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<th>Description</th>
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<tbody>
<tr>
<td>ADPLAC</td>
<td>Agricultural Development Partners Linkage Advisory Council</td>
</tr>
<tr>
<td>CDI</td>
<td>Center for Development Innovation</td>
</tr>
<tr>
<td>CFSC</td>
<td>Commercial Farmers Service Center</td>
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<td>GTP</td>
<td>Growth and Transformation Plan</td>
</tr>
<tr>
<td>Ha/ha</td>
<td>Hectare</td>
</tr>
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<td>ISSD</td>
<td>Integrated Seed Sector Development</td>
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<tr>
<td>MoA</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>MoARD</td>
<td>Ministry of Agriculture and Rural Development</td>
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<tr>
<td>NANA</td>
<td>National Agricultural Inputs Authority</td>
</tr>
<tr>
<td>NFIA</td>
<td>National Fertilizer Industry Authority</td>
</tr>
<tr>
<td>NSIA</td>
<td>National Seed Industry Authority</td>
</tr>
<tr>
<td>OARDB</td>
<td>Oromia agriculture and Rural Development Bureau</td>
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<tr>
<td>OAMA</td>
<td>Oromia Agricultural Marketing Agency</td>
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<tr>
<td>OIDA</td>
<td>Oromia Irrigation Development Authority</td>
</tr>
<tr>
<td>OSE</td>
<td>Oromia Seed Enterprise</td>
</tr>
<tr>
<td>OSMIS</td>
<td>Oromia Small scale and Micro Irrigation Support Project</td>
</tr>
<tr>
<td>Qt/qt</td>
<td>Quintal</td>
</tr>
<tr>
<td>SWOT</td>
<td>Strength Weakness Opportunity and Threat</td>
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<tr>
<td>SGPA</td>
<td>Seed Growers Processers Association</td>
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</tbody>
</table>
1. Introduction

Irrigation development in Ethiopia can be considered as a cornerstone of food security and poverty reduction tool as it clouts to stimulate economic growth and rural developments. As a result, irrigation infrastructures are increasing year after year, which show countrywide positive development.

The Ethiopian Irrigation Development Plan (IDP) emphasizes the development of small-scale irrigation systems through giving highest priority for capacity-building in the study, design, and implementation of irrigation projects. SMIS project is therefore working with key partners such as, Oromia Irrigation Development Authority/OIDA, BoA, ORARI etc on the soft aspects of capacity development, capacity utilization and capacity retention. SMIS is notably supporting in the development of skills, knowledge, competencies, application of skills & knowledge, facilitation of skills and knowledge transfer within institution, advising establishment of efficient structures, processes and procedures, integration of structures, regular adaptation of structures, establishment of adequate institutions, laws and regulations, enforcement of laws and regulation.

There are considerable experiences in the region that could be easily disseminated, adapted and replicated to enable the usage of appropriate irrigation technologies to overcome challenges, that protect the livelihoods of the people and bring about the desired growth and development. There is growing interest on investment of cereal and horticultural crop seed multiplication, marketing and distribution by smallholder farmers, cooperatives and unions. This helps to improve the efforts made to satisfy irrigation input demand. Nevertheless, there are key challenges that need to be addressed in transforming irrigation agriculture by overcoming a multitude of problems, which include irrigation input supply system and water management issues to help the attainment of Accelerated development through Growth and Transformation Plan/GTP and sustainable socioeconomic growth of the country.

There are several challenges that daunt irrigation input supply system. The constraints could be generally conceded as production and distribution system related, weak regulatory system, marketing and poor and inefficient linkage among irrigation development actors and agricultural input providers. These have been deterring irrigation production and productivity.

1.1. Purpose: Over the past two decades’ decision makers in Ethiopia have pursued a range of policies and investments to boost agricultural production and productivity. Irrigation development is found to be one of most trustful sector to improve food security though constrained by a range challenges. Agricultural input suppliers are responsible to deliver according to
the demand of the farmer However, due to the growing demands of the farmers for improved irrigation agricultural inputs, the supply sector could not satisfy the needs of the farmers. This shows that there are different factors directly or indirectly influencing the input supply system. Why irrigation input-supplying system failed to satisfy the needs of the farmers is not sufficiently analyzed so far in the region. Therefore this assessment focused to identify the challenges and opportunities of irrigation input supply and distribution system to create strong and efficient public private irrigation input supply linkage that offer opportunities to strengthen institutions so that they could improve smallholder access to improved seed, agrochemical, irrigation equipment’s, marketing and extension services.

1.2. Objectives
1.2.1 General Objective: The ultimate goal is to place efficient and responsive irrigation input supply systems for smallholder farmers. Creating responsive and efficient linkage among irrigation input suppliers, distributers and sellers is essential. Thus assessment is pledged to assess key opportunities and constraints that deter irrigation input supply system performance and build consensus on so that to improve agricultural/irrigation input supply and distribution strategy at regional level.

