Dar which makes threshers and rice polishers. ARARI has also now developed a new variety called Kokit that could tolerate shortage of rainfall and is adaptable to the area. Many other rice varieties are also being tested and researchers believe that there are promising cultivars for Metema. Collectively, these conditions may then encourage farmers to grow rice again.

Groundnut and mung bean (*Sudan misr*) could be other potential crops for the area. They are grown by few of the native farmers. Other farmers in one of the southern PAs have also tested and obtained encouraging results from groundnut. Some of the soils are suitable for growing this crop. Mung bean is an expensive crop and is sold at birr 17/kg in Addis supermarkets. Some of the areas that produce mung bean are Shewa Robit in the north central areas. The indigenous people have also been growing this crop for many years.

In irrigable areas banana, papaya and mango are potential fruits for the area. Some small-scale irrigated commercial farmers contacted during the participatory rural appraisal (PRA) showed very high interest to plant the dwarf banana (Cavendish dwarf) variety. Papaya and mango are also other important fruits widely preferred on irrigated farms. Some of these farmers have already planted mango but are

experiencing problems due to fruit abortion. Seed was collected from Addis and planted without grafting. The existing papaya plants are tall and also difficult to manage. Solo varieties would be appropriate for this area. This variety has big and testy fruits which are easy to manage. The important feature is that it is a hermaphrodite meaning that any seedling plant will bear fruits.

Other horticultural crops like onion and pepper are also potential vegetable crops. Onion is imported from Sudan and sold in both Metema and Gondar. It is possible to grow this crop in the irrigated areas in Metema. There are onion varieties developed by research that could be easily grown in Metema. In addition to the use of rivers, onion, pepper and other vegetables could be grown using under ground water. The development of household drip irrigation systems in Ethiopia may also contribute to the expansion of these vegetables. The OoA has a 2.5 ha seed multiplication site just outside of the woreda town. Different fruits are grown including banana, mango and papaya. However, the site is poorly managed and the varieties grown there are the same to those of the farmers. This site could have made an impact in introducing new technologies to the area. With a small investment the site could be used as a back stopping in terms new innovative technologies to be introduced to the area. The site has a diesel pump and a yearly budget of birr 18,000.

On the other hand, the Amhara Regional State through ARARI is trying to introduce other commercial commodities *Vernonia galamensis L.* (vernonia) to the area. Vernonia is being tested at the ARARI research plots in Metema. Vernonia is an indigenous weed plant grown in many parts of the country. The average seed yield is between 2 to 2.5 t/ha. Amongst the *Vernonia* spp., the Ethiopian vernonia has the highest oil content of up 41.9% with up to 80% vernolic acid, used in paint formulations, coatings plasticizers, reagent for many industrial chemicals. This crop requires 5-9 months from planting to harvesting depending on the temperature of the area. As the crop is still in its introduction phase no one in the woreda was aware of the current price, market channels, etc. The plant was observed growing well in research plots in Metema. However, care has to be taken that this species does not become a potential weed.

Table 5. Type of crop, area and expected production (2002 – 2004)

Sr. No.	Crop	2002			2003		2004	
		Yield (qt/ha)	Area (ha)	Production (qt)	Area (ha)	Production (qt)	Area (ha)	Production (qt)
1	Sesame	5	14,108	70,540	21,872	109,360	40,668	203,340
2	Cotton	8*	13,381	107,048	20,690	165,520	21,074	168,592
3	Sorghum	15	16,142	242,130	25,154	377,310	14,822	222,330
4	Maize	15	1,036	15,540	1,621	24,315	2,016	30,240
5	Teff	5	675	3,375	672	3,360	300	1,500
6	Finger millet	10	254	2,540	448	4,480	375	3,750
7	Noug	4	47	188	41	164	120	480
8	Soya bean	20	-	-	378	7,560	46	920
9	Pepper	6	-	-	3	18	27.5	165
10	Chickpea	4	-	-			27	108
11	Sweet potato	100	-	-	38	3,800	24	2,400
12	Rice	20	104	2,080		0	8	160

13	Tomato	200	-	-0		0	4.9	980
	Total	-	45,747	-	70,917	-	79,512.40	

*For local varieties. The newly introduced improved varieties could yield up to 15 qt/ha.

In general, the area has a good potential for growing different crops provided reliable irrigation water or rainfall is available. There are 3 rivers which could be used for irrigation and have a potential of irrigating 400 ha (currently identified). Currently, 49.5 ha are being irrigated where papaya, mango and other vegetables are grown. With the current attempts of introducing new crops to the area, sustainable water supply is going to be critically important. With the high average temperatures of the woreda, drip irrigation should also be encouraged in the area.

The market oriented priority crop commodities for Metema woreda are therefore identified as follows (in order of importance):

1. Cotton, rice/livestock farming system

1st Cotton
2nd Rice
3rd Sorghum
4th Sesame
5th Fruits (Banana, papaya, mango, guava)
6th Vegetables (onion, pepper)

2. Sesame, cotton, sorghum/livestock farming system

1st Sesame,
2nd Cotton
3rd Sorghum
4th Soya bean
5th Fruits (Banana, papaya, mango, guava, avocado)
6th Vegetables (onion, pepper)
7th Groundnut
8th Mung bean (green gram)

2.4 Livestock priorities

Production from most livestock commodities is poor. Even though experts and farmers believe that livestock feed is not a problem, getting milk and butter, in the market during the dry season is very difficult. If available, the price is very expensive. For example, the price of butter has increased from 14 to 22 birr a litre (liquid butter). Livestock productivity is therefore poor due to poor management; low genetic potential, low quality feed supply and the prevalence of various animal diseases. There are 3 cattle breeds in the woreda. They are Fogera, Rutana (Sudanese breed) and Fulta (Fulani breed from West Africa).

Important diseases of cattle are trypanosomosis and tick borne diseases. In addition, anthrax, black leg and pasteurolosis are also important diseases. Feed from

hyparrhenia is the main source of feed. In some areas, sorghum stalk is left on the crop fields while in some areas farmers cut and transport the stalk. It is used as a dry season feed supplement. The major animal feed resources during both the dry and wet seasons are natural grazing land which is dominated by *hyparrhenia* species. Hay making is not a practice in the area.

Table 6. Livestock population of Metema woreda

No.	Livestock type	Number
1	Cattle	136,910
2	Goats	32,024
3	Sheep	1,686
4	Donkey*	7,164
5	Poultry	7,127
6	Bee hives**	23,789

* All male donkeys
** There are about 3,500 participant farmers and 23,453 bee colonies
Source: Metema woreda Office of Agriculture (2004).

The marketable livestock commodities for both farming systems are shown below.

1st Cattle (Beef)
2nd Sheep and Goat
3rd Poultry (eggs, meat)
4th Apiculture
5th Dairy (milk, butter)

2.5 Natural resources

Water induced soil erosion is not a major problem in Metema due its topography. However, wind erosion is a problem, though it is minor. Therefore, soil erosion is not an issue of concern. Instead, deforestation through cutting and forest fire are major environmental issues of concern. Metema has a high coverage of Acacia dominated woodland. Important species include *Boswellia papyferia* for incense production covering about 68,000 ha. *Acacia Seyal* and *A. Polyacantha* also grow naturally and good sources of gum production. The resource base is classified as dense (above 1000 trees/ha), medium (500-1000 trees/ha) and sparse (below 500 trees/ha).

Tapping seasons of these resources start in mid October and ends in June every year. The following table shows the tapping duration.

Table 7. Number and duration of tapping incense trees in Metema

1st Tapping	30-40days
2nd Tapping	25-30days
3rd Tapping	22-25days
4th Tapping	20-22days
5th Tapping	15-20days
6th Tapping	10-15days

7th Tapping	7-10days
8th Tapping	7-10days
9th Tapping	7-10days

Boswellia spp. is predominantly growing in Awasa, Tumet, Shinfa, Das Gundo, Lemlem Terara, Ashera, Akushera, Genda Wuha, and Zebach Bahir, Lencha, Shashgae, Gubay Jejebit, Meka, Kemechela, and Metema Yohannes. However, the major Boswellia growing PAs are indicated below. Bamboo is also naturally found in Metema, even though its area coverage is well documented. Locally, it is used for construction purposes and is also illegally smuggled to Sudan for the same purpose.

Table 8. Estimated *Boswellia* tree cover (ha) and estimated tree population by PA in Metema

Name of PA	**Coverage (ha)**	**Tree population**
Das Gundo	15,855.00	1,434,500
Tumet Menduka	960.25	546,500
Shinfa	2,088.00	2,204,000
Lencha	5,895.54	5,895,540
Shashage	5,677.04	5,128,912
Gubay Jejebit	6,186.00	5,151,500
Lemlem Terara	1,932.13	1,620,130
Zebach Bahir	3,050.00	2,684,000
Awasa	8,750.00	8,968,750
Metema Yohannes	3,455.00	3,496,460
Total	**53,848.96**	**37,130,292**

Apart from the forest resources identified as commodities other forest resources that enable to keep the ecology (niche) for other resources need to be protected. Hence specific measures shall be identified in the process for conservation, enrichment and management of natural forests.

Three major rivers namely Shinfa, Guang and Genda wuha drain along the woreda. Their potential for irrigation reaches to about 400 ha in total. Some of the rivers substantially reduce their volume of water during the dry season. Ground water is available between 10m and 16m in the plains (valley bottoms)

Intermittent flow of some of the rivers and the flow the river in deep gorges are the major constraints for the utilization of the water resource to its potential. From the development perspective, survey of the reaches of the river and lifting the water using diversion is necessary. Where subsurface flow is also a problem use of day cut-offs and other alternatives (Gryones) are suggested for action trial. On the other hand irrigation water management (e.g. scheduling, application systems, etc) should be given attention, as the risk of salinity is prevalent due to the favourable climatic condition.

3. Institutions

3.1 Marketing

Cooperatives

The Metema woreda office of agriculture cooperative desk is organized under four teams consisting of cooperatives promotion, credit administration and distribution, audit service and non-agricultural cooperatives promotion. The office is mandated for the organization and development of cooperatives in the woreda. The non-agricultural co-operatives were organized to undertake small business like weaving, black smith, trade, small hotels etc. They have a total capital of birr 100,654 obtained from UNDP at 3 % interest.

There are 18 peasant associations (PA) in the woreda of which 12 are organized under multipurpose co-operatives. The rest 6 PAs will establish their own cooperatives in the near future. Out of the total of 17,188 households in the woreda, only 2999 (2653 male and 346 female) or 17 % are organized under multipurpose cooperatives. It is believed by government that cooperatives are found as one of the important vehicles in promoting agricultural development and enhance the livelihoods of the farming communities. Hence, according to the new structure, one cooperative is planned to be established per PA.

Some of the functions of the cooperatives include: coordination of short term credit for purchase of input like DAP, Urea, seed, sprayer etc in collaboration with Agricultural Input Supply Corporation (AISCO) and Metema Cooperative Union and medium term credit for purchase of bee hives and goats for production in collaboration with DPPC and regional bureau of cooperative. The cooperatives also buy crops (sesame, cotton and sorghum) when prices are low at the time of harvest, transport to Gondar or Bahar dar and sell at a better price, purchase and distribute input like cotton seed from factories. The cooperatives also lent out limited amount of money to cover expenses like weeding, oxen rental etc. Two cooperatives (Kumer and Gorogoro) provide milling service. The short term credit for input was given at 12 % interest, out of which 8.25 % will be given to AISCO and 4.25 % is allocated for the cooperatives. The medium term credit was given by the disaster prevention and preparedness commission (DPPC) and from the revolving fund to purchase bee hive, 5 female goats and one male goat/person as a package. Almost all farmers in Metema woreda are settlers who come from different parts of the country and are subsidized at the initial stage of their settlement (see annex - and -).

The new structure of the cooperative team within the bureau of agriculture will require 10 staff members. However, there are only 4 members at present. Efforts are being made to persuade farmers to join the cooperatives. However, due to inadequate staff and overlapping of activities, it was not possible to go out to the field and organize as more farmers as possible. The cooperatives are managed by 13 members (1 chair person, 1secretary, 1 treasurer, 3 loan committee, 3 audit committee, 1 accountant, 1 member, 1 purchaser and 1 sales man).

It was reported that there are three potential rivers (Genda wuha, Guang and Shenfa) available in the woreda. Water tables in most parts of the woreda are high about 10 meters). In spite of these opportunities, use of irrigation is very low and no irrigation cooperative has been established so far.

The Metema Cooperative Union was established in 2000. The union is located in Metema town and has 6 cooperative members. Part of the financial sources of the union is from the individual share purchased by the cooperatives. Each share has a value of birr 2000. Kokit cooperative has the biggest share (7x2000=birr14, 000) and the smallest share is purchased by Shenfa (2x2000=birr4000). The other sources of finance are from regional bureau of cooperatives, DPPC, UNDP etc.

Some of the activities of the union include: Buying and selling agricultural products, input supply, supply of consumable items like coffee, provide short term credit to purchase cotton seed and sesame. From 2003-2005, the Union lent out birr 445,000 to 5 cooperatives at 3% interest to purchase cotton seed. The cooperatives are again expected to sell the cotton back to the union. However, the cooperatives are free to sell the product any where if they get a better price than the union.

The union gets 30 % profit and distribute 70 % (10 % for share dividend and 60 % from the transaction) among member cooperatives. In 2003/04, the union distributed birr 9425.20 profit to cooperatives from share of coupons and crop sales. The union has a total capital of birr 1,417,798.90 of which, birr 238,794.16 is fixed asset and a liability of birr 1,179,004.74.

There are only 8 peasant associations who have market place in their localities. The rest 10 PAs either sell their products to traders or multipurpose cooperatives. There is a need to establish market places so that farmers would be able to sell agricultural products and get a better price.

Some of the problems of the union and cooperatives include: less number of cooperative members, lack of market information, officials of cooperatives are not actively participating in the development process of the cooperative, rather tend to focus on their own business, crop price instability, shortage of capital, crop purchase sites are very far apart and difficult for members of the cooperatives to transport and sell their products to the cooperative, lack of knowledge and management skills of cooperative leaders, shortage of store to keep their products, misuse of cooperative money, lack of flexibility by cooperative purchasers in determining crop prices at the time of purchase. This is because price for commodities will be fixed by the cooperatives prior to purchasing crops at the market. Only 7 out of 12 cooperatives including the union have an accountant.

Local and improved, delta pine varieties of cotton seed costs birr 1.00 and birr 8.00, respectively. However, due to lack of standards, farmers were forced to mix and sold both varieties of products at birr 2.00/kg.

Others

Ambassel trade organization is the major purchaser of sesame. It was reported that Ambassel try to dominate the market by dealing with individual farmers and provide cash advance before the crop is harvested. Farmers are then obliged to sell products based on previous commitment made with Ambassel. Traders also come from Shehedi (woreda town), Gondar and Addis Ababa and try to offer a better price than the cooperatives and attract farmers to sell their products.

There are eight companies who are involved in the production and marketing of gum and incense. There is a plan to organize cooperatives in incense and gum production and marketing.

Live animals, honey, cotton, sesame, sorghum are the major commodities traded in Metema. Live animals like cattle, honey, hide and skin, etc are illegally smuggled to the neighbouring Sudan. Because of the involvement of intermediaries in the marketing chain, cooperatives have to compete with traders in order to buy products from farmers.

3.2 Input supply

The input supply team of the woreda office of agriculture was vacant for more than a year and activities have remained very slow. Until very recently, the person in charge of the credit and distribution expert of the cooperative team was handling the input activities in addition to his responsibility.

Major function of the input supply desk is to coordinate the purchase and distribution of inputs like cotton seeds, sesame, fertilizer, chemicals, bee hives, poultry, goat etc. The input team together with the development agent will also follow up and perform field supervision, status of germination potential of seeds.

The other function of the input supply desk is to follow up the budget allocated for purchase of inputs mentioned above, procurement and distribution.

Chemical fertilizer and other input

Soils in Metema woreda are relatively fertile and chemical fertilizer use is extremely low. In addition, farmers do not use commercial fertilizer on Sesame, which is one of the cash crops in the woreda. As a result only 196 quintals of DAP and 119.5 quintals of Urea had been distributed in 2004/05. AISCO and Ambasel, the major suppliers of fertilizers, pesticide and herbicide have moved out of the woreda and are operating on a remote from the zonal office in Gondar. Due to high prevalence of pests and weeds, demand for herbicide and pesticide is high. A total of 2,375 lts (2,175 lts of endosulphan and 200 lts of malathion) and 300 kg of Sevin have been distributed to farmers in 2004/05.

Seed input for Sesame is mainly obtained through farmer to farmer exchange. Adi (improved variety) has been supplied through improved seed agency . However, the bulk of cotton seed for planting is procured from Des (akale and delta pine varieties), a private cotton processing factory in Gondar. The woreda has huge potential for fruits and vegetables production. However, due to lack of knowledge, planting material, subject matter specialist in the field of fruits and vegetables etc, input of such crops were not distributed as widely as expected and the potential could not be exploited. Very few farmers and investors produce these crops using traditional method of irrigation on a small plot of land and sell to residents in Metema.

Last year, 2000 BBM (broad bed maker) and 160 treadle pumps (metal and concrete type) were distributed to farmers. No demand assessment has been undertaken by the regional office before distribution. BBM and treadle pump costs birr 90 and 550

respectively. It was reported that the water table in most parts of the woreda is about 10 meters. Treadle pump can efficiently be used up to 6 meters depth. Hence, use of treadle pump will be very minimal in the case of Metema. It is suggested that motorized pump would be more convenient for most parts of the woreda.

Demand for chemical sprayers is very high. During 2004/05, 13 matebe and 16 solo type sprayers had been distributed by Ambassel through the cooperatives.

Oranges and bananas are brought all the way from Addis Ababa by very few traders and sold in the town. Onion (adama red variety) is smuggled from neighbouring Sudan as contraband and is sold at 2 birr/kg in Metema, Shehedi town.

Although the woreda has a high potential of honey production, supply of modern bee hive is very low. Only 30 Kenyan top bar type and 600 locally made bee hives and the necessary equipments were distributed in five cooperatives through funds provided by DPPC at 12 % interest. In 2001/02, 553 farmers received locally purchased goats for production through funds obtained by DPPC and revolving fund from the Regional Cooperative Bureau at 12 % interest. The intended package was 5 female and 1 male goats. However, money allocated for the purchase of these animals was only sufficient to cover 3 female and 1 male goats. Three hundred farmers received 240 cocks, one each and 60 farmers received 5 chickens plus one cock each as a package. The cocks and chicken were brought from Andassa and Kombolcha farms.

Others
The other player in the supply of improved cotton seed (gedera variety) and Sesame (adi variety) inputs was through the Ethiopian Improved Seed Agency. In 2004/05 cropping season, 500 quintals of gedera cotton seed variety was imported from Israel and distributed to investors and farmers by Kokit and Shinfa cooperatives.

It was reported that cost of the seed was very expensive (24.50/kg) as compared to the local variety (1 birr/kg). Investors were forced to purchase this seed on a credit basis without their interest. Yield of gedera variety was very poor and seed arrived late after investors had already purchased other cotton seed varieties. Distribution of Delta pine and Akala improved varieties of cotton seed to farmers was unplanned, expensive, low yield etc.

3.3 Rural Finance

The Amhara Credit and Saving Institution (ACSI) is the major provider of credit and saving service for the rural population. Some of the objectives of ACSI are:

- to provide credit and encourage poor rural and urban households to establish their own means of income generating ventures,
- encourage saving cultures,
- reduce poverty,
- help women to increase their household income and social participation so that they will be able to contribute to the economy etc.

