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Cluster Development Programs in Ethiopia: Evidence and Policy Implications

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This publication presents findings of the project report marking the end of preparatory assistance phase of the UNIDO project “National Cluster Development Framework for Ethiopia” based on the work of the Business, Investment and Technology Branch of UNIDO. Comments and suggestions on issues raised in this report are welcome and may be addressed to Adnan Seric at a.seric@unido.org.

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1. Introduction

Cluster development programs have become increasingly widespread tools in fostering innovation and growth of a competitive private sector in developing countries, including Ethiopia. Naturally emerged clusters of micro- and small-scale enterprises (MSEs) are predominantly common in Ethiopia in traditional and labor intensive sectors in rural and poor urban areas. This has attracted the interest of policy-makers and various development organizations such as UNIDO to promote such clusters because of the direct impact they have on poverty. A cluster based development has also been given a top priority in the country's current five years Growth and Transformation Plan (GTP) as the main tool for spurring income and employment growth among MSEs.

Owing to the existing policy enthusiasm to promote clusters, this report will provide additional background information to assist the ongoing efforts by the government and UNIDO and highlight possible potential avenues for intervention and investment targeting. The report reviews the relevant literature on cluster development, discusses specific case study evidence for Ethiopia, and provides explorative evidence from more aggregate data on overall colocalization of enterprises in Ethiopia.

More specifically, the report provides a general background on cluster development concept, the advantages of industrial clusters and the rationale for cluster development interventions in Section 2 and 3. A brief discussion of the MSE sector and clusters in Ethiopia is provided in Section 4. In Section 5, different past and ongoing cluster development programs in Ethiopia that are implemented both by UNIDO and the government are discussed. These programs will be presented in detail and lessons learnt will be drawn. In Section 6, we use more aggregate data to chart the localization of firms across different regions in Ethiopia to provide an overall picture of colocalization of firms across the country. We also present some evidence on characteristics of such locations, in terms of overall firm size, productivity, and linkages with the local economy. Section 7 summarizes the main findings of the report and provides some conclusions and policy recommendations for further integration of the cluster development methodology in to the national development processes.

2. The private sector in Africa and the role of industrial clusters

The private sector is often listed as a key driving force for industrialization in Africa in the development literature. A critically important role is played by micro- and small-scale enterprises (MSEs), which constitute the lion's share of the private sector in Africa. MSEs account for more than 90 percent of all firms outside of the

agricultural sector and 50–60 percent of the off-farm employment in Africa (Yoshino 2011). Promoting entrepreneurship in MSEs and stimulating their growth is viewed as a key instrument in poverty reduction efforts both by development agencies and policy-makers.

Despite their large employment contribution, MSEs are characterized by low productivity and constitute an insignificant share of the commercial output in most African economies (Yoshino 2011). MSEs often operate in the informal part of the economy and they do that side by side with a small number of very large firms that are mostly foreign owned, capital intensive and have better access to geographically wider markets (Bigsten and Söderbom 2006). The dualistic nature of the private sector in Africa is an indication of the “missing middle,” where we do not often see MSEs gradually growing into middle size firms and eventually larger ones.

Studies show that MSEs in Africa face various constraints ranging from costly business environments with high taxes and restrictive regulations, to lack of access to markets and finances, limited ability to acquire skills and managerial expertise, low access to appropriate technology and poor access to quality inputs and business infrastructure. Most of the constraints faced by MSEs are aggravated by the fact that they often operate in isolation across dispersed locations, which exacerbates the disadvantage of being small in size. The 2009 World Development Report characterizes the private sector in Africa as being in a “proximity trap,” which is manifested through weak agglomeration forces and high transportation costs (World Bank 2009). Weak agglomeration can result in loss of external scale economies that could hinder firms from gaining “sufficient scale to work efficiently” (Collier and Venables 2008). Such loss is particularly important for MSEs in Africa that generally operate in thin, fragmented and uncompetitive local markets compared to large firms (World Bank 2009).

One mechanism that can enhance scale advantages in smaller firms is clustering (Fujita and Thisse 1996; Krugman 1991, 1998). Industrial clusters are generally defined as the geographic concentration of economic activities within a certain sector producing similar and closely related goods. Clusters have gained increasing prominence in industrial and innovation policies throughout the world due to the established fact that agglomerations provide the following scale advantages to enterprises that belong to them. Clusters provide inputs, specialized labor and various services in nearby location that help **reduce costs of doing business** within clusters. Industrial clusters further promote division of labor between small and specialized firms that help to **raise collective innovation potential and interfirm cooperation**, fostering learning and innovative advantages. The presence of various actors, such as producers, machinery and input suppliers, traders and buyers in nearby locations helps **facilitate easy flow of knowledge and information exchange** among enterprises, which can allow them to pool resources and efforts

together for the achievement of shared economic goals. In general, industrial clusters can **lead to larger markets** enabling enterprises to operate at a larger scale arising from the division of labor within clusters.

In general clustering has two dimensions (Martin and Sunley 2003). One is the **functional dimension** that includes local interfirm linkages and forward and backward linkages with interconnected agents like input suppliers and output buyers. Such linkages often result in social interrelationships that are manifested through trust and collaborative networks that develop over a long period of time. The second one is the **physical dimension** that indicates the physical location of enterprises close to each other (geographic proximity) in the cluster. While geographic proximity help promote the functional dimensions of clustering, it alone does not provide a direct view about the nature and strength of local interfirm linkages and social networks (Martin and Sunley 2003).

3. The rationale for cluster development programs

There are a number of successful clusters in the developed world such as the electronics, multimedia, and cultural products agglomerations in California (Scott 1996), the technology-intensive industrial regions in Baden-Württemberg, Germany (Sabel et al. 1989; Herrigel 1993), software and telecommunications equipment in Ireland (Gallagher et al. 2002; Görg and Ruane 2000) and machine tools networks in Northern and Central Italy (Paniccia 1998). Dynamic clusters are a widespread phenomenon not only in the developed nations but also in developing economies. The wine cluster in Chile, the surgical instruments cluster in Pakistan, the cotton knitwear cluster of Tirupur in India, and the footwear cluster of the Sinos Valley in Brazil are few examples of the many cases of successful clusters in developing economies. These dynamic clusters are able to establish themselves into regional and global markets, record high growth rates and are able to generate wealth and prosperity to those operating in the clusters.

Despite these shining examples, a considerable number of clusters in developing countries and especially in Africa are lagging behind, with their potential to contribute to the development of local communities remaining largely untapped. The existence of industrial clusters "... does not necessarily imply that these clusters share all the stylized facts that identify the Marshallian type of district." (Giuliani et al. 2005: 552). This indicates that while clustering has the potential to facilitate industrialization through collective efficiency, it is not always realized in the real world. While some positive externalities are expected to automatically accrue to clustered enterprises, in the case of underperforming clusters, however, these benefits are often weighted against considerable disadvantages and market failures (Altenburg and Meyer-Stamer 1999).

Examples of market failures that may arise in clusters are coordination problems and inability of actors to initiate or sustain interlinkages and joint actions among cluster actors; information asymmetry, and suboptimal knowledge creation and diffusion, which can prevent spontaneous clusters to emerge or to reach their optimal size. The standard rationale for cluster development program or intervention is, therefore, to support and upgrade lagging clusters by promoting the supply of local and regional services that cannot be provided by the market itself.

4. MSEs and industrial clusters in Ethiopia

Following the current MSE strategy of Ethiopia, MSEs are defined as follows. An enterprise is considered as micro if it is employing less than 5 people and has a total asset that is worth at most 100,000 ETB and 50,000 ETB if it is operating in the manufacturing and service sector, respectively (FRDE 2011). An enterprise is considered as small if it is employing from 6 up to 30 people and have an assets that is worth at most 1.5 million ETB and 500,000 ETB if it is operating in the manufacturing and service sector respectively (FRDE 2011).

As in the case for many African countries, MSEs in Ethiopia have substantial coverage in the private sector. Increasing landlessness and declining absorptive capacity of the agricultural sector for the increased labor force in Ethiopia, together with limited growth in employment in the public sector has resulted in substantial number of new job seekers to turn to MSEs as the main source of livelihood. According to an estimate by the Ministry of Trade and Industry in 2004, the number of people earning their livelihood from MSEs in Ethiopia was eight times larger than those engaged in medium and large scale industrial establishments (MOTI 2004). Moreover, MSEs in Ethiopia are estimated to account for 88 percent of the private sector employment, which depicts the high share of MSEs in the general labor force (FDRE 2011).

According to a survey conducted by Central Statistical Agency (CSAE) in 2002/2003, within the MSE sector, microenterprises (handicraft and informal operators) account for 99.8 percent of total establishments, 99.6 percent of employment and 94.7 percent of gross value of production and 95.1 percent of the value added. The survey show that 89 percent of the MSE operators are concentrated in manufacturing, trade, hotel and restaurant activities. Among the manufacturing sector, production of textile, food and beverage processing, production of leather products including foot wear and manufacturing of wood and wood products account for more than 70 percent of the MSE establishments in Ethiopia (CSAE 2003).

