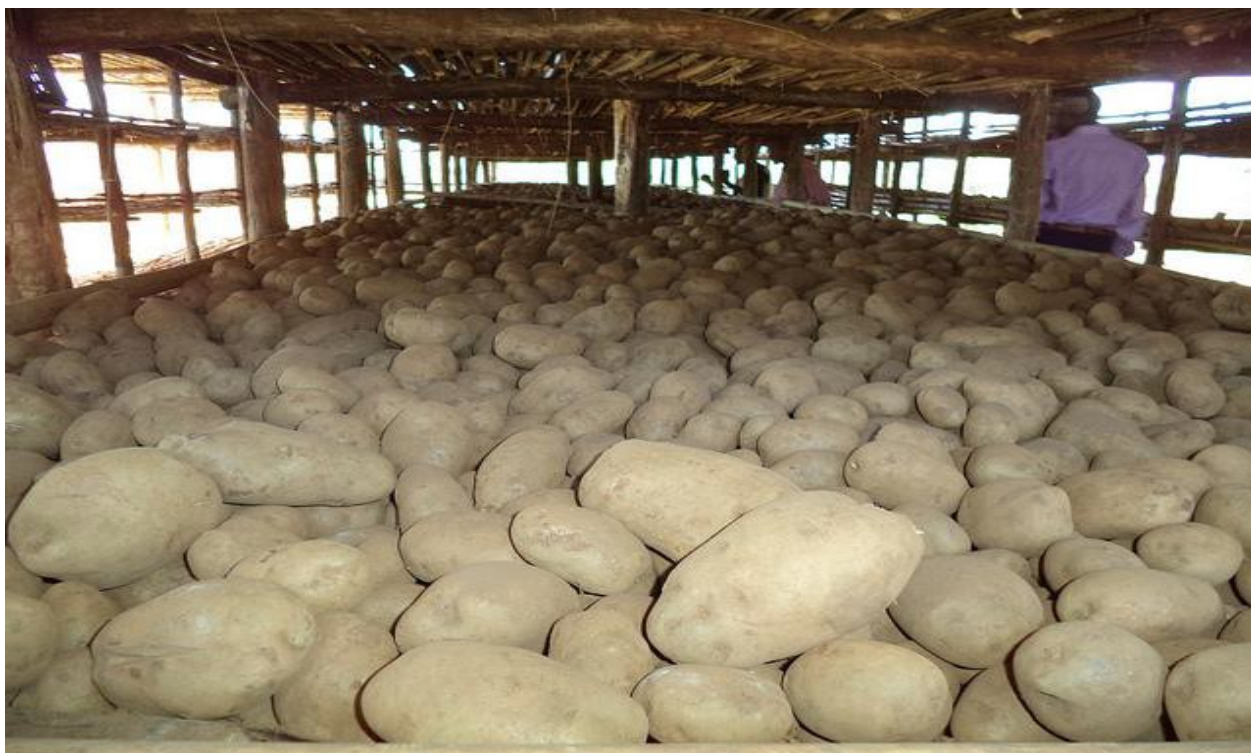


Potato Value Chain Analysis- Update in North Mecha, South Mecha, and Bahir Dar Zuria Woredas of Amhara National Regional State



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ACRONYMS AND ABBREVIATIONS

AARC	Adet Agricultural Research Centre
AGP	Agricultural Growth Programme
ANRS	Amhara National Regional State
ARARI	Amhara Region Agricultural Research Institute
ATVET	Agricultural Technical and Vocational Education and Training
BoA	Bureau of Agriculture
BoFEC	Bureau of Finance and Economic Cooperation
BoT	Bureau of Trade Industry and Market Development
BW	Bacterial Wilt (soil-borne disease)
CSA	Central Statistical Agency
DLS	Diffused Light Storage
ERCA	Ethiopian Revenue and Customs Authority
ESE	Ethiopian Seed Enterprise
FREG	Farmers Research Extension Groups FRG Farmers Research Groups
FTC	Farmer Training Centre
GAP	Good Agricultural Practices
GoE	Government of Ethiopia
GTP	Growth and Transformation Plan
Ha	Hectare
IDRF	Innovation, Demonstration and Research Fund
ISSD	Integrated Seed Sector Development
KIMCU	Koga Irrigation Marketing Union
m.a.s.l.	meters above sea level
OMFA	Ministry for Foreign Affairs of Finland
MGF	Matching Grant Fund
MoFEC	Ministry of Finance and Economic Cooperation
ORDA	Organization for Rehabilitation and Development in Amhara
PIF	Policy and Investment Framework (2010/11-2014/15)
PSU	Programme Support Unit (AgroBIG)
Qt	quintal
SMS	Subject Matter Specialist
SNNP	Southern Nations, Nationalities, and Peoples
SNNPR	Southern Nations, Nationalities, and Peoples Region TC Tissue Culture
TC	Tissue Culture
VC	Value Chain
VCA	Value Chain Analysis
VCD	Value Chain Development
VCF	Value Chain Fund
WoA	Woreda Office of Agriculture (woreda is equivalent to district)
WoFEC	Woreda Office of Finance and Economic Cooperation
WoTIMD	Woreda Office of Trade Industry and Market Development
Belg	short rainy season, January to June
Kebele	neighborhood (location of about 5,000 people)
Meher	long rainy season, June to December

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TO THE READER

This document is an update of a value chain analysis on potato that was commissioned and facilitated in 2016 by AgroBIG. For the update, 19 informants from three districts, namely North Mecha, South Mecha and Bahir Dar Zuria were interviewed, representing producers, brokers, traders, cooperatives and woreda, regional authorities. The data and narration that were presented in the original report from 2016 were updated accordingly.

The aim of this report is to give an overview of the current situation and projections regarding the supply of potato bulbs from woredas that AgroBIG is operating, possibilities for value addition at different stages of value chain and respective potential for income and job creation for the various value chain actors, and to present prioritized recommendations to AgroBIG for development interventions to assist the programme attain its goals.

Due to the nature of the assignment, which aimed at updating the already existing potato value chain analysis focusing only in the downstream side (marketing), rapid market survey was conducted in July 2018 in four project woredas namely North Mecha, Bahirdar Zuria, Dera, and Fogera. Rapid Market Survey is an efficient way to acquire knowledge about marketing systems, with a view to inform production and marketing strategies, policy processes, and the design and implementation of relevant interventions. It is also a process for discovering market opportunities and how to capture them through focus on an entire value chain. The selected method to gather the marketing data was interviews using structured questionnaire with collectors or assemblers, brokers, wholesalers, retailers and with representatives of government institutions. For the purpose, controlled interviews were chosen whereby the same questions had to be asked to all interviewees within each stage of the chain to get comparable answers.

The upstream data are expected to be unchanged, and hence the consulting team focused only on the marketing analysis which includes (a) the end market conditions, (b) existence or absence of new marketing channel/s, (c) current prices, transaction volumes, and (d) whether there are new introductions in the value chains such as value addition practices. Therefore, questionnaires for marketing actors and office level data collections were used to gather information from all the four woredas, the regional capital, and other actors in the country. The limitations of this survey are that it does not include as many processors s possible due to absence/limitedness of such actors for potato during the study time. Those which started processing have closed due to economical reasons. Upstream (production) part is not included in this study since the assignment was dealing only on the marketing side. Hence, data or findings from previous studies were included in the current report. Thirdly, the survey was conducted during off-season time when marketing of locally produced potato not active.

The most notable changes between the situation in 2016 and 2018 are, based on the survey the following achievements were made: - FTCs were supported, the understanding on potato quality concept was to some extent improved, materials that help for post-harvest handling and transporting the produce (mule drawn carts) were provided, collection centers were established, regional market information service delivery system were supported, etc. New marketing channels are emerging with Senselet, although it is new to the project areas. The newly establishing potato propagation centers at Mekele, Dessie and Bahir Dar will play significant role for the value chain. As for the recommendations for the remaining project period, AgroBIG should work closely with implementing partners on solving production, quality, post-harvest handling and marketing constrains indicated in this document through creating consultative group platforms.

In Addis Ababa September, 2018
Kassa Getu
Ahmed Ibrahim

1. EXECUTIVE SUMMARY

Ethiopia has a very high potential for potato production as much arable land is located in the mid and high altitudes, which are suitable for potato production. Close to half of the country's current potato production comes from Amhara region.

Potato is an important food security and a hunger reliever crop in Amhara region and in several other parts of the country. This is because of its ability to mature in advance of most other crops, in particular grain, at the time of critical food need, mainly from September till November. During these months, late blight prevents the production of potato. However, with the availability of late blight resistant varieties in the highlands, potato can now be grown during the long rainy season. This not only has the potential to eliminate the September–November period of food shortage, but also has provided potato producers with an income from the sale of ware potatoes during this period. Furthermore, potato has a wide flexibility in terms of the time of planting and harvesting, and can be harvested and consumed before the crop is fully mature. In addition, potato can be planted in various multiple cropping systems because their short and highly flexible vegetative cycle fits well into that. The grow cycle of potato is relatively short, around 100 days, depending on the variety and the local climate conditions.

In addition, potato produces more food per unit area than any of the other major food crops. This is illustrated by the fact that potato accounts for approximately 3.5% of the area devoted to the world's four main food crops, but contributes some 14% of the share of food production. The production of dry matter and protein from potato is significantly higher than other food crops such as wheat, rice and maize. From a food security point of view, it is important to note that potatoes produce more nutritious food more quickly, on less land and in harsher climates than most other major crops. Up to 85% of the plant is edible human food, compared with around 50% for cereals.

Market opportunities are emerging for potato as a popular source of affordable food for growing urban populations. Potato is not prone to speculative commodities trading on global markets; instead, prices are more likely set by local supply-and-demand conditions. Yet, potato has long been regarded as a subsistence crop and is still one of the underexploited food crops with a huge unrealized potential to improve food security, income and human nutrition. Also, in Ethiopia, there is a growing interest in the potato crop by private investors and policy makers. Cultivation of potato is rapidly expanding in irrigable areas. For instance, in Koga irrigation project, out of the total 5,705 ha of land covered by different crops, 1,331.8 (23%) was used to produce potatoes in 2017/18 and a total production of around 26,318.3 tons was achieved.

Seed potato supply has, as yet, not been taken up by the seed companies and has thus been overlooked in the formal seed system. Consequently, the informal seed system still prevails in much of the country. Due to the gap in seed quality control, the incidence of diseases as bacterial wilt and late blight have become serious and need due attention. As quality control and certification is weak, farmers are not very interested in paying higher prices for seed potatoes because they cannot be sure that they are getting the genuine product. According to the CSA's 2017/18 report, the national average yield of 13.9t/ha is still far below attainable yields which are as high as 45 tons/ha for the improved potato varieties. At the same year, the regional (ANRS) average yield was 15 ton/ha for rain-fed and up to 19.8 tons/ha for land under irrigation. The major reason for the low yield is farmers, for various reasons, do not applying recommended improved agricultural practices. Furthermore, because of lack of adequate storage facilities, packing and processing facilities, post-harvest losses are significant.

As for most of the agricultural value chains, women do participate in the cultivation of potato but are much less involved in decision-making and sale (except for some retailing). Potentially potato can generate more employment in the farm economy than many other crops and serve as a source of cash income for low-income farm households. Potato can also offer opportunities for processing at an industries scale, for instance for starch.

The opportunities related to the cultivation and marketing of potato in the Programme Area include:

- Expansion of irrigation infrastructure in the Koga area enables farmers to produce potato twice year;
- The understanding of value chain concept by farmers through AgroBIG interventions;
- Experience of seed potato production in the highland areas of ANRS;
- Existence of potato Tissue Culture (TC) laboratory located at ARARI, ORDA, and Dessie
- The presence of mini-tuber production facilities in the country
- The plan that BDU Integrated Seed System Development (ISSD) has to promote seed potato production in Mecha woreda;
- Existence of Farmer Training Centres (FTC);
- Existence of cooling facilities at the airport of Bahir Dar and possibility of transport by cargo planes from Bahir Dar airport to other destinations;
- The population growth of Gondar and Bahir Dar cities provides a steady and year-long demand;
- Ongoing infrastructure development, rural electrification and Universal Access to Rural Road Programme (UARRP) are an opportunity to strengthen trading, market information system and processing;
- The ongoing experiments with seed potato production in the highlands of Mecha woreda;

According to marketing survey conducted in Program areas the following constraints were noted:

- Lack of awareness for producers to pay high price for quality improved seed
- High cost of agricultural inputs
- Prevalence of seed and soil borne diseases, especially Bacterial Wilt (BW) in irrigated areas like Koga;
- Shortage of improved agricultural tools and equipment for pre and post-harvest operations
- Absence of proper storage facilities like DLS
- Transport capacity is said to be enough, however availability of cold-chain trucks is very limited
- Shortage of processing plants despite the growing urbanization and changing food habits
- Lack of cropping schedule or staggered production system
- Poor quality of ware potato
- Shortage of improved and certified seed potato supply mainly due to the absence of seed potato multiplication service providers;
- Inadequate financial management and planning skills;
- Poor market linkage facilitation for producers and collectors
- The involvement of large numbers of illegal brokers and traders both in ware potatoes and seed potatoes as well as lack of commitment to control or regulate illegal traders and brokers,
- Failure to organize primary cooperatives as strong marketing union in Bahirdar Zurian and North Mecha woreda.
- Lack of receipt system in selling and buying of potato,
- Poor sanitation of Bahir Dar vegetable market place (muddy and bad smell especially during rainy season).

