



## **Tropical fruit production through value chain development approach in Alamata Woreda, Northern Ethiopia: Experiences from IPMS**

Gebreyohannes Berhane<sup>1</sup>, Abraham Gebrehiwot<sup>1</sup>, Tesfaye Gebrezgiabher<sup>2</sup>, Kahsay Berhe<sup>1</sup> and Dirk Hoekstra<sup>1</sup>

<sup>1</sup>Improving Productivity and Market Success (IPMS) of Ethiopian Farmers Project

<sup>2</sup>Alamata Office of Agriculture and Rural Development (OoARD), Alamata

**December 2010**



Canadian International  
Development Agency

Agence canadienne de  
développement international



በኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፑብሊክ  
የግብርናና ገበያ ልማት ሚኒስቴር  
Federal Democratic Republic of Ethiopia  
MINISTRY OF AGRICULTURE AND  
RURAL DEVELOPMENT

**ILRI**  
INTERNATIONAL  
LIVESTOCK RESEARCH  
INSTITUTE

## Table of Contents

Acknowledgement .....	iii
Abstract .....	iv
1. Introduction .....	1
2. Methods and approaches .....	1
2.1. Baseline information .....	2
2.2. Documenting change processes and results .....	2
3. Background to tropical fruits development .....	3
3.1. PLW description .....	3
3.2. History and diagnosis of tropical fruits development .....	5
4. Value chain interventions.....	6
4.1. Extension services.....	6
4.2. Production intervention .....	6
4.3. Input supply/service provision.....	6
4.4. Output marketing .....	7
5. Results and discussion .....	7
5.1. Area/household coverage, production/productivity and income .....	7
5.2. Input supply/marketing.....	9
5.3. Indirect effects on gender and the environment .....	10
5.4. Organizational/institutional arrangements.....	10
6. Challenges in the intervention process/approach and recommendations .....	11
7. Lessons learned .....	11
8. References .....	12

## **Acknowledgement**

This paper documents interventions, results and lessons learned for tropical fruit commodity development in Alamata Woreda, based on a participatory market oriented value chain approach. The approach was introduced by the IPMS project/staff, who not only facilitated the introduction of the approach (technically and financially), but also played an important role as partner in the development process. The credit for the development results obtained go however to all the partners involved in this endeavor, especially farmers and staff of the Alamata OoARD, IWMI and private sector input suppliers and traders. Besides the authors, several people have contributed to the realization of the report including Rebeka Amha/Abraham Getachew and Dr Moti Jaleta who provided summarized baseline data and household level cost/benefit impact data, respectively, Yasin Getahun who provided maps and Genevieve Renard who edited the final version of this document.

## **Abstract**

The Raya valley in Tigray, where Alamata Woreda is located, has suitable climate and rich water resources, among others, to grow various tropical fruits. Development of fruits only started a few years ago (1996) with the Raya Valley Development Project and the OoARD (Office of Agriculture and Rural Development), mostly focusing on papaya.

A participatory rural appraisal (PRA) study conducted by the Woreda stakeholders identified tropical fruits as a potential marketable commodity in 2005. Using the commodity value chain approach, production, input supply and marketing problems, and opportunities were identified. Major problems were lack of knowledge and skills on tropical fruit production and management. Also, farmers were discouraged to grow fruits in their seasonally irrigated plots because of the free grazing which takes place during the dry season. Different extension approaches were used, including study tours to change the mind set of experts and farmers and to acquire knowledge. It also helped communities to devise organizational/institutional arrangements to protect seedlings, which encouraged the uptake of grafted mangoes and avocados.

Most of the fruits can be sold locally, since most fruits so far were “imported” from other parts of the country. Some market linkages were also established in 2009 for the sale of the first grafted improved mango varieties. Farmer to farmer communications, trainings, workshops and media coverage facilitated the further dissemination of knowledge and skills between PAs (Peasant Associations) in Alamata and neighboring Woredas. Both women and men farmers benefited from the intervention. The household survey conducted in 2009 indicated that households involved in fruit production, on average, earned around Birr 1300 from the sale of fruits - 70 % from papaya.