Credit repayment schedule varies from one investment type to the other. Example, credit for purchase of oxen, DAP, Urea, chemical, seed is for 8 months, trading

(honey, salt, coffee, tea rooms etc) is for 12 months, sheep and goat production is for 3 years. ACSI will focus more and encourage people to save their money and relay on their own income. ACSI has 10 branches and 174 sub-branches in the Amhara region, of which two sub branches are in Metema woreda. One of the sub branches is located at the capital of the woreda, Shehedi town and the other is located at Shinfa, a small town in the same woreda. Since 2002, interest for all types of credit has increased from 12.5 % to 18 %, including transport cost for ACSI staff to train farmers about the importance of credit, saving, supervision expenses, credit evaluation etc. in the respective peasant associations,

The Metema sub branch was established in 1999 and has lent out a sum of birr 5, 357,540 to 2618 clients until the end of 2004. The Metema sub branch has 10 staff members, of which 7 are technical staff and three guards. The following services are rendered by the Metema Amhara Credit and Saving Institution sub branch:

a. Group credit and saving: In order to get credit, 5-7 people should form a group and elect a chair person. The chair person controls the group and keeps an eye on his fellow group of any misusing of money. He will report to the centre group leader if he believes that the person in his group is misusing his money. Several groups form a centre. One centre has 10-15 groups of 85 to 105 people. There are 30 centres in the woreda. Out of 20 PAs (18 rural and 2 urban), 14 or 70 % are covered by the Metema credit and saving sub branch. Farmers who would like to take credit for the first time will submit request through the PA. The PA committee composed of (chair man, V/chair, DA, representative from youth, representative from elders, etc) will screen farmers by taking certain parameters given by ACSI. These are: Farmers who are believed to be hard working, economically active (18-60 years of age), socially acceptable, motivated, reside at least for 5 years in the PA, ownership of one or no oxen, no outstanding dept etc. The loan officer will further screen the loan document and disbursement of cash will be effected. The sub branch will also give training about ACSI, credit policy, saving culture etc. It was reported that group credit is some times risky. There are evidences that some farmers have disappeared after taking the loan and members of the group had to pay the credit for the others. This has created a negative impact on group credit. Hence, there is the opinion that credit be given on individual basis rather than in groups.

ACSI insists repayment of credit to be effected immediately after harvest. However, price of crops tend to be very low due to high supply during December/January and farmers are obliged to sell their products at low price to pay their credit. In order to solve this problem, it was suggested that credit be paid some time between April – May during which farmers will be in a better position to get a higher price for their products. The other option is for ACSI to receive the credit in two instalments. The first payment is at the beginning of the harvest and the other after few months.

The maximum amount of loan for a farmers is birr 5000. A farmer is obliged to open a saving account and deposit 5 % of the principal plus a saving of 1 % of the principal every month.

The Metema sub branch has no problem with repayment of credit from farmers. Because of the high demand for credit, ACSI has decided to expand its credit limit

from birr 5000 to birr 250,000 so that interested farmers and traders can satisfy their needs and expand business.

Traders who are taking credit from ACSI are required to open a saving account and deposit 3 % of the principal plus 1 % of the loan every month.

b. Asset loan: This loan is mainly given to government employees for construction, purchase of household goods etc. 10 % advance deposit is required before the loan is dispersed. For this group, if loan is less than birr 5000.00, repayment will be made within 12 months and if greater than 5000.00, repayment should be effected within 3 years. Salary of the person is taken as collateral and one person as a pledge. Interest is calculated at 18 %. Maximum loan can't exceed birr 15,000 or USD 1744.

c. Money transfer services: The Metema sub branch administers retirement fund from the Ministry of Social Security Authority. Salaries will be paid every month to 122 retired persons.

d. ACSI in collaboration with Ministry of Trade and Industry has started provision of credit to rehabilitate job less youth in Metema woreda who completed their high school. Each member will be given birr 1500 to start the business.

Others
Besides the microfinance institution, cash credit is provided to purchase inputs by multi purpose cooperatives, disaster prevention and preparedness commission, regional cooperative bureau, NGOs etc.

3.4 Agricultural extension service

The new agricultural extension service in the Woreda has now been reorganized as of January, 2005 and is operating under the leadership of the Head and Vice Head of the Agricultural and Rural Development office. The woreda is divided in to two parts and extension activities are shared between two group leaders. Both group leaders will have the following similar staff members under their supervision.

1. Team Leader
2. Extension & Training Expert
3. Crop Production and Protection Expert
4. Horticulture and Fruit Expert
5. Animal Production and Feed Development Expert
6. Soil Conservation and Water Development Expert
7. Agro-forest and Forestry Expert

The following extension staff report to both group leaders and operate in the whole woreda.

1. Rural Energy and Mines Resources Development Expert
2. Home Economics Junior Expert
3. Irrigation Agronomy Expert
4. Veterinarian
5. Senior Animal Health Assistance

6. Junior Animal Health Assistance
7. AI Technician
8. Hide and Skin Technician
9. Apiculture Technician
10. Crop Protection Technician
11. Forest and Agro-forest Technician

Although the new structure requires the above staff members, the current man power in the extension are only 9 experts and technicians and 33 development agents of which 19 are Technical Vocational Training College graduates. Five out of 9 experts and technicians (veterinarian, hide and skin technician, apiculture technician, crop production technician and forest and agro forest technician) are common for both teams and operate in the whole woreda. The other 4 experts (2 team leaders, animal feed and production and crop production experts and 33 development agents divide the woreda in to two and share extension activities.
If team leaders require technicians, they will take from the pool who are common for both teams.

Extension and training, crop production and protection, horticulture and fruit, animal production and feed development, irrigation agronomy, AI technician, apiculture technician and crop protection directly deal with agricultural production. Soil conservation, rural energy and mines resources development, forest and agro-forest deal with natural resources management. Home economics, veterinarian, animal health assistants, hide and skin technician are also under the extension group.

Table 9- Number of staff and educational level of the Woreda Office of agriculture

Department	Elementary (1-6)	Junior Sec. 7-8	High School 9-12	12 +1	Certificate	Diploma	BSc	MSc	DVM	Total
Office head	1		1				1			3
V/office head			1			2		1		4
Plan and program						1				1
Personnel and general service	4	6	7							17
Extension (group 1)				4	1	11	1			17
Input & marketing						1				1
Extension (group 2)				4	2	11	1			18
Extension (group 1 and 2)			5	1	2				1	9

Food security and disaster prevention								1		1
Cooperative promotion and inspection			1	1		4				6
Environmental protection & land administration				2		3				5
Total	5	6	15	12	5	33	3	2	1	82

Source: Metema woreda office of agriculture, February, 2005

Development agents (DAs) in the Woreda are involved in the distribution of inputs and assist in the collection of credit repayments for inputs supplied to farmers by cooperatives, members of credit committee in the PA etc. They also perform regular extension activities which include teaching on timely ploughing, weeding, harvesting, maintain optimum seed rate, use of quality seed, etc. It is also important for the DA to teach farmers visit their field regularly and check if there is any pest attack, flood, water logging etc. Livestock extension teachings include preparation of compost, maintaining optimum number of livestock etc. Farmers are also advised to report cases like outbreak of animal disease to veterinarians or DAs. Ten FTC sites have been identified and construction of five FTCs has been completed in Meka, Kokit, Shinfa, Dass, Mender 6, 7, 8 PAs. Three FTC graduates comprising of animal, plant and natural resource have been assigned in all five sites. Next year 6 plant and 5 animal sciences, 7 natural resources and 4 animal health assistants will graduate from the TVTCs and will be assigned in the woreda. It is indicated in the 3 years strategic plan that each household member (working and non working) should be able to earn birr 10.00 per day or 3650 birr per year. In order to accomplish this target, the extension service has two approaches, the household package and the minimum package.

Household package: Each development agent will work with an average of 50 households. Income of these farmers will be assessed from the type of crop they produce, livestock resources, labour force etc. Three types of combination of enterprises will be offered to the farmer to choose among the menus. Example, one combination of menu could be goat production, sesame and Cotton the other could be fattening, fruit crop, sorghum, vegetable production etc Farmer will choose one from the combinations. A business plan will be prepared as to when inputs will be available, when to start and finish the activities, cash requirements, input out put recording sheets, etc. The DA will make close follow up to all 50 households.

Minimum package: All farmers who are not in the household package will participate in the regular minimum package program including use of improved seed, timely planting and weeding, optimum use of inputs etc

3.5 Gender and HIV/AIDS service

The Metema Woreda women affairs desk is organized within the head of people's participation and organization office. The desk has two women affairs experts.
The office was established in 2003 and started the actual work in 2004 with the objective of gender mainstreaming, avoid harmful traditional practices, encourage pre marriage HIV tests, the dangers of untimely marriage, how to assist HIV/AIDS patients etc. In this exercise, after testing for HIV/AIDS two rural marriages were cancelled. In both cases it was men who were found positive. There is one hospital in Metema who perform HIV/AIDS tests. Women's affairs have offices at the regional, zonal, woreda and PA level. Vice chair of the PA follows women affairs issue. Although women affairs desk do not have its own structure below the PA, the office uses people's participation and organization's structure. According to the women's desk, 697 rural women have organized themselves in association and have birr 2871 capital. 110 women in Shehedi town have also formed an association with a monthly contribution of birr 0.25-2.00. In all sector organizations, there is a focal person who deals with women affairs. Girls club has been established at high school level and follow with problems associated with juvenile delinquencies, handle teacher student relationship, increase girls participation in the school activities etc and report to the association at all levels. Parents committee has been established at all schools and oversee girl students' issue. Women who organized themselves will be given priority to get credit from ACSI to run small business.

In an effort to reduce the spread of the disease, the woreda HIV/AIDS office provide teaching services like: voluntary counselling test (VCT), provide training to community based organizations, prevention of mother to child transmission (PMTCT), care and support for HIV/AIDS positive and orphans. According to the office, about 51 orphans aged below 15 years had been supplied with education materials from global funds of the G 8 countries, organize anti HIV/AIDS club at schools, distribution of condoms at hotels, shops etc. Focal points have been established in all government offices and are giving training on HIV/AIDS to their respective employees.

Community Voluntary Prelimondo (CVM), an NGO based in ITALY invited women association, teachers, church people, and government employees in Gondar and gave training for 5 days on HIV/AIDS. One teacher and a student have been given one day training in poster preparation. Child right workshop was also organized for Metema Kebele officials and sector government offices by Prelimondo.

Because of lack of reagent to undertake HIV/AIDS test, absence of technician in the hospital etc., voluntary counselling test (VCT) could not be undertaken for a long time. However, out of 212 people who took VCT in 2004/05, 45 people or 22.2 % were found positive. Of these, 23 were men and 12 women.

3.6. School and Woreda Net

a. School net

There is one junior high school (up to grade 10) in Metema woreda, Shehedi town. The school is equipped with 16 plasma TVs and School Net has already started at the same time like the other woredas. . The program is a one way (only listening including picture) transmission. Two teachers from the Junior High School and two staff members from Civil Service Reform have been trained in the use of the plasma TV and some basic computer training including Introduction to video conferencing, Introduction to computer, basic net working, MS word, MS excel, MS access, MS window, Internet explorer, web page design and basic PC trouble shooting for 35 days in Gondar by Neuro net with financial assistance from UNDP. Ato Solomon Nega and Nega Aseffa from Metema woreda civil service reform and Ato Gashaw Alemu and Tewolde Kasahun from the school have taken the training. Six subjects are given at the junior high school level through 6 channels.

Major problem encountered are:
- There is no electric power in the town. The school is forced to use diesel fuel and found it difficult to cover the cost.
- Education materials were sent on CD. Due to lack of computer, the school was not able to use the materials. Even if they manage to get computer from some where else, the materials are prepared in adobe acrobat and subjects like math will be difficult to convert to word and print.

b. Woreda Net

Generator house, satellite room and meeting hall construction has almost finished. The program was supposed to start last December, 2004. In this system, two way communications with picture and sound will be transmitted where participants will receive and send messages. According to Ato Solomon, there will be another training on web site for three weeks for the above staff in Addis Ababa. The training is supported by information communication technology authority and there is a plan to connect sector woreda offices.

4. PRIORITY COMMODITY DESCRIPRTION, 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 10. Cotton		**Both systems**
Production		
Cotton production has been in Metema for many years. It is hard to trace when production started. Farmers have developed own systems on cotton production and management. Cotton production in Sudan is a major source of money for the economy. The environment of Metema is similar to that of Sudan. In addition, unlike other arid areas in Ethiopia, Metema receives a relatively higher but also reliable rainfall. There are 4 rainy months (June to September). This extended rainfall period can support long seasoned crops. Farmers grow both improved and local varieties. Productivity of the local variety is very low compared to any one of the improved varieties introduced to the area. About 8 qt/ha is produced from the local variety while it is possible to produce 15-20 qt/ha seed cotton. In addition, fibre length and strength of the local variety is also lower compared to the improved varieties. However, the amount of seed in a boll is so high that it helps farmers benefit during sale because of heavier seed weight. The presence Flea beetle can be a major devastation during the seedling stage. Damage can be 100% in a very short time if appropriate chemicals are not applied on time. This needs therefore for farmers to have the chemical at hand when they decide to plant cotton. The presence of ginnery in the near by town of Gondar (180 km away) is another added advantage to producing cotton in Metema even though it may have problems of its own. The average land holding in the woreda is very high compared to other areas in the highlands. The proportion of land under cotton is mainly dependent upon the market. New cotton varieties have been introduced to the area through ARARI and MoA. The new varieties are Gedera, from Israel, Akala SJ2 and Delta Pyne from Melka Werer Research Centre and Hirhir from Humera. All the newly introduced varieties have performed better than the local one. However, because of high seed prices (Gedera birr 24/kg, other improved varieties 8.65, local variety was only birr 1/kg). This had raised farmers' expectations. The price of both the high and the poor quality varieties were the same. However, due shortage of labour cotton is picked three time as in other cotton growing areas. It is rather kept on the ground until all other farm operations (sesame and sorghum harvesting) are completed. As a result the quality is affected and hence the selling price. Currently, the Amhara national government has identified Metema as one of the woredas where cotton and sesame are the priority commodities. The past year cotton was produced on 21,074 ha in the woreda. Assuming that most of the farmers have planted the local variety about 17,000 tons of cotton have been produced.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Long experience in cotton production but	Training of both experts and farmers	Melka Werer/EARO, ARARI

production and management of cotton is still poor		OoA – extension IPMS – TA
Local variety is of poor quantity and quantity	Introduce high yielding improved varieties	Werer/EARO ARARI IPMS –TA
Limited number of varieties introduced	Increase number of varieties to be introduced for a wider choice	Werer/EARO, ARARI IPMS –TA
Lack of production knowledge on newly introduced cotton varieties (Gedera)	Provide training for extension staff and for farmers	BOA, IPMS, Meleka Werer Research center
Planting method of cotton is traditional (broadcasting)	Introduce and popularise cotton drillers and train farmers	IPMS, EARO/Melka Werer Rural technology centres Other international institutions
Flea beetle and boll worm (*Podagrica* spp.) causing major losses during seedling stage	Training on the threshold and application time Strengthen cooperatives and private chemical suppliers to the farmers. Encourage private pest control service givers/suppliers	Extension Teams, EARO/Melka Were Cooperative Team IPMS -TA
Expensive cost of labour affecting quality and quantity (NB. Farmers wait until all bolls are ready for one harvest)	Use of family labour should be encouraged. The new settlers are good source of labour (until they establish their own farms) Introducing mechanism to shorten farm operations prior to cotton picking (use of sorghum thresher to shorten the time spent on sorghum threshing) to get time to pick cotton	Cooperatives Team OoA, IPMS
Waterlogging problem	Select areas which are suitable or plant rice and training of farmers on the use BBM	OoA- Extension Teams IPMS - TA
Shortage of rainfall	Use adaptable varieties, or change to other tolerant crops (sorghum or sesame)	ARARI/Melka Werer OoA- Extension Teams IPMS - TA
Movement of livestock on cotton fields (before picking) affecting quality	Timely harvesting, but if problem persists, by laws will be needed to control the movement of livestock during this time by the society	Cooperatives Team, *WALC* OoA Extension Teams IPMS - TA
Input supply		
Agricultural Input Supply Corporation (AISCO), Ambasel, Cooperatives and some times OoA are involved in input supply. However, the area is believed to be fertile and application of fertilizer is nearly inexistent. There is ample farmland that is not managed by farmers. They practice shifting cultivation. Hence use of fertilizer is low. However, farmers used few improved varieties last season. There are private chemical suppliers and farmers buy and use from them. The situation on input supply also true for the commercial farmers. Currently the OoA is supplying cottonseed. Two of the improved cottonseed varieties come from Melka Werer and one from Israel. Knapsacks are freely available to farmers including commercial farmers and become in short supply as a result. The OoA has about 100 knapsacks.		

Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
High prices of planting materials (Gedera variety birr 24/kg, the others are birr 8.65/kg)	Encourage contract farming (Select appropriate varieties that do not segregate in order to get cheap and good seed) also develop small scale ginneries Organize seed grower groups and encourage community based seed multiplication scheme	Melka Werer/ARARI/ IPMS - TA
Shortage of chemicals and/or late arrival and shortage application equipments (Knapsack)	Encourage private pesticide dealers to avail appropriate chemicals Encourage cooperatives to avail necessary chemicals	Input supply, IPMS – TA Input supply, IPMS – TA
Variety mix up and no Reliable seed source	Maintenance breeding and supply of certified seeds. Establish community based seed supply system	Melka Werer, EARO, ARARI
There is no input use in cotton farming Particularly in large scale farms	Demonstrate the effect of fertilizers and pesticides on yield increase	Melka Werer, ARARI, IPMS and OoA
Unreliable cottonseed supply	Establish cottonseed producers from either commercial or small scale farmers	Melka Werer/OoA-extension IPMS-TA
Credit		
The Amhara Credit and Saving Institute (ACSI) is operational in the woreda. There are also intentions that it will open a Rural Bank in the woreda town. Some cooperatives have been given money to buy seed cotton from commercial farmers who received the Israeli variety (Gedera).		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Credit not available for buying cotton seed and pesticides	Facilitate credit for cotton production	OoA/ACSI IPMS – TA
Marketing		
Marketing of cotton is done on an individual basis. Traders come to the woreda and collect the seed cotton or some cooperatives may also buy and sell the product. There is one farmers union and it is weak in its capacity. The marketing of cotton is carried out without considering the quality of the cotton produce. Both the newly introduced varieties that have higher lint length and strength are equally valued with the poor local variety. As a result farmers we discussed with showed their dissatisfaction. However, there is the weight compensation that the improved varieties give at least twice as much as the local variety. The available ginnery is also said to cause some problems because of it capacity and also spending time for maintenance during picking time. Cotton produced in Metema is organic and may have a chance for better price if proper market outlets are organised.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Fluctuating market prices	Provision of timely market	Trade promotion Bureau

	information system at Woreda level	IPMS-TA
Quality of cotton is not considered during the marketing of cotton	Encourage quality grading system and quality based pricing Create Linkage between producers and textile industry Capacitate producers to search for Solutions Encourage co-ops to focus on purchasing of high quality cotton	Regional Marketing agency, IPMS - TA
Cooperatives do not have own stores for members to store their products and escape bad market periods.	Capacitate cooperatives to have own stores (Currently, 4 stores with a capacity of 10,000 qt each are being constructed) as they need more of these.	Regional Marketing agency, IPMS - TA
Lack of market information	Direct linkage between producers, textiles and private exporters needed Establish market information system at Woreda level	Regional Marketing agency, IPMS - TA
High profit margins by Ambasel, ginnery and private traders	Organise cooperatives for selling own produces by linking them with the main exporters and textiles or (Shorten market chain)	Regional Marketing agency, IPMS - TA
Lack of knowledge on cotton quality pricing	Training of both experts and farmers (service cooperatives) on quality cotton production and facilitate contract farming	Melka Werer/ARARI/Interested Textiles IPMS-TA
Service cooperatives lack cash for buying and selling cotton	Organise and capacitate service cooperative/unions	OoA/Cooperatives IPMS - TA
Lack of labour affecting time of picking due to overlap of sorghum harvesting and threshing This affects quality and hence price.	To timely pick cotton, introduction of time saving sorghum threshers is important	OoA/IPMS - TA
High loss of cotton in terms of quantity and quality due to lack of appropriate packaging system	Conduct study on appropriate packaging system and packaging material	EARO/Melka Werer, Textile factories, IPMS - TA
Lack of alternative ginnery	Assess the possibility of introducing small scale ginnery to Metema	Regional Investment Office EARO/Mwelka Werer, IPMS - TA