Based on the results of the marker survey, the following recommendations have been

suggested:

- Cropping schedule that minimize over production and over supply of similar crop at the same season should be designed and implemented in the programme areas
- Cluster production system of major vegetable crops shall be implemented in order to reduce damage of crops by pests
- To enable farmers, through training, supply quality potatoes and become competent in market, there is a need to train producers on pre and post-harvest handling practices
- Production enhancement through proper use of agricultural inputs including agricultural machineries should be promoted in order to make farmers competitive and to reduce the buying price to wholesalers or collectors.
- Providing Strong market linkage service majorly by woreda trade, Industry and marketing office in collaboration with woreda cooperative promotion office,
- Introduction of water saving technologies instead of using furrow irrigation
- Open market establishment foe a few days in a month to connect the farmers directly to consumers.
- Organizing cooperatives into a Union so as to induce collective marketing.
- Supporting entrepreneurs engaging in processing sector

AgroBIG's strategic intervention can be in creating a Multi Stakeholders Platform (MSP) to bring different actors of the value chain and governmental and non-governmental stakeholders to come together in every quarter and discuss on achievements of the plan, share best experiences, discuss on constraints encountered, devise solutions to the problems and finally develop action plans for the next three or six months and share responsibilities. Then AgroBIG team should make close supervision and follow-up from time to time. Each implementing partner.

2. INTRODUCTION

2.1. Background about Value Chain Concept

A value chain can be defined as the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers, and final disposal after use (Hellin and Meijer, 2006). Importance and role played by value chain was stated by many researchers. Some defined it as: Value chains are a key framework for understanding how inputs and services are brought together and then used to grow, transform, or manufacture a product; how the product then moves physically from the producer to the customer; and how value increases along the way (Webber and Labaste, 2010). The Authors went further thinking that the value chain perspective provides an important means to understand business-to-business relationships that connect the chain, mechanisms for increasing efficiency, and ways to enable businesses to increase productivity and add value. Webber and Labaste (2010) indicates that value chain provides a reference point for improvements in supporting services and the business environment which supported by Turner (2011) referring to giving an understanding of how to improve the competitiveness of the chain whilst increasing participation in a manner that fairly distributes value down the chain. This come on the same track point to value chain as a tool that can contribute to propoor initiatives and better linking of small businesses with the market (Webber and Labaste, 2010).

A value chain can be complex and contain a big number of actors. Each actor can also be connected to more than one value chain. Therefore, it's important to know the aim of the study and the point of interest. Thereafter decision can be made on where in the chain to start and what to include in the chain analysis (Kaplinsky & Morris, 2000, p.50). The first step in a value chain study is to identify the actors and the connections between them to get the chain mapped out. This can be done with a qualitative study, followed by a quantitative study when the map of the chain is completed. The quantitative study gives more information about activities and relations in the chain and makes the study more certain (Hellin & Meijer, 2006).

2.2. Potato Value Chain

Potato is one of the world's four major food crops, along with rice, wheat and maize. It is a crop that can be grown in a variety of altitudes. It has a wide flexibility in terms of the time of planting and harvesting, and can be harvested and consumed before the crop is fully mature. In addition, potato can be planted in various multiple cropping systems because its short and highly flexible vegetative cycle. The growth cycle of potato is relatively short, around 100 days, depending on the variety.

Potato produces more food per unit area than any of the other major food crops. Potato accounts for approximately 3.5% of the area devoted to the world's four main food crops, but contributes some 14% of the share of food production. Potato generates more employment in the farm economy than many other major crops. From a food security point of view, it is also important to realize that potatoes produce more nutritious food more quickly, on less land and in harsher climates than most other major crops. Up to

85% of the plant is edible human food, compared with around 50% for cereals

As a highly dependable food security crop, potato offers important advantages over major food grains. Potato is not prone to speculative commodities trading on global markets; instead, prices are more likely set by local supply-and-demand conditions. Yet, potato has long been regarded as a lowly subsistence crop and is still one of the underexploited food crops with a huge unrealized potential to improve food security, income and human nutrition.

The production of dry matter and protein from potato is significantly higher than other food crops such as wheat, rice and maize. Furthermore, the biological quality of the potato protein is high, with a well-balanced amino acid content that is comparable to that of milk and eggs. Therefore, supporting potato value chain has dual advantage for regional producers; it helps as income source and also compliment nutritional requirement of farming community, especially for children.

2.2.1. Importance to Ethiopia

In Ethiopia, food shortages often occur from September until November, prior to the grain harvest. During these months, late blight has in the past prevented the production of potato, particularly in the highlands. With the availability of late blight resistant varieties producers in the highlands of Ethiopia can now grow potato during the long rainy season. This not only has the potential to eliminate the September–November period of food shortage, it provides potato producers with an income from the sale of ware potatoes in September and October.

Ethiopia has a very high potential for potato production as its 70% arable land or over six million ha are located in the mid and high altitudes, which is suitable for potato production. It can be noticed that in Ethiopia there is a growing interest in the potato crop by private investors. In recent years, the production of this crop is expanding because of availability of improved technologies, expansion of irrigation culture, increased market value and production systems diversification.

However, according to CSA's 2017/18 report, the national average yields of 13.92 tons/ha are still below attainable yields that is can be as high as 45 tons/ha for the improved potato varieties. Similarly, according to the same source, the regional (ANRS) average yield was 15 ton/ha; but KIP's 2017/18 report indicated that under irrigation 20 tons/ha under irrigation have been reported. The main bottleneck to increased potato productivity in Ethiopia is lack of access and continuous supply of certified improved seed and failure to implement recommended full extension package and agronomic practices.

Improved and certified varieties are not yet easily available to the potato growers. The major reason being inadequate multiplication and dissemination is conducted in the country. Potato is a rewarding crop that is in high demand but it has failed to appeal to seed companies and being overlooked in the formal seed system. Consequently, the informal seed system prevails in much of the country. Due to the gap in seed quality control mechanism, diseases such as bacterial wilt, late blight, and viral problems have become serious in many areas. In some areas, they abandoned potato production due to such problems. The second bottle neck is lack of strong potato processors and simple

processing technologies that can absorb more potato at harvest with attractive price for farmers and also make technology transfer to farmers through contractual farming.

2.2.2. Importance to Amhara

Close to half of the country's potato production comes from Amhara region. Potato is an important food security and a hunger reliever crop in Amhara region and in several other parts of the country by virtue of its ability to mature in advance of most other crops at the time of critical food need. Cultivation of potato is rapidly expanding to irrigable areas. For instance, in Koga irrigation project, out of the total 5,705 ha of land covered by different crops, 1305 ha (23%) was under potato production in 2017/18 yielding and a total production of around 262,060 tons with maximum productivity 20 tons per ha under irrigation, whereas, productivity is slightly lower in rain fed area, for instance 15 t/ha in South Mecha.

2.3. Infrastructure

The road infrastructure has gone through major improvements in recent years. The government put one quarter of the total infrastructure budget into road projects to repair, upgrade and build new roads. A road fund has been created, funded by a fee included in the fuel price, to guarantee money for road maintenance (Ethiopian Government Portal [Undated]). Ethiopia is land-locked and uses Djibouti's harbor for import and export of goods, this means road transportations with heavily loaded trucks over long distances. The poor infrastructure together with high transportation costs has affected the economic growth negatively. That is why Ethiopia now is planning new railway projects with a total length of 5,000 km, which will be completed by 2020 (South world web magazine, 2013).

3. PRODUCTION AND POST-HARVEST PRACTICES

3.1. Seed system

The informal system is the predominant seed production system accounting for 98.7% of the total potato seed produced in the country. The formal system involves seed certification by Ministry of Agriculture according the Ethiopian Standard for Seed Potato (ES 494:2005). The legal framework for a formal root and tuber seed certification scheme not implemented. Given the size of Ethiopia, with a limited road infrastructure and the fact that seed potatoes are being produced by hundred thousand of small-scale farmers, the costs for implementing a formal seed certification scheme would be high. However, it might be feasible to certify seed produced by large-scale producers, particularly for those aiming at exporting potato seed to neighboring countries. To produce quality seeds for the potato production in Ethiopia, land need to be available at two different altitudes is needed; at highland farms (more than 2,400 m) to produce healthy seed during the warm and rainy spring season (January-May) and at midland farms (1,500-2,000 m) to produce healthy seed during the cold autumn season (October-January).

Seed quality is an important determinant for tuber yield and quality. A centralized approach whereby G2 (generation 2) and G3 (generation 3) seed is produced at only a few locations would involve huge logistics and cost to make this seed available to potato

farmers in major rural seed production areas. This calls for a more decentralized seed production and multiplication system. It links producers of pre-basic mini-tubers (like the one being supplied by Amhara Region Agricultural Research Institute (ARARI)) with farmer-based seed multiplication and dissemination systems, thereby creating a new hybrid system that incorporates components of the alternative as well as informal seed systems. Such a system would have the potential to give large numbers of potato farmers 'access to quality seed. In this regard, a huge investment in commercial mini-tubers production is being established by Tigray Biotechnology Center (Figure 1). Currently, there are different potato seed producers in different regions (Table 1).

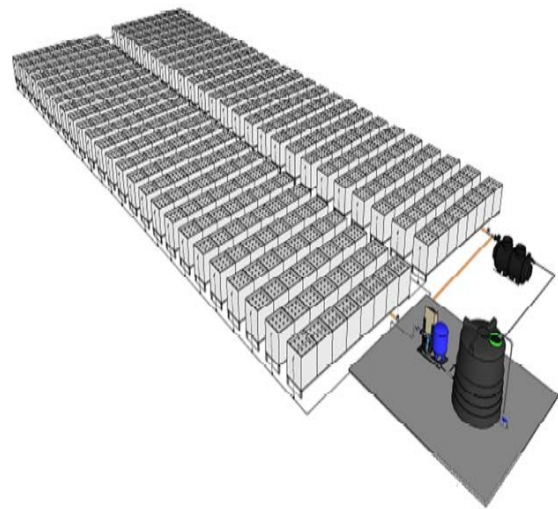


Figure 1. Mini-tuber production facility being established at Tigray Biotechnology Center in Mekele

Table 1. Seed potato producers across Ethiopia

No	Cooperatives /unions Name	Region/Woreda	Contact Person	Tel
1	Robi Berga Union	Oromia/ Wolmera	Tufa	0911928755
2	Bekuma Agric. PLC	Oromia/ Jeldu	Guta	0911077008
3	Edensa Cooperative	Oromia/ Jeldu	Tesfaye	0912208511
4	Adula PLC	Oromia/ Jeldu	Tesfaye	0910164756
5	Dinayas Potato Seed producer PLC	Oromia/ Jeldu	Zemenay	0910840842 0943828976
6	Derara Cooperative	Oromia/ Jeldu	Fikadu	0921431972
7	Abdi Jirenga	Oromia/ Jeldu	Legessa	0912208330
8	Chaluma	Oromia/ Jeldu	Dejene	0912208966
9	Bikila	Oromia/ Jeldu	Hailu	0913425511
10	Roba	Oromia/ Jeldu	Gurmesa	0912208257
11	Gemechis	Oromia/ Jeldu		
12	Gelan	Oromia/ Jeldu	Chachisa	0912208760
13	Woldo Telfam	Oromia/ Wonchi	Hailu	0912775620
14	Dagem	Oromia/ Degam	Girma	0913271491
15	Shewit Mesino	Tigray/ Atsib	Girmay Gebrehiwot	0914163876 0914702888
16	Guna Seed producer Debub Gondar	Amhara/ Farta	Yalew Haile	0918196724
17	National Potato Program/Adet	Potato Researcher/Adet	Dr. Baye Berihun Alemu Worku	0918766955 0918730476
18	SNNPR	CIP CIP Root crops program	Abiyot/CIP Wakene/CIP Dr. Fikadu/Hawasa	0911354369 0945648512 0911743625
19	Solagrow PLC	Debre Zeit	Mr. Jan Van de Haar	www.hidi.solagrow.nl

Source: Abebe Chindi (Holetta Agricultural Research Center), personal communications

The list in Table 1 only refers the major seed potato producers at National level. However, small-scale village level seed exchanges are also important in potato seed business in the country in general and in the AgroBIG project woredas in particular. Also, in Amhara region, the tissue culture laboratory and greenhouse facility (Figure 2) completed recently can be used for production of disease-free mini-tuber potato seed production.



