

SymbioCity



DEBRE BERHAN  
MUNICIPALITY

# Urban Sustainability Review of Debre Berhan 2020

THEMATIC AREA: SOLID WASTE MANAGEMENT





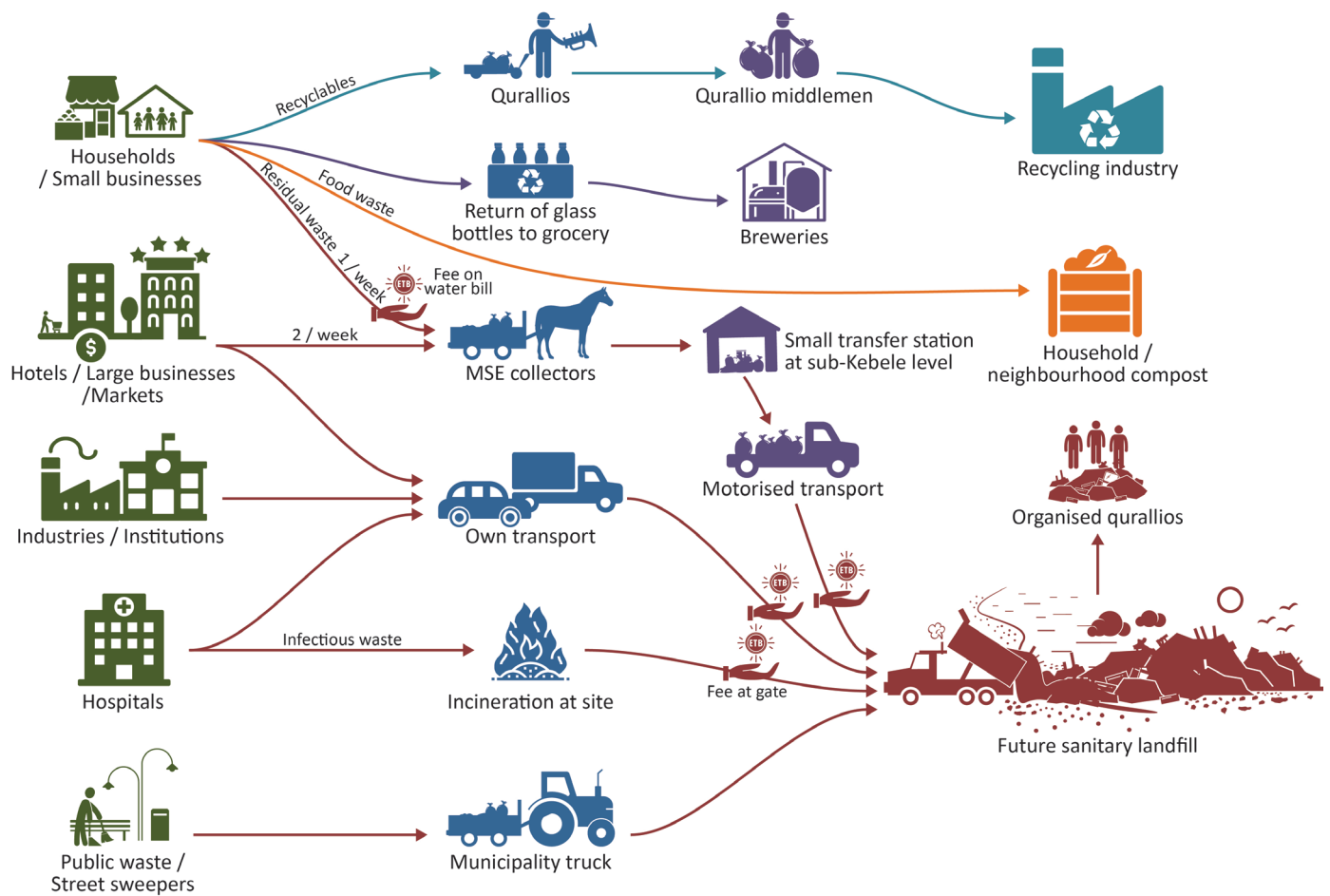
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## WASTE GENERATION