Table 11. Rice	**Cotton/Rice/livestock farming system**	
Production		
Rice was produced on only 8 ha last year, but was produced in more than 400 ha some years ago. Farmers in this farming system and two other PAs (Agam Wuha and Kokit) from the other farming system have suitable soils for this crop. Farmers are interested to grow again provided they are sure that there is the sheller in the woreda. Since then, new varieties suitable for Metema have been screened. Among these varieties Kokit has been developed for Metema woreda. All the other varieties already identified are also suitable for Metema. There is a research site which is managed from Gondar. However, there is one technical assistant based in Metema. Farmers believed that they had developed the food habit for rice. In addition the productivity was also very high and the market value was also good enough to encourage production. Below will only be some important problems and possible solutions, but is not exhausted because the crop is nearly out of production. The major issue they raised every time was the lack of equipments.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Poor yield of due to rainfall fluctuation	Plant appropriate varieties that are suitable to the area (Kokit, NERICA and other varieties) based on the weather condition of the area.	Input from WARDA ARARI, OoA – extension IPMS - TA
Lack technical support (mainly lack of polisher)	Introduce and popularise small scale rice polishers	ARARI, Regional Investment Office OoA – extension IPMS - TA
Difficulty of threshing using oxen	Introduce and popularise small scale Rice threshers	
Weed was a problem in some fields	Timing weeding is a requirement for better yield *Demonstrate the importance of herbicide use*	OoA IPMS – TA, ARARI
Input supply		
Much cannot be said about in put supply on rice as at now, but the things on the ground are encouraging in general. New varieties are developed for Metema and the necessary equipments, which were missing, are already in the woreda since about two years. Use of fertilizer in Metema in general is very low. However, with the reintroduction of rice where continuous cultivation may be required, fertilizer use will be inevitable in the future.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Polisher installed at woreda town but the rice growing PAs, are some 5 to 37 km away. On the other hand, the polisher is defective and it breaks seed during polishing	Introduction of small scale polishers close to the major rice growing areas Install existing polisher around the major rice growing area Repair the machine and put it in use	OoA IPMS – TA Coops
Limited number of rice varieties available	Introduce new varieties adapted to Metema	Metema Research Sub-Centre/ARARI, IPMS - TA
Credit		

Use of fertilizer in Metema in general is very low. In the future when the need for fertilizer becomes a necessity, farmers may need to get credit from ACSI or others. Therefore much cannot be said now.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Group credit system discouraging farmers	Create other convenient (farmer preferred credit systems)	ACSI/ Cooperatives Team, IPMS-TA
Weak capacity of service cooperatives to get and give credit to members	Strengthen service cooperatives Establish and strengthen credit and Saving system at Kebele level	OoA-extension IPMS - TA
Marketing		
There were no marketing problems when rice was produced in the area. This is also expected to be the case after the reintroduction of the crop. The price of rice in Fogera is about 280 to 300 birr/qt.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Weak financial resources of cooperatives may cause inability to collect and sell rice and hence may discourage farmers in the future	Strengthen cooperatives in financial resources	Cooperatives Team, IPMS-extension
Insufficient Storage facilities	Strengthen cooperative in infrastructure (storage)	OoA-extension, IPMS-TA
Remoteness of the area may make the crop cheaper	Value adding (packing and labelling) Find other market avenues (Sudan, if possible)	Regional Market Promotion Bureau, OoA, IPMS - TA

Table 12. Sorghum –		**Both systems**
Production		
Sorghum is an indigenous crop to Ethiopia. The natives of the area have developed own variety. The yield of this local variety is about 12 qt/ha, while the improved ones, already tested, could potentially yield 22 qt/ha. Some farmers have obtained about 18-20 qt/ha. Both the local and newly introduced varieties are resistant to striga. Farmers in the area practice kraaling on plots where the local sorghum will be planted. This process will also be applied to the fields to be planted by other sorghum varieties also. Even those farmers who do not own livestock ask for help from relatives and friends to do this. As a result, the crop can easily escape striga damage and farmers can harvest a good crop. Both small holder and commercial farmers grow sorghum. A household at an average would allocate about 1.5 – 2 ha for sorghum. Even though sorghum may be considered a food crop, it is the backbone for all activities in agriculture in Metema. Daily wages of labourers in big or small farms (sesame and cotton farms) include about 300 gm of sorghum flour daily. The introduction of better yielding and striga resistant sorghum varieties may help reduce area under sorghum where the land could be used to grow cotton or sesame. In addition, the market value of the local variety (red) is lower than the new varieties (white). However, sorghum is currently sold at more than 200 birr/qt. Commercial farmers consider this crop as a marketable commodity nowadays..		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Poor yield of local varieties	Popularise high yielding and striga resistant improved varieties (Gobiye, Yeju, Berhan, Teshale, Ashebir and Meko).	ARARI OoA – Extension Teams IPMS - TA
Striga is a major problem	Use of striga resistant varieties	ARARI, OoA - Extension Teams ICRISAT, IPMS - TA
Wild animals and birds attacking sorghum	Form clusters, where many adjacent farmers grow sorghum so that damage is distributed. effects along with scaring signs	OoA – Extension Teams IPMS - TA
Lack of improved agronomic practices	Training of extension staff and model farmers on improved management practices (e.g. row planting, use neem leave for storage, etc).	ARARI/ICRISAT OoA – Extension Teams IPMS - TA
Diseases like smut	Use of clean seed, seed dressing, burning of diseased sorghum stalks, use of resistant varieties. In general use of proper integrated pest management (IPM)	ARARI OoA – Extension Teams IPMS – TA
Less attention to sorghum leading to low yield (e.g. weed infestation)	Timely farm operations needed or use appropriate chemicals	ARARI OoA – Extension Teams IPMS – TA
Storage pests, mainly weevil	IPM – Use of Neem leaves in storage	ARARI/OoA – Extension Teams IPMS – TA
Farmers use high seed rate and plant population becoming too many due to thillering, hence low	Training of proper management systems of sorghum.	OoA – Extension Teams IPMS – TA

production		
Input supply		
Currently, few varieties (*Gobiye, Yeju, Berhan, Teshale, Ashebir and Meko*) have been introduced since 2 years, but not widely. "*Wody Aker"* is one variety that has been there for many years but is susceptible to striga attack. Most of the farmers use own local planting material which is red in colour and striga tolerant. The newly introduced varieties are relatively high yielding but also early maturing ones. As in the other commodities, fertilizer is not used for sorghum. Herbicide (2 4- D) is used during the second weeding in sorghum.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Lack of sufficient improved seeds (germplasm)	Introduction and on-farm multiplication of the improved varieties by farmers (contract farming for seed multiplication)	ARARI OoA – Extension Teams Cooperatives Team IPMS – TA
Lack or late arrival of chemicals	Strengthen service cooperatives	OoA – Extension Teams Cooperatives Team IPMS – TA
Lack of storage facilities	Strengthen service cooperatives	OoA – Extension Teams Cooperatives Team IPMS – TA
Lack of threshing machines (mainly for commercial farmers)	Strengthen service cooperatives	OoA – Extension Teams Cooperatives Team IPMS – TA
Credit		
The need for credit is high during first (labour power) and second weeding (2,4- D application). The culture of saving is weak even though there is Bank in Metema.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Group credit system discouraging farmers	Create other convenient (farmer preferred credit systems)	ACSI/ OoA-Extension Teams Cooperatives Team IPMS-TA
Weak capacity of service cooperatives	Strengthen service cooperatives	OoA- Extension Teams
Marketing		
Small traders are involved in marketing sorghum. The traders sell most of the sorghum with in the woreda but some of it could be transported to Gondar. Lack of storage facilities is forcing farmers to sell sorghum immediately after harvest and becoming cheap. Currently, white sorghum (seed from the improved varieties) is sold at 160 birr/qt, while the local variety is sold at 120 birr/qt.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Lack of storage facilities	Strengthen service cooperatives	OoA – Extension Teams, Cooperatives Team, IPMS – TA
Market dominated by local grain, price is low	Introduce high market value improved sorghum varieties	OoA – Extension Teams Cooperatives Team IPMS – TA
Market saturation because of harvesting at the same time	Strengthen service cooperatives	OoA – Extension Teams Cooperatives Team IPMS – TA

Table 13. Sesame –		**Both systems**
Production		
The production of sesame is predominantly smallholder but also are some commercial farmers, especially to the west (bordering Sudan). This area is situated about 60 km south west of Metema Yohannes town. Sesame is the dominant crop grown in Metema. It covered about 51% of the 2004 cultivated land (Table 3). Productivity of sesame is about 5 qt/ha. The increase in price of sesame has encouraged farmers to increase area under sesame. In only 3 years, the area under sesame increased from about 14,000 to 40,000 ha (Table 3). Different varieties have been introduced and this has encouraged farmers to plant more of sesame. These include, *Adi, Hirhir, Tejareb* and *Gojam*. On the other hand the last season's rain was optimum for sesame. All these varieties are intended to grow under rainfed conditions. A traditional oil extractor, called *Ansara,* driven by camel is used to extract sesame oil. The camel is blindfolded in a shed and rotates the pestle after putting sesame seed in the mortar. About 45 litres is extracted from 100 kg of sesame seed. However, cleanliness during the extraction of the oil is not up to standard. The oil cake remains for the owner of the *Ansara* which could be sold at about birr 150/qt and used as feed for very weak animals.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Lack of improved germplasm	Introduce and conduct adaptation trial for varieties with high yielding potential and high oil content	Melka Werer, ARARI, IPMS
Poor quality and yield of local red varieties (Dolmite)	Introduction of better performing white sesame varieties and improvement of cultural practices.	ARARI, Melka Werer OoA – Extension Teams IPMS - TA
Termite damaging the stem and causing quality to deteriorate because of the soil collected on the stem	Clean sesame "*Hillas*" (an upright standing heap of sesame harvest on the field) before collecting seed in to containers and cleaning seed also afterwards Dusting of chemicals in areas where "*Hillas*" are formed	OoA – Extension Teams IPMS - TA
High rainfall/waterlogging problems	Train farmers to Grow rice in waterlogged area while sesame on well drained soils *Introduce techniques to remove excess water from the field*	OoA Extension Teams IPMS - TA
Shattering of seed including after harvest	Training to timely harvest, putting "*Hillas*" on canvas or plastic materials Introduce technologies that keep the pod closed for longer period (stickers)	OoA Extension Teams IPMS - TA
Sesame sucking insect	Apply sevin or other chemicals	OoA Extension Teams

(*Elasmolus sorriddus*), after harvest and in storage	around "*Hilla*"	IPMS - TA
Some farmers grow low quality sesame (non white grain colour and low oil content)	Popularise the new varieties (*Adi, Hirhir,* Abunaam and *Gojam)* which are white grain types	ARARI, Melka Werer Wadi Medeni/Sudan OoA – Extension Teams IPMS - TA
Lack of technology package when new varieties are introduced	Provide information on technology package and variety characteristics and train extension workers and farmers on methods of production	BoA, ARARI, Melk Werer, ESE, IPMS
Diseases like blight ("*mich*") are common	Develop and introduce resistant varieties and exercising crop rotation.	ARARI, Melka Werer Research Cenre, OoA OoA – Extension Teams IPMS – TA
Input supply		
Farmers in the Metema do not use fertiliser for sesame and also other crops. An Insecticide against the sucking bug (sevin) is supplied for free by OoA. Farmers are aware that if this insect attacks their seed the price will be very low. As a result farmers are even asking the OoA for different chemicals at cost so that they will keep it with them and use when necessary. Three improved varieties have been introduced recently and farmers are happy about it. Wide adaptation of these varieties seems to be achievable.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Lack of sufficient improved varieties	Introduction and on-farm multiplication of newly introduced varieties by farmers for reliability of supply	ARARI/Melka Werer OoA – Extension Teams/cooperatives IPMS – TA
Late arrival of chemicals, particularly against the sucking bug.	Capacitate cooperatives to keep important chemicals like sevin and others in their store for easy dispatch.	ARARI OoA – Extension Teams/cooperatives IPMS – TA
Credit		
ACSI is very active in Metema. Group credit is possible. Farmers need a lot of money for weeding and harvesting sesame. Depending on the season, daily wages are very expensive in Metema. During weeding, a daily labourer would be paid 10-30 birr, where about 7-8 labourers would be needed/ha. During harvesting, labourers would charge about 100 to 160 birr/ha. This means on average farmers growing sesame would need to spend about **350** birr/ha. Credit then becomes an important tool to cover these expenses. This then makes farmers in need a lot of cash before selling his product. When credit from ACSI is not available for some reason, there are local money lenders who lend money at 50% interest rate during weeding and harvesting to be returned after selling sesame.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Group credit system discouraging farmers	Create other convenient (farmer preferred credit	ACSI, OoA- Extension Teams IPMS-TA

	systems) and introduce Credit and Saving system at PA level	
Weak capacity of service cooperatives	Strengthen service cooperatives	OoA-Extension Teams IPMS-TA

Marketing

This is a key factor in the production of sesame. Currently, the price of sesame is about 520 birr/qt in Metema. Price is fluctuating faster. In October, when sesame was being harvested, the price was 660 bir/qt. This is showing a price drop by about 140 birr/qt in only 4 months. This issue has been a major concern of most of the farmers (commercial and smallholder farmers). Therefore other alternatives need to be assessed. The big advantage is that sesame produced in Metema is purely organic. With the European and other markets requiring this, there could be a possibility to attract international traders to buy Metema sesame. In addition the volume of produce is also not easy. Currently there 4 stores with a capacity of 1,000 tons capacity each are being built by Food Security of the Region. These will ultimately be given to the Farmers Union in Metema. These stores may contribute towards marketing of produces from the area. Besides, sesame can have value added market advantages (oil and sesame cake) for small scale farmers.

Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Price fluctuation	Link with international traders who would be interested in buying high quality organic sesame	Regional Market and Trade Bureaus IPMS - TA
Lack of awareness about the organic nature sesame from the importers side	Popularise the organic nature of sesame produced in Metema Certify the organic sesame Create linkage between producers and exporting companies	Regional Market and Trade Bureaus Relevant International certifying bodies IPMS - TA
Whole sellers Consider Metema sesame as poor quality and pay lower prices as compared to Humara sesame	Organize sesame trade exhibition and convince whole sellers on the quality	Regional Marketing Promotion Bureau Trade and industry, Chamber of commerce, WALC, IPMS
Poor quality (grain colour and oil content) of the current variety	Change local varieties with white improved varieties like *Adi, Hirhir,* and *Gojam azene.* The purchase of sesame by coops should focus only on white seeded varieties	ARARI, Melka Werer In put supply/Coopreratives Offices OoA-Extension Teams IPMS - TA
Insufficient storage facilities	Strengthen cooperative capacity	OoA-Extension Teams IPMS - TA
Contamination of sesame seed with inert materials	Create awareness to farmers to sell clean sesame	OoA-Extension Teams IPMS - TA

resulting to poor quality Soil mixture due to termite affecting quality and hence price	and introduce and popularise small scale cleaners Quality based pricing will encourage farmers to produce high quality sesame use of appropriate chemical (against termites)	

Table 14. Tropical fruits –(Banana, papaya, mango, guava, avocado)		**Both systems**
Production		
There is a fruit nursery (seed multiplication) site run the woreda OoA. In the nursery there is one type each of papaya, mango, banana ("*Kenya type*"), avocado and orange. The management of the site is poor. It could be easily developed and be used a major source of planting material to the woreda. The varieties are also unknown and what available in the nursery is not different from what is available in the small farms. It could not be used as a backstopping to the farmers. There is a possibility of expanding this 2.5 ha site as the need arises. Metema has about 400 ha which could be developed under irrigation only about 10% is currently developed. These areas could be suitable for tropical fruits. There are about 19 private farmers who own small some irrigated land and pump their fruit farms from rivers. These farmers mainly grow local papaya which is tall and difficult to harvest. People in the area use papaya as a medicinal plant and sick people are given papaya in most cases. Few farmers are growing mango trees (one was visited) The banana grown in Metema has short which crack when ripe and become black during artificial ripening time. Farmers are eager to get the dwarf banana which is common in the rift valley and Arba Minch areas. A kilogram of banana and orange are sold at birr 5 each, while papaya is sold at 2 birr.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Existing planting materials of unknown origin (in both the seed multiplication site or farmers plots).	Introduce new and high yielding varieties from Melkassa	Melkassa, ARARI OoA – Extension Teams IPMS - TA
Newness to the technology and lack of knowledge of fruit management	Practical training of DAs and farmers, experience exchange programmes, increased on-farm introduction, Introduce appropriate management practices	Melkassa/ARARI OoA – Extension Teams IPMS - TA
Lack of technical backstopping and experience	Capacity building of OoA staff and reorganising the existing OoA managed horticulture seed multiplication site to satisfy demand	Melkassa/ARARI OoA-Extension Teams IPMS - TA
Poor shelf life of fruits aggravated by high temperature	Introduce cold storage system developed by Adet Research Centre (ARARI)	ARARI/Adet OoA-Extension Teams IPMS - TA
Concentration around rivers and short life of	Encourage the use underground water resources	OoA-Extension Teams IPMS - TA

rivers during the dry season		
Hard to manage types of fruits existing (Tall papaya, cracking, blackening banana)	Introduce manageable and market demanded	Melkassa/ARARI OoA-Extension Teams IPMS - TA
Abortion of mango fruits at young age	Identification of the causes of this problem and recommend control method	Melkassa/ARARI OoA-Extension Teams IPMS - TA
Input supply		
The major input in this regard is availability of necessary planting materials. Currently, the seed multiplication site of OoA is ill-equipped in terms of planting material and trained manpower. There were treadle pumps observed in the OoA but not with farmers. This site needs to be reinvigorated so that it satisfies the demand of farmers. There is a high demand for fruit seedlings by farmers but the OoA could not avail the planting materials. There is no single tree of the Cavendish dwarf banana or solo papaya or a fibreless mango variety in the woreda. The first dwarf Cavendish banana suckers were introduced in early March of this year (2005) by IPMS. These suckers are expected to be the future planting materials for the area. After the creation of awareness by the project, small commercial farmers also bought about 600 suckers of banana suckers from Zwai in May 2005. Efforts to introduce other fruit types are also underway.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Lack of improved planting materials that hare of better quality	Introduce improved planting material including short Cavendish banana, Solo papaya and fibreless mango varieties Reinvigorate the already existing nursery site for propagation and for adaptation trial	ARARI/Melkassa – TA for capacity building including grafting techniques OoA – Extension Teams IPMS - TA
Limited numbers of fruit varieties other than banana, mango and papaya available	Introduce and test different types of fruit including melamine nuts, grape and strawberry varieties	ARARI/Melkassa OoA – Extension Teams IPMS - TA
Lack of technical back up	Train farmers and Extension workers on methods of propagation techniques	Melkassa OoA – Extension Teams IPMS - TA
Fruit production is limited around river sides only and there is no homestead fruit production system	Introduce Rain water harvesting, and drip irrigation techniques around homestead	Extension Teams IPMS - TA
Theft is a big challenge in fruit tree production system	Establishing local bylaws enforcement	WALC
Rich ground water, but not utilized for fruit production	Converting the existing "*Ansara"* system to harvest water for fruits	Selam Vocational Training centre, IPMS - TA
Marketing		
Some of the owners of the small-irrigated farms have small shops in the Woreda town and sell their products. Banana and orange come all the way from Addis to Metema and are sold in these fruit shops. There has been no marketing problem mentioned for fruits except that the shelf life is affected due to high temperature. Once improved varieties of these fruits are introduced future		

market opportunities could go as far as Gondar and Bahir Dar. There is hope that the road from Gondar to Metema will be tarmac in the next year or so that it will facilitate accessibility to the woreda. This opens the opportunity that marketing of commodities from Metema will be much easier. In the future value added activities of fruits may need to be considered.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Poor shelf life of most fruits	Introduce cold storage system developed by Adet Research Centre (ARARI)	ARARI/Adet OoA-Extension Teams IPMS - TA
Remoteness of the area could pose a problem in marketing commodities	Focus on valuable commodities that could be needed regardless of the distance	OoA-Extension Teams IPMS - TA
Lack of knowledge with regards to supply and demand of each commodity	Comprehensive market assessment studies needed	OoA-Extension Teams IPMS