Table 1: Definition of MSEs in Ethiopia

Level of the enterprise	Sector	Number of people engaged	Total asset in Ethiopian Birr (ETB)
Micro enterprise	Manufacturing	≤5	≤100,000 ETB
	Service	≤5	≤50,000 ETB
Small enterprise	Manufacturing	6–30	≤birr 1.5 million ETB
	Service	6–30	≤birr 500,000 (US\$30,000)

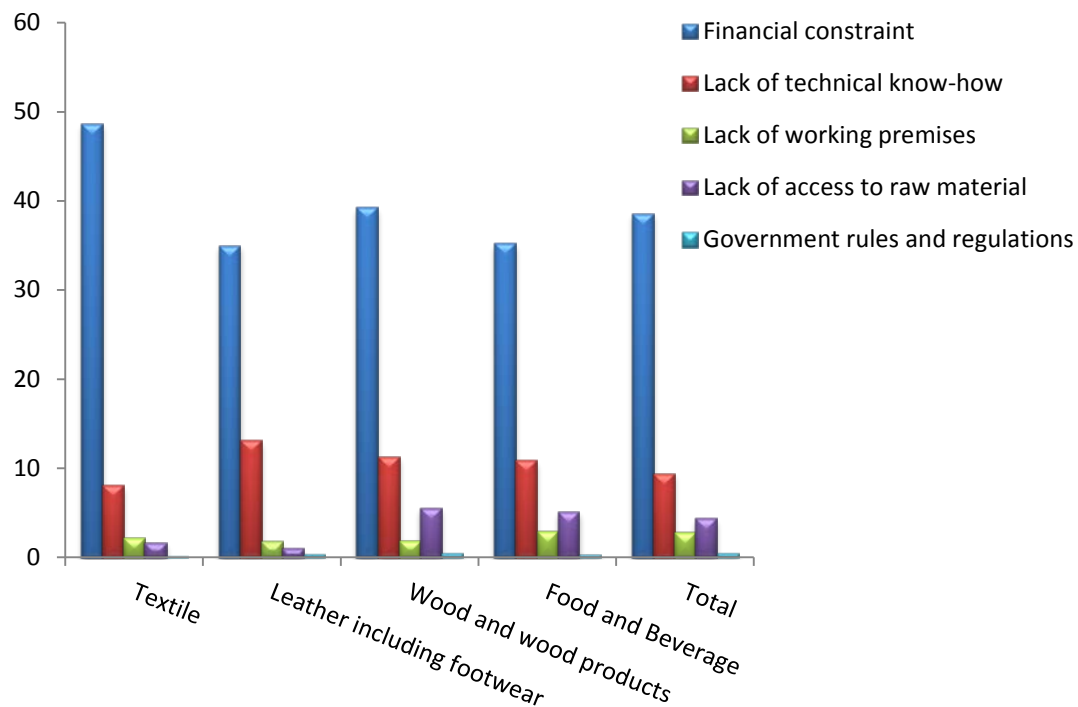
Source: FDRE (2011).

Despite MSEs contribution to employment, they face various constraints while operating their business. Figure 1 shows the major constraints MSEs face for selected manufacturing sectors in Ethiopia obtained from the survey. Financial constraint is by far the most important problem that MSEs face during the operation of their business. On average, close to 39 percent of MSEs in the four sectors identify financial constraints as the major constraint that they face. This is followed by lack of technical know-how to run their business by close to 10 percent of MSEs. Lack of access to raw materials is also mentioned as a major problem by almost 5 percent of MSEs in the four sectors. Lack of working premises is mentioned by 3 percent of the MSEs as the major problem, while government rules and regulations are mentioned by less than 1 percent of the MSEs.

Industrial clusters for MSEs are common phenomena in Ethiopia. The most common types of clusters in Ethiopia are natural clusters that spontaneously grow out of market forces over a longer period of time. Although the exact number of natural clusters in Ethiopia is not known, they are commonly found among labor-intensive manufacturing sectors and are mostly located in urban centers, rural towns and touristic areas. Some examples of such clusters are the footwear cluster in Mercato, Addis Ababa; the metal and wood work cluster in Mekel; the bamboo work cluster in Hawassa; and the handloom cluster in Addis Ababa.

There are both dynamic and lagging or survival natural clusters in Ethiopia. One example of dynamic natural clusters in Ethiopia is the footwear cluster in Mercato, Addis Ababa. In their study, (Sonobe et al. 2006) identifies this cluster as an “exceptionally successful case in Africa” because of its remarkable recovery from an intense competition from imported Chinese shoes in the late 1990s. At that time, the number of producers in the cluster was estimated to be only 500 (van der Loop 2003). The number of producing firms increased substantially after the recovery and reached about 1,000 in 2005 (Sonobe et al. 2006) and is currently estimated to be 1,500.

Figure 1: The most-important problem faced by MSEs for running their business (percent)



Source: Compiled based on data from Cottage/Handicraft Manufacturing Industries Survey, 2002/2003.

The reason behind the recovery of the cluster is the continuous innovation and learning efforts made by enterprises in the cluster, which are facilitated through the existing networks and knowledge linkages in the cluster (Sonobe et al. 2006; Gebreeyesus and Mohnen 2011).

As there are dynamic clusters, there are also lagging or survival clusters in Ethiopia. One such example is the Shiro Meda handloom cluster in Addis Ababa. The cluster, which has been operating for decades, constitutes close to 6,000 enterprises (Alemayehu 2006). A case study conducted on the cluster indicates that, although there are some advantages that enterprises automatically gain from operating close to each other such as the availability of large markets and the flow of tacit knowledge, the cluster is unable to grow in to a stage where rich competitive advantages can be found (Ali 2007). The typical features of an industrial cluster, such as a high degree of specialization and interfirm cooperation are weak in the cluster and there is low level of trust between enterprises and low willingness to cooperate (Ali 2007). According to interviews conducted in the case study, the main reason for low level of trust is associated with the culture of imitation that makes enterprises reluctant to share information, which has undermined enterprises' potential to innovate.

In addition to natural clusters, government created clusters also exists in Ethiopia. Government created clusters especially for MSEs are recent phenomenon in Ethiopia that have begun to be established starting from 2003. These clusters are established with the core intention of alleviating the working premise problems faced by MSEs. A detailed discussion about the types of existing government created clusters in Ethiopia and their characteristics is presented in Section 5.2.

5. Cluster development programs in Ethiopia

5.1 UNIDO's cluster development approach

UNIDO has been actively assisting MSE clusters in many countries in Africa, Latin America and Asia starting from the mid-1990 (UNIDO 2010a). The main objective of UNIDO's cluster development program is not to create new clusters but rather to provide assistance to underperforming clusters by initiating joint actions among enterprises in the cluster and various institutions. UNIDO's cluster development program is unique from cluster development programs that are currently being implemented in industrial nations such as European countries¹, in that UNIDO's approach rely more on cluster development agents (CDAs) for the implementation of the program (UNIDO 2010a). CDAs are specifically trained in the field of enterprise/cluster diagnostics, conflict management and resolution, network building, and project management and evaluation. CDAs operate as impartial brokers among cluster actors and help them share information and coordinate their endeavors. These brokers work on a daily basis in a specific cluster supporting all stages of technical assistance starting from the formulation of a diagnostic study to organizing and coordinating collective activities and promoting and coaching business networks.

Through the employment of CDAs, the cluster development approach of UNIDO tries to initiate assistance to clusters by:

- **Building trust** in order to enable cluster stakeholders with different or conflicting interests to work together.
- **Fostering cluster governance** in order to ensure the sustainability of cluster initiatives. This refers to teaching cluster stakeholders about the organizations, norms and values that facilitate joint actions and sustain collaboration over time.
- **Promoting business networks** among entrepreneurs who share commercial interests and work together towards shared objectives. Such network can be created both horizontally among similar enterprises and vertically through buying and selling relationships.

¹ For detailed description of cluster development programs in Europe, please refer to European Commission (2008).

- **Institutional capacity building** in order to enhance dialogue and collaboration between entrepreneurs and supporting institutions and strengthen the capacity of supporting institutions to provide efficient and effective services.

Cluster development in Ethiopia: UNIDO’s experience

UNIDO launched a cluster development project on MSEs in Ethiopia for the first time in 2005 until 2009. The major objective of the project was to reduce poverty and improve livelihoods by enhancing MSEs capacity and access to markets with products of adequate quality and competitive price. The stakeholders and partners of the project were as listed in Table 2 below.

Table 2: Project stakeholders and partners in cluster development project

Stakeholder	Responsibility
UNIDO	Implementing the project.
The Government of Austria	Donor.
The Ministry of Trade and Industry	Oversee the implementation and strategic directions of the project on behalf of the Government of Ethiopia.
Federal Micro and small Enterprises Development Agency (FeMSEDA)	Piloting and adapting the Cluster Development approach to the Ethiopian context and offering technical supports to the regions.
Regional Micro and small Enterprises Development Agency (ReMSEDA)	Responsible for the successful implementation of the project at the regional level.
Training Institutes	Provide training to cluster members upon the invitation of the project or at the request of the cluster members directly.
Microfinance institutes and business development service providers	Provision of finance and business development services to cluster members.

Source: Author’s compilation from UNIDO (2010b).

The program identified four natural clusters in Ethiopia by taking into account the concentration of large number of enterprises, their economic and development importance, and sustainability of the clusters in the short and medium term as well as their growth potentials. The three clusters included in the project were from Addis Ababa namely; the Gullele Handlooms Cluster, the Ready-made Garments Cluster and the Merkato Leather Footwear cluster. The fourth cluster included in the project was the Metal and Wood Works Cluster in Mekelle, Tigray.