## TRANSPORTATION

## DEPOSIT / TREATMENT



*Overview of vision of how the SWM system in Debre Berhan will work in the future.*



# Executive Summary

Ethiopia is one of the most rapidly urbanizing nations in Africa, with an average urbanization rate of more than 5.3 percent per annum. From a low level of urbanization, about 21 percent, such rapid urbanization is the driver of a major societal change. Ethiopia holds a national population of about 110 million people. With a rural-urban migration rate of about 4%, close to 4 million people will start a new life in Ethiopian cities every year. This puts pressure on urban managers in terms of providing services, homes, infrastructure, jobs and utilities for urban dwellers. Urban Ethiopia is going to be a central arena for reduction of poverty as cities will host rural to urban migrants searching for employment.

The government of Ethiopia's national plan for development, Growth and Transformation Plan (GTP), has embraced this reality through its focus on industrialization and urbanization as key vehicles for economic transformation and sustainable development. Ethiopia is implementing a framework called Ethiopian Cities Sustainable Prosperity Goals (ECSPG). The framework aims at achieving the SDG 11 which emphasizes safe, resilient and clean urban development. The SymbioCity approach of sustainable urban development is a tool and process methodology for achieving participatory, people-centred and integrated planning for sustainable city/society building. It fits well with the Ethiopian framework of inclusive, sustainable and economically growing cities. The approach builds on experiences and research from the Swedish context where key success factors of sustainable city building have been analysed and conceptualized.

Following the selection of Shashemene and Debre Berhan, to pilot the SymbioCity approach project, several activities have been carried out to identify key urban challenges and to diagnose the current situation in the city. This Urban Sustainability Review (USR) serves to describe the review for Debre Berhan, and the vision the city has developed for improving urban sustainability with focus on solid waste management. This review emphasizes on the process used, the methodology and tools applied and the outcomes so far.

After having defined and organized the project, the second step of the process involves making a diagnosis of the current situation of solid waste management and its connection to other urban systems, structures and goals. The working group also analysed roles and responsibilities of the various stakeholders affected by or contributing to the process. This was made through a participation by waste collectors, government officials, business sector and NGOs in the assessment. The stakeholders helped to provide a comprehensive understanding of how the system was currently working, what its strengths and weaknesses were and how it impacted different groups in the city. The working group

went in the field and observed and (walk-through-evaluation) identified areas of the city including slum areas, condominium housing, market areas, existing informal dumping sites, to develop a thorough understanding of the spatial and physical dimensions. The views from waste collectors (80% women), city officials and business sector were then triangulated to understand the current systems and collect ideas for improvements. This second step, with a diagnosis of the current situation and identifying and inviting stakeholder participation, will be a steppingstone for formulating a vision and objectives for the thematic area (which is the third step in the approach).

Having recorded the input from the stakeholders a wide group participated in creating a vision for solid waste management for the city. "Debre Berhan will be an exemplary clean and green city, with more jobs in SWM and greenery, with a community that is well aware of sanitation and hygiene and are satisfied with the SWM service provision". The vision captures the city's wish to use improved solid waste management to create more sustainable jobs, improve human health, create an understanding of the need to protect the environment, and deliver reliable service to the citizens.

From the vision the working group identified key goals and targets of how to achieve improvements and identified how they would like the future system to work. On page 4 is an illustration of how the municipality of Debre Berhan would like to organize solid waste management in the city in the future. It includes at household level source separation of waste in three fractions: 1) Organic 2) Recyclables 3) Residual waste. The MSE collectors (donkey cart) would still be operating in the residential areas but would drop off the waste at smaller kebele level transferstations to allow for more efficient transport of waste to the future sanitary landfill and recycling industries. Hotels and large business would continue to organize collection by themselves to encourage private sector involvement. Also industries and large institutions have to organize their own collection and transport of waste and they will be charged a gate fee to dispose of waste in the landfill. An important difference is also that the fee for SWM would be bundled with the water bill, making it easier for the municipality to control the process.