1.2.2. Specific objective:
The objectives of the study are to:
- Assess the input supply and distribution systems
- identify key opportunities and constraints affecting the system performance
- assess the influence of regional & national policy and legal framework governing input development, production and supply chain in the region and country
- to assist placing of effective irrigation input supply systems on the ground

1.3. Assessment Approach: Both the theoretical and practical roles of the public and private sectors as they relate to production, importing, distribution of seed, agrochemicals, irrigation equipment’s, extension systems, and markets was assessed. The paper begins with a brief overview of efforts to promote improved seed, agrochemicals irrigation equipment’s, extension services, and other modern agricultural inputs and services. A variety of data collection and a mix of data analysis techniques used for better understanding of Agricultural input supply and distribution system. Review of agricultural input supply, importing and distribution services documents and strategies, interviewing of key public and private institutions, unions, primary cooperatives, partners and experts working in planning and implementation of Research extension is done. Group discussion made to understand how the system is performing. Data analysis and
recommendation worked in Strength Limitation Opportunities and Threat/SLOT analysis. It is concluded by offering several policy solutions that aim to encourage investment and strengthen institutions necessary to improve smallholder access to improved seed, chemical fertilizers, and extension services.

1.4. Scope and Limitation: This study was carried out in Oromia region: West Shewa zone, Finfine and East Shewa. Thirteen primary cooperatives, unions, public institutions and agricultural input importers and distributors enterprises and trade companies located in these areas were included in the assessment. The assessment is commissioned to identify challenges and opportunities of Agricultural input supply system in general and irrigation agriculture inputs in particular. Its lastly intend to create public private irrigation agriculture input providers’ linkage among key public and private institutions to form workable system on the ground that involves NGOs, farmers’ primary cooperatives, unions, investors, financial institutions, producers & distributors and related stakeholders who are working in irrigation Development sector. Though useful, such study may not necessarily capture or delve socio economic and theoretical dynamics of input supply system exclusively. The assessment results mainly depend on document review, discussion and interview with key agricultural inputs importers, suppliers, distributors, producer, research centers actors of public and private sectors and farmers’ union. The result of the assessment could be used in the region sister institutions and other areas having comparable or similar situation.

2. Input Supply Policies and Institutional Arrangements

Efforts have been made to open the input supply market and improve its competitiveness since 1991. Moreover, a strategy document on input and output marketing and implementation mechanisms prepared by the Ethiopian Ministry of Agriculture and Rural Development (MoARD) in 2004 emphasizes the critical role of an efficient and competitive input markets for agricultural development. The strategy, while recognizing the role of the government, the private sector, and farmer organizations in input supply, emphasizes the need to enhance increased privatization of input supply and rural finance, a shift away from the current heavily government controlled system.

A series of proclamations and regulations that relate to agricultural input supply have been issued in Ethiopia since 1991 to improve the efficiency of the input supply market in the country. In 1993, the National Seed Industry Agency (NSIA) was established by Proclamation No. 56/1993, as an autonomous government agency governed by a council. The council is mandated to develop seed-policy and oversee their implementation upon approval. Another autonomous government agency was
National Fertilizer Industry Agency (NFIA) established in the late 1990s. In 2001, NSIA and NFIA were made accountable to the newly created Ministry of Rural Development (MoRD), which was mandated to ensure conducive conditions for the development, processing and supply of inputs necessary for rural development. In 2002, the National Agricultural Input Authority (NAIA) was established by Proclamation No. 288/2002 as an autonomous body of the government and took over the role and responsibility of NSIA and the NFIA. Both NISA and NFIA were dissolved mandated to ensure that production, supply, distribution and marketing of agricultural inputs.

In 2004, the Ministry of Agriculture and Rural Development (MoARD) created by proclamation No. 380/2004, merging the Ministry of Agriculture (MoA) and the MoRD. The powers and duties of the NAIA were transferred to the MoARD. Later on, the NAIA was dissolved. MoA is now agricultural input regulatory government body. The Ministry has developed Agricultural input marketing and distribution guideline in 2013 that showed the role and responsibilities of regions, zones and districts on seed, fertilizer, agricultural equipment’s, marketing, distribution, credit and collection system.

Private seed producers in seed industry is very limited in Ethiopia. Private seed sector is at its infant stage of development. Regional and national public seed enterprises are the dominant suppliers of both open pollinated and hybrid seed varieties in the formal seed sector. Currently with the support of Integrated Seed Sector Development in Ethiopia with mixed private and public oriented approach in boosting seed sector development emerges as a spring board to improve the seed system in Ethiopia.

The Integrated Seed Sector Development (ISSD) programme in Ethiopia is implemented by a consortium of partners including four universities (Bahir Dar, Haramaya, Hawassa, and Mekelle), Oromia Seed Enterprise, Ethiopian Seed Producers and Growers’ Association, and Centre for Development Innovation (CDI) of Wageningen University and Research Centre. The programme is implemented in four regions (Oromia, Amhara, Tigray and SNNPR) of the country in collaboration with several partners at national, regional, and local levels. The objective of the ISSD programme is to strengthen the development of a vibrant, market oriented and pluralistic seed sector in Ethiopia.