At the start of the project four CDAs were assigned to each cluster. The CDAs were trained by UNIDO about cluster development approach.

Box 1: Cluster development interventions by UNIDO in Ethiopia: selected examples

Technology upgrading in Addis Ababa Ready Made Garment Cluster

The ready-made garment cluster in Addis Ababa comprises of 26 large-scale and more than 4,000 small-scale firms producing garment, embroideries and knitwear. Poor access to modern and appropriate machinery and equipment was identified as the main problem facing enterprises in the cluster. In order to facilitate technology upgrading, workshops were held with firms in the cluster and various equipment suppliers in order to facilitate network formation and raise the awareness of producing firms about the available technologies. As a result, increasing interest and orders in machinery and equipment from machinery suppliers was seen in the cluster. In addition, business development services were provided by the supplier in terms of providing training and advice related with the new technology (UNIDO 2010b).

Skill upgrading in Addis Ababa handloom cluster

The handloom cluster in Addis Ababa comprises of weavers that have migrated from rural areas of the country who have acquired the skills and know-how through informal and on the job trainings. It was identified that enterprises in the cluster lack product development skills and produce traditional cloths with little innovation, product diversification and value addition. In order to address the issues related with skills, a one month skill-upgrading training was given in the areas of raw material selection, and development of new products and design for selected enterprises in the cluster. As a result of the training, more weavers became aware of the need to diversify their product range and improve their designs in order to remain competitive (UNIDO 2010b).

Network and subcontractor development in metal and wood work cluster in Tigray

The metal and wood work cluster in Mekele, Tigray includes more than 250 enterprises and 24 cooperative associations. The main products of the cluster include household equipment, office furniture, agricultural implements, construction materials, and simple machines. The cluster experienced an exponential growth in the period 2001 to 2005 due to public procurement measures and the growing demand for machinery fueled by a boom in agricultural production. Starting from 2005, however, the cluster underwent significant decline mainly due to shrinking market access. In addition, enterprises in the cluster faced increasing difficulties in meeting quality requirements which excluded them from participation in tenders and public procurement. In order to help the cluster regain competitiveness, UNIDO promoted the development of networks among enterprises in the cluster and initiates subcontracting agreements with one of the largest manufacturers of metal products in Ethiopia, the Mesefin Industrial Engineering (MIE). MIE provided training within its facilities to MSEs in welding, drawing, design and quality control among others (UNIDO 2010b).

The CDAs carried out diagnostic studies in all the four selected clusters in order to identify the gaps and formulate possible intervention areas. Through the diagnostic studies the following core common problems were identified. Enterprises in the

four clusters had difficulty procuring quality and regular supply of raw materials. Many entrepreneurs also had working premise problems where most work in cramped conditions and in some cases in their homes. Entrepreneurs in the natural clusters had a consistent problem of finance. Moreover, many entrepreneurs have insufficient resources, skills and knowledge to market their products widely and effectively. Based on the core problems identified, various interventions were undertaken in the following areas. In all the four clusters, the CDAs helped enterprises to form and strengthen both horizontal and vertical networks in order to enable them take joint actions. Enterprises in the clusters were also given tailored trainings seeking to resolve problems regarding access to credit, procurement of raw materials, marketing, technological innovation, etc. In addition, linkages between input suppliers, designer, training institutions and medium- and large-scale firms were created. Examples of some of the interventions in the various clusters are provided in Box 1 above.

Box 2: Ethiopia Edible Oil Value Chain Enhancement Program: a short description

Ethiopia has huge potential for scaling up its production of edible oil: favorable agro-climatic conditions for increased oil seeds cultivation, the labor-intensive nature of the subsector, conducive business environment, the willingness of the oil seed crushers to work at full capacity and the high local demand. Despite this potential however, the edible oil processing industry remains underdeveloped. Main constraints are: low production, poor quality of seeds, inadequate trading infrastructure and poor agro-processing facilities, weak business development services for upgrading the processors and limited access to local and international markets. Weak linkages among the chain's actors and lack of working capital also constitute major obstacles. A joint program was carried out by UNIDO, ILO and FAO—sponsored by the MDG-F fund—between 2010 and 2013 with the following goals: “enhance the sustainable supply of oil seed raw material at desired quantity and quality, promote efficient processing capacity and improve the access to markets.”

The program was conducted in several districts in two regions; Oromia and Amhara and focused on two high-potential oil seeds; Niger seed and linseed.

The cluster initiative was targeted to edible oil processors and several measures were undertaken in order to improve their technological and entrepreneurial capabilities, establish a formal organization for carrying out collective actions and investments and improve the quality of products and market access (UNIDO 2013).

A second cluster development program was carried out in 2010–2013, jointly with FAO, as a fundamental component of a larger program aimed at boosting the Ethiopian edible oil value chain, see Box 2. This program combined cluster development approach with value chain enhancement approach. While the cluster development approach is confined by geography focusing on concentration of interconnected firms in a certain location and their interaction; the value chain approach

focuses on creating value in each segment of the chain across the sector. The latter is not necessarily confined by geography and is aimed to strengthen vertical and horizontal linkages and providing capacity building and technical support for actors across the value chain. Combining the cluster and value chain development approach has an advantage to address the various constraints faced by the entire sector, while giving due emphasis to creating networks and interlinkages along each segment of the value chain.

Lessons from UNIDO's cluster development programs in Ethiopia

The experience of UNIDO in the delivery of cluster-based development to natural clusters in Ethiopia offers a number of useful insights for other clusters and local development programs.

1. The programs implemented in Ethiopia showed the need for having **sector specific interventions** that would indulge the active participation of stakeholders. The assignment of CDAs to each specific cluster further insures the assessment of the specific needs of each cluster and provides tailored interventions accordingly.
2. Since UNIDO's methodology of cluster development is largely based on the strengthening of trust, **the commitment of CDAs throughout the period of the project** was important to develop trust with the local community including the main beneficiaries, clustered enterprises.
3. The **strong involvement of public-sector institutions** such as FeMSEDA and ReMSEDA in the program contributed to trust and governance-building in order to insure the continuation of the cluster development initiative, once the project has phased out.
4. In addition, the **close collaboration between public and private sector stakeholders** in the project helped to draw a joint plan and pooled efforts and resources together that were essential for an efficient delivery of various services and supports to enterprises.
5. The success of a cluster development program is highly dependent on the level and quality of support that enterprises receive from various support institutions. The project worked closely with various support institutions like the Textile and Apparel Institute, Leather and Leather Products Technology Institute, TIVETs as well as FeMSEDA and ReMSEDA. By **supporting and building the capacity of public support institutes**, the project was able to insure the delivery of problem solving and quality services to enterprises.
6. While having tailored interventions, enterprises in the cluster were **cost-sharing and paying fees to access various services** from different support institutions. Such kind of practices helped prevent the emergence of dependency and over reliance on external assistance. Moreover, it helped to empower the enterprises

by increasing their decision-making and encourage them to take on responsibility for the accomplishment of cluster development activities.

5.2 Government's cluster development approach

Following the MSE development strategy of Ethiopia, there has been a pressing need by the government to enhance market integration by promoting industrial development that encompasses cluster based MSEs. MSEs are given recognition in the country's current industry development plan and are considered as a vehicle for employment generation particularly in urban centers and leading to economic development (FDRE 2011). MSE development is also considered to serve as an incubation device where MSEs can grow into medium size enterprises (FDRE 2011).

In line with the current MSE Development Strategy of Ethiopia, the government has formulated a cluster development directive in January 2011. The main objective of the cluster development directive of Ethiopia is to alleviate problems of working and selling premises often faced by MSEs. This is aimed to be done through the construction of standard working and selling premises where a number of enterprises that work on similar and closely related goods can enter and operate. The provision of premises to similar and related enterprises is believed not only to resolve their space limitations but also help create markets, facilitate technology transfer and induce network and collaboration among enterprises (FeMSEDA 2011). In addition, having MSEs that work on similar and closely related goods in one location is held to provide a ground where linkages with medium and large scale industries can be initiated.

According to the cluster development directive, Government created clusters are considered as incubation centers where MSEs are provided with various supports, in which they eventually can grow into medium size firms.

Priority sectors that can enter Government created clusters

Activities that can enter Government created cluster are mainly manufacturing enterprises that are engaged in the following segments:

- Textile and tailoring (tailoring, weaving, sweater knitting, embroidery and motif, dying and silk screen painting);
- Leather and leather products(shoe, leather made garments, various leather products and the like);
- Agro processing (foodstuff preparation, vegetable and fruit processing, honey processing and packaging, dairy products, bread and cake bakery, meat and fish processing and the like);

- Metal works and engineering (door and window works, electric work, welding, sheet metal works, office facilities, spare parts, upgrading manufacturing equipment);
- Wood work (furniture, teaching aids, bamboo products, agricultural inputs and the like);
- Traditional artifacts and jewelry works (bamboo and straw mat, jewelry made from gem stone, silver and bronze, horn and clay, doll making, motif and the like).

Selection criteria for identifying eligible enterprises that can enter Government created clusters

- Enterprises that are engaged in the propriety sectors selected above and have the potential to grow;
- Enterprises willing to use energy and space saving equipment collectively or individually;
- Enterprises that have good reputation in their loan and tax settlements;
- Enterprises that have a proper record of the income and expenses of their business;
- Enterprises that made good use of production and selling premises that were given to them by the government previously;
- Enterprises with selling and working premise problems.