# 1. Introduction

The city of Debre Berhan is applying the SymbioCity Approach in order to improve urban sustainability and capabilities to plan for inclusive and sustainable urban development. The project in Ethiopia is part of the Global SymbioCity Approach Programme which is funded by the Swedish International Development Cooperation Agency (Sida). Debre Berhan has selected a cross-sectoral working group as well as a steering committee of decision-makers and a national advisory board to oversee the project. The working group meet regularly with an international SymbioCity approach facilitator as well as a national urban expert. The working group in Debre Berhan commenced work in April 2018 and during the first phase of the project focused on defining and organizing the project and developing this Urban Sustainability Review. The Swedish Association of Local Authorities

and Regions (SALAR) and its subsidiary SKL International are implementing the pilot project in Ethiopia.

Debre Berhan city was established in 1454 by Emperor Zerayaqobe. It is situated in Amhara national regional state and currently, the city has been serving as the seat of North Shewa zone, Debre Berhan city administration and Basonaworana district. The city is located at 130 kilometer north east of Addis Abbeba. The city is also close to other larger urban centers of the region, Dessie and Mekelle.

The city is home to close to 150 000 residents and the population is growing by an average of about 4.5 percent per annum. The city is going to be under a strong pressure in terms of service demand, jobs and infrastructure. The population of Debre Berhan is young, 60% of the population are under 25 years of age.



Location map. Source: Urban expansion study 2014.

## 2. Background and purpose

### 2.1 Background

Debre Berhan city is one of two Ethiopian pilot cities applying the SymbioCity approach in order to improve urban sustainability and capabilities to plan for inclusive and sustainable development.

The project in Ethiopia is part of the Global SymbioCity Approach Programme which is funded by the Swedish International Development Cooperation Agency (Sida). The two pilot cities have selected a cross-sectoral working group as well as a steering committee of decision-makers and a national advisory board to oversee the project. The working group meet regularly with an international SymbioCity Approach facilitator as well as a national urban expert. The working group in Debre Berhan commenced work in April 2018 and during the first phase of the project focused on defining and organizing the project and developing this Urban Sustainability review.

### 2.2 Purpose for conducting the Urban Sustainability Review

The purpose of the Urban Sustainability Review for Debre Berhan is to conduct an assessment of the city's strengths and challenges regarding urban sustainability with special focus on solid waste management (SWM), and at the same time, provide stakeholders with an overview of the present situation as well as transparent insight into the upcoming strategic planning process. The Urban Sustainability Review can also act as a baseline for future follow-up.

The review of the current status of urban sustainability has been developed through a participatory process including several key stakeholders and actors, who have offered their views regarding urban development and solid waste management in Debre Berhan. By involving a wide range of stakeholders, the information obtained has led to a more comprehensive understanding of the challenges, opportunities, potential synergies have been achieved. The USR has therefore been an important process for stakeholders in the city, allowing them to get involved to describe the problems, influence the development of possible solutions and plans early in the process.

The SymbioCity approach can be applied in many ways. The project set up for the two pilot cities (Shashemene and Debre Berhan) in Ethiopia was that they, early in the project, would select a thematic or geographic area to focus the subsequent project on. The Urban Sustainability Review for Debre Berhan has been conducted in order to have a clear idea of the urban sustainability strengths and challenges of

the city. To provide all stakeholders of the project with an analysis of the present situation and a background for the upcoming strategic planning process as well as a clear account for how the analysis was made. The urban sustainability review can also act as a baseline for future follow-up.