2.1. Seed System in Ethiopia

The National Seed Policy of Ethiopia currently focuses on increasing smallholder use of certified seed by three means. First, the production of enough certified seeds from pre-basic and basic seeds, second emphasizes the production of certified seeds at prices that farmers are able and willing to pay and finally, availability of certified seed so farmers can access them when needed. These factors determine quantities of seeds
used by farmers and how much land is planted with certified seeds. The specific objectives of the national seed industry policy are to: Streamline evaluation, release, registration and maintenance of varieties developed by national programs. Develop an effective seed production and supply system through participation of public and private sectors. Encourage participation of farmers in germplasm conservation and seed production. Create functional, efficient institutional linkages among seed industry participants. Regulate seed quality, seed import/export trade, quarantine and other seed-related issues. Whereas, there is no evidence that showed the national seed enterprise has been neither supporting nor producing horticultural improved crops except cereals and pulses. This shows the inability to correctly estimate horticultural crop seed quantities demanded and supplied implies that resources are not properly allocated.

On the other hand, studies show, for centuries farmers in Ethiopia have been using their own seed saved from the previous crop or informally from their neighbors in the community. Seed systems in Ethiopia can be divided into two broad types. Formal system and the informal system (sometimes called local or farmers system). Both systems are operating simultaneously in the country and difficult to demarcate between the two. There is however, a fact that the formal system is the original source of improved seeds in the informal system. There is also a system that interact the two systems which is referred to as integrated seed system. Other forms of seed systems operating in both systems also exist such as Community-Based Seed System (CBSS). Though not well developed, few commercial seed systems are also operating in the country.

In Ethiopia, the bulk of seed supply is provided through the informal system. Often it’s found to be extremely important for seed security implying that its importance in national seed security. Studies showed 60-70% of seed used by Ethiopian smallholder farmers is saved on-farm and exchanged among farmers, and the remaining 20-30% is borrowed or purchased locally. The informal seed system (either self-saved seed or farmer to-farmer seed exchange) accounts for 90% of the seed used by smallholder farmers, while the share of improved seed is less than 10%. Horticultural seed multiplication either in formal or informal is insignificant. Due to this irrigation farmer are often constrained by access to quality horticultural seed and their produce are low.

2.2. Seed System in Oromia

Both type of seed system is operating in Oromia i.e. formal, informal and community based seed system. Oromia Seed Enterprise (OSE) is established by the Government of Oromia National Regional State through the Regulation No 108/2008. OSE was established to ensure accelerated and sustainable economic development through the implementation of agricultural and rural development policy and strategy of the country by the production, processing and
supplying improved and market-oriented seeds of food and forage crops to farmers and agro-pastoralist. It is also providing a technical support for strengthening and building the small-scale farmers’ capacity for the production and commercialization of quality seeds in the region. As public enterprise, the Oromia Seed Enterprise has double responsibilities. It has a mission to fulfill the government obligation as well as operate as commercial entity. The government needs the enterprise to produce large quantity of low-profit self-pollinating crops including vegetable crops for strategic purpose to support the extension and food-security programs. As business entity, it has also expected to increase production and sales with the aim of achieving marginal profits in order to sustain within country’s seed industry. As the enterprise profile showed it is rarely possible to profitably supplying some crops like; vegetable and spices seeds required by government for strategic process. Due to this, there are limited activities done on horticultural crop seed multiplication. This is partly due to vegetable seed market volatility and inadequate storage facility. Similarly, other studies carried out by Oromia Agricultural Marketing Agency (OAMA, 2014) and Oromia Bureau of Agriculture and Rural Development (OARDB, 2014) indicated that limited work done on horticultural seed multiplication. Oromia seed enterprise is closely working with Integrated Seed Sector Development/ISSED i.e. Haramaya university on post-harvest seed processing technologies for enhancing quality seed production and institutionalization of seed quality advisory services. However, there is no abundant proof work done on horticultural crops seed production.

2.3. Seed Marketing and Distribution Key Opportunities and Challenges

2.3.1. Seed marketing and distribution opportunities

There are enormous unsatisfied seed demand in the country. There is also conducive and diversified agro-ecology to produce horticultural seed. Government support and emphasis to food security and the seed sector, policies and regulations, immense and fast growing seed demand (especially basic seed), diversified and sustainable market (i.e. seed, seedling etc) diversification, specialization and the support from Seed Growers and Processors Association (ESGPA) to strengthen the private seed producers in the country has substantial ground to engage in the business. There are strong unions and primary cooperatives i.e. manpower, budget, logistics, leadership and administrative that can assist input distribution and create access for stallholder farmers. In view of that, the assessment reviled private seed producers have a pronounced opportunity to join horticultural seed enterprise. Government and respective regional institutions should have capacity of manpower, material and equipment’s, logistics, well-structured administrative
system to undertake technical back up and inspection capacity.

2.3.2. Seed marketing and distribution challenges
The assessment showed even though, both vegetable and cereals has relatively cheaper and readily available in the farmer’s villages just at the time of seed is required; it is found that, the seed system has limitation and complex structural, institutional and operations associated challenges with the development, multiplication, processing, sorting, stuffing, storage, distribution and marketing system.