Support packages given for enterprises that enter Government created clusters

The various support packages and services that are given to enterprises operating in the Government created clusters are:

- Training and information about saving and access to credit by professionals;
- Business Development Service (BDS);
- Industry extension services and trainings;
- Trainings to upgrade the marketing skills of MSEs and provide information to enable enterprises look for market opportunity independently;
- Linking enterprises with big companies and assisting them to participate in Government purchases and bid invitations.

Duration of stay in the clusters

The maximum time limit where MSEs can stay in the cluster is 5 years. Those enterprises that are able to grow into medium size enterprises will be provided another working space at industrial zones. On the other hand, enterprises that do not grow into medium-size enterprises will be excluded from the cluster but other supports like provision of finance, training, information and market linkages will continue for another 2 years.

Box 3: Types of government created clusters in Ethiopia

Established clusters: These are clusters that are constructed from scratch for a certain sector in a certain location. Producers that enter into established clusters usually come from different parts of the city and most of them do not have personal knowledge of each other before moving to the cluster. Enterprises entering these clusters include both new startups and those that have already been operating in the business in another location. Apart from the producing enterprises, input suppliers and service providers are usually absent in these clusters. Personal networks and business relationships among producers in established clusters are also very limited but external networks and contractual relationships with big companies and factories outside of the cluster and even the export market may exist. One example of established clusters in Ethiopia is Kirkos textile and leather cluster (Ali 2012).

Expansionary clusters: These are sheds and buildings that are constructed in the vicinity of the existing natural clusters. The aim of expansionary clusters is to provide spacious and clean working premises mostly to cottage based enterprises that used to operate in their homes at the natural clusters. Enterprises that would enter the expansionary cluster are expected to be the ones that used to operate in the natural cluster with a working premise problem. Most of these enterprises may have personal relationships with each other even before moving into the expansionary cluster. Because expansionary clusters are located in the vicinity of the natural clusters, most producers would be able to maintain their existing market with input suppliers and output buyers. The Gundish Meda Textile and Garment Cluster is one example of an expansionary cluster (Ali 2012).

Relocated clusters: This is the case where natural clusters are already congested and there is not enough space to build working premises in the vicinity of the existing clusters. As a result, enterprises that used to operate in the natural clusters are given working premises in another location outside the vicinity of the natural cluster. The enterprises that enter into the relocated clusters may have similar characteristics with that of the enterprises in the expansionary clusters in terms of personal relationships and having been stayed in the businesses for a long period of time. The only difference is that relocated clusters may be far away from their existing market of input supplies and output buyers. The Ethio-International Footwear Cluster is an example of a relocated cluster from the Mercato natural footwear cluster (Ali 2012).

Experience of cluster development program through the construction of working premises

Even though the cluster development strategy is formulated in 2011, the experience of cluster development in Ethiopia through the construction of working premises goes as far back as 2003. According to a case study conducted on Government created clusters in 2012, it was found that entrepreneurs entering these clusters can be both new startups and those that have already been in business (Ali 2012). The working premises are built in different locations mostly in the form of G+4 buildings especially for the textile and garment and leather sector and in the form of sheds made from iron sheets for construction, wood and metal work, urban agriculture and food-processing sectors. The working premises for a specific sector can be found located close to each other or scattered here and there based on the availability of open space to construct them. In Addis Ababa alone, a total of 2075 working premises were constructed from 2004 until 2011 where 23,783 MSEs are reported to have benefited. The total cost of building these premises is estimated to be more than 300,000,000 Birr.

Based on the case study, three types of government created clusters are identified as outlined in Box 3.

Lessons from Government's cluster development program

The lessons that are drawn from the case studies of the government created clusters can be generalized into the following points:

1. **Implementation and selection criteria:** In general, the Government established clusters permit greater focus of public resources and allow the provision of support to enterprises more accessible and feasible. However, some problems were experienced while allocating premises to MSEs. First, the selected production locations where the buildings have been built did not take into account the overall economic environment of the locations and the availability of market-outlet that entering enterprises can use. As a result, most enterprises located in government built clusters lacked appropriate market outlets to sell their products. Second, when building the premises, limited attention was given to the production organization and working condition of enterprises and specific sectors. Third, in some of the premises, physical infrastructure like electricity and water were not installed in time which made many premises left standing empty.
2. **Extent of trust and collaborative networks:** The types of advantages that are commonly seen in natural clusters such as the development of trust and collaborative networks, which are essential to address common opportunities and threats, are mostly absent in many of the case studies of the Government

created clusters. However, there are some instances where some enterprises, especially those that receive relatively large orders from companies and factories elsewhere are able to initiate linkages with other enterprises in the cluster by either sharing the orders or giving out a subcontract for certain parts of the product. Although such linkages are low, it could be one area of intervention in cluster development policies by either giving training on the advantages of collaboration and by appointing brokers and intermediaries to initiate and organize dialogues between enterprises in the cluster.

3. **Sustaining market linkages to enterprises that have grown to medium-size firms:** Given the limited time that enterprises are allowed to stay in Government created clusters (maximum of 5 years), the third lesson drawn from the case studies has to do with the possibility of maintaining the market linkages that enterprises have established in the Government created clusters when they move to another location such as an industrial zones. Enterprises in Government created clusters were asked how they would be able to maintain their market linkages if they move to another location. The answer to this question differs depending on the type of marketing channels used by enterprises. Those enterprises that have their own selling premises and those that sell their products through orders from other companies responded that they will be able to maintain their current customers even if they move to another location because the marketing outlet that they are using, to begin with, is not tied to their production cite. But for those enterprises that do not have their own market outlets except for the shop owners around the clusters and in big markets responded that they may lose their market outlets unless they have their own selling premises.

In general, the case study conducted on existing Government created clusters reveal that although there were few positive outcomes where the working premise problem of enterprises were solved and enterprises were able to obtain some focused interventions, it was challenging to create the envisaged advantages of clustering from the intervention. Despite the highly subsidized rent and in some cases free rentals of premises, most of the premises stand empty due to the various operational and marketing outlet difficulties mentioned above (Ali 2012).

6. Localization of businesses in Ethiopia

In this section we provide some exploratory evidence in order to try and paint an overall picture of the possible existence of clusters in Ethiopia. While the literature review above provides some case study evidence for specific clusters, we use data for the whole manufacturing sector to chart the localization of industry in Ethiopia. Related to our discussion above, we focus here on the physical dimension of clusters, i.e., we look mainly at geographic proximity of firms, though we also

attempt to consider the functional dimension by examining the strength of local linkages.

6.1 Putting firms on the map

In the first part of the empirical analysis, we use original firm-level data collected through the UNIDO Africa Investor Survey 2010 (AIS) which provides data for 19 Sub-Saharan Africa countries.² We use data for Ethiopia only. The collection of the dataset followed a rigorous survey methodology in terms of stratified sampling (on three dimensions: sector, size and ownership) and interview techniques (face-to-face interviews with top-level managers of foreign- and domestically-owned firms). The sample was constructed in order to be representative of public and private for profit firms with 10 or more employees.³ Given the sample design the data only provides us with a small sample of firms in Ethiopia. All in all, we have 549 firms in the dataset.

By construction of the data we are missing almost all of the above mentioned MSEs. Hence, our description of the localization of firms is a description of larger firms. The size distribution of firms is depicted in Table 3.

Table 3: Size distribution of firms in our data set

Size groups	Number	Share (in %)
Micro	27	5.63
Small	143	29.79
Medium	129	26.88
Large	181	37.71

Source: Own compilation.

As pointed out above, MSEs, while accounting for the lion's share of firms in terms of numbers, are generally low output and low productivity firms. Also, our data is a survey of firms, not a census. By construction we can, therefore, not consider all existing firms in a location, rather we focus on the sample. Our focus on larger firms provides important evidence on the location of firms that may be considered the most productive in the economy.

We use the data to chart the distribution of firms in a map of Ethiopia.⁴ From the data set, we know for most firms in the sample the name of the town in which they are registered. Based on this information, we allocate the geographical coordinates