Figure 2. Dessie Tissue Culture Facility

So far, in Koga command area, farmers are supplied with seed potato directly from nearby traders located both in Bahir Dar and Merawi towns. Local traders' supplies potato seeds that are brought from distant places such as Debre Markos, Hawassa, Shashemene, Kosober, Gaynt, and Gondar towns. The quality of seed potato, however, is reported to be inferior in quality. Farmers witnessed that there have been unfavorable practices such as mixing up different varieties. It is common to find plots in Koga and elsewhere with white and purple colors and varying tuber sizes during harvesting. Farmers distinguish the available potato varieties by observations and own experience. They differentiate potato varieties by color as white, red and mixed. According to farmers in Kudmi block, red color potato is preferred on the local market instead of the white ones. For Addis market, they are aware that they should grow white color potatoes, preferred for chips.

AgroBIG has organized two cooperatives consisting of 87 farmers producing potato seed in the highlands of Mecha. In 2015 cropping season, AgroBIG in collaboration with Adet RC, has started community-based potato seed multiplication pilot initiative. Adet RC has supplied 9,800 mini tubers to selected four farmers. The performance and productivity were found very promising. After harvest, each farmer has returned back the equivalent number of tubers initially given to them, and those seeds were replanted through irrigation on the organized youth group's plots in the same kebele. The remaining seeds were reserved for next planting season and shared to fellow cooperative members.

The Koga Irrigation Marketing Union (KIMCU): Cognizant of the seed potato problem, the KIMCU has supplied improved potato variety obtained from Shashemene area, albeit rejected by the farmers as the quality was found to be inferior compared to the ones delivered by local traders. Farmers in Kudmi Block wanted to get guarantees that the potato seed supplied by KIMCU is good quality. The union has created linkages with Ras Gaiynt seed producing cooperative.

Amhara Seed Enterprise (ASE): The Amhara Seed Enterprise is mandated to multiply and distribute certified seeds for cereal crops, horticultural crops and animal feeds, but have done little on potato. Its central focus so far has been in the multiplication and distribution of cereal crop seeds. With respect to seed potato, the enterprise has shown some interest and willingness to engage in seed potato production with the condition that support from AgroBIG is rendered and linkage is created with the Regional Tissue Culture Centre at ARARI. Minimum required materials and quality parameters shall also be fulfilled beforehand. Basic seed/early generation seed can be supplied from ARARI and from Organization for Rehabilitation and Development in Amhara (ORDA), which has recently established a tissue culture center in Bahir Dar.

3.2. Potato Production

3.2.1. Potato cultivation

Potato is a high yielding tuber crop with a short cropping cycle of about 3-4 months. This, coupled with high potential yield of about 40 t/ha, makes the potato a suitable crop for places where land is limited and labor is abundant (FAO, 2008) such as in Ethiopia. The highlands also offer favorable climatic and edaphic (soil) conditions. Furthermore, it is one of the crops with the highest growth rates in the country as a result of growing

markets, especially in urban areas, as eating habits change (Tesfaye et al., 2010). However, the potato sub-sector in Ethiopia is relatively undeveloped and is faced with low productivity of less than 10 t/ha. The attainable potential yield can be 35 t/ha, which are being produced by progressive farmers using quality seed potato of improved varieties coupled with improved management practices, under the same rain-fed conditions (Roger Bymolt, 2014).

Diseases and poor seed quality are intertwined such that frequent recycling of seeds leads to build up of disease leading to disease multiplication (Wang'ombe 2008). Some diseases such as bacterial wilt are both soil and seed borne which spreads rapidly through seed recycling. Sub-optimal production practices are another constraint (Gebremedhin et. al., 2008) as is poor soil fertility, which is closely related to poor management but also to small land plots making crop rotation a problem. Diseases such as late blight and bacterial wilt are a challenge which farmers should meet through good production practices, crop rotation and fungicides. Ethiopia also faces a fairly weak public extension system. Most farmers lack proper storage facilities (Diffuse Light Storage) for seed and cold storage (non-electric with traditional materials) for ware. Storage determines the sprouting of seed potatoes and the shelf life of harvested ware potatoes. Furthermore, road infrastructure is relatively poor (though improving) and there are limited opportunities for processing and value addition at present. Marketing systems are inefficient, characterized by ad-hoc sales and farmers cite price instability and poor prices as major challenges.

3.2.2. Input use

Improved varieties: To date, about 30 potato varieties have been released by the research centers of Adet, Kulumsa and Holleta. However, these varieties are mainly targeted for rain-fed potato production and not for areas under irrigation. For the latter, the research has not done much yet. Adet Research Centre has formulated packages for farmers and submitted to the BoA. These are expected to serve also the irrigated areas. The center has also identified some potato varieties with good characteristics for processing (industrial use and nutrition purpose).

Fertilizer: The main fertilizers used for production of potato are Urea, DAP and NPS. Farmers in the ANRS region apply the same; averages that were found were 0.5 and 1.5 qt/ha respectively. The amount of fertilizer to be used need to be further researched. Farmers in Koga area are using DAP and Urea, however they are complaining about the unprecedented price hikes. Due to this reality, the application of fertilizers to potato fields is below the recommended quantities and some may not use at all. Usually suppliers of DAP (di-ammonium phosphate) and Urea are primary cooperatives that are found in localities of farmers. Merkeb Union supplies chemical fertilizers on credit basis for Meher season production through primary cooperatives in the Koga area. Farmers are encouraged to apply fertilizers for irrigated crops including potatoes, and they have indicated that they get the quantities required without problems.

Chemicals: Pesticide application on potatoes is not a dominant practice in the Koga irrigation command area. Potato blight is the main disease in the area in particular during the rainy season. Farmers have confirmed that during off-season, there is no potato late blight problem as such. So, farmers often do not use chemicals either due to their feeling

that there is no need to apply or it is too expensive, or a combination of the two. Pesticides are mostly supplied by private vendors. There are few suppliers of pesticides and herbicides in the region; it remains a question whether this is the result of the low demand, the low rate of application, and the non-availability of chemicals. There is no real control on the genuineness and quality of the products sold. Even if the products are genuine, due to improper storage, handling, transport they may lose their quality. AgroBIG considering the situation initiated professional chemical service provided by organized and trained youth groups.

3.2.3. Agronomic practices

In Ethiopia, potatoes are often grown in rotation with other crops such as maize, rapeseed, and faba beans during the meher (main cropping) season. There are two main potato production seasons in Mecha:

- Off season, using irrigation from October to May;
- Main season, meher, rain fed, mainly outside the Koga area, April to August.

In Koga command area, the majority of farmers prepare the land in September to October, plant in October – May and subsequently harvest 100-120 day later. So, the period from February to April is the peak marketing period.

Farmers in northwest Ethiopia plant potato earlier in the season to escape late blight infection. However, this practice exposes the crop to moisture stress at the early growth stage for which potato is very sensitive and subject to considerable loss. Regardless of type of variety, yields declined as planting date was delayed. On the one hand, when planting early, infestation with late blight reduce but risk of production losses because of moisture stress increase. On the other hand, when planting relatively late, there is less risk of moisture stress but considerable risk of late blight. Therefore, May 1– June 1 are recommended planting dates around Adet for potato cultivars and similar agro- ecologies that are late blight susceptible and moderately tolerant/resistant. Although late blight resistant varieties are available, a few farmers in Koga command area do grow potato during the rainy season. AgroBIG has facilitated demonstration of improved and late blight resistant varieties, but baseline study showed the yield vary from 11.3 to 15.8 ton/ha. Average yields reported for rain-fed conditions is around 20 tons/ha for irrigated areas (like Koga). Yields realized at research stations is as high as 35 – 40 tons/ha, but this could not be achieved at field level. It has become clear that the lack of quality seed potatoes has contributed to the low yield along with poor agronomic practices and acidity of the soil.

3.2.4. Water requirements/irrigation

Potato is a water demanding crop. Where water is easily available, farmers tend to use too much water, in flood irrigation. Furrow irrigation is the preferred and availed system for the farmers.

3.2.5. Harvesting

According to CASCAPE (2015), determining the right time of potato harvesting is essential for achieving high quality produce. Ware potato fields should be harvested when tubers are mature; that is when the foliage has dried up and the tuber's skin is firm and cannot be removed when lightly rubbed with fingers. In other words, yellowing of

the potato plant's leaves and easy separation of tubers from stolon indicate that the potato crop has reached maturity and can be harvested for immediate consumption. If the potatoes are to be stored rather than consumed immediately, they should be left in the soil for to allow their skin to harden and hard skin also help seed potatoes to resist storage diseases. Consequently, seed potato fields should be harvested after hardening by cutting the foliage of the seed and letting to cure for 10 to 15 days. After the skin of tubers has become stronger it is then possible to dig out tubers using appropriate tools or manually not to damage tubers during harvesting. Tubers should be cleaned and free from soil other inert materials immediately after harvesting. The CASCAPE report also added, after harvest it will be important to separate the tubers for seed purpose and other purposes. It should be kept safely in appropriate areas not exposed to insect pests attack. But tubers isolated for seed purpose should be kept in diffused light store. But, the tubers should be stored temporarily in a shaded under dry and well-ventilated place for seven to ten days to allow time for the skin to become well suberized, and for any cuts or bruises from digging to heal.

Harvesting is best done when the soil is slightly moist to prevent abrasion and the tubers lifted carefully to avoid damage. Ideally, they should be left to dry for few hours in the field, collected in field containers and placed in a cool, shady place. Potatoes for food (ware potatoes) must not be exposed to light for more than a few hours; otherwise the color will turn green, develop an unpleasant taste and may become toxic. In the absence of storage technologies for ware potato, farmers in Ethiopia keep potatoes in the ground for a long period. This reduces tuber yield significantly as moisture is lost. An old study on extended harvesting period in Alemaya revealed that the yield of marketable tubers was reduced by 60% when tubers were harvested at 210 days after planting as compared to harvesting at 120 days. Uprooting potatoes by using oxen ploughing causes much damage. AgroBIG has introduced a potato digger to reduce losses but it is labour intensive.

3.3. Postharvest Handling

Potatoes belong to a group called semi-perishables vegetables, which are products with high natural moisture content. These products cannot be dried like cereals as lack of moisture leads to shrinkage, weight loss and loss of marketability. Products such as potatoes also are vulnerable to physical damage leading to fungal infections, bacterial rots and insect attack. Low storage temperatures, high relative humidity and adequate air flow and air composition are the main requirements for this group of products. Storage facilities must be designed according to certain specifications in order to deliver these requirements if tubers are to be stored for periods of three months or more. Tubers go through three different storage phases. These are: 1. Curing, 2. Cooling, and 3. Storage.

The first stage of storage immediately after harvesting is called "curing" and it is a natural process in the tuber of forming a thick skin. Wounds are healed during this process and this helps to minimize invasion by disease causing organisms such as bacteria and fungi. Careful harvesting, loading, transport and store filling are important to minimize bruising, skinning and cutting. Before storing, potatoes should be assessed for physical damage, soil adhering to tubers, surface moisture and any signs of disease, rot or pest

damage. Only clean, healthy, dry tubers should be stored. Damaged, infested or potatoes harvested from soils infected with bacterial wilts, blackleg, or other soft rots should be held separately and thereafter sold as quickly as possible. In addition, potatoes originating in soils infected with bacterial wilts or rots should never be used as a source of seed for further propagation.

Post-harvest handling which includes sorting and grading, packing, transportation, loading and unloading are carried out by farmers, brokers and traders. When the harvest is sold at farm-gate, all the handling activities are carried out by the buyers (trader or brokers). Normally, they hire daily laborers to separate the damaged and faultless tubers and sort the medium and large sized tubers from the smaller ones. They do not buy small-sized, diseased, pest infected or damaged tubers at all. Farmers often use these small ones for home-consumption or try to sell them in the nearby market of Merawi.

3.3.1. Storage requirements

In order to get the highest market prices, the quality of potatoes for sale need to be protected, and post-harvest handling such as storage and transport must be up to the standard so as to maintain good quality.