In sum the challenges could be summarized as production, marketing and partnership associated. Challenges related to production are poor quality controlling methods, basic seed shortage in terms of quantity, quality and variety, skill gaps in production and business management and the focus on few varieties specially hybrid maize, potato and Onion. The marketing problems stemmed from weak regulatory system and inadequate government involvement and support in seed distribution and price setting, low standard store for quality seed storage, access to credit and inaccessible road. Seed production requires integrated effort from the implementing partners such as research, extension policy makers and other. There is weak linkage between the partners in terms of technical support, seed policy, seed marketing, access to land and financial supports.

2.4. Fertilizer Supply system
Fertilizer procurement and marketing in Ethiopia has been debatable for some time now and has been identified as a major factor constraining smallholders’ fertilizer usage. Progress was made in the early 1990s, when the government seemingly opened fertilizer imports and distribution and adopted free market principles. The Agricultural Input Supply Corporation (AISCO), now the Agricultural Input Supply Enterprise (AISE), a government parastatal lost the monopoly of fertilizer trade in the country and all fertilizer subsidies were removed. The private sector responded rapidly to these reforms by 1996, several private firms were reported to be importing fertilizer and 67 private wholesalers and 2,300 retailers had entered the market and assumed a significant share of the domestic fertilizer market (Spielman et al, 2011; Matsumbo and Yamano, 2010).

However, shortly after liberalization studies revealed that because of trading policies that were heavily biased in favor of government affiliated companies and parastatals, private fertilizer firms could no longer compete and quickly exited the market. AISE is now in complete control of the fertilizer market and the sole importer and distributor of fertilizer in Ethiopia. AISE, in collaboration with the cooperative unions and the regional governments, has a control on importing fertilizer and is supported by a government guaranteed credit scheme and loans from commercial banks. Ethiopia’s
main channel to distribute and market fertilizers is through cooperative societies and regional governments no private agro-dealers.

Despite there is promising opportunities of fertilizer use and marketing there are several constraints. Weak fertilizer demand estimation and planning, poor fertilizer use/application, inadequate cost benefits based extension advisory services. This can be improved the capacity of respective structures starting from kebele to regional level input demand collection, planning and coordination capacity.

2.5. Agrochemicals Supply and Regulatory System

Plant Protection decree no 56 of 1971 was the first pesticide regulation in Ethiopia. According to this decree the Ministry of Agriculture was given the mandate to control the importation, production and sale of pesticides in the country. This decree lacked the necessary details and latter Pesticide Registration and Control Special Decree no 20/1990 was issued and has been implemented. Until pesticide Registration and Control Proclamation No 674/2010 was ratified. The decrees of agrochemical and pesticides are done often due in order to conduct registration and control of all types of pesticides under one legislative control through MoA.

Agrochemicals used in agriculture, including chemical fertilizers, herbicides, and insecticides. Most are mixtures of two or more chemicals; active ingredients provide the desired effects, and inert ingredients stabilize or preserve the active ingredients or aid in application. Every year nearly 30% of the potential of cereal & 10-15 % of horticultural crop production is lost due to insects, pests, plant pathogens, weeds, rodents, and birds and in storage. Hence the use of pesticides has become extremely necessary.

Adami Tulu Pesticide Processing SC, the sole pesticide producer factory in Ethiopia. The company is Governmental organization situated in Oromia region. The factory was established in November 1998. It is objective is to poise extreme inflation of agrochemical price and set equilibrium. It produces fugal and pesticides chemical in fluid or powder form. It works closely with Ministry of agriculture and plant clinics. The factory also imports herbicides from China and distributes to farmers, cooperatives, unions, government institutions.

Given the large scarcity of agricultural resources, agro chemical/pesticides are little used except for dealing with the migratory pests, particularly armyworm, desert locust, quelea bird and localized insect swarms in Ethiopia and particularly in Oromia. Studies showed largest users of agrochemicals are the few large-scale government-operated farms, particularly those growing wheat and barley in Bale and Arusi areas. However, smallholder horticultural production from small-scale irrigation systems is expanding and the farmers are making increasing use of chemical inputs. The continuing introduction
of HYVs is also attracting pests and chemical control is being made available to farmers. The use of pesticides is often with little or no understanding of either how to store them safely, or how to mix and use them correctly.

There are numerous public and private agrochemical importers and distributors in the region. Currently license and registration of private agrochemical enterprises is given by MoA. It is a regulatory body.

The assessment demonstrated there exists amorphous agricultural input regulatory system. Agrochemical import checkup is limited to physical counting, proving expiry dates and merely done at arrival. There is no consistent chemical quality test. Efficacy test is not reliable and weak legal framework. This provides for chemical package abuse, adulteration, sale of obsolete chemicals and use of ineffective pesticides and anti-fungal chemical. Which gradually have serious human health and environment impact debris. Major problems associated with pesticides is their disposal, lack of trained personnel, facilities and funds to get rid of obsolete pesticides.
3. Irrigation Agriculture input supply system assessment finding

This part of the assessment finding report presents key findings of the study under three sub sections. The first sub section showed in the table hereunder presents identified Strength, Limitation, Opportunities and Threats/SLOT of input delivery system. By similar fashion of presentation table two shows the role of different actors with regard to agricultural inputs delivery, marketing and distribution system. The third sub section narrate the implication of current input/service delivery system is analyzed from the perspective of policies, strategies and institutional arrangement.