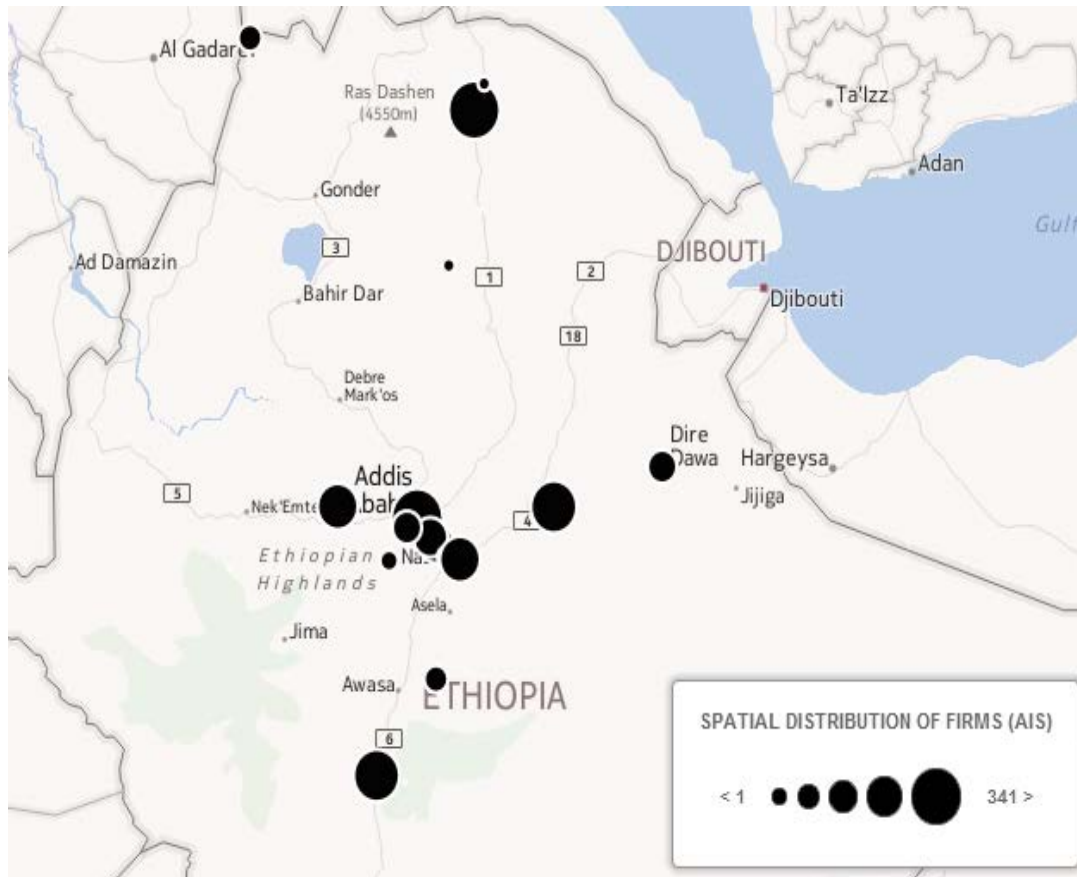
² Burkina Faso, Burundi, Cameroon, Cape Verde, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zambia.

³ An oversampling of relatively large firms (> 100 employees) has been adopted.

⁴ The raw data used for constructing the maps is presented in Table A1 in the Appendix.

associated with this town to the firm.⁵ In that way, we can chart the firms on the map.

Map 1: Spatial distribution of firms



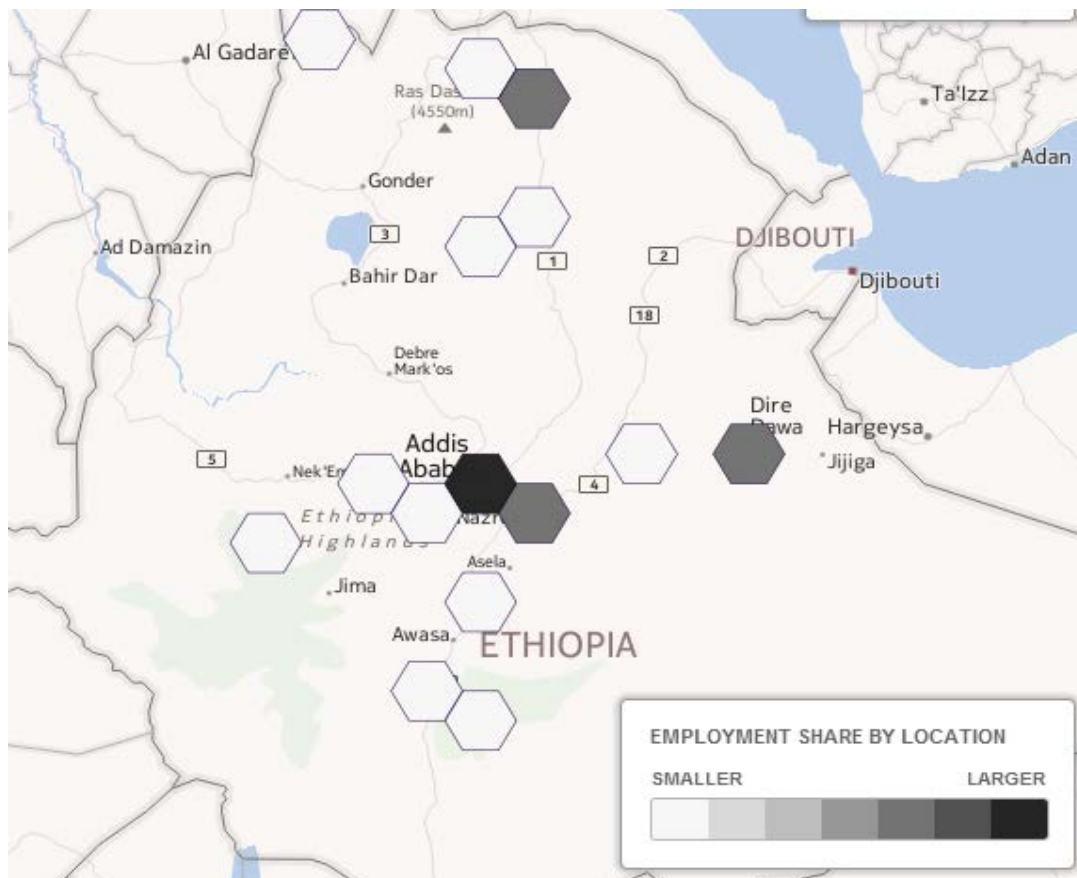
Map 1 shows the raw distribution of firms in the economy. Perhaps not surprisingly, the largest clustering of firms appears to be in Addis Ababa (341 firms). However, there are also substantial numbers of firm locations in the cities of Mekele (83) and Yerga Chefe (41 firms). Addis Ababa and Mekele are also locations that were highlighted in the discussion of case studies above of clusters that received UNIDO intervention (Box 1 in Chapter 5).

We now turn to look at some characteristics of firms in these locations, focusing on employment, output, local sourcing, and productivity. We know from the information used in Map 1 the location of the firms. We also know their levels of employment, output, and the extent of local sourcing (i.e., the share of inputs that are bought in the domestic economy). Using the level of, say, employment for a given firm we can, thus, calculate total employment in a location and, through geographical coordinates, plot this on the map.

⁵ Ideally, we would like to improve the accuracy and use the geographical coordinate of the exact location of a firm within a town. This is not available to us, however.

Accordingly, Map 2 indicates the share of employment in a location relative to total employment in the country. The higher this share, the more employment is concentrated in one location, and the darker are the hexagons. The map shows that, similar to firm numbers, employment shares are not equally distributed across the country. The location with the highest share by far is Addis Ababa, where 69 percent of employment in manufacturing is located. The second most-important locations, Mekele and Yerga Chefe, have 6 and 8 percent of total country wide employment. Hence, not only is manufacturing activity highly concentrated in three locations in terms of firm numbers, but also in terms of total employment.

Map 2: Distribution of employment shares

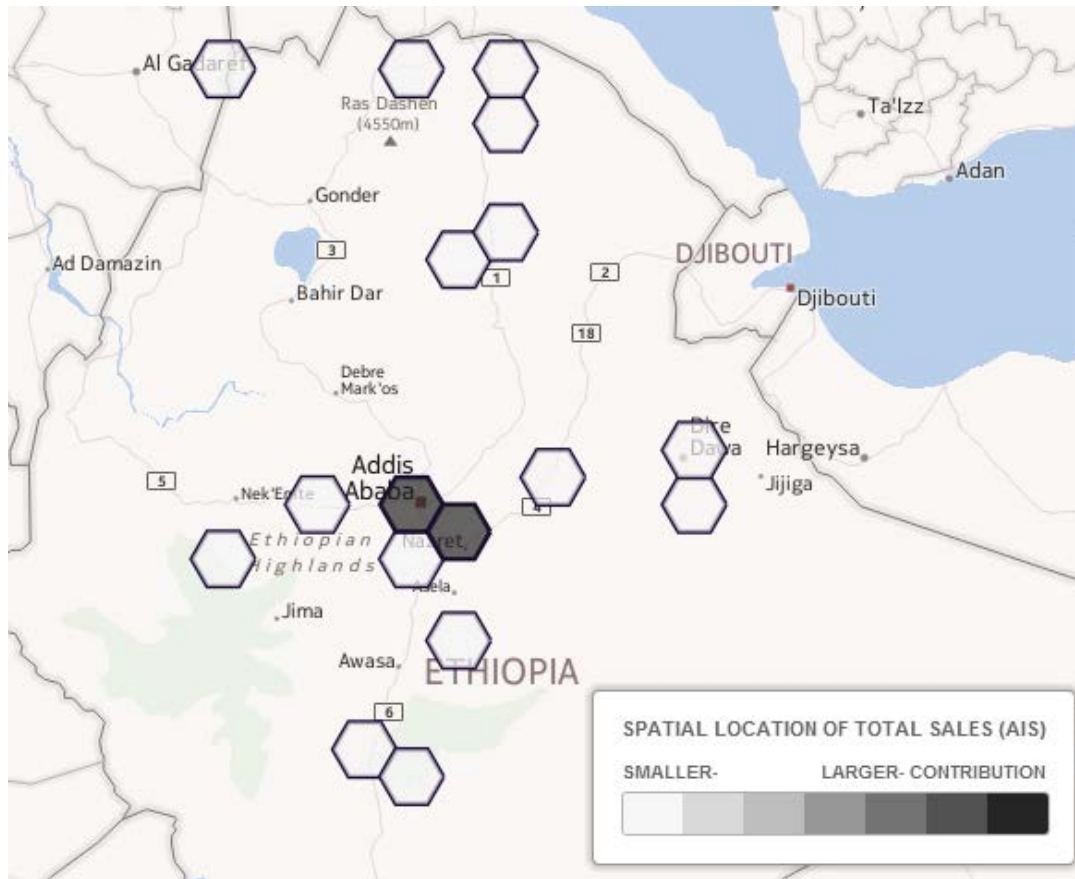


We carry out a similar exercise using total output produced by firms. Summing up output values for all firms and plotting them on the map shows that output is even more concentrated than employment (Map 3).