3.3.1.1. Seed potato storage (Diffused light store)

Diffused light stores (DLS) are most suitable where temperatures are moderate (no frost or extreme high temperatures) and seed has to be stored for more than four months. By using DLS, farmers are able to store their own seed stocks, instead of buying seeds of unknown health state from distant suppliers. However, the storage capacity of DLS is limited since all tubers must be exposed to the diffused light. These stores are suitable generally for small seed units and not for large scale seed production schemes. Seed potatoes stored in diffused light give short and strong sprouts than seed that has been stored for relatively long periods in the dark at higher temperatures

Experiences from CASCAPE project had shown the possibility of having small scale DLS at household level (12-14 corrugated iron sheet) and maintained quality potato seed by using this technology for more than seven months. But, this technology should be integrated with insect management especially potato tuber moth through the use of pure seed, cleaning the DLS before storage and after storage, use of chemicals (Diazinon), keeping the DLS cool and dry and finally allowing each potato tuber receive diffused light in the store. Generally, better quality seed tubers can be obtained with storage in DLS than in traditional dark storage, and as a result, productivity of potato can be enhanced through this postharvest management technology.

Seed constitutes a very important part of potato cultivation as it accounts for higher percent of the total cost and is the main source of diseases. In addition, unavailability of good quality seed potatoes at the right time is another problem in potato cultivation. Diffused Light Storage (DLS) is an innovation proven by CASCAPE project to enable small holder farmer to maintain their potato seed at higher quality levels. It can also be easily adopted to the existing farming systems and farm house holds cultivating potato. The DLS method is based on the use of natural indirect light and good ventilation or air flow, instead of low temperature, to control excessive sprout growth and associated storage loss. There are two basic elements of the DLS principle: light and ventilation.

3.3.1.2. Ware potato store

If potatoes need to be stored for a relatively short period, up to a few months, they should be sorted well at harvest, put aside any damaged, bruised or pest infested ones for immediate use. Damaged and bruised tubers can shorten storage life. Before putting a new crop into storage, the store should be cleaned with water and disinfectant to kill off any fungus or pests from the last crop. If Potato Tuber Moth (PTM) is a regular problem, a residual spray of a general insecticide such as Garden Ripcord (active ingredient cypermethrin) should be applied to the empty store just before harvest to kill any moths in the store. In most parts of potato growing areas, potato is mainly grown under rain-fed production system. As a result, excess production supply is evident during the main season leading to low crop price or letting farmers to get unattractive market prices for their produce. To avert such low price for their produce, demonstration and wider scale utilization of zero energy-demanding and locally-constructed affordable ware potato storage structure is crucial. Hence model ware potato store is designed to help them avoid this problem. The store is called Atbianesh.

3.3.3. Shelf life

Ware potatoes are commonly stored up to six months in the highlands without significant losses provided that: (i) the variety of potato is one with a long dormancy or the tubers are treated with a sprout inhibitor if storage duration is required to continue beyond the period of dormancy; (ii) the potatoes are free from diseases, damage or insect infestation; (iii) storage temperatures are kept to levels that do not induce high rates of respiration; (iv) the relative humidity within the store is kept at sufficiently high levels to reduce water loss from the tubers; and (v) the potatoes are not wet as a result of rain or condensation.

3.3.4. Packaging

After sorting and grading, the potatoes are bagged in sacks. The capacity of the sacks used varies from 115 – 150 kg. Standard sacks are not available, nor are they labeled. Later on the traders re-bag the potatoes in smaller bags. These processes result in damages on the tubers and thereby reduce the shelf-life of the potatoes. AgroBIG has provided weighing scales so that products can be sold at correct weights to avoid estimated judgment.

3.3.5. Transport

At present, the transport services in Koga area are dominated by private truck owners. Two types of trucks are used, bigger ones (capacity 9 tons) and smaller ones (capacity 4 tons). Many farmers do not sell their potatoes at the farm gate level, but rent horse drawn carts (locally called *Garis*) to transport their potatoes to the local market in Merawi. Similarly, traders are renting trucks to transport potatoes from farming sites to regional markets, mainly Bahir Dar. In general, the existing transport system does not seem to be a barrier in potato marketing.

4. MARKETING

4.1. Market Survey

Rapid Market Survey is an efficient way to acquire knowledge about marketing systems, with a view to inform production and marketing strategies, policy processes, and the design and implementation of relevant interventions. It is also a process for discovering market opportunities and how to capture them through focus on an entire value chain. Therefore, the survey was conducted in July 2018 to study marketing system, marketing channels, buyer's requirement, identify marketing constraints and finally to indicate possible interventions of the project to improve the situation. The result indicated that still the bargaining capacity of farmers is low.

4.2. Demand and Supply Situation

4.2.1. Supply

As indicated in the Figure 2 below, national potato production and supply increased significantly in the last five years in both program woredas and at national level. This may be a direct result of the various interventions initiated and put in place by AgroBIG in the project woredas. The increase in production and productivity at national level may create strong competition ground to sell products. Under this situation, growers should focus on market-oriented production with utmost quality.

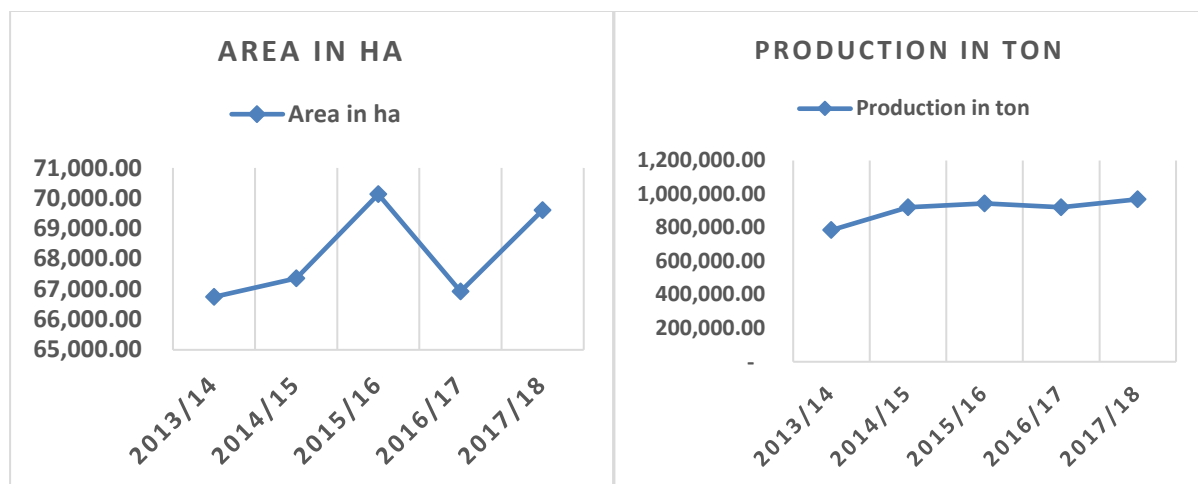


Figure 3. Area coverage (ha) and production of potatoes (tons), for Meher Season (2013/14 – 2017/18)
Source: CSA, 2013/14-2017/18

4.2.2. Demand

Consumption practices of potato products vary from country to country. Potato is commonly consumed in the form of cooked potato in a variety of traditional dishes. In the households of almost all eastern and central African countries, consumption of boiled potato is most dominant. Potato is commonly used in the form of sauce in mixture with other spices in Ethiopia. Some restaurants and hotels have French fries on the menu. A small percentage of potato is consumed in a processed form like potato crisps. Now a

days, the utilization of potatoes chips is increasing due to roadside crisp vendors in many towns and cities. A huge part of the potatoes is consumed as sauce/wot, with boiled as a good second. The consumption of boiled potatoes is higher by elder consumers as compared to younger ones. Youngsters increasingly consume much French fries especially in middle-income households. With the growth of population and urbanization, there is more positive prospect for the demand of not only potato but also for other agricultural products. Demand for potato varies between urban and rural consumers. Rural consumers prefer red potato to white one, whereas urban consumers demand white potato than red ones. Similarly, chips makers also prefer white potato.

4.3. Quality Requirements

There is no strict quality requiring for ware potato in the region except that of KogaVeg agricultural development plc. However, the qualities demanded by most buyers in the region depends on color. Red potatoes are more demanded by rural consumers, whereas white potato is mostly demanded by urban consumers. But local chip makers in Bahir Dar demand white potato. But the most important thing that producers should consider is general requirement of potato (whether it is white or red) that it must fulfil minimum quality requirements to attract buyers.

Accordingly, minimum quality requirement of ware potatoes includes well-matured, whole, sound, firm, washed to bright skin, similar color and appearance in any package. They should also be clean and free from greening, sprouting, sunburn, secondary growth, serious damage by pests and disease, serious deformation and crack, hollow hearts and other internal disorder, abnormal external moisture, foreign smell and or taste.

Quality problems mentioned by respondents during the marketing survey include mixed potatoes seed and mixed ware potato (different variety and color, size, bruised, blackened potato due to damaged skin, potato attacked by insect etc.). This quality problems mainly occur due to failures of regulating seed system and seed quality; crop management in field; poor harvesting technique; lack of curing; poor post-harvest handling; lack of sorting and grading; and improper way of packaging and transportation that includes loading and unloading.

In the project woredas, the only company that comply to some of the aforementioned quality parameters is KogaVeg agricultural development PLC. The company buys potatoes from producers based on contractual agreement. The agreement made in contract include quality specification based on size (potato with tuber size 15 – 75cm length), and potato tuber free from rot, mechanical damage, and free from foreign matter. Then after KogaVeg grade the collected potatoes before supplying to buyers in such a way that Grade 1 potatoes have the size of 15 – 75 cm. This grade goes to Senselet food processing company which is located in Debre Birhan. Whereas, oversized sized potatoes will be sold in Bahir Dar as ware potato and undersized potatoes will be used for seed purpose.

4.4. Marketing Outlets/Main Market Segments

The end consumers of ware-potato can be broadly be divided into three main categories:

- Households/individuals buying smaller quantities for daily consumption;
- Hotels, restaurants and institutional buyers like universities, prison, defense force;
- Processors.

The first two categories mainly buy potatoes to consumption at home, whereas the third one uses potatoes for processed food (chips, flour, crisps) preparation. Therefore, the selection criteria like size and color differs. Potato growers seem to be quite well-informed on the preferences of the first two categories of consumers. They know that consumers in Bahir Dar region prefer the red potato to white ones, whilst the Addis Ababa consumers prefer the reverse.

Low to middle income market segment: It is estimated that the vast majority, over 85%, of the Ethiopian market falls within this category of low to middle income market. This group consists mainly of individual consumers with limited purchasing power. Individuals buy potato for home consumption. Most of the time, they buy small amounts of potato from retailers.

High to middle income markets: The bracket of high to middle income markets is concerned with quality as much as prices; in particular consumers with middle to high incomes are concerned with a good quality and are prepared to pay a higher price for this. Prices are quite low in Addis Ababa.

Major buyers: The segment consists of big hotels, restaurants, cafes and institutional buyers like universities who set some quality specifications and requirements like timely and year-round delivery. For individual farmers it is hardly possible to guarantee this regular and year-round supply. Only in case they manage to organize themselves and jointly supply the institution, this may be possible; however, even then, the matter remains complicated because of the seasonality of the production. Large public institutions like the universities respect the national bidding system. One of the requirements for potential bidders is that they have a TIN number. At present, it is hardly possible to any farmer to fulfil such criteria, but cooperatives can do.