Table 1. SWOT Analysis

<table>
<thead>
<tr>
<th>Strength</th>
<th>Limitation</th>
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<tbody>
<tr>
<td>• There is seed &amp; agrochemical verification and regulatory system</td>
<td>• Structural problem to put effective regulation on agricultural</td>
</tr>
<tr>
<td>• Availability &amp; increasing of private and public cereal and</td>
<td>input marketing, distribution and use.</td>
</tr>
<tr>
<td>Horticultural seed and fruit seedling producers. E.g. Maize, onion</td>
<td>• Futile agricultural inputs demand collection and leftover</td>
</tr>
<tr>
<td>and apple</td>
<td>• Low quality and quintets of produce, market and distribution challenge</td>
</tr>
<tr>
<td>• Cooperatives and union created access to seed, agrochemical,</td>
<td>• Agricultural parastatals are pro rain fed agriculture input</td>
</tr>
<tr>
<td>fertilizer and seedling production.</td>
<td>supply and distribution system (e.g. inventory, punctuality in</td>
</tr>
<tr>
<td>• Government emphasis on irrigation and agricultural inputs supply</td>
<td>distribution)</td>
</tr>
<tr>
<td>and quality</td>
<td>• Weak planning skill and supervision</td>
</tr>
<tr>
<td>• Few private companies started extension services and expanding</td>
<td>• Shortage of improved varieties and inadequate supply of good</td>
</tr>
<tr>
<td>Farmers service center/FSC.</td>
<td>quality breeder and basic seed mainly for horticultural crops and</td>
</tr>
<tr>
<td>• Both formal and informal seed system is operating</td>
<td>ornamentals/spices.</td>
</tr>
</tbody>
</table>
- The relatively synergy between bureau of agriculture, private input suppliers and OIDA helped agricultural input planning and importing and distribution
- There is somehow seed multiplication monitoring, testing, verifying and certifying by seed verification committee is composed of users and technical staffs
- Private sectors and small holder farmers engaged in seed multiplication income has raised
- Relatively there is Research Extension Farmers linkage improvement in some areas due to ADPLAC

- Limited technical and managerial expertise and experience for efficient and economic production of quality seed.
- Absence of specialized seed farms for seed production of horticultural crops.
- Inadequate coverage of economically important/high value crops such as pulse, oilseed& horticultural crops.
- Low level participation of the private sector in the national seed industry development
- Inefficient irrigation inputs distribution system such as seed, fertilizer, agrochemical (i.e. few sales centers, limited retail dealers or concentrated in few towns).
- Absence of effective sales promotion and marketing
- Low quality of seed offered for sale, mainly for vegetable seed and hybrid maize.
- Poor quality and mixture of seed resulted low production, quality, deteriorate reliability
- Germination and purity problem in horticultural crops
- Package problem
- Inadequate and poor warehouses
- Adulteration
- Weak communication and integration among agricultural inputs suppliers, marketing and distributers
- Weak reporting system on irrigation input utilization (e.g. fertilizer and improved seeds, pesticides)
- Weak regulatory system and low capacity
- Scarcity of basic seed
- Inadequate facilities storage, road, communication etc
<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Supportive Policy and strategies are available</td>
<td>o Agrochemical disposal system</td>
</tr>
<tr>
<td>o Increasing and growing Demand</td>
<td>o Agricultural inputs price volatility</td>
</tr>
<tr>
<td>o Horticultural crop and agricultural investment demand</td>
<td>o Black marketing and side sellers</td>
</tr>
<tr>
<td>o Expansion of Irrigation and supportive policies</td>
<td>o Unavailability of Hard currency</td>
</tr>
</tbody>
</table>

- o Side sellers and too many brokers with no add value on the products
- o Shortage of hard currency and agricultural input tax
- o Marketing at dumping/clearance price
- o Unreliable climatic conduction
- o complex regional procurement procedures
- o Absence of pesticide management code of conduct
- o Research institutes have budget deficit to produce basic seeds
- o Low number of irrigation schemes (some irrigation schemes are totally not functional), poor and traditional agronomic practices deters agricultural input use
- o Knowledge and skill gap on input provision, marketing and distribution at different level.
- o Uncompetitive seed industry uncompetitive
- o weak irrigation water user association and linkage with irrigation input providers and distributors
- o Weak Agricultural Development Partners Linkage Council/ADPLAC
- o Lack of integrity among irrigation actors and weak accountability among public agricultural input business companies/enterprises
- o Difficulties of research finding patenting
- Availability of strong primary cooperatives and unions would ease marketing and distribution system
- Availability of research, private agricultural input importers and distributors, agrochemical factories, plant clinics
- Availability of ADPLAC