The map depicts the share of output in the location relative to total country wide manufacturing output. Almost three quarters of output (74 percent) are produced in Addis Ababa. Second is Mekele with roughly 8 percent. It is interesting to note that Yerga Chefe does not feature highly when it comes to output. This suggests that the concentration of firms and employment in the location is in small and low

productivity firms, where a high share of employment is not matched by an equally important share of output produced in the location.

Map 3: Distribution of output shares



In order to move from the purely geographic component of clusters to one aspect of the functional dimension, we map in Map 4 the share of local sourcing of manufacturing inputs in the location.

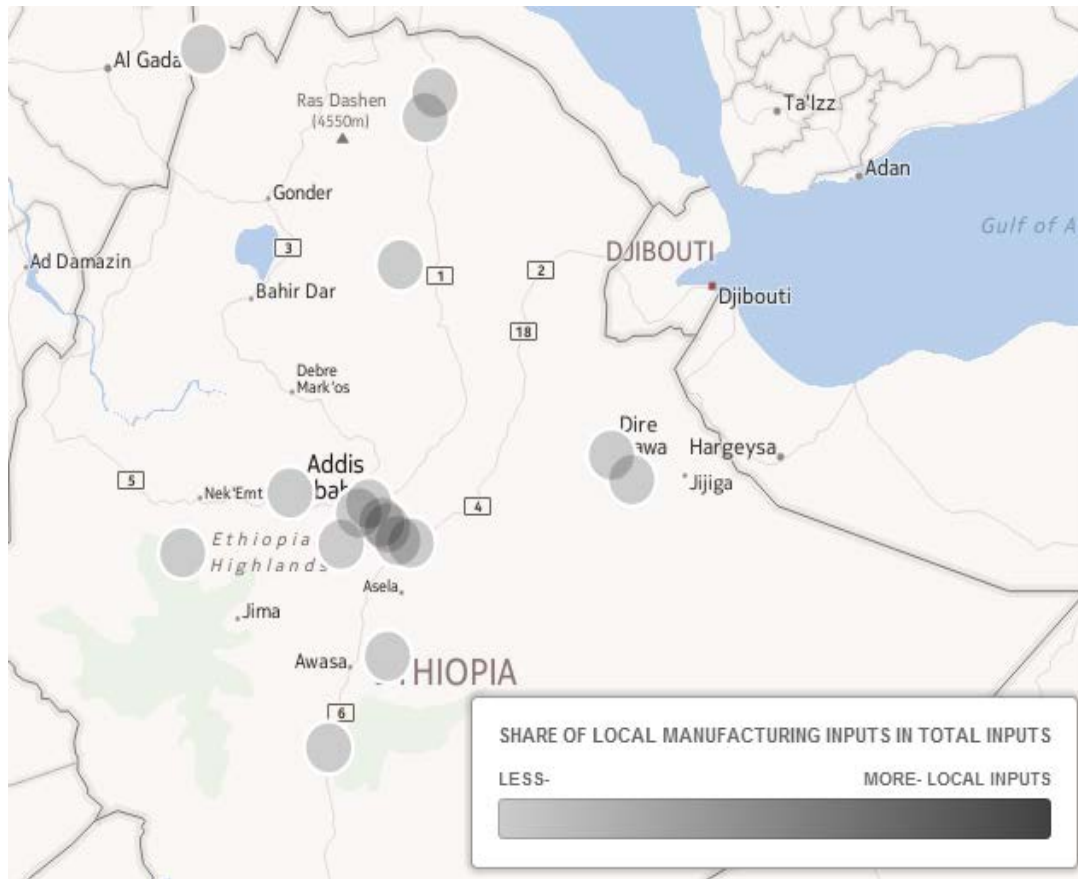
One would expect that in a cluster firms source inputs from each other—i.e., there are strong customer-supplier relationships. While we cannot measure those directly with the data at hand, we know from the dataset the share of inputs that a firm sources in the domestic economy and use this as a first rough indicator of local interfirm linkages.⁶ We calculate the average amount of local linkages for all firms in a given location and plot this average on the map.

The result is depicted in Map 4. We find that Addis Ababa has the highest level of local linkages by firms, indicating that the firms located there have the strongest connections with the local economy. This is not that surprising given our previous

⁶ Ideally, we would want to measure the amount of inputs that a firm sources in the locality, i.e., in our case, in the town in which it is located. This is, unfortunately, not available in the data. We therefore use a proxy, the amount of inputs bought in Ethiopia.

findings that Addis Ababa also features a large concentration of firms, which make it a hub for a variety of inputs available for closely located firms.

Map 4: Share of local sourcing of manufacturing inputs



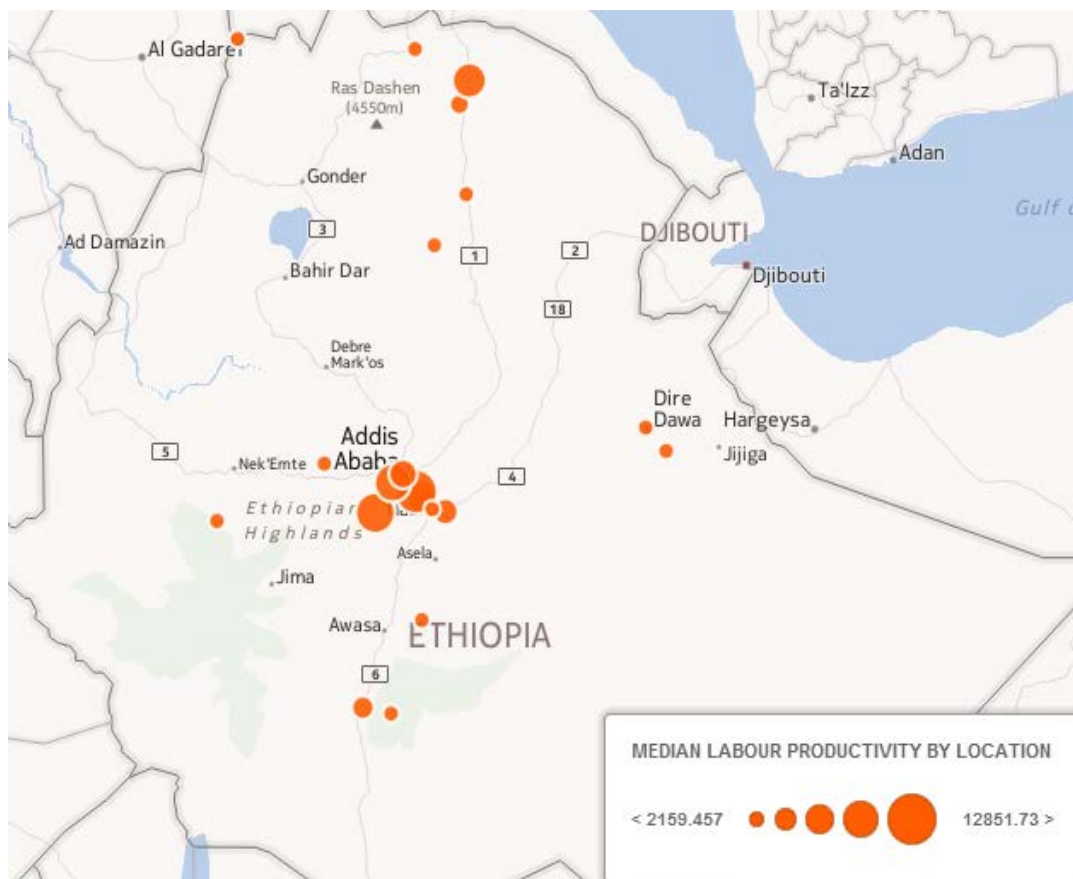
The discussion of the literature on clusters above suggests that one of the advantages of being part of such an agglomeration may be that firms can improve their productivity through reduced costs, knowledge flows, or interfirm cooperation.

Using the same approach as before, but using labor productivity (measured as output per worker) as the variable in question, Map 5 charts the distribution of the median productivity level in a location. The highest productivity firms tend to be located in the clusters around Addis Ababa and Mekele.⁷

Charting labor productivity growth rather than levels in Map 6 produces a similar picture. Firms with high productivity growth are mainly located in towns in which we also observe a concentration of firm numbers.

⁷ However, this calculation is particularly sensitive, as there are many locations with very low numbers of firms. Hence, one particular outlier may influence very much the median in some locations. This is illustrated by the fact that Addis Ababa itself does not boast the most highly productive firms, they are located in adjacent locations with very small firm numbers.

Map 5: Distribution of median productivity by location



To sum up, this exploratory analysis suggests that there is a strong concentration of firms in a small number of locations, in particular the capital Addis Ababa and Mekele in the north of the country. These locations show not only a large number of firms, but also a concentration of employment and output in the location.