Processed products: Potato is an important food and cash crop in Ethiopia. However, because of its perishability the farmers could not benefit much by preserving it in different ways. Hence, processing can bring value added foods and extend the availability of potato in different forms of food. At the same time, it can, to a certain extent, reduce post-harvest losses. Another added advantage is that increasing the type and volume of outlets may give better prices for the farmers, especially at harvest time. Various surveys demonstrated that tendencies in food habits changes in favor of easy-to-prepare foods such as French fries are rising. Moreover, the population is expected to double every 25 years, which will create more demand both fresh and processed foods. These shows that there is a good prospect for processing industries, which can be additional market outlets for both fresh and processed potato foods. Moreover, the prices of imported French fries are higher than locally made French fries by over 200 percent; this is a plus for local industries to engage in this sector. Many of the retail outlets process French fries for own use or for selling in their own establishment. Bahir Dar Food Science and Research Unit under ARARI has been promoting different uses of potato through the dissemination of

recipes and processing methods. The recipes include bread, injera (potato mixed with teff), alcohol and starch. In Ethiopia including in the program woredas, some processing facilities for potato have been established. However, the processing plants are small-scale initiatives that require small amounts of quantities of potato. A crucial issue regarding the processing establishment is marketability of the processed product. The successful introduction of processed products will depend a lot on consumer acceptance of the products such as:

- **French fries:** This potato-based processed food is being produced in Ethiopia including in the ANRS, on a small-scale owing to low demand. Part of this processed potato is imported e.g. frozen French fries and potato crisps. The demand for the former comes from some supermarkets and hotels in the capital city. Demand for frozen French fries outside Addis is still limited, in fact non-existent. Most of the establishments seem to prefer preparing their French fries from fresh potatoes. The main reasons are: (1) imported frozen French fries are relatively expensive, (2) they are relatively hard to get by, and (3) the difference in taste (in favour of the freshly prepared French fries). Ethiopia has only a few frozen French fries' processors. One of them had started production in Addis in 2011. This company supplies French fries to hotel and supermarkets in Addis. AgroBIG has supported chips making women groups in Bahir Dar.
- **Potato chips:** Nowadays, potatoes chips demand is growing in Ethiopia. henceforth, chips making company, Senselet Food processing PLC, was established in Debre Birhan is processing potatoes. The company bought 2,000 quintals of potatoes from KogaVeg Agricultural PLC. On the other hand, KogaVeg Agricultural Development PLC buys potatoes from 122 farmers organized as out growers in Koga Irrigation area that produce the crop on 30 ha of land. The company planned to increase farmland of out growers from 30 ha to 43 ha. The way they work with farmers is that the company supply seed to farmers, and then they buy the produce from farmers. With regard to this, the consulting team learned that Senselet has been in contact with a newly establishing commercial potato mini-tuber producer company, Tigray Biotechnology Center, at Mekele. Probably, farmer in the project area will be getting improved and disease-free seeds from such connections. Similar facilities can also be established in Amhara region since the basic requirements like a tissue culture lab are available at Dessie and Bahir Dar towns.
- **Potato flour production:** In Bahir Dar there is one entrepreneur engaged in potato processing. The process involves drying of potatoes and then drying it to prepare a powder. The product is mixed with other ingredients like bean, beetroot, carrot-flour to manufacture value added foods. The owner has obtained a patent on the extraction process. Most of the operations are done manually. The capacity of processing plant is 10 qt/day. The company has a stand in Bahir Dar market place in order to improve its access to clients. There have been no problems in selling the products. Some institutions like TVET bureau and AgroBIG have been assisting the company in different ways.
- **Starch:** Potato starch is used in Ethiopia is for industrial purposes. Different type of starch, including potato starch, are being imported from China and other countries. AgroBIG has conducted a study showing the potential of engaging in this business.
- **By-products like peels and waste:** By-products of potato processing like the

peels can be used for animal consumption. Often, the economic value of such by-products is neglected.

- **Export market:** Around 80 to 90% of the total volume and value of potatoes exported goes to Djibouti. The second biggest export country is Somalia, which accounts for 8 and 15%. The remainder of the export is to Sudan, Yemen and Saudi Arabia. The export of ware potato, both in quantity/volume and value is increasing. E.g. the export volume in 2001 was approximately 6,000 tons; in 2010 this had reached 21,555, and in 2015, it reached 71,893 tons. The bulk of the potato products exported by Ethiopia are fresh or chilled potatoes, followed by frozen potatoes and a relatively small portion of seed potatoes. As indicated in the graph below (Figure 4), the export showed an increasing trend in general in the last four years.

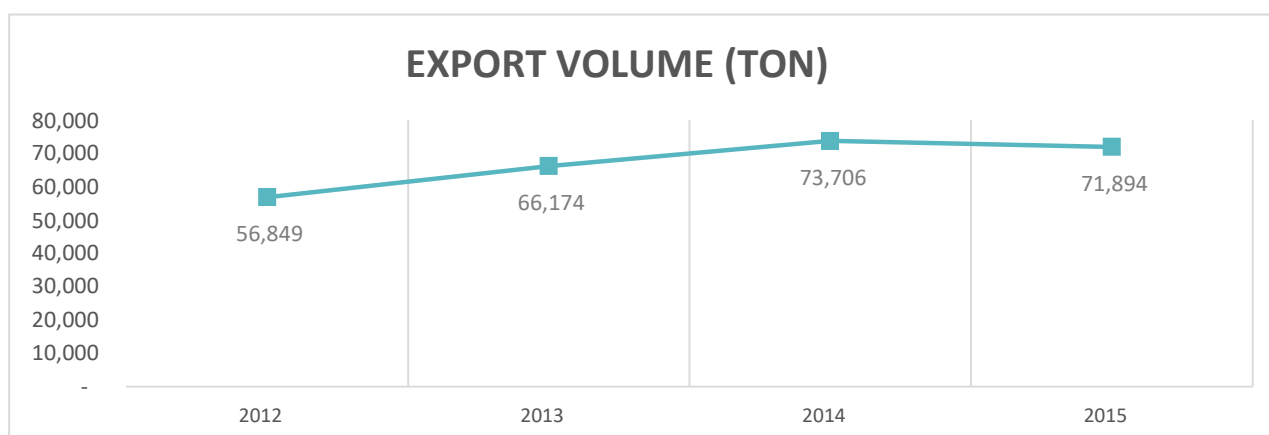


Figure 4. Potatoes Export Volume (2012-2015 – ton)
Source: Ethiopian Revenue and Customs Authority (ERCA)

4.5. Market Channels

Marketing channels refer to the routes taken by products from producers to consumers. Potato produced in ANRS pass through various channels until they reach the final consumers. Six main channels have been identified in the VCA (Figure 5).

The first and shortest one, and at the same time the most insignificant one when it comes to volume, is where the producers sell directly to the consumers (channel 1). This type of transactions takes place mostly in the woreda capital of Merawi and Mehal Genet. Some farmers from Koga area and Bahir Dar Zuria woreda even go to Bahir Dar to sell their produce directly on consumers and to retailers in the market. The volume in this channel is relatively limited. The major marketing channel in South Mecha woreda is Channel 1 and 2 primarily due to lack of collectors or assemblers in woreda and secondly, due to less annual production and supply volume of potato from the woreda.

Channel three to six are long channels as well as the most commonly practiced one where farmers sell their produce to collectors with or without brokers at the farm-gate. These brokers link collectors and wholesalers as producer-collectors. The wholesalers in turn sell the collected product to retailers, and to some supermarkets who subsequently supply to final consumers. Exporters also buy from collectors or wholesalers with and without broker and then export formally to Djibouti and informally to Somaliland and

Somalia. However, the volume of export and major source of potato for export need further study.

Brokers are major players in market linkage between traders and farmers, although they are paid by traders only for their service. Farmers complain that they are biased to traders since they get their commission from buyers. The cooperatives do not involve in collective marketing. With the exception of the state enterprises, most of the agreements such as between brokers and wholesalers and between farmers and brokers are verbal only. Further research and analysis are needed to find out if this always works out and how often there are disputes. It is not always possible to draw a clear demarcation between wholesale and retail activities as it happens that both functions are often undertaken by the same entity. For example, ETfruit acts as a wholesaler but also as a retailer selling directly to consumers.

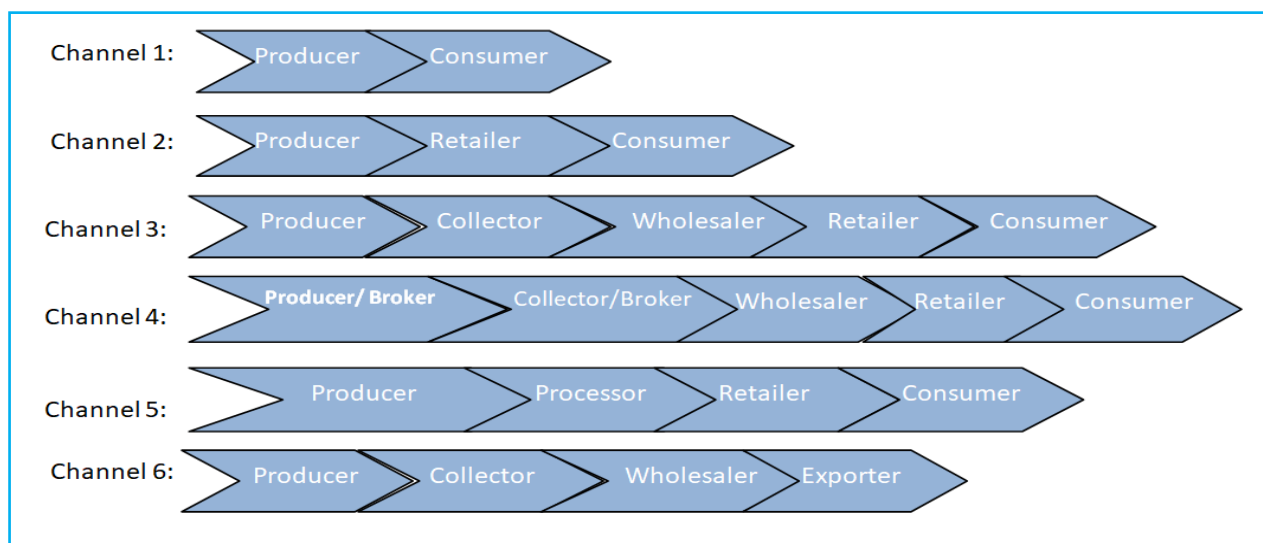


Figure 5. Ware potato market channels

4.6. Profit Margin

Relatively the biggest profit margin will go to retailers followed by wholesalers and collectors; but the amount of income retailers is getting per day is small since they are selling small amount of potato per day as opposed to wholesaler and collectors. Wholesalers buy and sell large volume frequently and sell relatively at lowest profit as compared to retailers and collectors. The maximum and minimum marketing cost are encored by wholesalers and collectors, respectively (Table 2).

Table 2. Profit margin for potato marketing agents

Profit Margin for Potato marketing actors				
	producer	Collectors	Wholesalers	Retailers
Purchase/production price per kg	0.89	3.5	5	7
Marketing cost per kg	0.5	0.5	1.65	1.55
Sell price per kg	3.5	4.5	7	10
Profit margin per kg	2.11	0.5	0.35	1.45
Margin (%)	48%	11%	8%	33%

4.7. Price Fluctuations

Price fluctuation often happens in some months, and sometimes very significant unprecedented changes are observed (Figure 6). Generally, price decreases during harvest and it increases during off season. Starting from mid-May, the supply from irrigation area significantly decrease and hence potato is supplied to Bahir Dar from other regions such as Arsi, Aselle and Shashemene. This is the time where the price hikes reaches the maximum value.

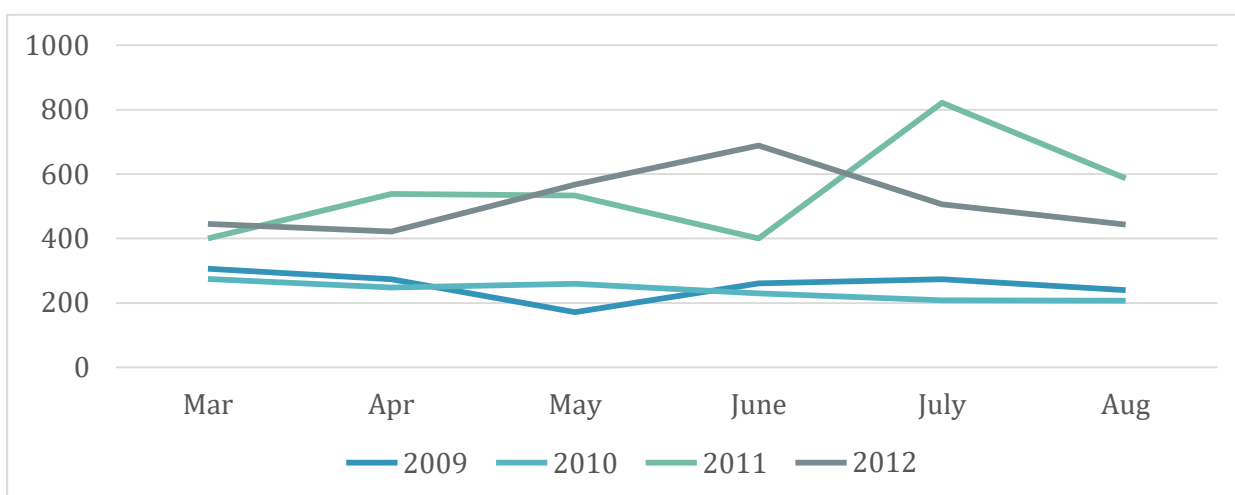


Figure 6. Price trend (2009-2012 - Birr/Qtl)
Source: BoT data base

5. VALUE CHAIN ANALYSIS

5.1. Actors of Value Chain

Prevailing value chain actors, their relationship and product flow have been indicated below in Figure 7.

5.1.1. Producers

Farmers/potato producers are key primary actors in the potato value chain VC. In Koga, farmers are organized based on irrigation canals and farm plot areas. Each tertiary canal has a *Ketena* leader. Each quaternary canal has water user team leaders with a maximum

of 16 ha of land and 30 farm households under their responsibility. Input use, agronomic practice and post-harvest handling described in sections above.