Based on the SWOT and Grid analysis the working group went on to discuss the choice of thematic area. Key issues from the SWOT and grid were identified and in a group discussion the issues raised were clustered and the working group were asked to prioritize the issues by marking three of the key issues with a tag. The issue that received the most tags was solid waste management and after a long discussion and mapping of how these issues ties in with other key urban issues the working group selected this thematic area as focus for the coming work.

The reasons why the working group wanted to focus on solid waste management were primarily; it is an issue that the citizens of Debre Berhan have raised as a serious problem, it is a prioritised development area on a national level, it addresses improving urban environment, it addresses urban health, it could potentially create more jobs, improved solid waste management may have synergies with urban greening. The reasoning behind the working group's choice of thematic area of focus for the continued project was presented, discussed and unanimously approved by the cabinet.

### 2.3 Project organisation

The project is organised through a multi-level scheme, reaching from national level down to local level through the stakeholder participation process. At national level the project is guided by an advisory board composed of:

- Ministry of finance and economic cooperation.
- Ministry of Urban Development and Housing (the main national project owner).
- Ministry of Environment.
- World Bank.
- UN-Habitat.
- Regional Bureau of Urban Development and Housing for Oromia and Amhara regions.
- SKL International.
- Mayors of both Shashemene and Debre Berhan cities.
- Ethiopian Cities Associations.
- Christian Relief and Development Association (CRDA)
- Ethiopian Institute of Architecture, building and construction (EiABC).
- Academic institutions.



The national advisory board regulates the overall project and disseminates experiences gained from the pilot cities to other similar cities in Ethiopia. It ensures and coordinates possible synergies with other urban development programs. The MUDH is the chair of the national advisory board and serves a key client of the project. The MOFEC makes sure the legal aspects and necessary formalities are fulfilled and that would allow the implementing organization (SKL international) in Ethiopia. This is materialized through a Memorandum of Understanding (MOU) signed between MOFEC and SKL International. The regional representatives are also key in disseminating and remove and disseminating information to other cities in the region.

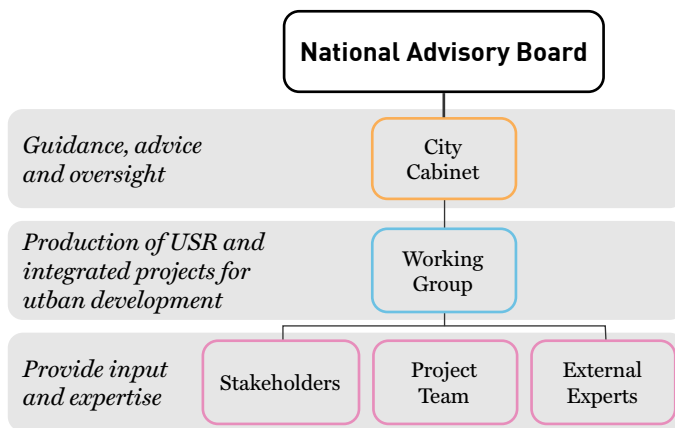


Figure: Overview of the project organisation structure.

At City level the project is guided by the City Cabinet acting as steering committee, composed of the Mayor and Head of Office representatives from key sectors in the city. The role of the City Cabinet is to oversee, guide and advise the project. The cabinet is also responsible of approving project activities and findings as well as deployment and monitoring of the project working group.

At project level, the working group consists of a selection of experts, from the following sectors:

- Job creation office
- Health office
- Education office
- ULGDP project office
- Solid waste management department
- Investment office
- Urban planning department
- Land management department
- Women and children office
- Youth and sports department

The working group is a selection of experts that constitute the core team in the project and are expected to work throughout the project period. The working group is applying the SymbioCity approach with its 6 generic steps including conducting planning and carrying out stakeholder participation, a diagnosis of the current situation of the city

and produce an urban sustainability review on the chosen thematic area. The working group will also lead the development of integrated sustainable proposals urban improvements. The working group together with support from an international SymbioCity approach facilitator (SCF) and a national urban expert implement the SymbioCity approach in the city.