Table 15. Vegetables –(Onion and pepper)		**Both systems**
Production		
There is hardly onion or pepper grown except in the small scale irrigated farms in the woreda. Size of the small irrigated farms range from 1 to 5 ha and all are situated around rivers. Experts of the woreda considered onion as the second most important priority commodity among horticultural crops. Onion from the Sudan is sold at 2 birr/kg and for produces from Metema to be competitive; it should be produced at a lesser cost. Pepper is also another potential crop which could be grown in the area. There will be no storage problems in relation to the latter crop, on an individual farmer basis. Currently, there are few areas where pepper is produced while onion not produced and hence no problems were mentioned from farmers in relation to production were mentioned by farmers and experts. With the volume expected to increase, small trucks would be needed to pick up the produce from the farms. This is common in the rift valley areas. The following problems are anticipated if these vegetables are to be produced.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Lack of knowledge on proper agronomic practices of vegetable production	Introduce and verify appropriate management practices to optimise quality vegetation production.	ARARI/Melka Werer OoA – Extension Teams IPMS - TA
Lack of knowledge on the amount and frequency of irrigation water	Establish optimum water application schedules for vegetables.	ARARI/ Melka Werer OoA – Extension Teams IPMS - TA
Lack of proper post-harvest handling and management	Practical training to improve the proper time of harvest, transport, handling and storage.	ARARI/Melka Werer OoA – Extension Teams IPMS - TA
Lack of market oriented production system	Training on the timing of growing vegetables targeting market	OoA – Extension Teams IPMS - TA
Pests and diseases	Use of clean planting materials, availability of necessary	ARARI/Melka Werer - TA OoA – Extension Teams

	agrochemicals on time	IPMS - TA
Input supply		
Most of the inputs in relation to vegetable production are exchanged among farmers themselves. There have been no improved varieties of vegetables, including onions and pepper. Some insecticides used for migratory insects are available in the OoA store. Other hand tools necessary for vegetable production are also available in the local market or brought in from the central market in Addis. These small scale farmers own donkey pulled carts and transport their produce to the town. However, with volume expected to increase small trucks would be needed to pick up the produce from the farms. This is common in the rift valley areas.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Lack of improved planting materials	On-farm program of multiplication of planting material (vegetables) by farmers	ARARI/Melkassa/ OoA – Extension Teams IPMS - TA
Absence of private agrochemical suppliers	Encourage cooperatives and private small scale traders to purchase and sell agrochemicals	OoA – Extension Teams, Cooperative Team IPMS-TA
Lack of irrigation equipments (treadle pump, etc)	If shallow wells are to be used for irrigation, training of private traders to make small scale irrigation equipments is essential	OoA – Extension Teams, Cooperative Team IPMS-TA
Credit		
ACSI is operating in the woreda. Private lenders are also involved in lending money to farmer who could not obtain credit from ACSI. Therefore, it is assumed that this also works for vegetable producers. However, vegetable production involves expensive materials, like water pumps, in which case availability of credit becomes essential. The private lenders ask for higher interest rate of 50% and repayment becomes very difficult. ACSI's strong support to this venture will determine its future success.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Rigid credit system	Encourage development of flexible credit system	ACSI, OoA-Extension Teams IPMS - TA
Group credit system discouraging farmers	Create other convenient (farmer preferred private credit systems)	ACSI, OoA-Extension Team IPMS-TA
Weak capacity of service cooperatives	Strengthen service cooperatives	ACSI, OoA-Extension Team IPMS-TA
The maximum loan is low (5,000 birr)	Increase loan to encourage farmers	ACSI, OoA-Extension Team IPMS-TA
Marketing		
Currently marketing of some of similar vegetables is done individually. Fresh vegetables are sold on the roads in the town by carts pulled by donkeys. Once produced, onion and pepper could be sold to Gondar and Bahir Dar. At present, onion comes from Sudan and sold at 2 birr/kg. The Sudanese onion is also sold as far as Gondar town. For the onion produced in Metema to be competitive, it needs to be produced at less cost, other wise it may lose the market. On the other hand, our other PLS, Fogera is growing onion extensively and hence calls		

for market assessment whether producing onion in Metema is economically viable or not. The following problems are expected to hamper onion and pepper production in Metema.		
Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
Market fluctuation	Organise cooperatives to buy and sell produces from members	OoA-Extension Team Cooperatives Team IPMS-TA
Lack of market information	Strengthen cooperatives and link with TAMSA	OoA – Extension Teams IPMS - TA
Weak capacity of service cooperatives	Strengthen service cooperatives	OoA-Extension Teams; Cooperatives Team, IPMS-TA
Poor shelf life, especially for onion	Introduce improved cool storage facilities developed by Adet Research centre	Melkassa/Adet Research Centre/ARARI IPMS -TA
Lack of knowledge with regards to supply and demand of each commodity	Comprehensive market assessment studies needed	OoA-Extension Teams IPMS

Table 16. Lowland pulses – (Soybean and Mung bean, groundnut)

Production

Soybean is a new introduction to the area. Some smallholder farmers have been growing this crop under adaptation trials recently. It is now considered as one of the potential crops that have proven to grow well in Metema. Joint on-farm adaptation trial results between ARARI and OoA indicate that 18-23 qt/ha (variety *Ethio-YE)* yield was obtained on well drained black soils. This yield was obtained from uninoculated and unfertilized farmer plots. Soybean is one of the priority commodities for the Amhara Region. As a result, ARARI imported 3 soybean varieties from South Africa. These 3 varieties were tested on 2 sites in South Wollo where the productivity was between 10 and 12 qt/ha in one site (altitude 1650 m asl) and much lower than this in the other site (altitude 1900 m asl). As a result, researchers concluded that if this crop is grown in low altitude areas, like Metema, the performance will be better. The Gondar Research Centre sub station in Metema is conducting adaptation trials on 6 nationally released varieties even though results are not available. When growing soybean inoculation is needed.

Informal discussions held with experts in the Amhara Agriculture and Rural Development Bureau (AARDB) indicate that large scale soybean seed multiplication activities will be launched for the next planting season in Metema and other lowland areas in the region. Efforts are also underway to purchase 1000 qt of soybean for the next planting season. A South African processing plant is going to be established soon in Bahir Dar and this is expected to as one of the buyers to the produce. In addition the already operational “Guder Agro-industry plant” in Bahir Dar is also another potential buyer of soybean produce. The latter plant produces baby food and needs soybean for this purpose. During the adaptation trials, there have been no problems observed. The plant stand was healthy and there were no insects observed. However, researchers believe that the crop needs to be inoculated during sowing and is also susceptible to waterlogged conditions.

Some of the natives grow both mung bean (Sudan misr) and groundnut in Metama. There are some areas that are suitable for these crops. Currently, mung bean is produced around Shew

Robit in Ethiopia. Grocery prices are expensive as at now in Addis. Market assessment studies will be required before embarking on aggressive production. Sudan produces a lot of groundnut and the area is conducive for this crop. Some farmers in Shefina PA have tested and are interested in producing groundnut.

Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
New introduction, agronomic practices not known well	Training to both farmers and experts needed.	ARARI OoA – Extension Team IPMS - TA
Susceptible to waterlogged conditions	Identify less waterlogged area for soybean	OoA – Extension Teams IPMS - TA
Diseases and insect pests may appear for which farmers/OoA may not have chemicals for	Practical training and awareness to reporting cases to Timely preparations needed to	ARARI/Melkassa OoA – Extension Team IPMS – TA

Input supply

The following are the potential problems for these crops.

Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
New introductions, lack of appropriate planting materials	Appropriate varieties in consultation with Melka Werer Research Centre	Melka Were/ARARI OoA – Extension Teams IPMS - TA
Lack of knowledge on the crop management and handling	Training of both farmers and experts and availing training materials along with manuals regarding each agricultural operation	Melka Were/ARARI OoA – Extension Teams IPMS - TA

Credit

There is no credit scheme directed towards encouraging the planting of soya bean, mung bean or other new crops.

Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
New crops, hence difficult to address credit issues.		

Marketing

It is hopped that marketing of these crops, at least, during the first year will lead to clear market channels. If the two plants mentioned above take what is produced for the first year and production is going to be beyond, other markets need to be assessed. This is because the local market for soybean may be low. It is hopped when large scale introduction is made, contract farming will be thought by the government/project so that farmers are not shocked due to lack market initially. This was observed in Alamta with haricot bean.

Areas which need to be addressed	***Potential interventions***	***Responsibilities/tasks***
No clear market channel on soybean marketing	Strengthen service cooperatives to enable buy and sell haricot bean	Regional Trade and Industry OoA-Extension Teams IPMS-TA
Lack of storage facilities	Strengthen cooperatives	OoA-Extension Teams Cooperative Team IPMS - TA

Lack of knowledge with regards to supply and demand of each commodity	Comprehensive market assessment studies needed	OoA-Extension Teams IPMS

Natural Resources related commodities

Table 17. Gum		**Both farming systems**
Production		
Collection of natural gums and resins is done in a traditional manner. The process is manual and labour intensive. The most widely used collection technique is tapping, the shaving of a very thin external circular layer of the bark. Nearly all the resin tappers come from Tigray and follow a system that is used in the region. In Tigray, a tree is tapped at a height of one meter in three spots that are at 15-20 cm distance from each other. Each tree is tapped and wounds refreshed at an interval of 15 days, which is a total of 8–12 tappings a year. In one collection season one tapper collects on average 10–12 quintals (1.2 tons). In Ethiopia, there are six Boswellia species namely, *Boswellia papyrifera, Boswellia ogadensis, Boswellia rivae*, *Boswellia pirrotae, Boswellia microphyla*, and *Boswellia negelecta*). Out of the six Boswellia species, *B. papyrifera, B. ogadensis, and B. rivae* are economically important. There is high coverage of Acacia dominated woodland in Metema. Important species in Metema are namely *Boswellia papyferia*, producing incense and covering 68,000ha, *Acacia Seyal* and *PolyaCantha* (producing gum) also exist. The resource base is classified as dense (above 100 trees/ha,) medium (500-100trees/ha and sparse (below 500trees/ha).		
Areas that need to be addressed	***Potential Intervention***	***Responsibility/Tasks***
Some gum trees such as *A. ployacantha* productivity is less known (not either tested)	Action research & demonstration in improving productivity	ARARI
Very poor coverage of gum trees despite potential and high return	Establishment of gum trees at large scale as well as at house hold level	OoA - Extension Teams IPMS - TA
Quality gum sources	Identify and establish gum trees at large scale as well as at house hold level	
Knowledge gap on harvesting and handling of Gums	Action research on tapping methods and handling	Forestry Research Centre (FRC), ARARI
Knowledge gap on propagation and management of gum trees (especially Acacia Senegal)	Action research on propagation and management techniques	FRC ARARI
Knowledge gap on diversity and coverage of Gum trees species	Survey and characterization of Gum species (at large scale)	FRC ARARI
Free grazing on Gum tree establishments	Enforcing community based plantation and management	OoA - Extension Teams
Poor diversity of genetic resources	Adaptation trial from other sources	FRC ARARI

Input Supply		
Areas that need to be addressed	***Potential Intervention***	***Responsibilities***
Seed sources are not available	Identify seed sources to supply the extension	ARARI, FRC, IPMS
Marketing		
Areas that need to be addressed	***Potential Intervention***	***Responsibilities***
Poor Market information	Make information accessible and also do a research on markets	IPMS

Table 18. Incense		**Both farming systems**
Production		
There 3 private companies involved in tapping this resource by paying 12 birr of royality/qt to the government. Incense is obtained from naturally established trees of *Boswellia Papyriferia*. So far the incense is collected following the indigenous practice and exported by the exporters themselves. The woreda has high potential covering 10 PAs with an area of about 53,849 ha and an estimated 37,130,292 trees. Trucks full of young people from Tigray are employed for collecting incense in Metema.		
Areas that need to be addressed	***Potential Intervention***	***Responsibilities***
Knowledge gap on propagation and management of Incense trees	Action research and demonstration on propagation and management techniques	FRC, ARARI/ IPMS
Knowledge gap on harvesting and handling of Incense	Action research and demonstration on tapping techniques and handling	ARARI/FRC/IPMS
Declining yield due to moisture stress	Demonstration and action trial on moisture harvesting to improve yield.	Extension, IPMS
Lack of protection on the existing incense forest stands	Fire protection Prevention from deforestation Enrichment plantation	Extension
Lack of sense of ownership of the producers	Strengthening allocation and regulatory systems	Extension/IPMS
Input supply		

Areas that need to be addressed	***Potential Intervention***	***Responsibilities***
Poor restocking for damaged tree population	Strengthening production and plantation on private basis	Extension
Marketing		
Areas that need to be addressed	**Potential Intervention**	**Responsibilities**
Limited market information	Develop market information for produces and exporters	IPMS/Extension
Poor infrastructure	Developing rural roads that connect PAs	Extension
Knowledge gap on the extent of processing and packing	Assessing possibilities for further processing and informing the stakeholders	IPMS/FRC/ARARI

Table 19. Bamboo		**Both farming systems**
Production		
Lowland Bamboo is dominantly available in Metema though its use limited only to fence and thatch house construction. Currently this resource is illegally exported to Sudan at only 1 birr per stand.		
Areas that need to be addressed	***Potential Intervention***	***Responsibilities***
Knowledge gap on existing Bamboo potential	Survey and characterization of the potential	Extension/ARARI
Lack of protection on the existing Bamboo forest	Enforce community based bamboo management (CBBM)	Extension/IPMS
Marketing		
Limited market information	Develop market information for producers	IPMS/Extension
Knowledge gap on the extent of processing	Assessing possibilities for further processing	IPMS/ARARI

Table 20. Cattle Fattening		
Production		
Cattle fattening in Metema Woreda is not very well practiced. There is no established culture of fattening cattle for markets. Holding of large number of cattle is a common practice and has social prestige value. Oxen are reared for plowing purposes than for meat. Direct beef cattle sell in Metema market is common; illegal cross boarder sale of live animals is common. On the other hand, theft of livestock is a common phenomenon in the area. As a result transhumance cattle production system is a common phenomenon with highland cattle moving to the lowlands during the main rainy seasons from June to October in search of feeds. This brings about also livestock diseases coming and going to and from Metema.		
Areas which needs to be addressed	***Possible intervention***	***Responsibility***
Livestock Disease problem	Establishing health posts at the entry and exist points Encourage and support private drug Dealers, Support to the existing animal health service	Woreda OoA, ILDP, IPMS-TA
Very few farmers practice fattening of cattle because of lack of knowledge and theft problems	Training farmers on fattening techniques and benefit of cattle fattening and enforcement of laws.	OoA– extension ILDP, IPMS, ARARI
Breed differences in size	Selection of large body size breeding bulls from Sudan for fattening purpose	OoA– extension ARARI, ILDP, IPMS,
Lack of knowledge of feed production and conservation	*Enhance forage development* Train in hay making and other feed conservation practices *Train farmers on the use of sesame seed cake*	OoA– extension ARARI, ILDP, IPMS- TA
Problem of large cattle holding for prestige	Train farmers on limited and selected breeds for fattening	OoA– extension ARARI, IPMS-TA
Transhumance during the rainy season	Develop grazing land renovation, area closure and enrichment	OoA– extension ILDP, IPMS-TA, ARARI
Shortage of water during the dry period and long distance for watering points	*Develop system to use under ground water, Use of Rain water harvesting techniques*	
Uncontrolled movement of animals (from highlands and Sudan)	Train farmers on animal disease control, establish health posts	OoA– extension ARARI, ILDP, IPMS- TA
Poor knowledge on improved feeding systems	Increased utilization crop residue, supplementation, improved forage production	OoA– extension ARARI, IPMS-TA
Marketing		

There is no slaughter house in Metema town. Live animals are instead tracked through this woreda.		
Areas which need to be addressed	***Possible intervention***	***Responsibility***
Limited market information, resulting in low prices	Use all means of communication (Radio, etc), Establishing market information system	OoA –coop, ILDP. IPMS TA, ARARI
Theft and illegal market across border	Effort should be made to keep laws and regulation	WALC
Poor cattle price due to poor feed resources	Develop proper feeding systems, Introduce high value forage species	OoA, ILDp ARARI, IPMS- TA ILRI, ILDP
Limited linkage with traders	Conduct Demand study In the Sudan and Create linkage with the potential importers. Increase linkages with local and export market system	OoA, ILDP, ARARI, IPMS
Limited local market	Conduct market demand study in the near by towns Increase linkages with local and export market system	OoA, ILDP, ARARI, IPMS
Metema is a major centre for cattle market outlet to the Sudan	Strengthen quarantine in order to supply disease free cattle. Establish proper animal marketing system	MoARD ILDP, ARARI, IPMS
Input supply		
Input supply specifically for cattle fattening purpose is not available in Metema Woreda. Use of feed supplements and improved feed resources are not common. Veterinary services from OoA are provided during programmed vaccination period and during disease outbreak cases. There are no well organized facilities for animal movement control and disease inspection for healthy animal delivery to the slaughter houses.		
Areas to be addressed	***Potential Intervention***	***Responsibility***
Poor supply and few sources of industrial by-products (oil seed cakes, molasses, etc)	Forage development, crop residue improvement, Chemical and material supply Technology and material supply	OoA, ILDP, IPMS
Inadequate water supply for improved fattening	Use of hand dug wells and Avail materials for watering	OoA, ILDP, IPMS
Insufficient veterinary service and drug input	Encourage private traders to supply veterinary drug and materials, Train privates	OoA, ILDP, IPMS
Lack of trained man power	Training and capacity building	OoA, ILDP, IPMS
Lack of cattle fattening proximal to the urban	Establishing Urban	WALC, IPMS

centres	Agriculture	
Credit		
ACSI is the only institute available in Metema woreda. Credit is accessed for food security packages on individual household basis and on collateral basis for any other activity.		
Areas to be addressed	***Potential Intervention***	***Responsibility***
Credit not available specifically for fattening	Negotiate with ACSI to give credit for fattening	OoA, ACSI, IPMS, ILDP
Credit arrangement for fattening inconvenient	Apply individual loan scheme Establishing Credit and saving system Search other competitors for credit provision and include Banks to provide credit for interested individuals	OoA, ACSI, IPMS, ILDP Coops desk IPMS, WALC
Credit process too long (2 weeks up to 1 month)	Shorten loan processes	OoA, ACSI, ILDP, IPMS

Table 21. Dairy		
Production		
Milk production is based on local cattle breeds in the rural areas of Metema. Feed and feeding systems are based on low quality feeds with no intention for feed improvement and supplementation. Proper health service is not available except regular vaccination and treatment during outbreaks. Production from the local breeds does not exceed 2 l/day.		
Areas to be addressed	***Potential Intervention***	***Responsibility***
Lack of improved forage	Improvement of forage development suitable to the system	ARARI OoA, ILDP IPMS
Poor genetic potential of local breeds for milk production	Selection of better local breeds Introduction of improved heifers/bulls/AI	ARARI OoA ILRI, IPMS, ILDP
Poor knowledge for increased utilisation of locally available feed resource	Feed preservation (hay), increase crop residue utilization, apply supplementation	ARARI OoA ILRI, IPMS, ILDP
Animal health service is not satisfactory	Prevention and control of infectious and parasitic diseases Encourage and support private sector animal health providers	OoA ILRI, IPMS, ILDP
There is no improved husbandry	Train extension workers and farmers on improved husbandry and sanitation and proper housing	OoA ILRI, ILDP, IPMS
Poor knowledge of farmers on specialised dairying	Training of farmers	OoA ILRI, IPMS, ILDP
Deterioration of milk quality	Confined feeding and cooling systems	OoA ILRI, IPMS, ILDP
No selection for better milk yielding cows is practiced	Apply bull selection based on dams milk yield	ARARI, OoA ILRI, IPMS, ILDP
Input supply		
Input supply for dairy sector in Metema Wereda is very low and only restricted to veterinary services to the local breeds. Extension packages on forage development, breed improvement, diversified species utilisation, and locally available feed resource improvement is very weak. AI services are delivered by the OoA. .		
Areas to be addressed	***Potential Intervention***	***Responsibility***
Less focus on dairy extension packages	Give emphasis to improved dairying	OoA IPMS, ILDP
No training on improved dairy production	Train farmers and technicians	OoA IPMS, ILDP