Bulking and trading

Cooperatives and associations: Cooperatives are formally established, registered legal entities; their major source of capital is membership registration fees and shares. Associations may be informal, or formal and registered. In the irrigated farming areas farmers establish Water User Associations (WUAs). Legislation for WUA's is still being developed and currently they are not formally legal entities, according to AgroBIG's report). In Koga area, primary cooperatives are established in 12 blocks according to secondary irrigation canals. Their main role is to manage irrigation water utilization in the command area, input distribution, transmit market information and facilitate linkage services, strengthen membership, etc. Similarly, the Koga Irrigation Marketing Cooperative Union is providing services including input/output marketing (pesticide, sprayers, and seeds including potato). Output marketing by the Union has not yet started, especially related to horticulture crops including potato, though some efforts have been made to create linkage with institutional buyers such as Bahir Dar University (BDU). It also provides support to primary cooperatives.

5.1.2. Brokers /middlemen

Brokers/middlemen play a great role in linking producers with collectors and collectors with wholesalers. Therefore, the role of middle men can't be undermined and also their role can't be avoided, at least for now, wherein strong market linkage facilitation and facilitators do not exist. However, even though middlemen have some positive role in market linkage, they give low price to farmers and reduce profit margin of producers as well as collectors. On the other hand, the involvement of middle in marketing increase unnecessary cost on processors and end buyers/consumers. Therefore, the role of middlemen can be substituted by developing well organized value chain actors in such a way that all actors fulfill their duties and collaborate with each other as partners. Two types of middlemen exist in potato marketing. The first type are farmers who play the potato marketing connection role between fellow farmers and buyers. The second group of middlemen play dual role, sometimes they collect themselves and sometimes they do the connection part only.

5.1.3. Collector or assemblers

Collectors are marketing actors that play a great role in assembling farmers' produce at farmgate or at open market place and then sell the product to wholesalers. The term collectors sometimes used interchangeably with assemblers. Without these actors it is difficult to bulk or assemble products from many smallholder farmers to fill trucks of wholesalers. Therefore, individual collectors or primary cooperatives are needed to assemble farmers produce especially in program areas. However, the survey result depicted that there are no licensed collector or assemblers in South Mecha and Bahir Dar Zuria Woreda. Primary cooperatives organized in Bahir Dar Zuria have not yet started assembling and marketing potato in bulk.

5.1.4. Wholesalers

Wholesalers buy potatoes at farmgate through brokers or directly and collectors.

5.1.5. Retailer

This group of traders buys potato from the wholesalers and sells to consumers. Usually the transaction volume is limited. Women’s involvement in this part of the chain is substantial compared to other chains in the chain.

5.1.6. Exporters/ international market

Ethiopia is a net exporter of potatoes. The export is limited mainly to two neighboring countries Djibouti (which accounts for more than 80% of the export volume) and Somalia.

5.1.7. Processors

➤ There are little or no potato processing phenomena in the region, except small scale chips being prepared and supplied in hotels and micro business operators. Youth women groups were supported by AgroBIG to engage in chips supply in Mecha and Bahir Dar town.

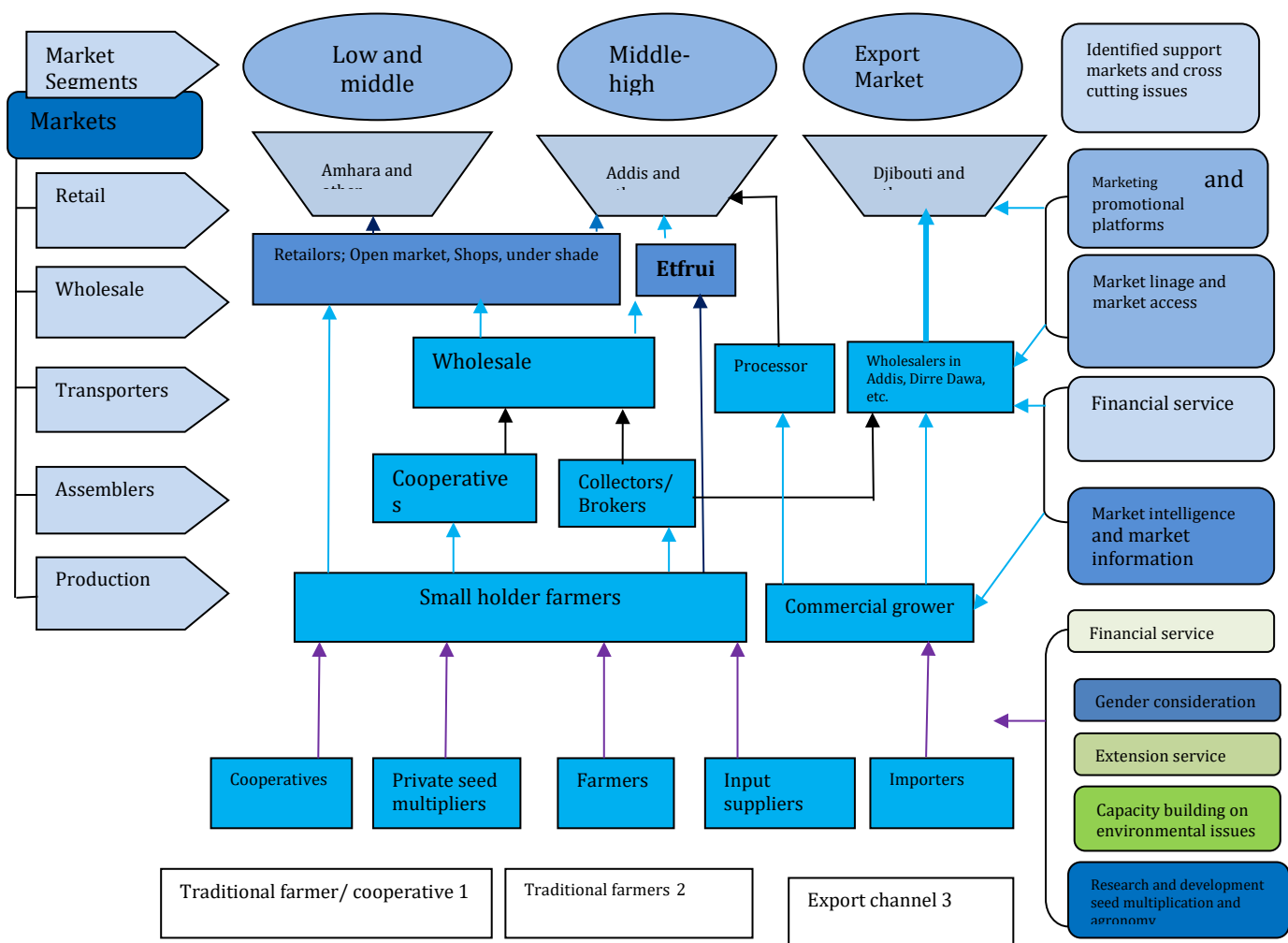


Figure 7. Potato value chain actor's relationship map

5.2. Service Providers

5.2.1. Extension services

Woreda offices of Agriculture: The Woreda offices of Agriculture (WoA) provide various advisory and practical services to farmers producing potato. The office encourages farmers to plant potato, use improved seeds, use furrow irrigation and apply recommended level of fertilizer. The office is working towards expanding irrigation access and coverage in the woreda through different strategies such as development of small scale irrigation, use of generators, pumps, provision of advice on agronomic practices, post-harvest handling, etc. AgroBIG has been providing trainings and various material support.

Koga Irrigation Project office: The Koga Irrigation Project Office has been set up and is accountable to the BOA. It is currently providing extension/advisory service on potato production in the command area. Extension services are categorized into two main parts: advisory services and cooperative development and management. Farmers Training Centers (FTCs) are also established in the Koga irrigation command area, namely, Kudmi, Amarit, Ambo Mesk, Enguti, and Andinet *Blocks*. The Koga irrigation project structure is mainly targeted to intensify irrigated agriculture engaging small holder farmers.

FTC and ATVETs: The Agricultural Technical and Vocational Education and Training Centers (ATVET) have been established in order to upgrade the skills of the Kebele Experts (KEs) and (agricultural) subject matter specialists. The Farmer Training Centers (FTC) are, as the name already indicates, training centers for farmers. AgroBIG has supported the construction of model FTCs that include a 2.5 ha demonstration area directly linked to the FTCs. Regular trainings are provided at FTC level.

Kebele Agricultural Experts: There are 3 Kebele experts per kebele; one specialized in agronomy/horticulture, one in livestock and one in Natural Resources Management (NRM). Most of them are generalists and did not receive training in particular crops like potato. The Kebele experts provide extension services in the field. Several farmers made the comment that the Kebele experts are often underperforming. Lack of motivation due to low payment and absence of up to date trainings is amongst the reasons that contributed for poor performance.

Cooperative Promotion Agency: The Cooperative Promotion Agency (CPA) provides the following major services to cooperatives:

- Organize and provide legal certificate to cooperatives;
- Provides audit services to cooperatives which are organized in economic groups;
- Create awareness among members of cooperatives and the larger community regarding the benefits of cooperatives to solve socio-economic challenges;
- Facilitate the distribution of dividends among members of cooperatives;
- Provide training on bookkeeping, management and leadership, good governance and so on.

Woreda office of Trade: The following services are rendered in Mecha:

- Strengthening of market linkages;
- Disseminating market information (market price information collection on a weekly basis- Wednesday & Saturday) and reported to the respective Zone Office every Monday and average price information is posted on information board;
- Creating conducive market condition for traders (e.g. map prepared to cluster perishable product traders under market sheds in Merawi town).

Adet Research Centre: This Centre is mandated by the GoE to conduct agricultural research activities in the Western part of Amhara Region, mainly in South Gondar, Awi, and West Gojam administrative zones. Adet Centre is also the national coordinator for potato research in Ethiopia. Its role is technology generation, adaptation, multiplication and demonstration for up-scaling. In Koga irrigated command area, Adet Research Centre has established a trial site and two potato variety adaptation trials (i.e. Belete and Jalen) have been carried out. The research has also released a variety specifically for the highland areas of Western Amhara region which is resistant to late blight disease. The center has established seed potato multiplication site at Felegehiwot kebele in Mecha (at approximately 2,500 m.a.s.l.). Some selected farmers are engaged in the activity. It seems there is new variety demonstrated in the project woredas since the variety (Belete) was planted on farmers field in March 2013. A storage facility is under construction. The prime requirement for potato seed production is to establish diffused light storage (DLS). In the highlands of Mecha woreda, there is a collaborative effort to promote seed potato production at a place called Debre Yakob watershed supported by the Water and Land Resource Project. The center has also been providing some training to Farmers-Research-Extension Groups (FREGs) to foster alternative seed system. There is limited capacity in the supply of disease-free seed potato.

Bahir Dar Technology Multiplication and Food Science Centre: The Bahir Dar Technology Multiplication and Food Science Centre under the Amhara Metal Industry and Machine Technology Development Enterprise, METEC, regionally mandated to generate technology, demonstrate and multiply more adaptable and compatible technologies to small holder farmers. It has been conducting action-oriented research undertakings and availing pre and post-harvest technologies. Although its main target is to support small holder farmers, it also collaborates with donor supported projects and small private enterprises. It provides consultation services for high-tech technologies (e.g. consultation and installation of seed processing machines for ASE). It relies on prototypes by searching from internet and partly secured from Ethiopian Science and Technology Commission. The pre-harvest case team is responsible to adapt small scale irrigation, solar power technologies, and post-harvest case team, crop processing and transportation technologies like thresher, storage, processing for milk, honey/bee hive. The role of the food science section is to conduct nutritional value analysis, availing trainings and demonstration.

Technical, Vocational, and Enterprise Development Bureau: The bureau has been striving to provide multiple services to organized business operators, both in the rural and urban areas. Prior to the administration of any training, they provide assistance to the SME to get organized, which, finally, includes formalization of the business. The services are accessible in 287 one-stop-shops (country- wide) organized at Kebele/town

level. The types of services provided so far include awareness creation, registration, need identification, linkages to each training, saving and credit, technical support in business plan preparation, and legalization. The participation of women in skill training, employment generating schemes, market sheds and clusters has reached 41%.

Potato coalition: Potato coalition was established in the region in collaboration with other stakeholders for joint planning, learning and improving coordination of actors that are working in the value chain. AgroBIG was supporting and participating in the initiative.

5.2.2. Financial services

Inadequate access to financial services is one of the major bottlenecks in rural areas. Microfinance institutions (MFIs) and rural savings and credit cooperatives (RUSACCOs) are the only formal financial institutions providing financial services to poor rural households. Currently, only about 15% of rural households have access to savings and credit services. Women account for nearly 50% of the client base of MFIs and RUSACCOs. Cooperatives have inherent constraints to develop their own capital and to provide collateral for commercial loans. The lack of working capital prevents cooperatives to participate in crop marketing. Private traders dominate the market and set the purchase prices, because they pay cash on delivery to the farmers.