The working group meets with the international SCF and national urban expert in on-the-job workshop trainings that are held over the course of a week and will happen 8 times over the project period. The trainings include practical application of the SymbioCity methodology, inspirational lectures and between work weeks the working group carry out tasks and assignments as a part of the training program.



Working group of Debre Berhan in action planning scenarios for the future SWM system in the city.

## 3. Process and Methodology

### 3.1 SymbioCity

SymbioCity is an approach and methodology that promotes a holistic, integrated and multidisciplinary path to sustainable urban development based on extensive experience from Sweden and application in developing countries. Sustainable urban development is a complex field comprising of inter-connections between urban systems, services and relationships, and the SymbioCity approach provides a conceptual framework for the many issues and linkages that need to be considered in urban development initiatives. The SymbioCity model allows decision-makers to review urban areas holistically and attempts to show how spatial, environmental, social-cultural, and economic factors are in fact integrated and mutually supportive. The approach recognizes that urban areas are created by people for the people and, therefore, should be inclusive and build on stakeholder participation.

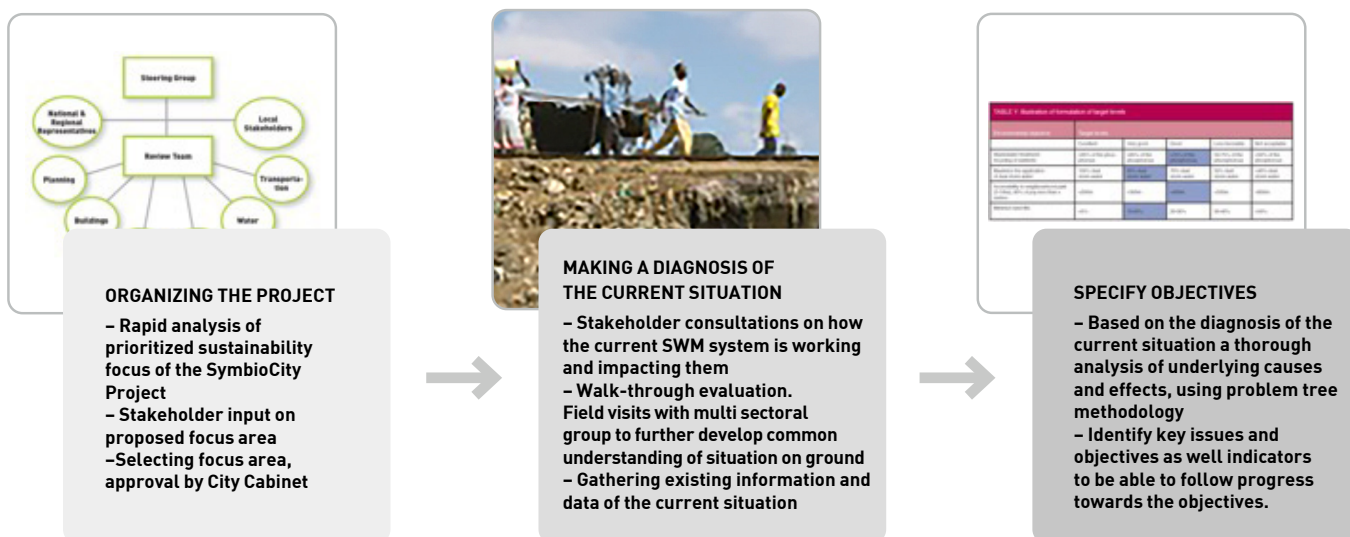
The main objectives of the SymbioCity approach are:

- Support multi-disciplinary cooperation **among stakeholders** and a holistic and integrated approach.
- Contribute to **capacity building** by mutual sharing of knowledge and experiences between stakeholders.
- Be a platform for dialogue and cooperation between stakeholders at the local level.
- **Guide the Urban Sustainability Review (USR)** at different levels using multi-disciplinary and sector approach.
- Contribute to city wide strategies for improving urban areas.
- Help cities and towns to **plan practical and integrated systems solution**.