Data source: key informant interview

Table 2. Role and responsibilities of key actors in Agricultural input supply and distribution

<table>
<thead>
<tr>
<th>Actors</th>
<th>Roles</th>
<th>Strategic interest</th>
</tr>
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<tbody>
<tr>
<td>Ministry of agriculture</td>
<td>▪ Policy and strategy support for program implementation&lt;br&gt;▪ Regulatory role&lt;br&gt;▪ Technical backstopping</td>
<td>▪ Strengthening implementation capacity of regions&lt;br▪ Improving agricultural production and productivity&lt;br▪ Achieve food security and surplus production for export&lt;br▪ Develop commercial agriculture</td>
</tr>
<tr>
<td>Regional Agricultural bureaus</td>
<td>▪ technical and strategic support for zone &amp; districts to strengthen program implementation&lt;br▪ support successful meeting of GTP plan implementation&lt;br▪ support and monitor private agricultural input supplier and investors&lt;br▪ Ensure that researchers and research programs generate suitable technologies focusing on farmers’ priority needs and constraints in their work plan or research agenda.&lt;br▪ Ensure timely collection of agricultural inputs, multiplication and distribution of generated agricultural technologies</td>
<td>▪ strengthen program implementation capacity of zone &amp; woreda agricultural bureaus&lt;br▪ Improving commercial agricultural (increase production and productivity) in the region&lt;br▪ Achieve food security and surplus production for export in the respective region</td>
</tr>
</tbody>
</table>
| Zonal agricultural bureaus | Ensure effective technology dissemination  
|                          | Create necessary conditions for researcher and extension staff generating technologies and verifying the adaptability, profitability and sustainability of the technologies.  
|                          | Update technological database regularly, formulating location specific extension recommendations, and enhancing the transfer, adoption of the technologies, and monitoring their impacts.  
|                          | Identify agricultural development interest and potential of the area  
|                          | Ensure zonal plan streamline with regional and national GTP  
|                          | Monitor and coordinate agricultural development partners (e.g. research, investment etc)  
|                          | Facilitate communication between regional bureaus and district agricultural offices, through compilation of performance reports  
|                          | Monitoring and evaluation of extension program being implemented by district agricultural offices  
|                          | Create necessary conditions for researcher, extension staff and farmers to participate in identifying researchable problems, generating technologies and verifying the adaptability, profitability and sustainability of the technologies under farmers’ circumstances.  
|                          | As zonal agricultural offices functionally representative of the regional bureaus, their strategic interest in delivering agricultural advisory service is same as the regional bureau |
| **Woreda agricultural offices** | - Prepare and implement extension program implementation plan  
- provide services to farmers  
- collect and report agricultural inputs demand on timely manner | - Build technical capacity of farmers through provision of agricultural advisory services to increase production and productivity |
| Research Institutions (Federal and regional) | - Generate agricultural technologies and conduct Small scale technology popularization (pre)  
- Participate in package development  
- Participate in the capacity building activities | - Verifying technologies, introducing newly generated technologies to contribute to increased production and productivity through adoption of technologies |
| Universities | - Generate agricultural technologies and conduct Small scale technology popularization in the vicinity.  
- Participate in package development | - Verifying technologies, introducing newly generated technologies to contribute to increased production and productivity through adoption of technologies |
| Private enterprises | - Provide technical advice and supply inputs (seeds, chemicals and equipment) through contractual farming arrangement | - Profit Oriented-Purchase agricultural output at required quality and quantity from targeted farmers through contractual arrangement (eg. Mushroom processors, agro-chemical suppliers) |
| NGOs | - Piloting best practices and testing methods and approaches to agricultural extension  
- facilitate access to technologies and market (pilot level) | - Building local capacity and facilitation and capacity strengthening for public extension service giving organizations |
| Farmers’ organizations/CBOs | - Provide input supply services, such as seed fertilizer, financial services, storage and transport.  
- facilitate delivery of services to members | - Serving members interest towards the goal of increased agricultural production and productivity. (eg. irrigation and multipurpose cooperatives) |

Data source: key informants and dusk review
3.1. Key Analysis of Irrigation Agriculture Input Provision System

This section focuses on irrigation input supply constraints and its implication as it related to the purpose of the assessment; to identifying the challenges and opportunities of irrigation input supply and distribution system. In due course it descends to the aim of creating strong public private irrigation input supply linkage that aligns with the regional and national policy and strategies frame work.

The assessment key findings in Table 1 demonstrated that, there exists seed and agrochemical regulation system which is managed by Ministry of Agriculture. There is growing interest on investment of cereal and horticultural crop seed multiplication, marketing and distribution by smallholder farmers, cooperatives and unions. This helps to improve seed provision access and efforts made to satisfy the enormous seed demand.