Amhara Credit and Savings Institute (ACSI)

ACSI is one of the 32 microfinance institutions (MFIs) in Ethiopia and among the largest and best performing MFIs in the country. It is the main financial service provider in the rural areas of Amhara region. ACSI has a wide outreach with a network of 401 branches covering all woredas and 3,449 kebeles of the region with 9,000 staff. ACSI has one million active borrowers and 4 million active savings clients.

Granting of agricultural production loans to farmers is based on business plans submitted by the loan seeker, which are appraised by ACSI for borrower's eligibility and loan feasibility. The amount of loan taken by farmers ranges between birr 4,000 – 5,000 for potato production at an annual interest rate of 18%. Loans to individuals are usually provided against group collateral. All loans have to be repaid within one year.

ACSI has four branches in Fogera with 48 staffs and five branches in Mecha with 64 staffs. Most of the staff works in the field dealing directly with farmers' agricultural production loans. Good systems have been developed for the follow-up of loan utilization and loan client relations. Most loans to farmer families are signed in the name of the wife. Women are recognized to be more diligent in dealing with financial issues. Repayment in Mecha and Fogera woredas is practically 100%.

AgroBIG has supported ACSI with a Loan Fund of 5.7 million birr. The Fund is to be used for working capital lending to agricultural cooperatives at 13% interest for the selected value chains and for wholesale lending at 11% interest to RUSACCOs in the Mecha and Fogera woredas. Generally, farmers and cooperatives prefer to borrow from the cooperative financial institutions at lower interest rate and to receive an annual dividend from the cooperative financial institutions.

Cooperative financial institutions

A large number of rural cooperative financial organizations have been established in the country to cater for the financial needs of agricultural and other cooperatives and their members. The rural cooperative savings and credit institutions in Ethiopia comprise of a total of 113 savings and credit unions and more than 15,000 rural savings and credit cooperatives (RUSACCOs). These are members' own institutions and capital for lending is collected from members' share contributions and savings. The Cooperative Promotion Agency (CPA) is mandated to supervise and audit the operations of cooperative financial institutions according to the Cooperative Law and a large number of CPA field staff is engaged in training and supervision of these organizations and the implementation of the RUFIP program.

There are 26 cooperative savings and credit unions each serving their designated woredas in Amhara region. They provide loans to farmers' agricultural cooperatives and other types of cooperatives that are members of the unions. This is the main lending channel to RUSACCOs for additional lending capital for loans to individual farmer members. Loan amounts are relative to the share and savings contributions of the member organizations. Loan interest is 10 – 12% for loan duration of one year. Repayment is nearly 100%. At the kebele level, farmers receive loans from a total of 2,825 rural savings and credit cooperatives in the Amhara region. Lending interest is stipulated by the bylaws of the RUSACCO as agreed by the members and is currently 12%. Normally the loan duration is one year and group collateral is used for repayment security. Capital for lending by RUSACCOs is limited, which restricts farmers' opportunities to invest in agricultural production. Repayment culture in rural lending is excellent and normally 100% of the loans are repaid.

Other banking institutions lending to rural farmers and agricultural cooperatives

The National Bank of Ethiopia governs and regulates financial institutions in the country. Foreign investment in the financial sector is not allowed in Ethiopia. A large number of banks operate mainly in large towns and are increasingly widening their branch network also to the woreda capitals. Farmers' cooperatives can receive loans from these banks at commercial terms and by providing collateral for repayment security.

AgroBIG grants

AgroBIG provides co-funding to value chain actors for investments in the selected value chains, including potatoes, through three grant funds which are awarded on competition basis:

- Innovation, Demonstration and Research Fund (IDRF); 85% contribution for development and demonstration of innovative approaches and support to research programmes.
- Value Chain Fund (VCF); 85% contribution for small farm investments in mechanization and farmer services.
- Matching Grant Fund (MGF), 50% contribution for large scale investments in post-harvest handling and processing for markets.

5.2.3. Business enabling environment

The business enabling environment at the national and local level encompasses policies, administrative procedures, enacted regulations, market standards and the state of public

infrastructure. In addition to these more formal factors, social norms, business culture and local expectations can be powerful aspects of the business enabling environment. Understanding these unwritten rules of society is essential to understand why value chain actors behave the way they do. These more informal factors often impact on women or people from minority groups who enter or are trying to enter the value chain as actors.

The second Growth and Transformation Plan (GTP II) is a main policy document 2015 - 2019 that has been adopted by the Ethiopian government. It emphasizes the significance of the agriculture sector as a major source of economic growth. The strategy strongly supports the intensified production of marketable farm products for domestic and export markets, by small holders and private agricultural investors. It also encourages a shift to production of high value crops focusing on high productivity areas and intensified commercialization.

Managing natural resources and building the capacity of farmers and government structures is also emphasized. During the GTP II period, application of improved technologies will be intensified to ensure the supply of the required quantity and quality of fertilizer, improved seeds, and small farm machineries.

There are capacity limitations at all levels that include human resources, working premises, equipment, communications, machinery, furniture and other facilities. ATVETs and FTCs require capacity building and improved facilities in order to strengthen their competencies to upgrade the skills of DAs and subject matter specialists. There is also weak research-extension-farmer linkages and lack of communication and collaboration with the private sector.

6. CROSS-CUTTING ISSUES

6.1. Gender Inequality

In the programme woredas of AgroBIG, women are generally disadvantaged. In meetings, few women attend, and their voices are often not heard. Potato production is a laborious farming activity which needs high labor input from planting to harvesting and marketing. Both women and men are taking part in the process of production with a varying degree of involvement. Despite the considerable contribution of women, men have the main responsibility for selling the harvested potatoes, reducing women's access to and control over the produce. One of the factors that have turned out to influence the adoption of new technologies is whether the farmer is female or male. Due to many socio-cultural values and norms men have freedom of mobility and participation in different meetings and consequently have greater access to information. Therefore, male-headed households seem to be more likely to adopt new varieties, technologies, cultivation practices, etc than female-headed households.

AgroBIG conducted a gender study at an early stage, and identified possible interventions. In particular, AgroBIG has implemented targeted interventions, and avoided standard awareness raising trainings. Specific interventions targeting women have included the training of 66 women in Fogera on agronomic practices and food preparation to help these women grow and prepare vegetables for sale at the local market. AgroBIG is also in

the process of establishing a very special loan fund exclusively for women entrepreneurs. The support to family financial literacy that AgroBIG has channeled through ACSI, is another example where women have been in the focus.

6.2. Reducing Social Inequalities

Taking the local situation into considerations, AgroBIG has given a strong focus on creating inclusive, efficient and profitable value chains. At operational level, the inclusion of vulnerable groups like people infected with HIV/AIDS or having disabilities is not an easy one since much hard work is needed in the field.

Women are disfavored in the society in terms of generating direct income from farm produce as compared to male. So, in order to improve women's income, roadside market is one means that can be considered. It involves women in direct sale of farm produce in program woredas, and hence, it will help the whole family to get good price from their produce. Additionally, women are active enough to sort and grade onion in the farm, and thereby get better income. Sorting and grading will improve quality of marketable onion, and hence it will become win- win approach both for farm owners and women.

6.3. Climate Change Adaptation

Issues directly related to climate change adaptation and mitigation has not been high on the AgroBIG agenda. Soil conservation activities are for instance beyond the scope of the Programmed. The activities undertaken by REILA can be seen as a support activity in that farmers, once they are secure on their land, are prepared to invest in land improvement including the planting of trees, which means being better prepared for hard times. Measures that have been taken by AgroBIG included creating awareness on efficient use of water in the irrigation systems as well as considerations of the Environmental Impact Assessments. On the wider approach to environmental concerns, AgroBIG has taken serious measures to prevent and stop the wide and irresponsible use of chemicals against weeds that, in the past, have taken place in Fogera. With this regard, in fact, a 3-days awareness and mitigation campaign were organized for 83 participants drawn from irrigation cooperatives, farmers, development agents (Das), chemical service providers, etc. The results obtained include (a) action plans were developed on the roles and responsibilities to be taken by each stakeholder and (b) responsible use of chemicals through the established sprayer groups. Manual well/borehole drilling is a mitigation measure for water shortages in the dry season that need to be promoted.

7. OPPORTUNITIES, CONSTRAINTS AND SUGGESTED SOLUTIONS

7.1. Opportunities

The opportunities related to the cultivation and marketing of potato in the Programme woredas (for detail SWOT analysis see annex 1):

- Availability of irrigation infrastructure in the Koga area enables farmers to produce potato twice year;
- Better understanding of value chain concept stakeholders and farmers through AgroBIG interventions;
- Existence of potato Tissue Culture (TC) laboratory In the country (ARARI and Mekele)
- Existence of Farmer Training Centers (FTC);

- Increasing demand with increasing population and purchasing power,
- Most of program woredas are accessible to main asphalt road to Bahir Dar, Gondar, and Addis Ababa.
- Existence of irrigation schemes, sufficient water and land resources
- Availability of ground water potential in Fogera and Dera woredas that can be developed and used for second cycle irrigation
- Farmers were organized as irrigation water user cooperative (Fogera, North Mecha, Dera and Bahir Dar Zuria)
- Availability of support institutions, which include governmental and non-governmental organizations such as AgroBIG.

7.2. Constraints

According to marketing survey conducted in Program areas the following constraints were observed.

Production Constraints

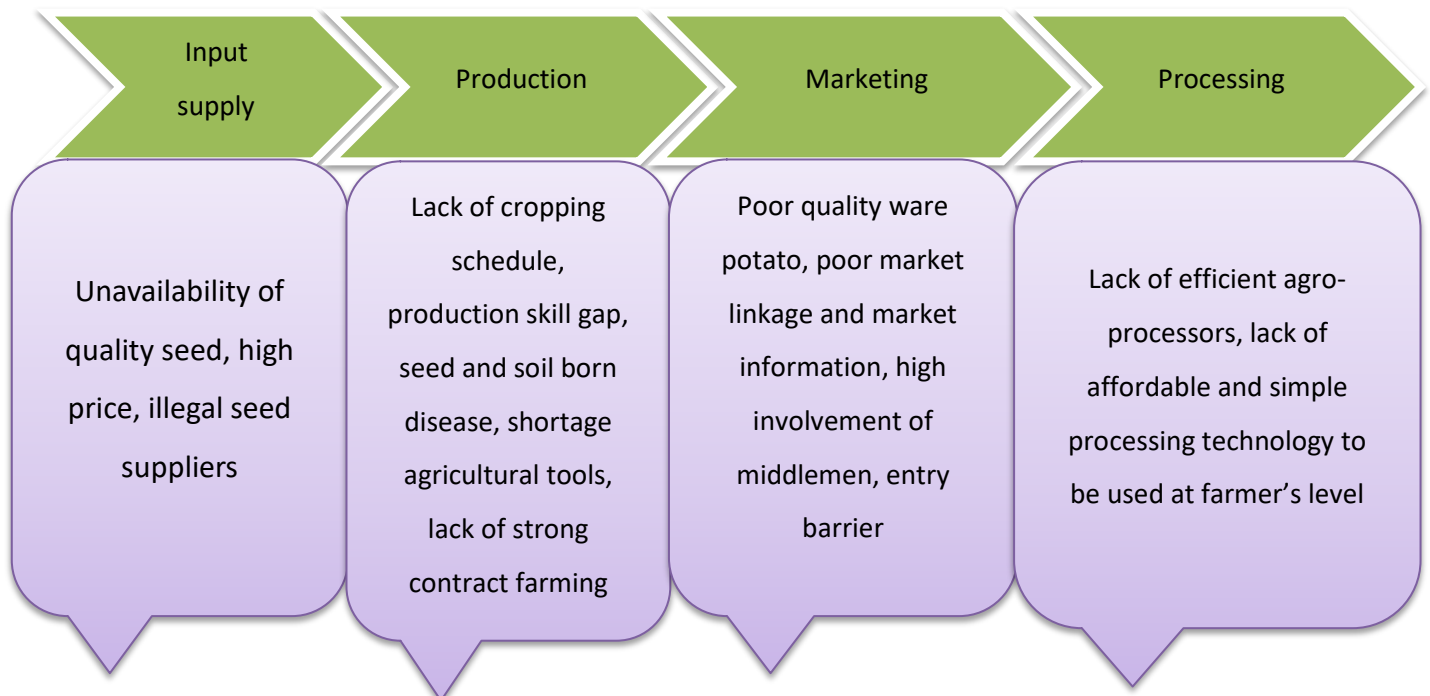
- Shortage of improved and certified seed potato supply mainly due to the absence of seed potato multiplication service providers;
- Lack of awareness for producers to pay high price for quality improved seed
- High cost of agricultural inputs
- Due to lack of staggered cropping schedule, most farmers grow the same crop at the same time, and hence they supply to market at the same time.
- Prevalence of seed and soil borne diseases, especially Bacterial Wilt (BW) in irrigated areas like Koga;
- Shortage of improved agricultural tools and equipment for pre and post-harvest operations

Marketing constraints

- Absence of proper storage facilities like DLS for seed potato and for ware potato store as well,
- Shortage of processing plants despite the growing urbanization and changing food habits,
- Inadequate financial management and planning skills;
- The involvement of large numbers of illegal brokers and traders both in ware potatoes and seed potatoes as well as lack of commitment to control or regulate illegal traders and brokers,
- Failure to organize primary cooperatives as strong marketing union,
- Lack of receipt system in selling and buying of potato,
- Poor sanitation of Bahir Dar vegetable market place (muddy with bad smell especially during rainy season).
- Low quality ware potatoes: Most of the respondents interviewed at Bahir Dar mentioned that potatoes produced in North Mecha and Bahir Dar Zuria are inferior in quality as compared to potatoes from Arsi, Aselle and Shashemene.
- Poor market linkage facilitation by implementing partners to link producers and collector or assemblers to big buyers
- The collaboration between institution that are responsible for market linkage is not strong, for instant between woreda office of Trade and cooperative promotion office
- Lack of reliable and timely market information service delivery to producers.