Lack of improved local dairy breeds	Strengthen private bull stations	OoA, ILDP, IPMS
Credit		
ACSI provides money to farmers, however, dairy, as specialised activity does not yet receive loan, but instead for livestock reproduction purposes. .		
Areas to be addressed	***Potential Intervention***	***Responsibility***
Credit insufficient for cattle dairying	Encourage formation of cooperatives and use of dairy goats once the taboo is removed	ACSI, OoA-coop IPMS, ILDP
Marketing		
Milk supply from rural areas is seasonal and greatly confined to availability of feed during the rainy season.		
Areas to be addressed	***Potential Intervention***	***Responsibility***
Milk supply is seasonal mostly confined to the rainy season (when feed available)	Introduce improved feed supply for year round supply	OoA, ILDP, ARARI, IPMS
Poor milk quality and hygiene	Milk collection and inspection through cooperative formation; Training of farmers on tethering and milk processing and handling	OoA, ILRI, ILDP IPMS, ARARI
Cultural barriers on the sale of milk by rural farmers	Training of farmers on the benefits of milk production	OoA, ILDP IPMS, ARARI
Less attention to whole milk sale (butter processing is preferred)	Introduce butter processing technology	OoA, ILRI, ARARI IPMS, ILDP

Table 22. Goat (meat)		
Production		
There are about 35,000 goat and sheep and over 75% of these is goat population. The goat breeds are local and are meat type. The major sheep breed is known as Gumuz sheep. The area is suitable for goat production and the WOoARD plans to distribute about 6,240 goats to settlers. They are however kept under traditional management with no improved feeding and housing system. Currently the population of both sheep and goats is about the same in the woreda.		
Areas to be addressed	***Potential Intervention***	***Responsibility***
No exercise of supplementation and improved feeding	Train to adopt improved feeding systems	OoA, ILDP, IPMS, ARARI
Internal and external parasites and diseases problems affecting productivity	Train paravets, encourage private traders to sell veterinary medicine	OoA, ILDP, IPMS, ARARI
Lack of better breeds with faster weight gain	Introduce improved breeds and improved feeding, health and management aspects	OoA, ILDP, IPMS, ARARI
Lack of goat fattening knowledge	Training on fattening	OoA, ILDP, IPMS, ARARI
Stray dogs (attack young animals and spread diseases	Focus on crosses	OoA, ILDP, IPMS, ARARI

Input supply		
Extension support for improved sheep and goat production and marketing is very weak. Veterinary service focuses on regular vaccination during disease outbreak. Local goats being supplied as food security package. No selection and improvement of local breed's genetic potential.		
Areas to be addressed	**Potential Intervention**	**Responsibility**
Less extension support, low package dissemination	Vet post construction, Forage seeds and planting material provision Training of extension workers and farmers on better goat keeping	OoA, ILDP, IPMS
Veterinary service low	Supply of veterinary facilities and drugs	OoA, ILDP, IPMS
No trend for breed improvement		OoA, ILDP, IPMS
Credit		
There is credit facility for improved goat purchase. However, the credit service does not specifically focus on small ruminant production activity. However, many farmers start keeping goats		
Areas to be addressed	**Potential Intervention**	**Responsibility**
Lack of small ruminant focussed credit	Provision of credit to address small ruminants production	OoA, ACSI, ILDP IPMS
Marketing		
Market is seasonal mostly during the holidays. Marketing is done on an individual basis as for the other commodities. Middle men collect from Metema market and its surroundings and transport them to Gondar town. The price of goat in local market ranges from 150 to 500 Birr and that of an average sheep is about 250 Birr. Goats have better market than sheep in Metema town.		
Areas to be addressed	**Potential Intervention**	**Responsibility**
Middle men based market to Gondar and other towns during holidays	Organize farmers and Create linkage with potential buyers in Gonder	OoA, ILDP, IPMS, ARARI
Seasonal market, during holidays,	Awareness of farmers for direct selling of their product Conduct market demand study (volume, type of breed and other quality requirements In the Sudan)	OoA, ILDP, IPMS, ARARI WALC, IPMS
No market information given to farmers	Establishing and Provision of market information system	OoA, ILDP, IPMS, ARARI

Table 23: Poultry production		
Production (Eggs/Meat)		
In rural areas, poultry (eggs/meat) are produced by scavenging backyard production with local chicken. No extension activity on local chicken; some extension activities (pilot package) on genetic improvement program for egg production have just started, comprehensive package (housing, feeding, health management). Traditional network of marketing from rural to urban areas.		
Areas which need to be addressed	***Potential areas of intervention***	***Responsibility***
Traditional low input system	Provide appropriate technologies, especially to women and children	ARARI OoA ILRI, IPMS, ILDP
Attack by predators	Proper housing system	
Poor growth and egg laying performance	Supply improved genotypes	
High chicken mortality due to diseases	Vaccination, improved animal health services	
High post harvest losses; storage problem	Marketing cooperatives	
Poor genetic potential	Introduce of appropriate technologies for genetic improvement– (chick rearing; hay box tech); Lack of knowledge	
Input supply		
Limited input supply of improved genotypes which includes vaccination only. There is no drug and feed supply system		
Areas which need to be addressed	***Potential areas of intervention***	***Responsibility***
Poultry package with improved genotypes just started	Enhance and expand activities	ARARI, OoA, ILRI, IPMS, ILDP
Shortage of pullets and day old chicks	Increase supply of chicken from multiplication centers	ARARI, OoA, ILRI, IPMS, ILDP
Lack of vaccines, drugs	Involve cooperatives and private sector	ARARI, OoA, ILRI, IPMS, ILDP
Shortage of appropriate feeds	Involve cooperatives and private sector	
Credit		
Credit system just started along with package.		
Areas which need to be addressed	***Potential areas of intervention***	***Responsibility***
There has been no credit facility – Recently, credit available for package	Improve and expand credit facility outside the package (involve micro finance)	ARARI, OoA, ILRI, IPMS, ILDP
Marketing		
Marketing is done on individual basis in rural markets.		
Areas which need to be addressed	***Potential areas of intervention***	***Responsibility***
Low prices	Organize marketing cooperatives and linkages with private traders	ARARI, OoA, ILRI, IPMS, ILDP
Lack of markets		
Eggs collected from small rural markets and sold in bigger towns		
Poor quality of eggs due to storage problem		

Table 24. Apiculture (Production)		
Production		
Honey production is a common practice. Vegetation cover of the indigenous species is better. Honey production is dominantly traditional hive based but some transitional hives (about 800) have been recently introduced. It is possible to harvest honey twice in a year. Data on the productivity of the modern hives was not available		
Areas to be addressed	***Potential Intervention***	***Responsibility***
Shortage of trained manpower on modern bee production	Training of farmers and experts on modern bee keeping	OoA , IPMS, ILDP, SOS, ARARI
Bee pests and diseases affecting production	Training of the communities and DAs in the identification and treatment of diseases & pests	SOS-Sahel/ICIPE IPMS, ILDP, ARARI
Mostly traditional bee hives based production system	Increase modern bee hive introduction	OoA, IPMS, ILDP ARARI
Sources and potentials of bee forage not identified	Bee forage identification, screening and introduction of adapted species	OoA, ILDP, IPMS ARARI
Long distance travelling as a result of shortage of bee watering points	Watering point and spring development needed	OoA, ILDP, IPMS ARARI
Low yield as a result of pests and diseases	Training of farmers for proper pest and predator control and safe herbicide application	OoA, ILDP, IPMS ARARI
Lack of knowledge on modern bee production	Training of experts and farmers on modern bee keeping	OoA, ILDP, IPMS ARARI
Input and supply		
Recently modern bee hives have been introduced. Extension support is not adequate.		
Areas to be addressed	***Potential Intervention***	***Responsibility***
No honey extractor	Introduce number of extractors	OoA, ILDP, IPMS
Shortage of bee hives	Training of local carpenters on modern bee hive production	OoA, ILDP, IPMS
Only few bee hives introduced	Introduce additional number of modern hives, extractors and accessories	OoA, ILDP, IPMS
Bee fodders not identified and no bee fodder introduction made	Identify existing bee fodders and introduce improved ones	OoA, ILDP, IPMS
Low supply of bee colony	Training of farmers on modern queen rearing techniques	OoA, ILDP, IPMS
Shortage of accessories	Improve the supply of	OoA, ILDP, IPMS

	accessories	
Credit		
The existing credit system does not specifically target to improve bee production in the area. If some farmers involved on bee keeping activity, availability of credit is essential		
Areas to be addressed	**Potential Intervention**	**Responsibility**
Lack of apiculture targeted credit	Strengthen apiculture focussed credit	OoA, ILDP, IPMS
Marketing		
Metema market is the centre for honey market. Honey from traditional hives has many impurities and the price ranges from 16 – 20 Birr/kg. Accessibility is another constraint affecting honey price. Middle men are potential buyers of honey. Gondar and illegal market to Sudan are the major outlets .		
Areas to be addressed	***Potential Intervention***	***Responsibility***
Traditional honey extraction affecting quality (only one extractor available)	Organise cooperative based collection and cleaning centres (more extractors) and train farmers	OoA, ILDP, IPMS ARARI
Inaccessibility affecting honey price and hence middle men and some traders in Metema are the only buyers of honey from farmers	Create other clean honey market outlets, provide information on markets	OoA, ILDP, IPMS ARARI
No organised honey market	Organise cooperatives for collecting, cleaning and marketing honey	OoA, ILDP, IPMS ARARI
Quality affecting price of honey (15 Birr/kg)	Organise cooperatives for collecting, cleaning and marketing honey	OoA, ILDP, IPMS ARARI

5. Outline of Programme of Work for Metema Woreda PLS

5.1 Priority commodities and natural resource management technologies

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

Cotton, rice/livestock farming system

Priority crop commodities: Cotton, Rice, Sesame, Fruits (papaya, banana, mango), Pepper

Priority livestock commodities: Meat from cattle and goats, dairy (butter)

Sesame, cotton, sorghum/livestock farming system:

Priority crop commodities: Sesame, Cotton, Fruits (papaya, banana, mango), Pepper

Priority livestock commodities: Meat from cattle and goats, dairy (butter)

*For both farming systems **potential crop commodities** include Soya bean, haricot bean, vernonia, while the **potential livestock commodities** are **apiculture** and **poultry**. Studies will determine consideration of these commodities as priority commodities from year 2 on wards. The project will identify relevant institutions, including project staff for the study..

NRM technologies in both farming systems: Water harvesting mechanisms, including shallow wells, river diversion for irrigation purposes will be considered. Introductions of new water harvesting technologies will be emphasized. Water table is considered to be very high and irrigation potentials will be emphasized. Initially, locally (in country) existing irrigation (water harvesting equipments) will be given due attention.

The PLS has high potential for incense and gum. Incense is already produced from large areas. Focus will be made towards improving the quality of the produce. In addition communications will be made with relevant local and/or international institutions to contribute towards introducing better propagation, handling and harvesting methods. Incense production is believed to be declining due to moisture stress and better management. *In situ* water harvesting mechanisms will also be focused on. On the other hand, bamboo grows in the area but there is knowledge gap in terms of identifying on how many ha it is grown. Relevant institutions will be consulted/invited to identify this resource and make it valuable to the farm households.

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).

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

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

To link the PLS institutions with the Resource Information Centre, electronic linkages with the Woreda Agricultural Desk will be established. This effort will have to be integrated and synchronized with other activities in this field i.e. Woreda Net, School Net and Agri Net (Metema) was one of the test woreda for this project and received computers and staff training). There is one junior high school (up to grade 10) in Metema woreda, Shehedi town. The school is equipped with 16 plasma TVs and School Net has already started at the same time like the other woredas. The program is a one way (only listening including picture) transmission. Two teachers from the Junior High School and two staff members from Civil Service Reform have been trained in the use of the plasma TV and some basic computer training including Introduction to video conferencing, Introduction to computer, basic net working, MS word, MS excel, MS access, MS window, Internet explorer, web page design and basic PC trouble shooting for 35 days in Gondar by Neuro net with financial assistance from UNDP. Ato Solomon Nega and Nega Aseffa from Metema woreda civil service reform and Ato Gashaw Alemu and Tewolde Kasahun from the school have taken the training. Six subjects are given at the junior high school level through 6 channels. Major problems encountered are the absence of electric power in the town. The woreda is does not enjoy the 24 hr electric power supply. As a result, the school uses diesel fuel powered generator which is very difficult to cover costs. On the other hand, education materials were sent on CD. However, due to lack of computer, the school was not able to use this resource. On the other if even managed to get a computer, the software on which these materials are prepared are on adobe which will require acrobat reader and converter to make it easily to read and print using word. This software is not easily available.

Regarding woreda net, a generator house, satellite room and meeting hall construction have almost been completed. The program was supposed to start last December, 2004. In this system, two way communications with picture and sound will be transmitted where participants will receive and send messages. According to Ato Solomon, there will soon be training on web site for three weeks in Addis Ababa. The training is supported by information communication technology authority and there is a plan to connect sector woreda offices with this system.

Table 25. Project support for PLS knowledge management system (first year)

Activities	**Target**	**Responsible**
(100) Continuous assessment of current state of knowledge	Woreda institutions	Woreda institutions involved in extension, input supply, micro

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

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

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

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

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

Table 26- Potential woreda staff (Training of Trainers) to be included in the innovative methods training

Woreda offices	**Number**
Crop Production	11
NRM*	5
Livestock	5
Horticultural crops	1
Cooperatives	2
Micro finance	1
Women affairs office*	1

Rural Women Affairs*	1
HIV/AIDS office*	1
Total	28

*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 and some other specialists (gender, natural resource management, environment), 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 27. Potential Woreda staff to be included in technical training of priority commodities

Office	Priority commodity	Number
Agricultural Development Sector	NRM	1
Agricultural Development Sector	Cotton and sesame	3
Agricultural Development Sector	Tropical fruits and Vegetables	3
Agricultural Development Sector	Goat fattening	3
Agriculture development sector	Dairy and beef production	3
Agricultural development sector	Poultry and apiculture	3

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

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

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

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

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

Table 28. Project support for PLS general capacity building support (first year)*

Activities	**Target**	**Responsible**
(200) Training and follow up in innovative methods	Woreda staff and FTC staff	Project staff and consultants
(200) Training and follow up in gender	Woreda staff and FTC staff	Project staff and consultants
(200) Training and follow up in environmental assessment	Woreda NRM staff and FTC staff	Project staff and consultants
(200) Development of a reward system for institutional staff	Experts and FTC staff	Project staff and WALC and RALC
(200) RALC and WALC learning activities including field visits and workshops	RALC and WALC	Project staff

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

5.4 PLS sustainable livelihood development (RBM code 300 series)

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

Table 29. FTCs with potential for priority Commodities and NRM technologies in both farming systems

FTC	**Sesame**	**Cotton**	**Rice**	**Horticulture**	**Fattening**	**sheep and goat**	**Dairy**
Kokit	X	X		X	X	X	X
Meka	X	X	X	X	X	X	X
Mender	X	X		X	X	X	X

6,7,8							
Shinfa	X	X		X		X	X
Das Gundo	X	X				X	

Table 30. FTCs with potential for NRM technologies in both farming system

FTC	Irrigation	Fertilizer/herbicide/ Pesticide	Malaria	Flood
Kokit	-	X	X	X
Meka	X	X	X	X
Mender 6,7,8	-	X	X	X
Shinfa	X	X	X	X
Das Gundo	-	X	X	X

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 were 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 detail description of the priority commodities and activities on the priority commodities which are envisaged to be accomplished within the first year of the project ‘s life.

5.4.1 Sesame (Both farming systems)

Production

During the programme launch workshop, Sesame was ranked first as a commodity crop. The crop is widely grown and it is a major crop for 85% of the Kebeles found in the woreda. Although Metema area has high potential for sesame production, many production constraints are hindering to realize high yield. Among the many production constraints, lack of improved varieties, poor seed supply system and lack of adequate knowledge were identified

Commonly farmers grown different local varieties of sesame (*Hirhir, Abunam,Gojam Azene, and Tajareb)* and farmers choice is largely depend on the marketability of the variety, productivity and the prevailing environmental condition of the season. Some varieties are preferred because they do not shatter immediately, e.g. Gojam azene. In addition, these late shattering varieties in general are preferred by woman household heads. This is related to labour availability in the farms.

Hirhir has a white colour, high oil content and high yielding potential, relatively it tolerate drought and it matures within a short period of time. The variety is introduced to the area more recently by private investors from *Humara* area and it is being

expanded from time to time. Currently, many small-scale farmers are started to grow this variety after they realize its marketability. Shattering and poor yield when the rainy season is prolonged are some of the potential problems related to Hirhir variety

Abunaam is also considered as one of marketable variety although its production is confined to large-scale farms.

The other potential variety grown in the Area is *Gojam azene.* This variety is introduced from *Pawe* area (south) and it is widely grown in both large and small-scale farm holdings. The variety has equal importance with respect to its quality and marketability. This variety is believed to have a potential to improve the soil fertility status when it is grown in poor soils. Moreover; it opens its pods very slowly so that shattering is not a big problem. On the other hand, the labour demand to extract the seeds from the pod is very high. As opposed to the above two varieties, *Gojam azene* requires more rain in an expanded period of time and more days to mature so that yield is highly affected whenever there is shortage of rain.

Last year, the Ethiopian seed enterprise introduced *Adi* variety to this area from *Meleka Werer* and distributed to both large and small-scale farmers. However, farmers found that the variety shown to have less performance as compared to the above local verities and farmers recognize that the branches are easily detachable whenever there is wind blown. *Adi* was a new variety to this area, and no adaptation trial was conducted prior its introduction and farmers associated their failure with lack of production knowledge and package

There is no seed supply system and farmers rely only on disorganized informal seed supply system so that farmers use their own farm saved seeds from time to time. There is no research work on sesame and popularisation of new technologies is limited

Sesame is less affected by diseases, even though blight is observed in some years. In a similar way, the crop is less affected by field insect pests but sesame seed bug (sucking insect) is the major problem after crop harvest. There is no recommended pest control practice and farmers themselves tried various chemicals against the crop attack. Sesame in general is susceptible shattering loss. However, the magnitude of shattering loss varies from one variety to the other, for example Hirhir is more susceptible than Gojam azene. Varieties with high shattering characteristics require more labour during harvest and the harvest is very poor at times when there is shortage labour.