While in other Districts the development of improved marketable varieties was supported with the development of private nurseries, attempts to introduce them in Alamata did not succeed because of the presence of large scale regional nurseries, which grow a large number of seedlings and sale seedlings at a much reduced price to farmers.

**Key Words:** Commodity development, fruit production, IPMS, private fruit nurseries, value chain

## **1. Introduction**

The IPMS project, funded by the Canadian International Development Agency, was established to assist the Ministry of Agriculture and Rural Development in the transformation of smallholder farmers from a predominantly subsistence oriented agriculture to a more market oriented (commercial) oriented agriculture.

The project adopted a “participatory market oriented commodity value chain development” approach which is based on the concepts of innovation systems and value chains. Crucial elements in the approach are the focus on all the value chain components instead of only a production technology focus; the linking and capacitating of value chain partners and the assessment, and synthesis and sharing of knowledge among the partners.

The project introduced this approach in 10 Pilot Learning Woredas (PLW) in Ethiopia with the objective of testing/adopting the approach so that it can be promoted nationwide. An integral part of the approach is the identification of marketable commodities and the value chain constraints and interventions. This was accomplished through a participatory process in all PLWs

This case study focuses on the development of fruits in Alamata Woreda with the objectives of documenting diagnostic results and value chain interventions, and providing proof of concept, challenges and lessons learned to be considered for scaling out.

Following the introductory section, the remaining sections are structured as follows. Section two deals with methods and approaches used in the study, while section three presents background information, including description of the PLW and the history and diagnosis of fruit development. In section four, value chain interventions - extension, production, input supply, marketing, and credit issues - are presented. Section five dwells on results and discussion on production/income, input supply/marketing, gender/environment/labour use, organizational and institutional aspects, while sections six and seven deal with challenges and lessons learned, respectively.

## **2. Methods and approaches**

To start the development of a commodity, IPMS used a district level participatory market oriented value chain planning approach, aimed at identifying i) main farming systems, ii) potential marketable crop and livestock commodities at farming system level, iii) constraints, potentials and interventions for each value chain component iv) value chain stakeholder assessment with potential (new) roles and linkages. Different value chain stakeholders were involved and consulted in this planning exercise. Secondary biophysical and socio economic data were collected, followed by open ended interviews with focus groups and key stakeholders. The results were presented in a stakeholder workshop in which priority marketable

commodities were decided upon together with key intervention areas and partners.

This initial rapid assessment was followed by some more detailed studies on selected commodities. Such studies were conducted by partner institutions and/or students and or IPMS staff using formal surveys, interviews and observations.

To implement the program at Woreda, Peasant Association (PA) and community levels, the project facilitated different knowledge management and capacity development approaches and methods to stimulate the introduction of the value chain interventions by the actors concerned. The various value chain interventions are documented by the project staff in the six monthly progress reports and the annual M&E reports.

To quantify the results from individual and/or combination of interventions, the project established a baseline and measured/documentated changes. Several data sources were used to establish the baseline and to measure change.

## **2.1. Baseline information**

To establish a baseline, data from a formal baseline study and data from some special diagnostic studies were used. The initial PRA study also contributed to the quantitative and qualitative baseline information.

Amongst others, the formal baseline study used PA level interviews and records to collect information on fruit tree coverage and the number of households involved in fruit trees. This information was used to compile district level information on fruit trees acreage by crop and households.

## **2.2. Documenting change processes and results**

Several sources were used for regular documentation of change processes and results, including six monthly progress reports, annual M&E reports, ICRAF fruit marketing study report, records kept by the OoARD, personal observations and diaries. Monitoring changes in production/productivity of tropical fruits for a few selected farmers was conducted on a regular basis. The stakeholder meeting was organized to establish the evolution of the roles and linkages of the value chain actors.