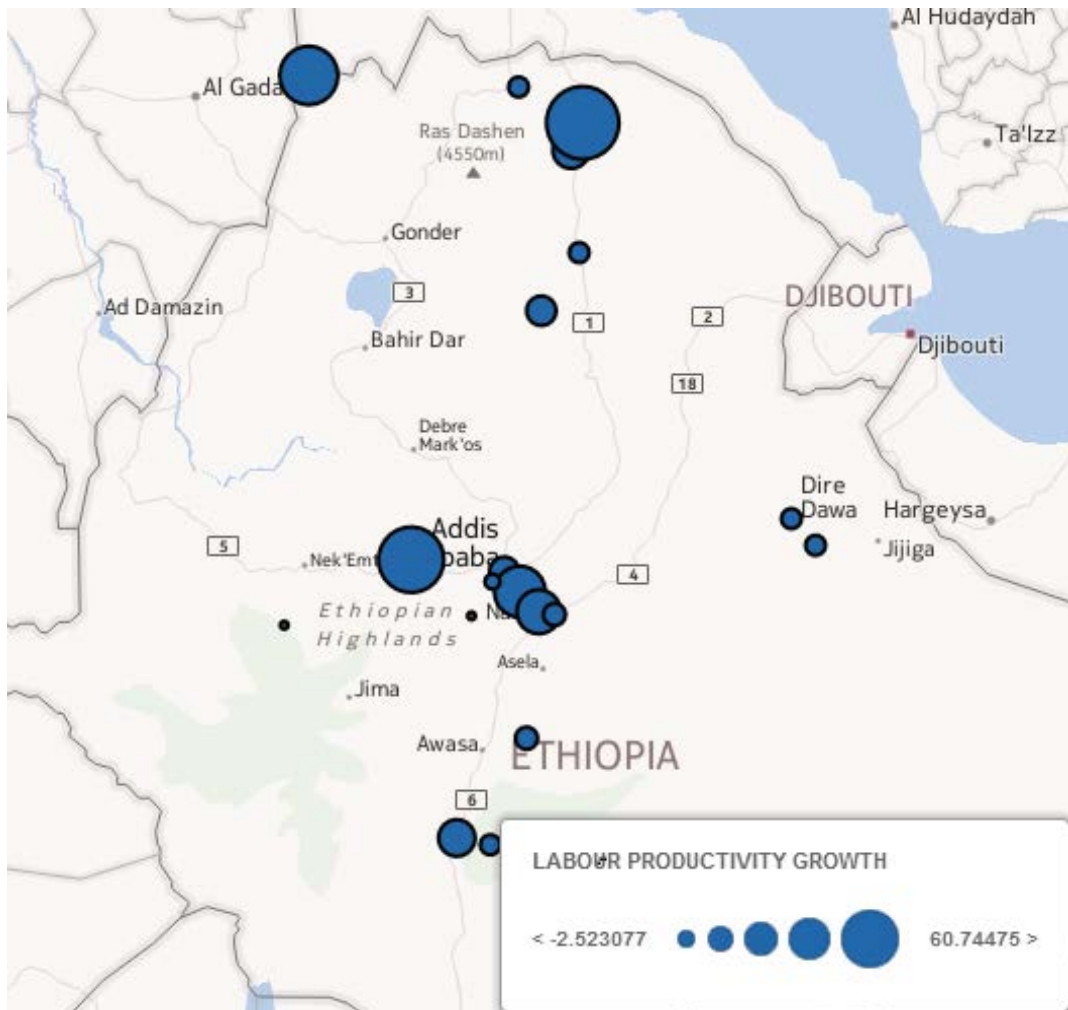
Furthermore, firms located in those towns tend to have the strongest local linkages and the highest levels and growth of productivity.

6.2 Firm characteristics in clusters

In this section, we look at the census data provided by the Ethiopian Statistical Agency on all manufacturing firms with more than 10 employees for the year 2004. As such we use information on more than 2,000 firms which represent the whole spectrum of medium and large manufacturing firms active in Ethiopia. As shown before large firms in African countries do not represent the bulk of employment in aggregate.

However they often are more capital intensive, more productive and might exhibit some market power with potential consequences for smaller firms. Furthermore, they play an important role in getting access to inputs not available on local markets and might contribute to attract other firms including suppliers of intermediate goods of production.

Map 6: Labor productivity growth



With this dataset at hand, we might answer important questions: Do medium and large firms differ in terms of size and performance when they are located close to other firms active in the same industries? Or is there no difference when taking account the location and industry characteristics of firms? These questions are important when studying the advantages related to the colocation of firms.

To account for the size of a cluster in each region-industry pair, we take the log of the number of firms active in each region-industry. More specifically, we extract the firm level data of our dataset including the 4-digit industry information on each firm and a disaggregated locational measure known as “zone” which is a further subdivision of regions. It allows us to account for the density of firms belonging to the same 4-digit industry in each Ethiopian “zone.” We define a cluster as a specific industry-zone combination. For example, take two firms. If they are active in the same 4-digit industry and same zone within a region then they belong to the same cluster. Otherwise they do not.

The next step is to construct our measurements for size and productivity. Our first measure of size is the total number of employees available in our dataset for each

firm and taken in logarithmic form (l_{ijk}), where (i) denotes a firm, (j) an industry and (k) one zone. In an alternative estimation, we also use (log) output as measure of firm size. In order to see whether size of an individual firm is indeed impacted upon by the number of other firms located around it, we estimate the following equation:

$$l_{ijk} = \beta_1 X_{jk} + \alpha_j + \gamma_k + \sigma_{ijk} \quad (1)$$

where X_{jk} measures the (log) number of firms in each 4-digit industry/zone pair. γ_k and α_j are zone and 4-digit industry dummy variables and σ_{ijk} is our white noise error term. Table 4 shows the estimation results of Equation (1).

Table 4: Size and productivity in clusters for medium and large firms

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Employment	Total sales	Value added per worker	Employment	Total sales	Value added per worker
X_{jk}	-0.238***	-0.337***	0.701***	-0.303***	-0.409***	0.272***
α_j	yes	yes	yes	yes	yes	yes
γ_k	yes	yes	yes	yes	yes	yes
Y_{jk}	---	---	---	-0.430*	-0.481	0.392*
Nb of obs	1,822	1,822	1,822	1,809	1,809	1,809

See the text for description. *, **, *** significant at the 10, 5, 1 percent level, respectively.

Source: Own calculation using CSA manufacturing census survey for the year 2004.

We see that the β_1 coefficient is negative and highly statistically significant even when we control for industry and zone dummies. It shows that the larger the number of firms active in the same zone-industry pair, the smaller are firms collocating in this cluster. In Column 2, we see similar results for the logarithm of sales per firm as a measure of size. Medium and large firms are on average smaller the larger the number of firms collocated in a specific cluster. One reason might be that smaller firms are more likely to cluster. Another explanation may be that more firms means fiercer competition and, thus, command smaller average firm size. Unfortunately, with the data at hand we cannot dig deeper into possible reasons for these findings.

The fact that firms in clusters tend to be smaller does, however not necessarily mean that clustered firms are less efficient. To explore this issue, we replace our size variables by value added per worker as a productivity measure. It is calculated as the logarithm of total sales minus raw materials, intermediate inputs and energy divided by the number of employees.

Results are presented in Column 3 of Table 3. We see that the coefficient on the cluster variable is positive and significant which suggests that the increased collocation of firms in a cluster is related to higher firm level efficiency in terms of value added per worker.

Thus, the location of medium and large firms close to other firms in the same industry seems to benefit firms in terms of a productivity premium. This is what we would expect if locating in a cluster brings with it the benefits discussed in the earlier sections.

The estimations reported in Columns (4) to (6) of Table 4 add one more variable to the empirical model. This is the (log) number of firms in the same zone but operating in different industries than firm i . Inclusion of this variable does not change our earlier results. Also, the coefficients on this variable itself are similar to the coefficients estimated for the number of firms in the industry/zone, but they are only weakly statistically significant. This suggests that the strongest clustering effects stem from firms in the own sector. Firms operating in other industries but located in the region tend to have much weaker effects on the performance of firms in a cluster.

In the next step, we consider the same questions as before with an alternative dataset provided by the Ethiopian Central Statistical Agency, *the small Manufacturing Industries Survey*. It is now a sample of small manufacturing firms. Information on these firms is provided for the year 2003. It is well established that measuring productivity in small and micro enterprises in Africa is a delicate task including defining the boundaries between a firm and a household. Thus any measurement of size or productivity might be distorted. With this drawback in mind, we recalculate equation (1) for our sample of small firms. As we now have only small firms we focus on productivity, as there is not much variation in terms of size.

Table 5, Column 1, shows our results for productivity measured in terms of value added per worker. The coefficient on x_{jk} , our cluster variable is not statistically significant. Thus, there seem to be no relationship between the number of small firms active in the cluster and the productivity levels of individual firms in the cluster, when considering small firms solely.

We now join the large and medium dataset to this the small firm level data to have a closer look at the value added of firms in the small firm dataset. For the same reasons as before, and because the two datasets do not cover the same time period, we need to take our following results with a pinch of salt. However, we know where both types of firms are located and in which industry they are active. Are small firms more productive in terms of value added per worker when located in clusters with a higher presence of large firms or not? Exploring this question might

help to shed light on the need to better understand the interactions between large firms and small firms in cluster analysis.