Emphasis has been given to food security where Horticultural and seed sector policies are included. It is found that there is an increasing number and interest of public companies’ engagement in irrigation investment and input supply. These improves and accelerate technology adoption, innovation result transfer process and thereby enhances extension services. MoA delivers policy and strategy support for program to implementation regulatory role and provides technical backstopping. These helped to strengthen implementation capacity of regions and contributed to food security and contributed to surplus production of exports on selected crop types. Regional institutions monitor agricultural input planning, distribution and marketing. Formulate location specific extension recommendations and enhance adoption of the technologies. NGOs, civil society institutions/CSOs and public institutions to some extent are involved in piloting irrigation technologies, assist improvement on irrigation input supply services, such as seed, fertilizer, financial services, storage and transport. Union and cooperative facilitate delivery and distribution of agricultural input to their members. Piloting best practices and testing methods and approaches to agricultural extension and facilitate access to technologies and market.

Whereas there are several challenges that daunt irrigation input supply system. Input provision system challenge begins with at the time and place of demand collection. If either of these are deceived it entails, there is no effective agricultural (mainly irrigation) input demand collection. Effective demand exists if demand data is based on willingness and ability to pay by the fellow framer or else It will lead to yearly left over of inputs. This will discourage providers in many aspect and causes damage, lost, reduce qualities etc. more often than not, grass root level extensionists deliver merely estimate of the annual agricultural inputs utilization and mostly disregard irrigation inputs that ensued difficulty to track irrigation sector input demand by types, utilization rate and time.
In such settings under or over supply of inputs is certainly to happen. Both have limitation in such a way that the under supply of inputs involves low productivity of irrigation land or opportunity cost of holding hard currency as much of the inputs are imported. In such situation input supplying agencies and government are found themselves in risk as it holds development currency. Agriculture input demand has been collected once per in a year the input demands for rain fed and for irrigation agriculture. These two agricultural activates are carried out at different season of a year. Nonetheless, these two activities are managed with totaled demand collection and aggregated supply of inputs.

Service provision for effective irrigation development needs coordination of different stakeholders. Demand for inputs is supposed to be created by training of farmers by different level of irrigation development authority and development agent provide irrigation service provision. Collected demand data has been submitted to different level structure of cooperative offices. Cooperative agency offices are sumitted the data to unions that supply inputs from Agriculture input supplying Corporation (AISCO). However, this system is not as such practical due to loose linkage among these actors.

Most horticultural crop seeds, pesticides and herbicides are imported from foreign country by homeland legal importers. Ministry of Agriculture frequently check imported items and notify to Oromia Irrigation Authority by letter and the Authority also notify zones Irrigation Authorities respectively who import what. Zones Irrigation Authorities also notify district authorities and cooperative agencies of zones and districts. Albeit such strong linkage among legal importer and distributors is missing. Few importers and distributors look taking the advantage of these and embark to work with non-legal distributors. Therefore, most seeds and agrochemicals distributed by these agents are blended with undesirable qualities and quantities that affect farmers to produce low quality horticulture products and poor market price. Irrigation seeds and agrochemicals are strategic inputs that enables to realize the country’s strategic goals. They are not a material simply let to market mechanisms. When farmers buy agrochemicals and equipment’s from illegal distributors they could not get guarantee and services instruction when and how to apply /use agrochemicals, seeds, irrigation equipment’s. These is partly because of lack of proficiency. Therefore, these led to erroneous use of inputs which are may be invalid from the very beginning.

According to OIDA,2014/15 report current vegetable production is 128qt/ha while there exist potential to produce 368qt/ha using appropriate inputs such as seed, agrochemicals and recommended agronomic practices. This implies there is a loss of 240qt/ha. The production loss is worst when compared to research findings that reaches vegetable production of 474qt/ha that shows a loss of 329.4qt/ha. Corresponding production loss is also recorded as compared to potential production capacity of root crops, fruit and spices per hectare in these order 392qt/ha, 310qt/ha and 14qt/ha.
The constraints could be generally conceded as production and distribution, marketing and partnership associated. Challenges related to production are poor/loose regulatory/system that directly affect basic seed production, quality of agrochemical and fertilizer. Structural problem to put effective regulation on agricultural input marketing, distribution and use. Futile agricultural inputs demand collection and leftover. Low quality and quantities of produce, market and distribution, agricultural parastatals are pro rain fed. Skill gap in production and business management and the focus on few varieties specially hybrid maize, potato and Onion. The market problems emanated from weak regulatory system and inadequate government involvement and support in seed distribution and price setting, low standard store for quality seed storage, access to credit and inaccessibility. Regarding partnership and distribution there is weak coordination, logistic problem apart from difficulties of accessibility.

Generally, the assessment demonstrated there exists weak agricultural input regulatory system. There is no reliable efficacy test of agrochemical. This resulted seed and chemical package manipulation, adulteration, marketing of obsolete chemicals & seeds, use of futile pesticides and anti-fungal chemical that would bring serious human health and environment impact debris unless the regulatory system is strengthened.

The linkage among key partners is constrained by technical efficiency, accessing market information, and finance

This can be improved through institutional capacity development, strengthening decree and implementation of regulatory policies. Creating institution based marketing, improving quality controlling parameters and strong monitoring. Providing planning skill improvement panacea to zone and district experts and DAs and assist them to provide market lead extension advisory services.