In 2009, the project also developed a set of guidelines for the PLW staff to systematically collect relevant information for the case studies including history, changes in extension services, value chain interventions (production, input supply, marketing and credit), results, challenges and lessons learned. Part of the information was obtained from the previously mentioned baseline and other sources and specially arranged key informant interviews and a commodity stakeholder workshop. The stakeholder meeting was organized to establish the evolution of the roles and linkages of the value chain actors.

In Alamata, all the eight PAs (Kulugize Lemlem, Selam Bekalsi, Limat, Tumuga, Selem Weha, Tao, Laelay Dayu, Gerjele) targeted by IPMS for market development were included in the formal household survey conducted in 2009. The survey data consists of relevant production and marketing information on vegetables including area allocation, production costs and inputs use, level of production, and marketed surplus. In selecting the sample households, with the aim of getting some idea about the effect of the different interventions, a distinction was made between households who had adopted/benefited from the various interventions and households who did not. In both sample groups, both wealth and gender criteria were considered to get a representative distribution of sample households.

Following the collection of all relevant information, a write-shop was organized to present information in a systematic manner. Drafts of the PLW specific commodity case studies were then reviewed at the IPMS Head Quarters.

### **3. Background to tropical fruits development**

#### **3.1. PLW description**

Alamata is located 600 km North of Addis Ababa. It is the most Southern Woreda of the Tigray Region and borders with Amhara region from the South and West and Afar region from the East (Figure 1). There are 10 PAs and 2 town dwellers associations in the Woreda. The total population of the Woreda was 128,872 while the number of agricultural households was 17,597 in 2003/04. Altitude in the area ranges from 1178 to 3148 m and 75% of the Woreda is low land (1500 masl or below) and only 25% is found in intermediate highlands and highlands falling between 1500 and 3148 masl. The small undulating mountains surrounding the Woreda are very steep with low vegetation cover. These mountains cover a large area and drain to the Alamata valley. The mountains surrounding Alamata cover a large area and have a series of dissected gullies which serve as a source of runoff water to the Alamata valley. The gullies join together and form seasonal rivers down the foot of the mountains. The dissected channels slowly spread over the valley depositing silts and water down to the valley. The fine silt is relatively fertile and the water becomes a source of supplementary irrigation. The Alamata valley is one of the most agriculturally potential areas in the region. Farmers in the Woreda extensively cultivate cereals and vegetable; and raise mainly sheep and cattle in the valley.

Eutric Vertisols, Lithic Leptosols (Cambic) and Lithic Leptosols (Orthic) are the soil types covering nearly 100% of the land in the Woreda. Soil pH for profiles tested by Relief Society of Tigray (REST) from the valley bottoms indicate that it ranges from 7.4 to 8.5 and is reported to increase with depth. Traditionally, fertility of the soils on the plains is believed to be fertile because of the silt coming from the adjacent mountains. However, previous studies by the Raya Valley Project indicate that soil fertility is low. Field observations demonstrated that the soils in some areas indicated salinisation problems and needs careful reassessment of the area (IPMS 2005; Makombe and Prasad 2006).

Rainfall is usually intense, short in duration and unreliable. Average annual rainfall for 8 years (1995 to 2002) was 831 mm/yr. As a result of all these, Alamata is one the 16 drought prone Woredas in the region. Alamata experiences bimodal rainfall, but since recently the rainfall pattern has drastically changed so that at times the main rains (July to August) start around mid August and stop soon after while the small rains are unreliable.

Tef and sorghum are the dominant crops covering around 75% of the Woreda cultivated area, even though yield of these crops is very low at about 5 and 7 qt/ha, respectively. Farmers in the area plant the long seasoned sorghum but usually have poor harvests. *Parthenium hysterophorus* L. (congress weed) is becoming a major weed in the area, especially in the lowlands of the Woreda.

Livestock are integral component of the farming systems. Oxen provide almost the entire traction and threshing power. Despite the large population of livestock, especially cattle and sheep, productivity is low as in many other parts of Ethiopia. Alamata is suitable for small ruminants, both sheep and goat production. Livestock feed is a major limiting factor in the area. However, sorghum contributes a significant proportion of the supplementary feed resource.