Table 31. Project support for Sesame production

Activity	**Target**	**Responsibility**
(400) Study the existing sesame production system and its constraints	Farmers in and around 5 FTCs	Students, Project staff
(200) TOT on Sesame Agronomy, Crop protection, cleaning, and post harvest handling	Woreda Crop production and protection team, 5 FTC staff	EARO research station

(200) Supply of demonstration materials on diseases and sesame seed bug control techniques	5 FTCs	Project in collaboration with EARO and MoARD
(200) TOT on farmers based seed production and quality declaration methods	Woreda experts, 5 FTC staff	BOA, IPMS
Organize seed growers at a community level	5 FTC	
(200) TOT on Sesame Varieties demonstration	Woreda experts, 5 FTC staff,	EARO/project staff
(200) Supply demonstration materials on varieties, seeding rate, fertilizer application and agronomic work	5 FTC	ERO
(400) Study and characterize the existing varieties	5 local varieties with good quality and high oil content	Melka Werer, IPMS ARARI
(200) Search and supply technologies against shattering (Stickers)		Melka Werer, ARARI, IPMS
(200) Training on chemical use and handling, impact of chemicals on health and the environment; and timing of chemical application, etc. against sesame sucking insect and termites	Woreda crop production and protection experts (3 experts)	Federal Plant Production and Protection Department, Melka Werer/Gondar Research Centre, IPMS - TA

Input supply

The major problem in input supply is shortage of improved varieties and timely availability and; lack of adequate funds for input supply

Table 32. Project support on sesame input supply

Activity	**Target**	**Responsibility**
(400) Study the existing Sesame input supply system and identify potential areas for improvement (including gender and environment)	Farmers near 5 and around 5 FTCs and DA posts	Project staff in collaboration with Woreda experts and EARO, Students
(200) Demonstration materials for input supply including improved seeds, small scale seed cleaners and oil pressing mills	5 FTCs	Melka Werer/EARO, IPMS- TA
(300) Facilitate supply of	Farmer in and around	Support Woreda input

improved seed from EARO Melka Werer centre	5 FTCs	supply with funds provided by the project.
(300) Provide credit fund for on farm seed multiplication	Farmers in and around 5 FTCs	Micro Finance with project funds
(400) Study, introduce and popularise improved seeds from within and outside of Ethiopia	5 FTC	Melka Werer/EARO, IPMS-TA
(300) Facilitate credit for input purchase and organize farmers credit and saving group at PA level	5 FTC	ACSI, Co-ops Desk, IPMSS

Marketing

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

Table 33. Project support for sesame marketing improvement

Activity	**Target**	**Responsibility**
(400) Study on sesame seed quality at farm level	Farmers, near 5 FTCs and DA posts	By EARO staff collaboration with Woreda experts
(200) TOT in quality improvement at the farm and marketing levels	Woreda experts, 5 FTC staff	By EARO staff
(300) Farmer training in quality improvement	Farmers in or near 5 FTCs and DA posts	FTC staff guided by woreda experts
(400) establish marketing information system at Woreda level	Farmers near 5 FTCs and DA posts	Project staff, woreda experts, cooperatives
(200) Popularising organic Metema sesame and ensure Certificate	Cooperative, Unions, small scale and commercial farmers, to exporters, international buyers, standard agencies	IPMS - TA, Chamber of Commerce, Regional Trade and industry
(200) Create linkage between producers, exporters/international buyers	Exporters, international buyers	IPMS - TA, Chamber of Commerce, Regional Trade and industry Bureau
(300) Training on quality grading system	Farmers in and around 5 FTC	Ethiopian seed Enterprise/Chamber of Commerce, IPMS -TA,

5.4.2. Cotton

Production

Cotton production is a common practice in Metema, however; the productivity of cotton is very low as compared to the potential of the area. Various reasons were suggested for the observed low productivity. Among the many problems indicated, use of low yielder local variety, Lack of know how on improved practices, Pest damage particularly caused by flee beetle, limited use of Fertilizers, Water logging problem, shortage of appropriate Chemicals and shortage of manpower and overlap of cotton picking with sorghum harvest and threshing play significant role. Therefore, the present emphasis in cotton production is to improve productivity of cotton. This requires training of extension workers and farmers on Improved Agronomic and crop protection practises moreover there is a need to train farmers on post harvest handling techniques

Table 34. Project support for cotton production

Activity	**Target**	**Responsibility**
(200) TOT on improved methods of cotton production including agronomy, pest control (seed dressing, etc.), and post harvest handling	Training of Woreda staff and farmers in 5 FTC	BOA, ARARI/Melka Werer, IPMS - TA
(400) Study the effect of fertilizer use on yield	Farmers in and around 5 FTC	ARARI, IPMS-TA Melka Werer, Woreda OoA
(200) TOT on the use of BBM on water logged cotton farms	Training of Woreda staff and farmers in 5 FTC	ARARI, BOA, IPMS Melka Werer
(300) Supply of demonstration materials, like BBM, seed dressing drums, printed materials, small scale ginnery, seed drillers	5 FTCs	ARARI/Melka Werer, Woreda OoA, IPMS - TA
(300) Provide credit fund for cotton production	Farmers around 3 FTCs	ACSI with project funds
(200) Training on chemical use and handling, impact of chemicals on health and the environment; and timing of chemical application, etc. against flee beetle, boll worms, etc.	Woreda crop production and protection experts (3 experts)	Federal Plant Production and Protection Department, Melka Werer/Gondar Research Centre, IPMS - TA

Input supply

The major problem observed on input supply system is lack of inputs including improved seed, fertilizers, farm implements and chemicals. Moreover, lack of private sector involvement in the distribution of inputs is the other constraint

Table 35. Project support for cotton input supply

Activity	Target	Responsibility
(400) Study the existing cotton input supply system and identify potential	Farmers around 5 FTCs and DA	Woreda OoA, Students, IPMS - TA

areas for Improvement (including gender and environment)	posts	
(200) Supply of Demonstration materials for input supply including pesticide, sprayers, seed treating drum, improved seed, seed drillers, row planters, etc.	5 FTC	EARO, ARARI, BOA, IPMS-TA,
(200) TOT on cotton seed multiplication,	Woreda crop production experts	Melka Were/EARO, ARARI,
(300) Organize seed grower farmers and facilitate basic seed of improved and Adaptable varieties from Meleka Werer	Farmers in and around 5 FTCs	Woreda Cooperative desk, Co-Ops promotion Bureau, Melka Werer Project staff,
(300) Provide credit funds for the purchase of Chemicals, knapsacks, Fertilizers, BBM, and improved seeds	Farmers served in 5 FTC	ACSI/Banks with project funds
(300) Encourage and support private sector to involve in input supply through credit/training	Traders in around 5 FTCs	ACSI/Banks with project funds, Woreda OoA,
(200) TOT on organizing farmers on credit and saving group	5 FTCs staff	Woreda Cooperatives office
(300) Organization on credit and saving groups at FTC level	Farmers in and around 5 FTCs	FTC staff supported by woreda staff, IPMS - TA
(300) Facilitate funds for input and out put product storage	Cooperatives	ACSI/Banks with project funds

Marketing

To address the marketing problems of cotton with the strategy on improving quality there is a need to link producers with textile industries and exporters. Since extended period of sorghum harvesting and threshing activities compete with the timely picking of cotton and hence resulting in poor quality cotton, the project intervention to shorten the prolonged time required for sorghum threshing is vital. Lack of cotton grading mechanisms and lack of price differential between poor and good quality cotton hinders to focus on quality cotton production. The most important factors on poor cotton market development are lack marketing information and lack of cotton contractual farming. This requires rapid intervention

Table 36. Project support in improving cotton marketing

Activity	**Target**	**Responsible**
(400) Conduct detail study on cotton market chain and potential quality deterioration factors in relation to market	5 FTCs	Regional Market Promotion Offices, ARARI, Woreda Extension, IPMS - staff
(300) Create linkage between Producers (small scale and commercial farmers) and textile industries	Farmers in and around 5 FTC	Regional Market Promotion Office, Woreda Extension Teams, IPMS-TA
(300) Organise contractual	Farmers in and around	RBoARD, , Woreda

farming arrangement	5 FTCs and interested commercial farmers	Extension Teams, IPMS - TA
(400) Identify and establish market information system for cotton	Farmers in and around 5 FTCs	Regional Market Promotion and Bureau trade and industry offices and IPMS-TA
(300) Capacitate Cooperatives. In purchase of quality cotton from members (Training/Credit)	Co-ops in and around 5 FTCs	Bureau of trade and industry, Standards Authority and IPMS
(400) Study on appropriate packaging materials and techniques to improve quality	Farmers in and around 5 FTCs and commercial farmers	EARO/Melka Were, Regional Marketing Promotion Offices, Bureau trade and industry, Standards Authority and IPMS - TA

5.4.3 Fruit

Production

Currently, farmers in Metema exercise growing of fruit trees (Mango, Papaya, and vegetables) with the use of irrigation water. The area has an ideal environment to grow tropical fruits, however, production is limited to areas adjacent to riverbanks. It has been identified that lack of knowledge on fruit propagation techniques and absence of hand dug wells around homesteads are the limiting factors for realising the high production potential.

The project will provide due emphasise on stimulating production through introduction of high quality fruit seedlings and training of extension workers and farmers to upgrade their skills on fruit propagation techniques. Moreover, trainings will be provided on post harvest handling of perishable commodities and introduction and popularisation cold storage facilities will be undertaken. Moreover, introduction of animal driven water pumps will be considered to stimulate fruit production around homesteads. Metema is believed to have a high water table which could be exploited for this purpose.

Table 37. Project support on fruit production

Activities	**Target**	**Responsibilities**
(200) TOT on fruit production	Woreda crop production experts	Melkassa/EARO/ Adet,-IPMS - TA
(300) Training of fruit growers and other interested farmers on fruit production methods	Fruit growers and other interested farmers in and around 5 FTCs	OoA, Project Staff, Melkassa research
(200) Introduce and establish fruit nursery with different adaptable fruit spp. for demonstration purposes	5 FTCs	Melkassa/EARO, ARARI, IPMS - TA
(300) Organize and establish	Farmers in and around	IPMS

farmer to farmer fruits seedling supply	5 FTCs	

Input

Despite the high potential to grow fruit trees, the production is limited due to various constraints mainly due to lack of knowledge and input supply. To change the existing situation the following activates will be performed to facilitate input supply system

Table 38. Project support on fruit input supply

Activities	Target	Responsibilities
(400) Study existing fruits' input supply system	Regional BoARD, Woreda OoA, farmers in and around 5 FTCs	Students, IPMS - staff, Melkassa/EARO
(200) Introduce high quality papaya, banana, and mango varieties into the existing OoARD nursery to be used for demonstration and source of planting materiasl (banana)	ExistiWoreda OoARD nursery	IPMS, Melkassa Research/EARO,
(200) Supply of demonstration materials including budding, grafting and efficient irrigation equipments (treadle pump, drip), animal drawn carts, cold storage facilities and other technologies	5 FTCs and Fruit grower farmers	Melkassa/EARO Selam Vocational Centre, ARARI, IPMS-TA
(300) Facilitate supply of improved fruit seed/seedlings from various sources	5 FTCs	Woreda Input supply office, Project research partners, Project staff
(300) Facilitate credit for input supply	Fruit growers	ACSI/Bank through project funds
(300) Training of farmers to convert the existing "*Ansara*" system for irrigation	Interested "*Ansara*" owners in the 5 FTCs and beyond	Selam Vocational Training Centre, Woreda OoARD, IPMS-TA

Fruit marketing

Currently the demand for fruits is attractive. One kilogram of papaya is sold 2 birr, a single mango fruit costs 1 birr and a kilo gram of orange costs 5 birr. This implies that the demand is much higher than the supply. However, this may not be long lasting and things may change when production increases. Therefore, market studies have to be conducted in large and small towns around Metema Woreda, including Bahir Dar, Gondar, Quarra and some towns in Sudan that close to Metema town. In addition, as the weather is harsh preservation technologies will be of importance for marketing of these fruits.

Table 39. Project support on fruit marketing

Activities	Target	Responsibilities

(400) Conduct market studies in Gonder and Bahir Dar and smaller towns around Metema	Towns near Metema	Students, IPMS-staff, OoA
(400) Conduct feasibility/profitability study on fruit production	Farmers in and around 5 FTCs	Students, IPMS-staff, OoA
(300) Train small scale traders in value adding of fruits in Metema area	Small scale traders	Melkassa/EARO, OoA Home science
(200) Training on group marketing	Woreda Coops. staff	

5.4.4. Rice

Production

Rice is one of the potential crops grown in Metema Woreda. The crop is new introduction to the area and it was spread in short period of time in most Kebeles and was covered up to 400ha of land. Many research works were conducted to screen adaptable varieties and two varieties (Kokit and Tegabe) were found to be adaptable. Currently, the production is dramatically reduced due to lack of post harvest (Threshers and polishers). Much can not said about the production constraints of production except the input supply

Table 40. Project support for rice production

Activity	Target	Responsibility
(200) TOT in the production and use of *Azolla anabaena* on rice	Woreda crop production experts and staff in FTCs located in the Cotton/Rice/Livestock system	National Soil Laboratory/Adet/ IPMS - TA
(200) TOT in rice agronomy (transplanting, land preparation) and seed production including NERICA varieties.	Training of 4 supervisors and 1 expert, FTC staff located in the Cotton/Rice/Livestock system	Adet Research centre, IPMS - TA
(400) Study on the existing rice production systems	Farmers around 5 FTCs	Adet Research Centre/Project staff
(300) Training through travel to Fogera PLS and Adet Research Centre	Selected farmers in and around the FTCs located in the Cotton/Rice/Livestock system	Adet/ARARI/ Woreda OoA, IPMS - TA

Input

The major problem identified on rice production is lack of threshers, polishers and drought resistant varieties. The following activates will be performed to solve the problem and to restart rice production in Metema

Table 41. Project support for rice input supply

Activities	Target	Responsible
(300) Facilitate the	Farmers in and around the FTCs	National Soil

supply of *Azolla anabaena* on rice	located in the Cotton/Rice/Livestock systems (including 2 PAs in the other farming system)	Laboratory Adet, IPMS - TA
(300) Introduce drought resistant varieties	Farmers in and around the FTCs located in the Cotton/Rice/Livestock systems (including 2 PAs in the other farming system)	Adet/ARARI IPMS - TA
(300) Organize seed growers group	Farmers in and around the FTCs located in the Cotton/Rice/Livestock systems (including 2 PAs in the other farming system)	Adet/ARARI IPMS - TA
(200) Introduce and popularise small scale rice polishers and threshers (post harvest technologies)	Farmers in and around the FTCs located in the Cotton/Rice/Livestock systems (including 2 PAs in the other farming system)	Adet/ARARI, Selam Vocational Training Centre, IPMS - TA

Marketing

Before 4-5 years ago, rice was produced on more than 400 ha. Last year, it is produced from only 8 ha. The current price for rice in Metema is 4.00 birr/kg. With the availability of reliable post harvest equipments in the woreda, rice production is expected to increase dramatically. This is because many farmers contacted still show very interest in growing rice. Withthis potential increase of production, it will therefore be essential that appropriate market studies are conducted.

Table 42. Project support in rice marketing

Activity	**Target**	**Responsibility**
(400) Study on cost benefit analysis of rice production system	Farmers in and around the FTCs located in the Cotton/Rice/Livestock systems (including 2 PAs in the other farming system)	Adet Research Centre, Project staff and other collaborators, IPMS-TA
(300) Provide revolving fund to cooperatives to purchase rice during harvest period and sell during better periods	Coops. in and around the FTCs located in the Cotton/Rice/Livestock systems (including 2 PAs in the other farming system)	ACSI/Bank, with funds from IPMS
(300) Link for market opportunities between cooperatives and potential buyers	Coops. in and around the FTCs located in the Cotton/Rice/Livestock systems (including 2 PAs in the other farming system)	Regional Bureaus of Trade and Industry and Cooperatives Promotion, IPMS- TA

5.4.5 Sorghum

Sorghum production

Production of sorghum in Metema is a very old activity. Farmers have developed own ways of controlling striga. Productivity of of the locslly grown land races is poor. Better yielding varieties need to be available. Currently, striga resistant varieties have already been tested at the research sub-centre in the area.

Table 43. Project support in sorghum production

Activities	Target	Responsibilities
(400) Study the feasibility/profitability and market chain of sorghum production	Small and big farmers in and around 5 FTCs	Students, Project staff
(300) Popularise high yielding and striga resistant improved varieties (Gobiye, Yeju, Berhan, Teshale, Ashebir and Meko) on farmers fields	Farmers in and around 5 FTCs	ARARI, Woreda OoARD – Extension Teams, IPMS - TA
(200) TOT on general agronomy and principles of IPM (e.g. use of Neem leaves in storage, etc.)	FTC staff, Woreda OoARD crop production /protection experts	ARARI/Regional BoARD crop production/protection experts, IPMS – TA
(300) Training of model farmers on improved management practices (e.g. row planting, seed dressing, use neem leave for storage, etc).	Farmers in and around 5 FTCs	FTCs staff guided by Woreda crop production /protection experts, IPMS-TA

Input supply

Limited number of varieties are introduced so far. However, efforts are underway to introduce new one to the system. Early maturing, high yielding and striga resistance is what is required from the new varieties. If sorghum matures early, cotton production will not be affected.

Table 44. Project support in sorghum input supply

Activities	Target	Responsibilities
(400) Study sorghum input supply	Farmers in and around 5 FTCs	Students, Project staff
(200) TOT on on-farm seed multiplication system	Woreda crop production experts, 5 FTC staff	Regional BoARD crop production/protection experts, IPMS- TA
(300) Train farmers on on-farm seed multiplication system	Farmers in and around 5 FTCs	FTCs staff guided by Woreda crop production/protection experts, IPMS- TA
(300) Encourage farmer to farmer seed distribution system and avail credit, if needed	Farmers in and around 5 FTCs	ACSI/Banks through funds from IPMS, Input supply Desk
(200) Introduce simple threshing	5 FTCs and	Selam Vocation School,

machines (animal driven, manually operated, for small farmers; and motor driven for commercial farmers) for demonstration purposes	interested commercial farmers	ARARI, IPMS- TA

Marketing

Most of the produces from commercial farmers, left after distribution to labourers, is sold to small traders in Gondar. Small farmers also produce enough for their food and some for sell. Neither the cooperatives nor the commercial farmers have sufficient store to keep the produce for longer period of time. As a result, grain is sold immediately after harvest. Storage weevils are are also common in the area. Few months after the harvest, the price of sorghum substantially increases. It is currently sold at more than 200 birr/qt, while it was between 120 and 160 birr/qt, depending on the grain colour, during the harvest period.

Table 45. Project support for sorghum Marketing

Activities	Target	Responsibilities
(400) Study the marketing of sorghum including market chain	Farmers in and around 5 FTCs	Regional Marketing Promotion Bureau, Students, IPMS- TA
(300) Training of farmers on group (cooperative) marketing and market orientation of sorghum production	Farmers in and around 5 FTCs	Woreda Cooperatives desk, IPMS-TA

5.4.6 Irrigated Vegetables (Onion, Pepper)

Production

The potential for vegetable production in Metema is high. The water table is believed to be shallow. Currently water pumped from river is the main source of irrigation water. There are no technologies to support the pumping out of this resource for vegetable production. Efforts will be highly needed to support this. There are locally available technologies that could easily be introduced into the area. Development of water harvesting technologies (wells, river diversion, streams, etc.) could significantly contribute to the expansion of vegetable production in Metema. Onion is imported from Sudan and the price of the locally produced onion need not be higher than the price from Sudan. A study will be needed to know the existing production system.

Table 46. Project support to improve production of vegetables

Activity	Target	Responsibility
(400) Study of existing vegetable production system	Farmers around 5 FTCs	Project staff with Melkassa (EARO)/ARRI staff, students
(200) Training on improved water/irrigation management (wells, river diversions, dams)	Woreda NRM experts, and staff of 5 FTCs	Regional BoARD experts, project staff
(200) Training on	Woreda crop production	ARRI, Melkassa (EARO),

improved vegetable production, including pest, disease control	and protection experts, and staff of 5 FTCs	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 staff

Input supply

As there is poor or no vegetable production, there is no supply of improved varieties of vegetable seeds. However, those few that produce use grow own seeds (pepper) or seeds bought from town (pepper, onion), which are either poor in quality or very expensive or a combination. Establishing a regular on farm supply system will be one of the primary tasks of the project. Supply of irrigation equipments is also limited in the area. Therefore, appropriate small scale irrigation equipments will need to be available locally. It will be worthwhile linking with Selam Vocation Training Centre for irrigation equipments.

Table 47. Project support to improve input supply of vegetables

Activity	Target	Responsibility
(400) Conduct study of input supply system	Farmers around 5 FTCs, cooperatives	Project staff, Melkassa EARO, students
(300) Facilitate the supply of inputs (different vegetable seeds, small scale irrigation equipments, etc)	Farmers in and around 5 FTCs interested in vegetable production	Woreda input supply, project staff, Melkassa (EARO), Selam Vocation Training Centre
(200) Training on improved input supply system (farmers to farmer seed system)	Woreda crop production and protection experts, staff of FTCs	Melkassa (EARO), IPMS - TA
(300) Training and program follow up (in FTCs) in farmer to farmer vegetable seed supply system	Farmers in and around 5 FTCs and cooperatives	FTC staff under guidance from Woreda crop production and protection experts and Melkassa (EARO), IPMS-TA
(200) Supply of demonstration/training materials on post harvest handling and improved vegetables	5 FTCs	Adet Research Centre, Melkassa (EARO), IPMS - TA

Marketing

Marketing of vegetables is done on individual basis. Since farmers harvest vegetables at about the same time, prices fall significantly at harvest. The project will help conduct feasibility study of the commercial production of vegetables. If feasible, project support for production, input sup

ply and marketing will be provided. Farmer groups will need to be strengthened to market own produces. Contract farming will also be encouraged with this regard. The market for vegetables seems to be limited but study will be needed to verify this.