In general, this call for more thorough strategic intervention planning. The intervention strategy could be short-term, midterm and long-term.
4. Conclusion and Recommendation

4.1 Conclusion

There is a wide-ranging increasing trend for development of the horticultural sub-sector partly due to increasing demand emanating from increasing population, urbanization, increased awareness of on nutritional and health importance of horticultural crops like vegetables and fruits. This has triggered increased demand for good quality seed, agrochemical and fertilizer market. The demand for agro-processing and export of vegetables is also quite substantial. Ethiopia has diverse agro-ecologies for production of cool season vegetables like cabbage, onion, carrot, beetroot, Swiss chard, kale and Ethiopian mustard and warm season vegetables like tomato, chili and sweet pepper as well as green beans. The high demand for horticultural products, availability of suitable agro-ecology, and increasing irrigation schemes development focusing on vegetable and fruit production through irrigation, have resulted in increased demand for quality inputs e.g. seeds of improved varieties of various vegetable crops so as to serve further boost in local production, albeit with increased investment.

Increasing number of international and local private agents are introducing, getting tested and registered commercial vegetable varieties in Ethiopia, which, in turn, is increasing the chance of boosting vegetable production using high yielding improved varieties, seeds of which can easily be imported and/or produced in the country. Increasing number of agro-companies are
importing and distributing commercial vegetable seeds in the country. Since there are a number of stockiest in different parts of the country, the imported seed is easily distributed to the major vegetable producing areas and respond easily to the vegetable seed demand. However, good quality seed is still lacking due to different factors: limited policy implementation capacity (e.g., facilities such as laboratory, logistics, and budget) and capability (knowledge and skill gap). Similarly, there is limited capacity of public sector vegetable breeding program to develop and release seeds that are more adapted to specific agro-ecologies in the country as well as for effective vegetable seed production and distribution, extension services and weak linkages and integration among value chain actors. A number of opportunities and constraints influenced the development of vegetable seed system and vegetable production and marketing in Ethiopia. Fully exploiting the opportunities may result in minimizing the underlying challenges. The findings of the study have the following implications to enhance the supply of quality vegetable seed and substantially contribute to increased productivity. A similar scoping study has assessed opportunities and constraints for future economic development of sustainable horticultural inputs particularly seed businesses. The results indicated that domestic horticultural crop production is limited by poor access to improved inputs, seed varieties, quality seed and technical assistance, among others.

4.2. Recommendations

On the basis of the analysis and conclusions from the study, the following recommendations are proffered. There is an urgent collective need by the government respective institution in this case OIDA, development agents and the private sector to:

- Strengthen the horticultural and cereal crop seed quality control and assurance system to ensure inspection and certification of irrigation inputs. Especially vegetable seeds and agrochemicals.
- Improve public and private engagement in horticultural crop e.g. vegetable and fruit technology generation, seed multiplication, marketing and distribution.
- Promote public-private partnership/linkage among key public and private irrigation input importers, venders and distributers companies.
- Develop clear regulation and directives for registration of commercial irrigation inputs especially horticultural crop seed varieties by private investors so that more number of varieties of different vegetable and fruit crops can be introduced and produced in the country and prepare clear guidelines for the importation and distribution of quality vegetable seed to meet demand adequately.
Increase public and private sector investment in irrigated vegetable production to increase the supply of vegetable, which in turn will increase the demand for vegetable seed, fertilizer and agrochemicals.

Capacity building is needed at all levels, including Ministry of Agriculture staff, Ethiopian seed enterprises, seed growers and other stakeholders, as well as training in better seed demand assessment and forecasting techniques.

Improve farmers’ market orientation with respect to a particular high value crops and planning of annual irrigation agriculture inputs.

Provide extension advice on seed production, processing, treatment and storage.

Developing a legal framework that permits marketing of certified and uncertified seed of acceptable/standardized/ genetic purity, germination quality and moisture content.

Regulatory system should be guided by certain standardized variables like: testing, registration, trading practices, labeling, packaging, storing, availability, advertising, distribution, residue and disposal systems.

Inspection of agrochemical products and records by authorized inspector (taking samples, noting the legality of the labels, checking bag, weight, inspection record etc)

Financing the regulatory program through registration fees and inspection/tonnage fees.

Administration, enforcement and assessment of penalties by a designated authority.

Training of zone and district public and private extension staffs to undertake reliable input estimation. This could reduce leftover and storage problem. Besides it reduces price escalation and control obsolete input marketing.

Agricultural Research institutes that conduct horticultural crop seed development should be financially assisted to generate basic seed so that seed enterprise, unions and cooperatives could multiply quality seeds under strict follow up and technical back of seed certifying committee and extension staffs.

Expanding Commercial Farmers Service Center/CFSP I.e. one stoppe shops. to improve smallholder productivity, food security and incomes through the development of sustainable, private-sector driven agricultural input supply and services. Retail farm supply and service locations that include inventories, training, services and output market linkages.
➢ Create functional and efficient institutional linkages among seed industry participants.

➢ Regulate seed quality, seed import-export trade, quarantine and other seed related issues.
5. References


Georges, D., 2013. Improving agricultural Input Supply system in sub Saharan Africa.