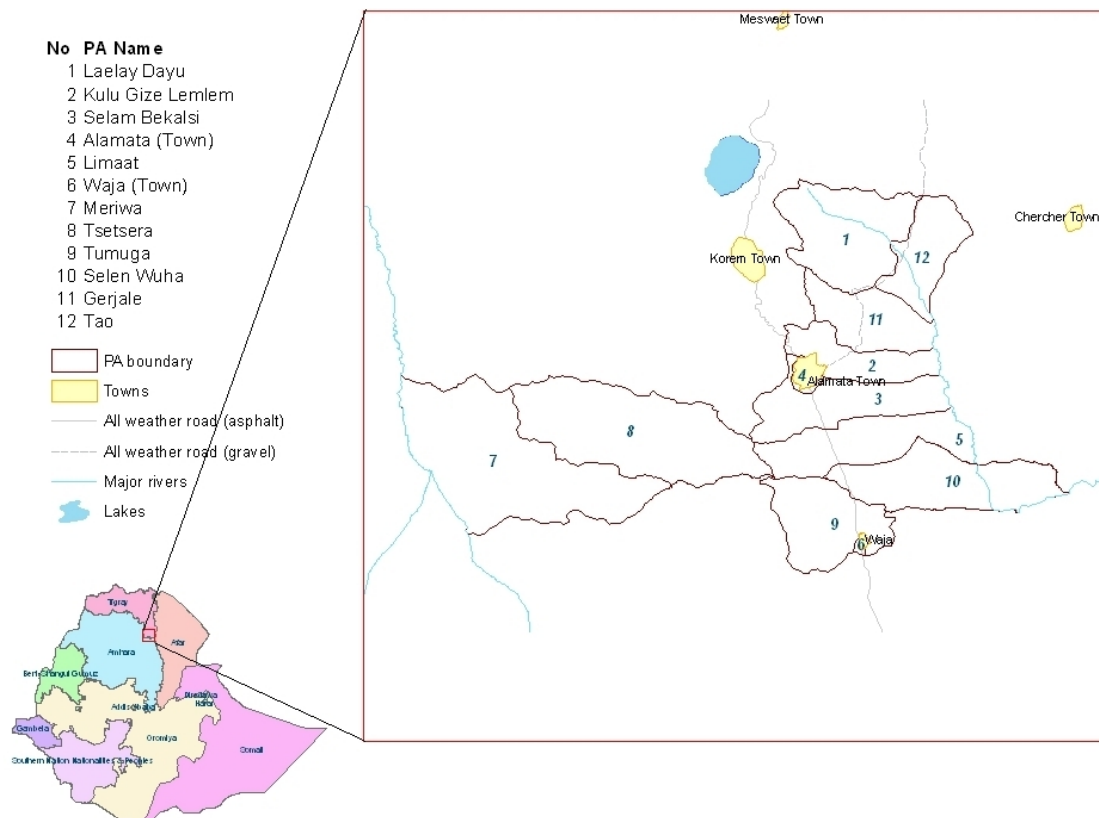


Figure 1. Location of Alamata PLW

### 3.2. History and diagnosis of tropical fruits development

Many types of tropical fruits can be grown in Alamata because of the conduciveness of the climate and easy access to water resources. The District is among the potentially best tropical fruits producing areas in Tigray region. It is considered by the Regional government as a “Development Corridor” where commercial agriculture can develop. Both surface water and ground water sources are available in Alamata.

Intervention on tropical fruit production in Alamata started in 1996 by the OoARD and the Integrated Raya Valley Development project. At that time, emphasis was given on the introduction of non improved and less productive fruit seedlings such as papaya, guava, lemon and coffee. In 2002, for the first time, 49 grafted mango and 1110 grafted orange seedlings were introduced to the Woreda and distributed to farmers (Table 1). Similarly, 198 of 4276 mango seedlings introduced in 2005 were also grafted (Table 1). Otherwise, many of the fruit seedlings distributed until 2005 were none grafted. Other seedlings, including papaya were raised in the Regional Government Nursery in Alamata. Private fruit nursery is not available in the Woreda although few farmers exercise raising papaya and non grafted orange seedlings.