*The four dimensions of urban sustainability; environmental, economic, socio-cultural, and spatial (the built environment). Human health, comfort, safety and overall quality of life are in the center.*





Overview of the first three generic steps of SymbioCity Approach.

The SymbioCity approach comprise of six generic steps:

1. Define and organize the process.
2. Make a diagnosis of the current situation.
3. Specify objectives.
4. Develop alternative proposals.
5. Analyse impacts.
6. Implementation and follow up.

This URS outlines the result and describes the work with the first three steps of the SymbioCity process.

### 3.2 Organizing the project and Selection of Thematic Area

As mentioned above, the Symbio City Ethiopia Project in Ethiopia was organized in such a way that the city early on would focus their planning efforts on a specific geographical or thematic area.

There was initial indication on priorities even before the project started, the City Administration of Debre Berhan had identified topics already when the MoI for the project was being formulated. At the start of the SymbioCity project the working group, representing several departments of the administration, made a new assessment of the most prioritized areas for sustainable urban development in Debre Berhan.

Based on a rapid SWOT and Grid analysis Key issues were identified and clustered. The working group discussed what type of interventions could potentially have impact on multiple key issues that they wanted to address. For example, improving SWM could generate more low-skill jobs for urban poor, improve human health, improve quality of public space and reduce pollution. The working group was asked to prioritize the key issues and select the one of what in their view was the highest priority. The issue that received highest priority among the working group was Solid Waste Management.

On page 12 i is a summary of the rapid SWOT analysis carried out by the working group.

After prioritizing key issues, the working group decided to focus on SWM with the following arguments.

Why focus on SWM:

1. It is an issue that the citizens of Debre Berhan repeatedly have raised as a serious problem that impacts their daily life.
2. It is a prioritised development area on a national level.
3. It addresses improving urban environment.
4. It addresses urban health.
5. It could potentially create more jobs.
6. Improved solid waste management may have synergies with urban greening.
7. Improved SWM could benefit the city's aspirations to increase tourism.

The reasoning behind the working group's choice of thematic area of focus for the continued project was presented, discussed and unanimously approved by the City Cabinet, the steering group for the project.



Working group focal person Amsalu Mekonen presentation for City Cabinet members regarding suggested thematic focus for the project.

Below is a summary of the rapid SWOT analysis the working group carried out.

<h3>Strengths</h3> <ul style="list-style-type: none"> <li>• Debre Berhan is chosen as a key Industrial city – there are already several large industries established.</li> <li>• Proximity to Addis Ababa and the recycling industry there.</li> <li>• Cool temperatures and high quality ground water.</li> <li>• Available labour force.</li> <li>• Debre Berhan University – strong academic resources to use for improved knowledge and awareness</li> </ul>	<h3>Weaknesses</h3> <ul style="list-style-type: none"> <li>• Lack of awareness about solid waste management both with the public and government institutions.</li> <li>• Lack of finance/budget to provide services.</li> <li>• Solid waste management has not been prioritized by the local government.</li> <li>• Low stakeholder involvement i.e. NGO who work on solid waste management.</li> <li>• Poor resource utilization, low recycling.</li> </ul>
<h3>Opportunities</h3> <ul style="list-style-type: none"> <li>• Favourable location, good connections to neighbouring cities.</li> <li>• Skilled professionals and labourers.</li> <li>• Strong community that is involved in the urban development through the Kebele organization.</li> <li>• Debre Berhan is a UIIDP-city and can be awarded funds for development projects if they are in line with the UIIDP program.</li> <li>• Many engaged religious groups in the city who are assisting on awareness issues.</li> <li>• Debre Berhan has several important tourist locations.</li> </ul>	<h3>Challenges</h3> <ul style="list-style-type: none"> <li>• Local government capacity to implement projects and plans.</li> <li>• Lack of attention to eco-system services and urban development impact on the environment.</li> <li>• To create jobs for the increasing urban population.</li> <li>• Large urban poor population and large rate of urbanization.</li> <li>• Low payment for municipal services and poor reliability of service delivery.</li> <li>• Improve urban health.</li> <li>• Climate Change.</li> <li>• HIV/AIDS and other sexual transmitted diseases.</li> <li>• Increased alcohol and substance abuse (including khat).</li> </ul>