Owing to this reason, farmers only get distorted market information from each other and collectors and brokers have had advantage out of it.

- There is an entry barrier for farmers to sell their produce in Bahir Dar vegetable market place as it is only allowed for licensed traders due to lack of organized free open market place for farmer's produce,
- Lack of store and retail shop for vegetable farmers, primary cooperative and Union in Merawi, Woreta, Bahir Dar and Gondar
- Limited number of licensed big buyers (collectors or assemblers) in Merawi and Bahir Dar Zuria woredas



7.3. Solutions

- Availing quality agricultural inputs through agro-dealers with close supervision
- Provision of market linkage service
- Improving collaborations between support institutions within GOs and NGOs
- Capacity building of farmers in good agricultural practices
- Strengthening regional market information service delivery,
- Organizing primary cooperatives as union
- Organizing free open market in Bahir Dar city administration province
- Improving the sanitation and drainage of the central market at Bahir Dar

8. AGROBIG INTERVENTIONS

Based on survey made and the remaining project life AgroBIG should implement the following interventions in collaboration with implementing partners:

Improving production and post-harvest management:

- Establishing certified agro-dealers that can supply registered and certified seed and other inputs,
- Training farmers and development agents on full package of potato production, harvest and post-harvest handling, and thereby improve productivity and quality,
- Promoting contractual farming by linking farmers with Koga-Veg
- Introduction of DLS and ware potato storage into all project districts,
- Increasing access to the disease-free seed supply system through the use of available tissue culture facility in ANRS and Mekele
- Introducing cropping schedule to reduce over supply at the same time,
- Introduction of irrigation technology that save water so that area under irrigation can be increased,
- Introducing minimum quality requirement of potato for marketing and then training farmers on it,
- Strengthening potato seed producing and marketing cooperatives, building their capacities,
- Creating further awareness on use rural donkey and mule drawn carts,

Strengthening Market and Business Development:

- Organizing existing primary cooperatives as union in collaboration with Regional Cooperative Promotion Agency and then capacitate them to actively participate in marketing
- Working with Bahir Dar city administration so that the municipality Establish open and free market in the city for rural community to use it without any license,
- Building pilot store and shop for retail and wholesale for primary cooperatives and unions in Bahir Dar open market to be built
- Establish roadside markets as retail outlets in production areas
- introducing collection centers for cooperatives and regional terminal market for horticulture crops in general
- facilitating strongly market linkage for producers and coop/unions so that they can sell directly to big buyers without middlemen, in collaboration with respective woreda office trade and Woreda cooperative promotion office

Increased Value Addition:

- encouraging available potato processors in Bahir Dar technology from India and other countries in collaboration with regional investment bureau and private sectors
- Supporting additional business ideas in agro-processing
- Promoting nutritional use of potato and training farmers how to make variety of dish from potato, especially for children

Strengthening Market and Business Development:

- facilitating reliable and timely market information service delivery for all program woredas

- strongly regulating illegal brokers or licensing them, by coordinating Woreda office of trade
- strongly controlling illegal seed suppliers that supply uncertified seed
- introducing receipt system in potato marketing
- strengthening and encouraging available potato processors in Bahir Dar

Strengthening the capacity of private and public service providers:

- Training Model farmers, Das, Agricultural Extension experts, on potato production, harvesting, post-harvest handling and marketing,
- Planting potato on FTC with full-package and demonstrating all recommended practices to farmers at all steps, input used, planting method, crop and water management, harvesting, packaging and storage.
- improving farmers business skill trough training at FTC level

9. CONCLUSSIN AND RECOMMENDATIONS

Based on the results of the marker survey, the following recommendations have been suggested:

- Cropping schedule that minimize over production and over supply of similar crop at the same season should be designed and implemented in program area and production of major vegetable crops should be clustered based on comparative advantage of program woreda's
- To enable farmers, through training, supply quality potatoes and become competent in market, there is a need to train producers on pre and post-harvest handling practices and on importance of sorting and grading before taking to market,
- Production enhancement through proper use of agricultural inputs including agricultural machineries should be promoted in order to make farmers competitive and to reduce the buying price to wholesalers or collectors.
- Providing Strong market linkage service majorly by woreda trade, Industry and marketing office in collaboration with woreda cooperative promotion office,
- Introduction of water saving technologies instead of using furrow irrigation
- Open market establishment foe a few days in a month to connect the farmers directly to consumers.
- Organizing cooperatives into a Union so as to induce collective marketing.
- Supporting entrepreneurs engaging in processing sector
- Adopting and implementing potatoes post-harvest technology that can improve quality and shelf life of potatoes,
- Providing Strong market linkage service majorly by Woreda office Trade in collaboration with woreda cooperative promotion office,
- Strengthening the existing regional market information system and sharing experience of market information system of Fogera woreda to all other program woredas by improving it,
- Vegetable growers such as primary cooperatives and Union should have pack house around production area as well as standard store and shop in big markets (Merawi, Woreta, Bahir Dar and Gondar) so that they can use it as wholesale and retail centre to get better price. On the other hand, in order to minimize their marketing cost, they can use hired labour during harvest season on temporary

base or can hire on commission base to sale the produce.

- One or two Open market places should be organized in Bahir Dar by Bahir Dar city administration in different direction so that farmers can easily entre to market and sell their produce to consumers, retailers, assemblers or any other big buyers without any entry barrier. This enables farmers to get good price as they can get final price that consumers pay or retailers or wholesaler can pay without broker or middlemen.

10. Annexes

10.1 Potato production and marketing SWOT analysis

Opportunity	Constraints	Possible Intervention
<ul style="list-style-type: none"> • Availability of Large potential of irrigable land and irrigation water • Farmers were organized as irrigation water user cooperative (fogera, North Mecha, Dera and Bahir Dar Zuria) • Access asphalt road that leads to Merawi, Bahir Dar Gondar, Mekele and Addis Ababa • Availability of Wholesale traders and collectors • Availability of ground water potential in Fogera and Dera woredas that can 	<ul style="list-style-type: none"> • Due to Lack of cropping schedule all farmers grow the same crop at the same time and all supply to market at the same time. • Low Quality ware potatoes:- Most of the respondents interviewed at Bahir Dar mentioned that Potatoes produced in North Mecha and Bahir Dar Zuria is inferior in quality as compared to potatoes from Arsi Aselle and Shashemene. • Poor market linkage facilitation by implementing partners to link producers and collector or assemblers to big buyers and market. • The collaboration between institution that are responsible for market linkage is not strong, for instant between worweda TIM and cooperative promotion offices is not strong to facilitate market linkage for primary cooperatives. • Lack of reliable and timely market information service delivery to producers: , due to this farmers only get distorted market information from each other, collectors and brokers that make their bargaining capacity very weak. • There is an entry barrier for farmers to sell their produce in Bahir Dar vegetable market place as it was only allowed for licensed traders, and 	<ul style="list-style-type: none"> • Cropping schedule that minimize over production and over supply of similar crop at the same season should be designed and implemented in program area and production of major vegetable crops should be clustered based on comparative advantage of program woreda's • To enable farmers supply quality potatoes and become competent in market there is a need to train producers continuously on post-harvest handling and on importance of sorting and grading before taking to market. • Adopting and implementing potatoes post-harvest technology that can improve quality and shelf life of potatoes, • Providing Strong market linkage service majorly by woreda trade, Industry and marketing office in collaboration with woreda cooperative promotion office , • Strengthening the existing regional market information system and sharing experience of market information system of fogera woreda to all other program wredas by improving it.

<p>be developed and used for second cycle irrigation</p> <ul style="list-style-type: none"> • Access to big market like Bahir Dar, Gonder , Mekele and Addis Ababa Market • Continuously increasing population and Demand • improvement in infrastructure and government policy that support agro processing 	<p>also due to lack of organized free open market place for farmer's produce .</p> <ul style="list-style-type: none"> • Lack of store and retail shop for vegetable growers farmers primary cooperative cooperatives and Union in Merawi, Woreta, Bahir Dar and Gondar • Limited number of licenced big buyers (collectors or assemblers) in Merawi areas • Absence of any licence collector in South Mecha and Bahir Dar Zuria woredas 	<ul style="list-style-type: none"> • The existing Irrigation water users and marketing primary cooperatives in Dera and fogera woreda should be organized as one strong marketing Union and then involve in marketing. Similarly Primary cooperative in Bahir Dar Zuria should be organized as Union, so that the union can collect potatoes from primary cooperatives and distribute to big markets and also sell it. • Vegetable growers primary cooperatives and Union should have pack house around production area as well as standard store and shop in big markets (Merawi, Woreta, Bahir Dar and Gondar) so that they can use it as wholesale and retail centre to get better price. On the other hand in order to minimize their marketing cost they can use hired labour during harvest season on temporary base or can hire on commission base to sale the produce. • One or two Open market place should be organized in Bahir Dar by Bahir Dar city administration in different direction so that farmers can easily entre to market and sell their produce to consumers, retailers, assemblers or any other big buyers without any entry barrier. This enables farmers to get good price as they can get final price that consumers pay or retailers or wholesaler can pay without broker or middlemen.
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10. 2. Lists of contacted persons

S.N	Name of contacted persons	Woreda	Town	Business type /Organization and Responsibility	Mobile telephone
1	Ato Xilahun	North Mecha		collector	
2	Ato Hunagna Worka	North Mecha	Merawi	Collector and Retailor	09-43580676
3	Ato Birhanu	North Mecha	Merawi	Woreda Agricultural Office Head	09-18072410
4	Ato Towacho	North Mecha	Merawi	Koga Irrigation Expert	09-18747482
5	Ato Yihune Minale	North Mecha	Merawi	Woreda Agricultural Office , Ex-head	09-18070229
6	Ato Garamow Tasfa	North Mecha	Merawi	wholesaler ,Vegetable	09-75582327
7	Ato Tazeb Feleke	North Mecha	Merawi	Wholesaler ,Vegetable	09-18413368
8	Ato Sharow Abi	South Mecha	Mahal Genet	Retailor of vegetable	09-32275789
9	Ato Ashabir Gashu	South Mecha	Mahal Genet	Retailor of vegetable	09-75583225
10	Asefa Alamirew Enyew	Bahir Dar	Bahir Dar	processor	09-18353620
11	Ato Takele Getahun	South Mecha	Mahal Genet	Woreda Agriculture , extension dep't head	09-18083503
12	Ato Tesfahun Alahany	South Mecha	Mahal Genet	WoT, expert	09-18231475
13	Ato Aseffa Shababaw	South Mecha	Mahal Gennet	Woreda Agricultural and livestock, head	09-18193341
14	Ato Habtamu	Bahir Dar Zuriya	Bahir Dar	Woreda Agricultural Office	09-18086791
15	W/ro Yenenat Barihe	Bahir Dar Zuriya	Bahir Dar	Woreda Cooperative Promotion office, Team Leader	09-18727717
16	Ato Andarge Yimano	Bahir Dar Zuriya	Bahir Dar	Woreda Irrigation team, team leader	09-18145891
17	W/ro Nardos Wasihun	Bahir Dar Zuriya	Bahir Dar	Woreda irrigation team, irrigation agronomist	09-18736609
18	Ato Amony Asmara	Bahir Dar City	Bahir Dar	Wholesaler	09-18010018
19	W/ro Yisarach Alem	Bahir Dar Zuriya	Addis Alem	retailer	

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