**Table 1.** Fruit seedling distribution in the PLW, 1998-2005

Type of Fruit	1998	1999	2000	2001	2002	2003	2004	2005	Total
<b>Papaya</b>	795	5435	0	200	5856	24265	10803	11283	58637
<b>Guava</b>	163	440	0	100	660	3521	0	5123	10007
<b>Avocado</b>	0	0	0	5	19	1342	1604	613	3583
<b>Mango</b>	0	0	0	0	137*	198	1711	4276**	6185
<b>Banana</b>	30	0	0	5	320	20	4325	750	5450
<b>Orange</b>	0	380	0	0	1110	0	0	0	1490
<b>Coffee</b>	905	1776	0	1050	1554	5044	0	3590	13919
<b>Total</b>	<b>1893</b>	<b>8031</b>	<b>0</b>	<b>1360</b>	<b>9519</b>	<b>34390</b>	<b>18443</b>	<b>25635</b>	<b>99271</b>

\*Only 49 were grafted, \*\*198 of them were grafted.

Source: OoARD report

IPMS introduced the participatory market oriented commodity value chain approach in Alamata in March 2005. The stakeholders identified tropical fruits production as one of the marketable commodities, despite the lack of knowledge on the fruits, poor husbandry practices, including free movement of animals during the dry season, an inadequate input supply system for seeds/seedlings and lack of market linkages.

## **4. Value chain interventions**

### **4.1. Extension services**

As there was a lack of awareness on tropical fruits production by farmers, emphasis was put on creating a better understanding through training and experience sharing study tours. From February to June 2006, one training and two study tours were conducted on market oriented tropical fruit development. As a result of these tours, several farmers took up tropical fruits seedlings, especially mango, papaya, orange and lemon during the 2006/07 rain season. Success stories of papaya and mango production from 2006-2009 were documented and presented for learning purposes during different conferences, farmers meetings and field days.

Scaling out/up knowledge sharing events were arranged by Raya Azebo Woreda (neighboring Woreda) and Maichew (zonal capital). Success stories of IPMS Alamata were presented during the farmers' conferences and policy makers' meetings in these districts.

There was also good media coverage, including Ethiopian Television (ETV) and a local radio station on fruit market promotion in Alamata. Also the successful reclamation of the swampy land and transformation into productive farmland was documented by the Ethiopian Television, local radio station and a national daily newspaper—Addis Zemen (IPMS 2008).

### **4.2. Production intervention**

Fruits have been planted on some of the newly reclaimed swampy and irrigated areas. A major problem was the poor establishment of seedlings (mango, avocado) on fields away from the homestead, due to the free grazing system, shortage of improved varieties and poor management practices. IPMS, in collaboration with OoARD and BoARD (Regional Bureau of Agriculture and Rural Development) in line with capacity development activities has facilitated and promoted the distribution of grafted mango varieties (Keit, Kent and Tommy Atkins) and hermaphrodite papaya (solo). As a result of the expansion of fruit production in the district, communities in Timuga, Selam Bekalsi, Kulugize Lemlem, Gerjelle and Laelay Dayu PAs developed bylaws that prohibit free grazing of livestock. This has encouraged farmers to plant fruits on farmlands, outside of the backyards which were the only places for planting fruits.