Table 48. Project support to improve marketing vegetables

Activity	Target	Responsibility
(400) Conduct feasibility study on vegetable marketing and the market chain.	Farmers around 5 FTCs, nearby market towns including Mekelle	Melkassa (EARO)/Adet Research Centre, students, Project staff ,
(200) Training on marketing group formation, and vegetable marketing	Woreda cooperative staff and staff of 5 FTCs	Melkassa (EARO)/Adet Research Centre, students, Project staff,
(300) Farmer training and program follow up (in FTCs) on marketing group formation and vegetable marketing	Groups, cooperatives around 5 FTCs	FTCs staff and cooperative promotion desk staff, IPMS - TA

5.4.7 Lowland pulses (Soya bean, Mung bean, groundnut)

Production

Lowland pulses are new introductions to the area. Of these lowland pulses, soya bean has been introduced into the area. It has proved to be doing well under farmers' conditions. As a result of this, it is expected that Metema will be an area where large scale seed multiplication scheme will be launched, during this cropping season. Groundnut is grown by the natives (Gumuz), especially around Shinfa and Tumet PAs, to the south of the woreda. Mung bean on the other hand is also grown by the same group of farmers, but the extent to which it is produced is very low.

Table 49. Project support for Lowland pulses production

Activities	Target	Responsible
(400) Study on existing production systems, constraints	Farmers in and around 5 FTCs	Melkassa (EARO), Project staff
(200) TOT on agronomic management of lowland pulses	5 FTCs staff	Melkassa (EARO)/ARARI, IPMS - TA
(200) Training of farmers on agronomic management of lowland pulses	Farmers in and around 5 FTCs	FTC staff guided by staff from Melkassa (EARO)/ARARI, IPMS- TA
(200) Supply of demonstration materials on diseases, pests and agronomy in the form of written materials (pamphlets, handouts)	5 FTCs	Melkassa (EARO)/ARARI, IPMS-TA

Input Supply

Currently, supply of planting materials for these crops is inexistent. The regional government is attempting to secure planting material for this planting season. Farmer

to farmer seed supply system need to develop because the PLS is remote and expecting planting materials from the centre could be discouraging.

Table 50. Project support for Lowland pulses input supply

Activities	Target	Responsible
(400) Study on existing input supply system	Farmers in and around 5 FTCs and beyond	Students, Project staff,
(300) Develop farmer to farmer seed supply system	Farmers in and around 5 FTCs, commercial farmers	Woreda agronomists, Project staff
(300) Initially facilitate supply of improved lowland pulses, avail credit, if needed	Farmers in and around 5 FTC	ACSI/Bank, Woreda OoARD, Melkassa (EARO), IPMS - TA
(300) Supply of demonstration materials for smallholder and commercial farmers	5 FTC	Melkassa (EARO), IPMS- TA

Marketing

Grocery price for mung bean is believed to be very high. There are interested traders who would want contractual arrangements to grow this crop with farmers for a reasonably good price. This is an opportunity for developing contract farming in the area. The same holds true for soya bean. There are some companies in Bahir Dar who would want a bulk of this produce. It is expected that a South African company is planning to open a food processing factory in Bahir Dar. If this materialises, the requirement for soya bean will be substantially high.

Table 51. Project support for Lowland pulses Marketing

Activities	Target	Responsible
(400) Study on lowland pulses marketing and market chain	Farmers in and around 5 FTCs and beyond	Regional Marketing Promotion Bureau, Students, Project staff,
(200) TOT on community based marketing, cooperatives/creation of marketing groups, purchasing and processing of pulses	Cooperatives and 5 FTCs staff	Regional Marketing Promotion Bureau, Project staff
(300) Training on community based marketing, cooperatives/creation of marketing groups, purchasing and processing of pulses	Farmers in and around 5 FTCs, Traders and cooperatives	FTCs staff guided by Project staff
(300) Facilitate the provision of marketing fund for cooperatives/marketing groups	Cooperatives/Marketing groups	ACSI/Bank, Woreda OoARD, IPMS - TA
(200) Facilitate market linkage for output marketing	Cooperatives,/marketing groups in and around 5 FTCs	Regional Marketing Promotion Bureau, OoAARD, Project staff

5.4.8 Natural Resources related commodities- Incense, Gum and Bamboo

These have been identified as the important commodities in the area. As a result problems related to these commodities have been addressed in Chapter 4. These are natural resources owned by the government and involvement of individual farmers with regard is limited. For this reason, the possible interventions on these commodities are less clear, at least, for year 1. Hence, areas of intervention are not spelled out in this section. Once the area of interventions for these commodities is identified, they will be detailed, at least for year 2.

5.4.9.Cattle Beef

2.1.1. Production System

Cattle fattening in Metema area is not well known. There is no established culture of fattening cattle for market. Holding of large number of cattle is a common social prestige value. Oxen are reared for ploughing purpose only. In the Woreda there is transhumance during the wet season. There are different breed types including Fogera cross, Rutana and Felata cattle breeds. The area has quite big potential for cattle beef production. However, it has been observed that the absence of best selection among the local breeds, disease problems, absence of improved forage, water shortage/long distance of watering points during the dry season, theft and lack of knowledge on cattle fattening hinder to realize this potential. Therefore, this project need to play a role to improve the production system

Table 52. Project support for cattle beef production

Activity	Target	Responsible
(400) Study existing beef production and management system	Farmers in and around 5 FTCs	ARARI, Project staff
(200) TOT to educate and create awareness on the value of good quality animals (animal selection), develop grazing land management, area closure and improved feeding system	5 FTCs staff and DAs	Woreda Extension Teams, Project staff, ILRI, ILDP
(300) Train farmers to educate and create awareness on the value of good quality animals, develop grazing land management and improved feeding system	Farmers in and around 5 FTCs and interested traders	FTC staff aided by Woreda staff
(200) TOT on improved animal health and disease control, effects of transhumance and on feed conservation and utilization techniques	5 FTCs staff and DAs	Woreda extension, Project staff, ILRI, ILDP
(300) Training on feed conservation and utilization techniques and improved animal health and disease control and effects of transhumance	Farmers in and around 5 FTCs and interested livestock traders	FTC staff aided by Woreda staff, IPMS - TA
(300) Organize forage seed growers group	Farmers In and around 5 FTCs	FTC staff aided by Woreda extension, Project staff, ILDP

Input supply

It has been identified that there is poor supply and source of feed supplement. In only limited instances, weak animals are feed with sesame oil cake. People with *Ansara,* local oil presser, sell sesame oil cake at about 150 birr/qt. However, as most of the sesame sold in grain form, supplementation very poor. This trend of not extracting oil locally is happens especially when sesame grain is sold at higher prices. This season (2005) was one of them as most of the grain was sold out of the woreda. Shortage of water is another big problem and cattle move long distances in search of water. Veterinary service is very poor and the intervention of private sector in this venture is very limited. Credit supply for fattening purpose is none existant.

Table 53. Project support cattle beef input supply

Activities	Target	Responsibilities
(400) Study beef input supply	Farmers in and around 5 FTCs	Students, Extension Teams, IPMS - TA
(300) Facilitate credit funds for veterinary service providers	Private veterinary service provider	ACSI/Bank with funds from IPMS,
(200) Establish health posts at entry and exit points with in the woreda	Woreda OoARD	Woreda OoARD, IPMS - TA
(200) Introduce and popularise improved forage species	5 FTC	ILDP, IPMS - TA

Marketing

The marketing system is underdeveloped. There is no market information provider in the area and no one is concerned to link producers with potential buyers. As a result there is no encouragement for those who practice cattle fattening. Illegal cattle trade is common and up to 4000 cattle daily are believed to cross the border to enter the Sudan. There is no market auction at the border and there are no health inspection posts both at the entry and exit points.

Table 54. Project support in cattle beef market

Activities	Target	Responsibilities
(400) Conduct beef marketing study in the Sudan (Demand and supply), including the market chain	Metama woreda, woredas close to Metema both with in Ethiopia and the Sudan	Students, IPMS, BOA, OoA
(200) Establish market information system	5 FTCs	Trade and industry, IPMS-TA
(300) Facilitate linkage of producers with potential buyers	Farmers in and around 5 FTC	Regional Marketing Promotion Bureau, Extension Teams, IPMS-TA
(300) Establish veterinary inspection system in market places	Farmers in and around 5 FTC	OoARD, IPMS-TA

(300) Encourage creation of bylaws to control theft	Farmers in and around 5 FTC	WALC, woreda OoARD,
(300) Facilitate credit funds for fattening	Farmers in and around 5 FTCs	ACSI/Bank with funds from IPMS,
(300) Establish link with veterinary clinics and drug stores	Farmers in and around 5 FTCs	OoARD, IPMS-TA

5.4.10. Dairy

Dairy Production system

Dairy production in Metema is very traditional and entirely based on local breeds. The productivity of local breed is very low (2 l/day) it can be said it is cow calf based. However, productivity varies from breeds to breeds and the Felata breed is identified to be better milk yielder with low fat content as compared to the other breeds. Despite this opportunity no attempt was made to select better breed to be used as dairy cows

Apart from the observed inherent low milk yield of local breeds. This is believed to be aggravated because of poor feed conservation and utilization methods, lack of improved forage with better nutritional value, livestock diseases and prevalence of internal and external parasites. To improve the situation, Developing improved forage production, selection of better milk yielding local breeds, use of better feed conservation and utilization techniques, use of improved feeding system and improved animal health services are believed to solving this problem. In order to do these training of communities to improve their knowledge and skills on the management of dairy animals will be critical in improving the existing poor dairy production.

Table 55. Project support on dairy production

Activities	**Target**	**Responsibilities**
(400) Study milk marketing, its feasibility and profitability	5 FTCs	Students, OoARD, IPMS - TA
(200) Establish improved forages for demonstration purposes	5 FTCs	OoARD, project staff, ILDP, ILRI
(200) TOT on improved dairy management, feeding system, feed conservation and utilization methods	Woreda Livestock production experts	Regional BoARD livestock experts, ILDP, ,ILRI, Project staff
(300) Train farmers, including women, on improved dairy management, feeding system, feed conservation (preservation) and utilization methods	Farmers in and around 5 FTC and DAs	Woreda OoARD, ILDP, ILRI, Project staff,
(300) Train women farmers in milk processing and handling	Farmers in and around 5 FTC	ILDP, ILRI-Debre Zeit, Project staff,
(300) Organize dairy farmers group particularly, women	Farmers in and around 5 FTC, but close to Shehdi and Metema Yohanes towns	OoARD, Project staff,

Input supply system

In Metema, there are no improved genotypes with high milking yield and less focus has been provided on dairy extension package including credit. Despite the existence of high disease incidences there is no animal health service provider. Improved milk processing and preservation equipments are unknown. Establishing bull service centre and provision of AI will dramatically change the existing situation

Table 56. Project support on dairy input supply

Activities	Target	Responsibilities
(400) Study the potential for privatization of the supply of drugs, veterinary and bull services	Farms in and around 5 FTCs	Students, ILRI and project staff
(300) Provide credit funds for starting private bull station service (year 2)	Interested farmers in and around the 5 FTCs	ACSI/Bank with project funds
(400) Study the existing fodder system with the aim of developing a innovative system	Farmers in and around 5 FTCs	ILRI Forage Diversity/CIAT Students, Project staff
(200) Training on on-farm fodder production with the aim of developing on farm fodder seed multiplication schemes	Woreda livestock experts and staff 5 FTCs	ILRI Forage Diversity/Project staff
(300) Supply of different fodder species	Interested farmers in and around 5 FTCs	ILRI/CIAT, ILDP with Project funds
(300) Training of farmers and cooperatives (in FTCs) the development of a farm based fodder seed multiplication scheme	Interested farmers in and around 5 FTCs	FTC staff, guided by Woreda/project staff
(300) Encourage private traders/farmers to introduce and supply improved dairy genotypes	Interested traders and/or farmers in and around 5 FTCs	OoARD, IPMS, Holleta research
(200) Supply improved dairy processing equipments, including milk churner, improved forage seeds, and training materials for demonstration purposes	5 FTCs	ILDP, ILRI-Debre Zeit Research Station, Project staff
(300) Facilitate credit for dairy farmers particularly for women	Dairy farmers in 5 FTC	ACSI/Banks through funds of the project

Marketing system

Dairy marketing is under developed..It is only rural based seasonal milk supply system. Whole milk, butter and *Arera* (*wegemet*) are supplied for market. However, there is no consistent supply (round year) of milk. The price of one litter of milk is 1 birr during the wet season, while it is hard to find a litter with 4 birr during the dry season. There is also high demand for Butter (ghee) in the Sudan. It is sold at 25 birr/kg. The potential needs to be exploited. However, this needs to be studied and be verified so that farmer groups/cooperatives may benefit from this effort.

Establishing dairy groups and dairy products marketing, units based on the results obtained, will stimulate dairy production system in the woreda

Table 57. Project support on dairy market

Activities	Target	Responsibilities
(400) Study the feasibility/profitability of dairy products marketing, including market chain	Small towns around the woreda, including towns in the Sudan	Students, OoARD, IPMS-TA
(300) Organise milk days to create awareness for urban people		
(300) Establish and develop milk and milk products marketing groups	Farmers in and around 5 FTCs	Co-ops desk, project staff, WALC
(300) Organise milk days to create awareness for urban people	Women dairy groups around towns, within the 5 FTCs	OoARD, Project staff,

5.4.11. Goat

Production system

Three local breeds (*Rutana, Gumuze and local*) are known in Metema area. The average number of goat per household is five this is due to easier management as compared to cows or oxen. *Gumuze* Goats have shorter in size broaden in width have faster growth and good fertility, Moreover, they provide higher milk yield.

Commonly the price of goat ranges from 150 – 400 birr/goat in the Woreda market. There is high fertility of goat and single goats give berth twice a year with high probability of 2 or 3 twins in one occasion this is largely depend on feeding and good monitoring. However, there is a problem of foot rot disease in the area and providing slatted floor is must to protect them against the disease. Generally goat husbandry is extensive type and there a problem of labour to keep and monitor in the field

Table 58. Project support on goat production

Activities	Target	Responsibilities
(400) Conduct study on the current goat production system	Farmers in and around 5 FTCs	ILRI, Regional BoARD, Project staff
(200) Training on improved goat production (including breed selection), including disease and pest management; and feed production	Staff of 5 FTCs	Regional BoARD, Woreda livestock experts, Project staff
(300) Farmer training on improved goat production, including disease and pest management; and feed production	Farmers in and around 5 FTCs	FTC staff supervised by woreda staff
(300) Farmer training and program follow up (in FTCs) on on-farm fodder production and feeding systems	Farmers in and around 5 FTCs	FTC staff supervised and guided by woreda livestock experts, IPMS -

		TA
(300) Encourage and train farmers in market oriented goat production system	Farmers around 5 FTCs	Woreda OoARD, project staff,
(200) Create conditions that enforce laws against theft	Farmers in and around 5 FTCs	WALC, Woreda OoARD, The community

Input supply system

Although there is huge potential for goat production in Metema, production is very traditional due to various reasons. These include of lack of input for improved goat production. These problems need to be addressed if goat production is thought to bring about changes in the livelihoods of the farming community. Currently, local goats are being supplied as food security package.

Table 59. Project support on goat input supply

Activities	**Target**	**Responsibilities**
(400) Study the current input supply system in order to develop innovative improvements	Farmers in and around 5 FTCs	Students, woreda input supply, Project staff
(300) Facilitate improved input supply, including improved breeds	Farmers in and around 5 FTCs	Woreda input supply unit, cooperative office, project staff
(300) Strengthen and private animal health providers through credit, if needed	Private veterinary. service providers	ACSI/Bank through funds from IPMS
(200) Training on community based livestock health services	staff of 5 FTCs	Regional BoARD, Woreda livestock experts, 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 woreda livestock experts, IPMS - TA
(300) Facilitate credit funds for market oriented goat production	Farmers around 5 FTCs	ACSI/Bankswith funds from IPMS

Marketing system

The goat population in Metema area is very high as opposed to the high population of goat, the average price paid in Metema is higher when compared to the price in the high lands having the same body weight. Therefore, the possibility of selling goats to Gonder or Bihar dark is not profitable. Therefore, there is a need for Assessment on the potential Demand and supply of goats in the Sudan.

Table 60. Project support on goat marketing

Activity	**Target**	**Responsibility**
(400) Conduct study on goat marketing system, including market chain	Farmers in and around 5 FTCs	Students, Regional Market promotion office, Project staff

(200) Training on market oriented goat production	Woreda livestock experts (5), staff of 5 FTCs	ILRI, Regional BoARD, Regional Market promotion, IPMS - TA
(300) Farmer training and program follow up (in FTCs) on market oriented goat production	Farmers in and around 3 FTCs	FTC staff supervised and guided by woreda experts, and staff of IPMS- TA
(300) Develop linkages with traders and potential exporters	Farmers in and around 5 FTCs	Regional Market promotion Office, IPMS - TA
(300) Facilitate credit funds for market oriented goat production	Farmers around 5 FTCs	ACSI/Banks with funds from IPMS
(200) Training on group formation for goat marketing, if required	Woreda livestock experts, Coops office, FTC staff	Regional Market promotion Office, IPMS - TA
(300) Farmer training and program follow up (in FTCs) in group marketing of goat	Farmers in and around 5 FTCs, cooperatives	FTC staff supervised and guided by woreda experts (Cooperatives, livestock experts),IPMS-TA

5.4.12 Poultry

Production system

There is no modern poultry in Metema. The existing chickens are all local and hence productivity is poor. These chickens may have own merit of surviving without much feed. Currently, chicken are only allowed to look for own food. However, this system can not help improve livelihoods of farming families. Improvement is therefore required with this regard. The extension did not support this sector until recently.

Table 61- Project support for poultry production

Activities	Target	Responsibility
(400) Conduct study to assess profitability of poultry production	Farmers in and around 5 FTCs	Students, Project staff
(200) TOT in commercial poultry production (diseases control, feeding and other management techniques)	Woreda livestock expert and staff from 5 FTCs	DZRC/EARO, IPMS - TA
(300) Farmer training and follow up in FTCs/DA posts on commercial poultry production	Interested farmers in and around 5 FTCs	FTC staff guided by Woreda/ project staff and DZRC/EARO
(200) TOT in the use of hay brooders, and vaccines (paravets)	Woreda livestock experts and 5 FTC staff	DZRC/EARO, Woreda livestock experts, IPMS - TAf
(300) Farmer on the use of hay brooders and vaccines.	Interested farmers in and around 5 FTCs	FTC staff guided by Woreda/project staff and DZRC/EARO staff.

Input supply system

Currently, there is lack of improved chickens and vaccination supply in Metema. Diseases control and the supply of feed are also inexistent. Training of paravets will also need to be considered as this may provide the basis for efficient animal health services, including poultry. Hay box brooder will also need to be demonstrated and a sustainable supply system needs to be thought. Private and/or cooperative system may be considered for the supply of feed/drugs in the area.

Table 62- Project support for poultry input supply

(300) Provide improved genotypes, especially to women and children, avail loan money, if needed	Farmers in and around 5 FTCs	ARARI,/DZRC/EARO , Woreda OoARD, ILDP ACSI/Bank, IPMS for TA and loan money
(200) Provide improved technologies (Hay box brooder, day old chicks,egg storage facilities, vaccines, etc.) for demonstration purposes	5 FTCs	DZRC/EARO, ARARI IPMS - TA

Marketing system

Poultry marketing is carried on an individual basis, as the production is smallholder-based using local chicken. There is a substantial poultry resource in the Woreda. The local price is about 20 Birr for female and 35 Birr for male chicken, while the price of an egg is about 50 cents. Once the market viability fo poultry is identified, group formation may be important.

Table 63- Project support for poultry marketing

Activity	Target	Responsibility
(400) Study existing supply and demand and market chain	Farmers in and around 5 FTCs and traders	Students, Project staff
(200) TOT for poultry marketing group formation (women and young jobless)	Woreda livestock expert, staff from 5 FTCs and DA posts	Regional Marketing promotion Bureau, Project staff
(300) Farmer training and follow up in FTCs for group formation	Interested farmers in and around 5 FTCs	FTC staff guided by Woreda staff, IPMS - TA

5.4.13 Apiculture

Production system

Traditional honey production is a common practice in Metema. The vegetation cover of the woreda is currently ok and can support big number of bee colonies. There needs to be a study whether the existing bee species are of type to domesticate. This is because they seem to too wild. It could be for this reason that very few farmers keep very few beehives in the backyard. Therefore, there should be a study to determine this.