Table 5: Size and productivity in clusters for small firms

Dependent variable: Value added per worker 2003	(1)	(2)
X_{jk}	-0.013 (0.216)	0.02 (0.218)
Y_{jk}	-0.140 (0.577)	-0.35 (0.606)
L_Share_{jk}	---	0.815** (0.375)
α_j	yes	yes
γ_k	yes	yes
Nb of obs	1,747	1,747

See the text for descriptions. *,**, *** significant at the 10, 5, 1 percent level, respectively.

Source: Own calculation using both CSA manufacturing datasets.

In order to do so we estimate equation (1) again for our sample of small firms but this time augmented by an additional independent variable: L-Share. It is calculated as the employment share of medium and large firms in total employment for each zone-industry pair. Column 2 of Table 5 provides the results of this estimation. We see that the coefficient on L_Share is positive and highly significant. Higher employment shares of medium and large in zone-industry clusters are positively related to the value added of small firms. While this result should be interpreted with care, it suggests that the performance of small firms is related to the presence of larger firms in their cluster.

7. Conclusion and policy recommendation

The overall picture that emerges from the explorative analysis in Section 6 is that there seems to be strong colocalization of firms in particular around Addis Ababa, Mekele and, to some extent, Yergachefe. This leads to a strong concentration of firm numbers, employment and output in these regions. Also, these clusters of firms tend to have the highest productivity and the strongest linkages with the local economy. This indicates that there are indeed potentially strong benefits from locating in a cluster of firms, as suggested by the literature reviewed in the earlier part of the report. We also discuss specific case studies of clusters in Ethiopia, such as the Ready Made Garment Cluster and the Handloom Cluster, both located in and around Addis Ababa.

From the review of the literature and the available evidence, in particular the case studies, a few policy relevant conclusions can be drawn. First, our discussion suggests that a top-down approach to cluster development should be exercised with caution as the risks of failure might be high, in particular if the aim is to ‘generate’ clusters from scratch via policy interventions. This is because the advantages of clustering such as trust, collaboration and tacit flow of knowledge usually take time to develop and need an environment that is based on market forces. However, governments can play an active facilitative role in the formation, growth, or scale up of emerging and existing natural clusters by providing basic ‘hard’ infrastructure like roads and electricity and crucial ‘soft’ infrastructure such as supporting institutions, resources for building trust and cooperative efforts and building conducive business environment. Public policies can also contribute by identifying weaknesses in existing natural cluster value chains and attract investors and businesses to fill those gaps in order to strengthen the forward and backward linkages.

As experienced from the cluster development approach of UNIDO, cluster programs that focus on already existing natural clusters may emphasize on the benefits of creating cooperative networks and encouraging dialogue between enterprises in the cluster and other agencies. Cooperative networks can help enterprises exchange information, pool resources, design collective solutions to shared problems and develop a strong collective identity. Cluster programs can also involve promoting collective marketing so as to raise awareness by generating for example a brand name for the cluster. Cluster programs could further provide local services for enterprises operating in a specific cluster, such as financial advice, marketing and design services. Such local service provision at cluster level ensures that specific local needs are met.

While applying UNIDO’s cluster development approach, the following points should be considered.

1. The success or failure of the UNIDO’s cluster development approach lies almost entirely on the CDAs. **Careful selection of CDAs and providing them with appropriate training** is therefore important in order to ensure the success of the program. Monitoring systems with clearer baseline, target and indicators, would enable CDAs and other cluster stakeholders to get clear picture of the progress made, and of progress to be made. Consideration should also be given to the nature of the particular natural cluster and of how large it is (i.e., how many enterprises) a CDA can realistically support. Depending on the size of a cluster, more than one CDA may need to be hired. Moreover, since the task of the CDA involves working on a daily basis in a specific cluster, the CDA should be fully engaged in his/her job. There should also be enough incentive for the CDA that takes into account his or her effort. Having a co-CDA from

government institutions to work closely with the externally hired CDA will also help generate local capabilities so that the co-CDA would be able to acquire the skills necessary to carry out the cluster development work after the phasing out of the program.

2. In addition to the CDA, **the overall organizational set-up and management of a Cluster Working Group (CWG)**, which comprises of the various stakeholders and partners that will be involved in the cluster development program directly or indirectly, is crucial for the success of the cluster development program. The governing body of CWG should be dynamic, so that each member is able and willing to make decisions and should be sustainable in order to insure the continuity of the progress of the cluster even after the phasing out of the program.
3. The development of trust, which is UNIDO's methodology of cluster development for initiating joint action among entrepreneurs, is difficult to develop and can take longer time than envisaged for it to occur. In addition, the motivation and commitment of entrepreneurs to engage in joint actions can only be safeguarded if they see tangible benefits in the short term. In order to maintain the momentum and insure the further development of trust, **cluster initiatives should start with low-risk but quick result generating interventions**. Progressively, as the trust level increases, the interventions can move into longer-term and high-risk activities. In addition, adopting local values and nurturing social capital can help strengthen trust.
4. While formulating cluster development programs, it is crucial to **take into account the possible heterogeneity in enterprises' performance, capabilities and production history** and avoid applying a 'one size fits all' cluster policy in all sectors and context. Like in any policy actions and interventions, cluster development programs should be tailored on the existing (and evolving) local circumstances of the different clusters.
5. Finally, **monitoring and proper impact evaluation should be an integral part of cluster development programs** in order to bring about clarity on the expected outcomes and provide lessons to improve results. In line with the initiative's objectives, the impact evaluation shall include not only measures of income-based variables but also other noneconomic capabilities such as skill acquisitions and spillover effects of various interventions. The impact evaluation can be designed and implemented at the different phases of the cluster development life cycle.

The use of more aggregate data to investigate the existence and benefits of clusters, as done in Section 6, is seen as particularly useful as it allows one to draw more general conclusions about cluster development than very specialized case study evidence. Indeed, the combination of the two approaches, as done in this report, provides arguably the most rounded picture of clusters.

The data analysis in Section 6 can only be seen as exploratory at this stage, however. The UNIDO Africa Investor Survey provides a wealth of information on firm performance that can usefully be further explored for evaluating the benefits of clusters. However, the disadvantage is the very limited coverage of the survey, which misses in particular small firms.

In general, in order to better understand clusters, it is important to combine information for large and small firms. In particular, it would be useful to have more detailed information on the market interactions between larger and smaller firms—e.g, their customer-supplier relationships, incidence and type of technology transfer, exchanges of workers, etc.

The empirical analysis in Section 6 is based on cross sectional data for one particular year. This enables us to provide a snap shot picture of the existence of clusters. Taking advantage of dynamics and observations of firms along the time dimension is a priority to better understand the location decision by firms and the forces that lead to the emergence and transformations of clusters, and the potential benefits thereof.

Furthermore, an analysis of the interaction of firms in different sectors of the economy might be fruitful in unleashing economic development. Who are the suppliers, who are the final good producers? What role do services activities play in a cluster? Better availability of datasets that provide information on such links (e.g., in input-output tables) as well as information on firms in services sectors would be necessary to tackle this issue.

These issues should be addressed in further research in order to improve the understanding of the functioning of clusters and enable more focused policy advice.

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Appendix

Table A1: Raw data used for construction of maps

	nb_firms (t1)	lat	long	sh_cc_emp(t2)	sh_cc_sales (t3)	sh_cc_dom_inp (t4)	prod_median (t5)	prod_growth_median (t6)
1	341	9,022735596	38,74679947	69	74,17	76	3886,01	11
2	1	14,15935993	38,90074158	0,0291094	0,00			
3	14	9,149999619	37,73333359	5	2,51	2	2159,46	45
4	1	12,41530991	39,55966187	0,065205	0,00			
5	3	8,55	38,39	0,2154093	0,18	0	8602,44	-16
6	1	8,450488091	36,35140991	0,5821874	0,00	5		-3
7	10	8,743803978	38,98868942	3	1,51	0,0568384	4332,15	4
8	5	9,58922863	41,87018967	2	1,16	0		
9	9	8,808716774	38,914608	0,6753374	2,12	0,43995	12851,73	19
10	1	9,304648399	42,13264084	0,7999255	1,21	0,7211472		
11	4	14,28038788	36,61748886	0,1408893	0,12	2		19
12	2	11,80000019	39,15000153	0,2084231	0,20	0,0502445		10
13	83	13,49613953	39,47352982	6	7,73	2	2309,32	14
14	3	8,594099998	39,12141037	0,7195836	0,39	0,536206		18
15	17	8,564474106	39,29207993	2	2,70	5	2710,37	5
16	6	8,916666985	38,61666489	0	1,22	1	8361,97	0
17	4	7,238654137	38,98816681	0,0477394	0,00	0,0046776	1999,11	8
18	1	6,093029976	38,59266281	0,0349312	0,00			
19	2	13,78333282	39,59999847	0,2608199	0,01	0,0260969	5813,80	61
20	41	6,1666	38,23	8	0,48	5	2617,73	12

Code to locations

- 1 ADDIS ABABA
- 2 ADWA
- 3 AKAKI
- 4 ALAMATA
- 5 ALEM GENA
- 6 BEDELE
- 7 DEBRE ZEYIT
- 8 DIRE DAWA
- 9 DUKEM
- 10 HARAR
- 11 HUMERA
- 12 KEBELE
- 13 MEKELLE
- 14 MOJO
- 15 NAZARETH
- 16 SEBETA
- 17 SHIRE
- 18 SOLOMO
- 19 WUKRO
- 20 YERGACHEFE