### **4.3. Input supply/service provision**

Fruit seedlings supply is organised by the OoARD except for few farmers who raised papaya seedlings for their own plantation. Grafted fruit varieties were obtained from the Upper Awash area while non grafted/improved fruits (e.g avocado, guava, papaya) were raised in the Regional nursery in Alamata. To enhance the supply of grafted mango, avocado and orange varieties by encouraging private seedling supply in the Woreda, training on fruit seedling nursery management was given to 7 farmers. These farmers however, didn't

enter into the business because the OoARD nursery has been selling grafted seedlings at a much subsidized price of Birr 2/seedling since March 2005 and continued until 2009. Additional effort was made with the regional BoARD to encourage private fruit nursery establishment of private fruit nurseries by providing plastic bags and forest soil although the farmers still were not courage enough to start the business. To address the shortage of grafted seedlings, FAO assisted the regional government with strengthening the government nursery in Alamata. In 2008, FAO brought improved scions of avocado (Hass, Ettinger and Bacon) and new varieties of papaya. Accordingly, 100 grafted avocados were tried at one farmer at Gerjele PA, but the performances of these materials were not satisfactory due to poor management. But the newly introduced papaya varieties, Yellow and red maradon, in 4 PAs (Gerjele, Laelay Dayu, Selam bikalsi and Kulgize lemlem) are doing well.

#### **4.4. Output marketing**

Tropical fruit marketing in Alamata is not well organized. Papaya, orange and guava are sold to passengers who travel largely by buses along the road side. Papaya, mango, avocado and orange are also sold in juice houses and the number of these has increased from 2 in 2005 to 7 on 2009. However, most mango, avocado and orange fruit are transported from either the central part of Ethiopia (Addis Ababa) and/or from Amhara region (Mersa). Production of papaya fruit in Alamata increased since 2006 and market linkage with Mekelle juice houses and a fruit whole seller (fruit distributor) was arranged. Papaya is transported to Mekelle and sold on time with no spoilage on production site.

The grafted mango varieties named Kent, Keit and Tommy Atkins planted in 2005 (Table 1) and 2006 rainy season (Table 2) reached to fruit production in May – August 2009. These improved mango varieties were well managed by few farmers and their fruits are already in Alamata and Mekelle markets. Fruit market promotion and field day for knowledge sharing was arranged by the Woreda OoARD, and IPMS. Participants were about 50 farmers from 5 PAs (Timuga, Selam Bekalsi, Kulugize Lemlem, Gerjelle and Laelay Dayu), DAs, OoARD experts, Woreda, Alamata town and zonal administrators. Field visit to one private sector fruit plantation was made in June 2009. Mango and papaya fruit plantation at Gerjelle PA (swampy area) was visited. Innovative knowledge sharing event was conducted by allowing all participants to test the fruits by eating. All participants ate one mango each and ½ slice of papaya at the spot and took on full papaya fruit to their homes to give it to their families. The intention here was to influence the whole family so that those households plant these fruits. The event was recorded and broadcasted by Ethiopian Television for a wider knowledge sharing purpose.

### **5. Results and discussion**

#### **5.1. Area/household coverage, production/productivity and income**

The baseline data conducted in 2005 indicated the number of households and PAs engaged in fruit production in 2005 (see Table 2).

**Table 2.** Number of households and PAs involved in fruit production

<b>Land use</b>	<b>No of HH producing</b>	<b>No of PAS</b>
Avocado	191	8
Papaya	665	8
Irrigated papaya	919	8
Mango	99	8

Source: IPMS baseline survey, 2005

As a result of the various interventions, in particular the study tour, training and subsequent arrangement for protection of planted seedlings in the fields, demand of farmers for grafted fruit seedlings started to increase. From 2006 onwards all mango seedlings were grafted, however the seedlings had been raised in the Upper Awash Agro industry fruit nurseries, transported to the Regional nursery in Alamata and distributed from this nursery to different Districts/farmers.

Although the demand by Alamata farmers for mango seedlings continued to be high, distribution did not show any increase for the major fruits in 2007 (Table 3). This was due to shortage of grafted seedlings. Part of this was caused by the quota allotted by BoARD, which was lower in 2007 because the Woreda received more than its normal quota in the previous year.