Table 64- Project support for Apiculture production

Activities	Target	Responsibility
(400) Study the existing apiculture production system	Farmers in and around 5 FTCs	Holleta Bee Research Centre (HBRC)/SOS Shale, IPMS - TA
200) TOT on modern bee keeping (disease & pest identification and control)	Woreda apiculturist, other livestock experts, 5 FTCs staff	SOS Shale/HBRC, Woread OoARD, IPMS - TA
(300) Training of farmers modern bee keeping, disease & pest identification and control	Farmers in and around 5 FTCs	FTC staff guided by woreda staff, IPMS - TA
(300) Training of farmers on modern queen rearing techniques	Farmers in and around 5 FTCs	HBRC/SOS Sahel, Woreda OoARD, IPMS - TA
(200) Identification of the existing best bee forages, introduction of other forage from elsewhere which are adaptable to the area	Areas around the 5 FTCs and other places, including outside of Metema	HBRC/ SOS Shale, Woreda OoARD, IPMS-TA
(300) Encourage farmers to dig wells to avail water for bees	Farmers in and around 5 FTCs	Woreda OoARD, IPMS-TA

Input supply system

Recently, few modern bee hives have been introduced. Extension support towards apiculture is not adequate.

Table 65- Project support for Apiculture input supply

Activities	Target	Responsibility
(200) Introduce number of extractors, different types of modern hives and accessaries	5 FTCs	HBRC/SOS Sahel, Woreda OoARD, IPMS - TA
(300) Avail credit facilities for buying modern bee hives once honey production is vailable	Farmers in and around 5 FTCs	ACSI/Bank, Woreda OoARD, IPMS for availing credt money
(200) Introduce different bee forages for demonstration at FTCs	5 FTCs	HBRC/SOS Sahel, IPMS - TA
(300) Train local carpenters to make bee hives and accessories locally	Farmers in anround 5 FTCs and interested carpenters in town	HBRC/SOS Sahel, Woreda OoARD, IPMS - TA

Marketing systems

Metema is the centre for honey market. Honey from traditional hives with impurities is sold at 16 – 20 birr/kg. There is no organised marketing of honey as is for the other commodities. Small traders buy and take the honey to Gondar. Illegal market to Sudan is another major market outlet.

Table 66- Project support for Apiculture marketing

Activities	Target	Responsibility
(300) Organise honey market by creating honey marketing groups/cooperatives with collection and cleaning centres	Farmers in and around 5 FTCs	SOS Sahel, Woreda OoARD, IPMS - TA
(200) Avail market information	5 FTCs	SOS Sahel, Woreda OoARD, IPMS - TA

Annex 1. List of workshop participants Metema PLS, March 3-4, 2005

No	Name	Sex	Organization	Responsibility	Telephone
1	Grazmatch Gewede	M	Kumer-Aftit PA	Farmer	
2	Gashaw Mohammed	M	Agam Wuha	Administration Head	
3	Gizat Anteneh	M	Office of Agriculture	Cooperatives Team Leader	310121/22
4	Mulugeta Alem	M	Office of Agriculture	Bee Keeping Expert	310222
5	Tekaligne Yiblet	M	Kekit Farmers Association	Chairman	
6	Abdi Suleman	M	Office of Agriculture	Crop Prod. & Prot.	300123
7	Mulat Getahun	M	Office of Agriculture	DA	
8	Abeba Biruk	F	Agamwuha	DA	310081
9	Fasika Kassie	F	Kumer	DA	
10	Mekashaw Nadew	M	Meka	DA	310121
11	Dejen Alebachew	M	Office of Agriculture/Kokit	DA	
12	Bitew Melese	M	Region Agriculture Office	Dept. Head	205850
13	Mebrahtu Degu	M	Metema Administration	Deputy Administrator	310125
14	Dr. Hassen Kebede	M	Office of Agriculture	Deputy Head of OoARD, and Representative	310152
15	Shumet Gobeze	M	Office of Agriculture	Environmental Protection	310121/22
16	Molla Mohammed	M	Office of Agriculture	Extension Team Leader	310121/22
17	Mintesnot Mesku	M	Kokit Farmers Association	Farmer	
18	Sherif Mango	F	Aftit Farmers Association	Farmer	
19	Alefu Sisay	F	Kokit Farmers Association	Farmer	
20	Alga Takele	F	Kumer Farmers Association	Farmer	
21	Enanu Mengesha	F	Kokit Farmers Association	Farmer	
22	Emiwedu Belete	M	Kokit Farmers Association	Farmer	
23	Wubale Alemu	F	Gendewuha	Farmer	
24	Asres G.Meskel	F	Mender 6,7,8	Farmer	
25	Aregash Bogale	F	Agam Wuha	Farmer	
26	Sele Ayanaw	F	Shenfu Mariam	Farmer	
27	Zerihun Demissie	M	Aftit	Farmer	
28	Ayalew Hassen	M	Agam Wuha	Farmer	
29	Addisu Legesse	M	Tumet PA	Farmer	
30	Kiros Woldeyes	M	Shehdi	Investor (Farmer)	310064
31	Sheih Yenus Yusuf	M	Gorgoro	Farmer	
32	Takele Teshagere	M	Meka	Farmer	
33	Mekashasw Abohay	M	Meka	Farmer	
34	Yitayew Beyene	M	Meka	Farmer	
35	Dr. Getachew Alemayehu	M	ARARI	Director	205200
36	Mezgebu Tegegn	M	Metema Office of Agriculture & Rural	Head	310121

			Development		
37	Fisseha Eshete	M	Woreda Capacity Building	Head	310120/183
38	Taemyalew Asnakew	M	Office of Agriculture	Head of the Office	310169
39	Samre Manasebo	M	Metema -Youhannes	Investor (farmer)	
40	Yahiya Yimer	M	Shehdi	Investor (Farmer)	
41	Tesfa Worku	M	Metema-Yohannes	Investor (Farmer)	
42	Worku Tiruneh	M	Metema Farmers' Union	Manager	310140
43	Dessie Teshager	M	Office of Agriculture	Marketing & Input	
44	Tayachew Alemneh	M	Office of Agriculture	People's Participation	
45	Solomon Berhane	M	Information	Public Relations	310124
46	Abay Akale	M	Office of Agriculture	Regions Association Head	
47	Terefu Tesfaw	M	Information	Support	310123
48	Daniel Taddese	M	Office of Agriculture	Team Leader	310121/22
49	Dr. Berhanu G.Medhin		IPMS Project		
50	Azage Tegegne		IPMS Project		
51	Kahsay Berhe		IPMS Project		
52	Abebe Misgina		IPMS Project		

Annex 2. Metema PLS planning workshop program, March 3-4, 2005

Shehdi town, Metema

Date	Time	Topic	Speaker
March 3,2005 (Thursday)	8:00 - 8:30	Registration	Ato Worku Teka
Moderator - Ato Adebabay Mengist			
	8:30-8:40	Welcome and Introduction	Ato Mezgebu Tegegne (Wereda Agr. and Rural Development, Head, WALC Chair)
	8:40 - 9:00	Project Background	Dr. Berhanu Gebremedhin
	9:00 - 9:10	PRA Process	Dr. Azage Tegegne
	9:10 - 9:30	**Coffee break**	
Chair Person – Dr. Getachew Alemayehu			
	9:30 - 9:50	Crop Production	Ato Kahsay Berhe
	9:50 - 10:00	Questions/Discussion	Participants
	10:00 -10:20	Animal Production	Dr. Azage Tegegne
	10:20 - 10:30	Questions/discussion	Participants
	10:30 - 10:50	Institutions	Ato Abebe Misgina
	10:50 - 11:00	Questions/discussion	Participants
	11:00-12:00	Technology display	Ato Worku Teka
	12:00 - 3:00	Lunch break	Organizers
	3:00 – 3:15	Organizations of breakup sessions	Dr. Berhanu Gebremedhin
Chair persons/Rapporteurs of breakup sessions Group 1. Crop production and NRM: Dr. Getachew Alemayehu/Ato Worku Teka Group 2. Livestock production Dr. Azage Tegegne/Dr. Hassen Kebede Group 3. Institutions: Dr. Berhanu Gebremedhin/Ato Abebe Misgina			
March 4,2005 (Friday)	8:00 - 9:00	Breakup session continued	Participants
	9:00 - 9:30	Coffee break	
	9:30-12:00	Group Discussion	
	12:00 - 3:00	Lunch break	
Chair Ato Berhane Gidey			
	3;00-3:20	Group 1 Crop report	Ato Worku Teka
	3:20 -3:40	Questions/discussion	Participants
	3:40 - 4:00	Group 2 Livestock report	Dr. Hassen Kebede
	4:00 -4:20	Questions/discussion	Participants
	4:20 - 4:40	Group 3 Institutions report	Ato Abebe Misgina
	4:40 - 5:00	Questions/discussion	Participants
	5:00-5:50	General discussion	Participants
	5:50 - 6:00	wrap up and the way forward session	Dr. Azage Tegegne
	6:00	Closing	Ato Mebratu Degu, Metema Wereda V/Administrator

Annex 3 -Amount of short and medium term credit delivered by multipurpose cooperatives for purchase of inputs and goat production, 2004.

No	Cooperatives	Short term credit									Medium term credit		
		DAP(Q)	UREA (Q)	Chemical (lts)	Seed (Q) **	Sprayer (no)	Bee hives (no) *	Poultry (no)	Credit Amount (birr)	No. of farmers	Number of farmers	Credit amount	Remark
1	Kokit	39.5		402(150)	142.5			46	160,010.50	648	113	116,007.50	
2	Dass	-	-	194	89.9		13	46	79,775.00	694	111	114,837.50	
3	Kumer	23.0	15.5	163	13		2	46	19,169.50	100	60	72,429.50	
4	Gende Wouha	18.5	22.0	189	9.8				17,562.00	175	30	26,499.90	
5	Metema Yohannes	-		221	23.7				24,100.00	99	30	26,499.90	
6	Shenfa	45.5	22.4	183(150)	99.4	29	2	46	109,302.00	336	72	73,897.80	
7	Mender 6,7,8	11.0	14.0	167	54.4		7	34	50,537.40	430	101	106,004.20	
8	Tumet	26.0	13.0	212	120.7		6	46	105,635.70	339	60	70.086.00	
9	Zebach Baher	16.0	18.0	188	-				7141.60	17		-	
10	Lemlem Terara	-	-	178	9.6				10,903.00	98	9	7949.90	
11	Agam Wouha	16.5	14.6	147	9.7			36	14,033.00	100	4	3534.30	
12	Gorgoro	-	-	131	9.9				8520.00	93	7	6183.30	
Total		196.0	119.5	2,375	582.6	29	30	300	606,689.70	3129	597	623,929.80	

Source: Metema woreda, OoA

Note

* = Kenya top bar type of hive
- Figures in parenthesis are sevin chemicals in kg
**= Cotton seed

Annex 4. Total number of cooperative members and total capital as of October 2004, Metema woreda

No.	Name of Cooperatives by Service Type	Year of Establishment	Household Members			Capital (birr)			Capital (Birr)		
			Male	Female	Total	Fixed Asset	Cash	Total Capital	Liability	Capital	Total Asset
1	Kokit	1995	778	169	947	5690.00	842,179.00	847,870.00	572,283.00	275,586.00	842,179.00
2	Dass	1993	281	24	305	10,875.00	1,327,294.00	1,338,169.00	1,308476.00	29,693.00	1,327,294.00
3	Kumer	1997	310	50	360	2523.00	235,585.00	238,107.00	198,909.00	39,198.00	235,585.00
4	Gende Wouha	1993	241	21	262	5286.00	93,019.00	98,306.00	66,717.00	31,589.00	93,019.00
5	Metema Yohannes	1998	112	9	121	7347.00	65,981.00	73,328.00	61,635.00	11,693.00	65,981.00
6	Shenfa	1998	196	8	204	992.00	64,586.00	65,578.00	59,878.00	5700.00	64,586.00
7	Mender 6,7,8	1997	72	2	74	13,098.00	1,334,154.00	1,347,252.00	1,326,040.00	21212.00	1,334,154.00
8	Tumet	2004	112	8	120	565.00	77,220.00	77,785.00	71,695.00	6089.00	77,220.00
9	Zebach Baher	1997	166	6	172	600.00	20,487.00	21087.00	11,973.00	9113.00	20,487.00
10	Lemlem Terara	1993	113	13	126	1,861.00	27,631.00	29,492.00	16,756.00	12,736.00	27,631.00
11	Agam Wouha	1993	126	19	145	60.00	28,298.00	28,358	20,863.00	7,494.00	28,298.00
12	Gorgoro	1993	146	17	163	29,191.00	14,090.00	43,282.00	41,776.00	1,505.00	14,090.00
	Total		2653	346	2999	78,088.00	4,130,521.00	4,208,609.00	3,757,001.00	451,608.00	4,208,609.00

Source: Metema woreda, OoA

Annex 5. List of WALC members and telephone address

No	Name	Title	Telephone
1	Ato Mezgebu Tegegne	Head, Woreda Agricultural & Rural Dev. Chair	08- 310122
2	Ato Hailu Berhanu	Deputy Head, BoA, Member,	08- 310121
3	Ato Mebratu Degu	Woreda V/Administrator, Member.	08- 310126
4	Ato Daniel Tadesse	Extension Group 1 Leader, Bureau of Agriculture, Member.	08- 310121
5	Ato Mola Mohammed	Extension Group 2 Leader, Bureau of Agriculture, Member	08- 310121
6	Ato Guadeshet Aseffa	Natural Resources Group Leader, Bureau of Agriculture, Member.	08-310121
7	Ato Gizat Anteneh	Cooperative Development Group Leader, BoA, Member	08-310121
8	Ato Worku Tiruneh	Head , Cooperative Union, Bureau of Agriculture, Member.	08- 310140
9	Ato Fekadu Haile	Head, HIV/AIDS Secretariat, Metema Woreda, Member,	08- 310135
10	Ato Tamyalew Asnakew	Head, ACSI (Amhara Crdit and saving Institution), Member,	08-310169
11	Ato Getachew Assefa	Head, Small Scale Trade and Industry, Member,	08-310116
12	Ato Tayachew Alemneh	Women's Affairs Desk, Member,	08-310132
13	Dr. Hasen Kebede	ILDP Coordinator (Integrated Livestock Development Project, Member.	08-310152
14	Ato Worku Teka	Research and Development Officer, IPMS, Secretary,	09-766677

Annex 6. Market price of some commodities (2004/05)

Type	Unit	Average price in birr	Remark
Cash crops			
Sesame (herher)	kg	5.20	
Cotton (local and Delta pine)	kg	2.20	
Cotton (Gedera)	kg	3.30	Not yet confirmed
Cereal			
Sorghum	kg	1.60	
Rice	kg	2.00	
Vegetables and fruits			
Banana	kg	4.00	
Papaya	kg	2.00	
Orange	kg	5.00	
Livestock			
Oxen	No	1218.00	
Bull	No	1010.00	
Cow	No	937.00	
Young bull	No	820.00	
Heifer	No	759.00	
Goat	No	234.00	
Donkey	No	463.00	
Chicken/cock	No	18.00	
Honey	Kg	12.00	
Bee hive	No	270.00	Kenya top bar
Bee hive	No	80.00	Local
Inputs			
DAP	Kg	3.10	
UREA	Kg	2.78	
Endosulphan	Lt	55.30	
Sevin	Kg	78.20	
Cotton seed(gedera)	Kg	23.40	
Cotton seed(akala,delta pine)	Kg	8.25	
Sesame (adi variety)	Kg	5.90	
Sprayer (solo)	No	347.00	
Sprayer (Matebe)	No	433.00	

Source: Metema Woreda, OoA

Annex 7. Peasant associations visited and farmers held discussions during the PRA process

No.	Name of PA	Farming system	Farmers contacted
1	Tumet Menduka	Sesame, cotton, sorghum/livestock	Ato Addisu Legesse
2	Shinfa	“ “	Ato Mohamed
3	Metema Yohanes	“ “	Ato Samre Manasebo Ato Tesfa Worku
4	Agam Wuha	“ “	Ato Gashaw Mohamed Ato Ayalew Hassen W/o Aregash Bogale
5	Kokit	“ “	Ato Gibtsu sisay Ato Tekalighn Yiblet W/o Alefu Sisay W/o Enanu Mengesha
6	Kumer Aftit	“ “	Ato Grazmach Baudi W/o Ragaya sheriff Ato Zerihun Demissie Ato Fasika Kassie Ato Alga Takele
7	Meka	Cotton, Rice/Livestock	Ato Moges Tadesse Ato Dinku Alene Ato Mekashaw Nadew Ato Takele Teshagere Ato Mekashasw Abohay Ato Yitayew Beyene
8	Awlala	Cotton, Rice/Livestock	
9	Shehdi	Sesame, cotton, sorghum/livestock	Ato Yahya Yimam Ato Gebrehiwot Gebreselassie

Annex 8. List of participants in the project introduction workshop
February 4, 2005 (7:30-10:30 PM),
Shehdi, Metema

No.	Name	Institution	Responsibility	Address
1	Fekadu Haile Micheal	HIV/AIDS	Coordinator	Woreda administration
2	Gezahegne Moges	Peoples Participation affairs	Expert	08/310022
3	Dr. Hassen Kebede	OoA	Representative/Desk Head	08/310152
4	Getachew Assefa Sharew	Small scale Industries and Trade	Head	08/310116
5	Worku Tiruneh Lemlemu	Cooperatives/Union	Manager	08/310140
6	Gizat Anteneh Mekonen	Cooperatives	Expert	08/310121
7	Wondemhunegne Deres Tezera	Environmental Protection and Land Administration	Surveyor	08/310121
8	Worku Teka	ILRI/IPMS	RDO-Metema	08/310121
9	Abebe Misgina	ILRI/IPMS	Research Technologist	01/463215
10	Kahsay Berhe	ILRI/IPMS	Research Technologist	01/463215
11	Aklilu Mesfin Kidane	Regional BoARD	Natural Resources Expert	08/460695
12	Yirgalem Asegid	ILRI/IPMS	RDO-Fogera	08/460695
13	Mezgebu Tegenge	OoARD	Head	08/310122
14	Dr. Azage Tegegne	ILRI/IPMS	Animal Scientist	01/463215

Annex 9. Cropping calendar (Eth. calendar) of some crops grown in Metema woreda

Crop type	Land Preparation (months)	Sowing time	Weeding (months)	Harvesting (months)	Threshing (months)
Sorghum	-	June 12-30	July, August	Nov. to Dec.	January
Maize	-	June 1-15	July, August	October	November
Teff	May, July	July 25 – Aug. 5	Aug., Sept.	Nov. – Dec.	January
Finger millet*	-	June 15 - 30	July, August	November	January
Rice	March, May	June 12- 18	July, August	October	November
Chickpea	May, June, July	August 27- Sep	September	Nov. – Dec.	Dec. –Jan.
Cotton	May	June 1- 10	Jul., Aug., Sep.	Nov- Jan	Jan.- Feb
Sesame (Var. *Tejareb*)	-	June 25-Jul. 5	July, Aug.	October	November
Sesame (Var. *Hirhir, Gojam azene*)	-	July 1-15	July, Aug.	October	November

* Grown in 2 PAs (Kemechela and Awlala)

Source: Metema Office Agriculture, 2005

Annex 10. Tree population of *Boswellia* sp. distribution in some dominating PAs*

PA	Tree spcies	Coverage in ha	Tree population
Das Gundo	*Boswellia*	15,855.00	1,434,500
Tumet Mendoca	>>	960.25	546,500
Shinfa	>>	2.088.00	2,204,000
Lencha		5895.54	5,895,540
Shashage	>>	5677.04	5,128,912
Gubay Jejebit	>>	6,186.00	5,151,500
Lemlem Terara	>>	1,932.13	1,620,130
Zebach Bahir	>>	3,050.00	2,684,000
Awasa	>>	8,750.00	8,968,750
Metema Yohannes	>>	3,455.00	3,496,460
Total		51,763.048.00	37,130,292

*Other than these, *Boswellia* sp. is also grown in Ashera, Akushera, Gend Wuha, Zebach Bahir and Kemechela PAs.