**Table 3.** Fruit seedling distribution in the PLW, 2006-2009

<b>Type of Fruit</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>Total</b>
<b>Papaya</b>	11154	11554	17120	3916	<b>43744</b>
<b>Guava</b>	147	66	0	0	<b>213</b>
<b>Avocado</b>	2767	927	310	0	<b>4004</b>
<b>Mango</b>	3540	356	1869	4228	<b>9993</b>
<b>Banana</b>	920	104	1570	641	<b>3235</b>
<b>Orange</b>	964	1074	808	12	<b>2858</b>
<b>Coffee</b>	0	5017	549	200	<b>5766</b>
<b>Total</b>	<b>19492</b>	<b>19098</b>	<b>22226</b>	<b>8997</b>	<b>69813</b>

Source: OoARD, 2009

At the time of the baseline survey, impact at household and District level of most of these varieties was still limited especially since survival rates had been poor and most trees had not yet started producing fruits. The household survey conducted in 2009 started showing some impact at household level from the sale of fruits, in particularly papaya (Table 4).

**Table 4.** Household data on volume of sale and income from fruit production, 2009

No	Fruit type	For all growers			For sellers				% of selling HH
		Obs	Average volume sold (kg/HH)	Average value sold (Birr/HH)	Obs	Average volume sold (Kg/HH)	Mean value (Birr/HH)	Average selling price (Birr/kg)	
1	Papaya	15	254.9	864.40	15	254.9	864.40	3.50	100.0
2	All fruits	19		1272.75	19		1272.75		100.0

Source: IPMS Household survey, 2009

## 5.2. Input supply/marketing

Fruit seedling (Grafted mango and orange, lemon, papaya and coffee) is sold to the farmers at a subsidized price (Birr 2/seedling) by the OoARD. FAO provide fruit seeds to be planted in the OoARD nursery and also supported financially to the running cost of the nursery site. As mentioned earlier the project's efforts to introduce private nurseries did not bear fruit because of the availability of this big regional nursery and the fact that seedlings were sold at a much reduced price. As a result, there is no private sector involved in fruit seedling marketing.

Because of the increased interest in fruit development, various stakeholders began to intervene in the capacity building and establishment of storage facilities. Accordingly, Oxfam-America, USAID/REST and OoARD built four cool storage facilities to increase shelf life of onion and fruits, in three PAs (Kulu Gize Lemlem, Gerjele and Laelay Dayu). Though the two cool storage facilities at Laelay Dayu were designed exclusively for fruit, so far they are only used for onion. These facilities could possibly be used for both fruits and vegetables because of differences in harvesting time and production volume. For example, mango comes to fruiting between May and August, when relatively fewer amounts of vegetables are ready for harvest. This means there will less competition for space.

Market linkage of the improved mango fruits was made with supermarket in Mekelle and it was sold for between Birr 12 to15/kg to the supermarket owners. Demand for Mango fruits was very high in Alamata town and juice houses alone requested for daily supply of about 200 kg/day. However, mango production was only widely grown in two private farms and the number of improved mango trees on individual holdings is few but most are also

young that these trees have not yet started bearing fruit and hence supply is still low.

### 5.3. Indirect effects on gender and the environment

Although, it might require a study to assess the attitude and awareness of the farmers regarding the benefits of fruit development, it is believed to have improved and changed the mentality of many farmers that fruits are considered as food and vital element to human health and improving economic gains. Since women nurture and manage fruit plantation as compared to men, at the backyards, they have benefited from managing the income generated from fruits for the household. Moreover, the increasing plantation and expansion of tropical fruits in the Woreda has improved the micro climate of the specified pocket areas and the Woreda at large, creating a greener environment suitable for fauna and flora of the area. In addition, if the population of these mango trees increases over time, the increase in water table and hence salinity problems might be minimized because these fruit trees are deep rooted.

### 5.4. Organizational/institutional arrangements

Actors involved in the development of tropical fruits production and their roles in Alamata PLW are presented in Table 5

**Table 5.** Main actors and roles in development of tropical fruit production Alamata

Actor	Role (changes)
<b>OoARD/Kebelle administrators</b>	<ul style="list-style-type: none"> <li>- Build capacity of farmers, DAs and technical backstopping to producers at PA level</li> <li>- Employs qualified staff to strengthen the development of tropical fruit</li> <li>- Organize community arrangements to protect fruit seedlings in the open fields</li> </ul>
<b>TARI</b>	<ul style="list-style-type: none"> <li>- Actively participated in the reclamation of Gerjelle and Timuga wetland</li> </ul>
<b>Farmers</b>	<ul style="list-style-type: none"> <li>- Changed land use from low value cereal crop production to high value tropical fruits plantation</li> <li>- Women farmers engaged in homestead papaya and mango production</li> </ul>
<b>Private sector</b>	<ul style="list-style-type: none"> <li>- Allow their fruit plantation area for knowledge sharing purpose through field days.</li> <li>- Support other farmers in technical advice and provision of seedling</li> <li>- Organized group marketing of papaya fruits by facilitating market linkage with traders in bigger cities.</li> </ul>
<b>REST/USAID/Oxfam</b>	<ul style="list-style-type: none"> <li>-Assisted in establishment of storage facilities</li> <li>- Provide capacity building to farmers, DAs and experts through study tour</li> </ul>

	<ul style="list-style-type: none"> <li>- Provide tissue cultured banana seedlings</li> <li>- Provide infrastructural and organizational support for deep well irrigation schemes</li> </ul>
<b>FAO</b>	<ul style="list-style-type: none"> <li>- Provide capacity building to farmers, DAs and experts</li> <li>- Supply fruit seeds to be planted in the OoARD nursery</li> <li>- Support financially the running cost of the nursery site</li> </ul>
<b>IPMS</b>	<ul style="list-style-type: none"> <li>- Facilitate training, study tours and field days to farmers and OoARD experts</li> <li>- Facilitate linkages between actors, provide knowledge, assist in market development and document processes and results</li> </ul>

## **6. Challenges in the intervention process/approach and recommendations**

Challenges which prompt further development of the value chain components to sustain interest and growth, include:

- The fact that there is regional nursery and projects in Alamata which handout fruit seedlings at a much subsidized price or for free has discouraged potential private nursery operators in the area to come into this business.
- The fact that most of the fruit farmers are located in 5 different PAs is expected to create some problems for group marketing.
- Free movement of animals was a serious bottle neck for tropical fruit development in the Woreda. Only fruit leaves are available in some of the areas that all cattle, goats and camels can browse. The freely wondering animals did not find any green feed to be grazed and their choice is to destroy the fruit leaves. However, bylaws and rules were developed at community level to protect the orchard fruit area.
- Skills development for production interventions aimed at improving the productivity (planting, pest and disease management, water management) have to be more vigorously pursued by the extension system. Proper staffing of the OoARD with fruit, irrigation and horticulture expertise is required to support the ever increasing fruit production.
- Exhibitions, field days and study tours should be organized to increase the awareness of farmers on tropical fruits production and confinement of livestock in support of fruit production.
- While marketing of fruits in as well as outside the district is very promising, more marketing arrangements should be developed when fruits will become available in increasing quantities.

## **7. Lessons learned**

The Raya Valley where Alamata district is found has suitable climate and natural resource (soil, water) for tropical fruit production.

Demand for fruits was increased through a combination of knowledge interventions, communal protection of planted seedlings and introduction of

grafted seedlings which require less time to set fruit, produce a more marketable fruit quality and easy to manage trees.

Early indications from the household survey suggest that farmers planting fruit trees can substantially add to their farm income.

## **8. References**

IPMS 2005. Alamata Pilot Learning Site diagnosis and programme design. Pp. 84.

IPMS, 2008. Alamata PLW Progress Report: April – September 2008. REST, 1998. Feasibility Study report, for the Raya Valley Agricultural Development. Volume III, Agriculture. December 1998.

Makombe, G. and Prasad, K.C. 2006. Addressing Irrigation Needs of Alamata Farmers: Options and Scope. IWMI Report, pp. 30.

OoARD, 2009. Alamata OoARD. Annual Report, 2009.