### 3.3 Stakeholder Mapping

After having organized the project, with project structure and works schedule, the working group went on to identify the key stakeholders that are in one way or another related to the project. One of the key principles of SymbioCity approach is that identifying and engaging key stakeholders is a crucial step towards finding integrated sustainable local solutions for local problems. During the first week of the training the working group spent time to map the important stakeholders in Debre Berhan city that would influence the project implementation and would be effected

by the future project. The working group also identified a strategy for engagement with the stakeholders.

Urban development is influenced by a number of stakeholders in the city. Citizens, local organizations such as religious groups, unions, trade groups, women's organizations, NGOs and local business. By involving representatives from stakeholder groups the city can develop more sustainable and people centred solutions to challenges. For example the local business communities generate revenue for the municipality that would help finance infrastructure and



**Table: Stakeholder mapping**

No	Stakeholder	Type of Stakeholder	Motivation (Interest and Possible Contribution)	Brief description of stakeholder
1	Citizens Household survey of 250 households.	Public	Achieve national goals, i.e. job creation and local economic development in SWM sector and well improved SWM and urban environment.	Households and residents of the city including youth, women and senior citizens are in one way or another influenced by or will influence the project.
2	Municipal experts/ Departments City manager, SWM department, finance department, UIIDP department, job creation department, regional representative for SWM issues, Women and Children's department.	Local Government	Sharing ideas and experience	These are the various departments in the municipality. Each working group member represents his/her own department, shares experiences and disseminates it.
3	Solid waste management workers (85% women).	Organised MSE	The workers hold key knowledge about how the system works today and should be part of improving the system.	Self-organised cooperatives handling solid waste collection in the Kebeles.
4	Amhara Development Association	NGO	Providing motorized carts of collection.	Local NGO supporting city administration with improving SWM.
5	D/Berhan City Water Office	Public	Liquid waste treatments and organizing billing for water services.	Local NGO supporting city administration with improving SWM.
6	Emmanuel Development Organization	NGO	Putting dust pin at main road and giving trainings for community.	Local NGO supporting city administration with improving SWM.
7	Dashen Brewery Factory s.c	Private	Financing and idea sharing.	Large brewery and employer which also supports urban projects to improve living conditions.
8	Habesha Brewery Factory s.c	Private	Financing and idea sharing.	Large brewery and employer which also supports urban projects to improve living conditions.
9	D/Berhan Tannery Factory Plc	Private	Financing and idea sharing	Large company using chemical and other materials that can potentially be hazardous.
10	D/Berhan Abattoir Service	Public	Abattoir treatment	Large waste generator of waste that is potentially hazardous.
11	D/Berhan University	Academic	Research and capacity building	The university has skilled trainers and academics who can assist the municipality in awareness raising.
12	D/Berhan Prison Office	Public	Experience sharing and financing.	Large employer in the region also a large waste generator.
13	D/Berhan Referral Hospital	Public	Experience sharing on containing hospital wastes.	Large employer in the region also a large waste generator.
14	D/Berhan Rotary Club	CBO	Under process for sponsoring waste lift trucks.	Local business council group also engaged in charity work. Are preparing proposals to get funding for waste collection vehicles.



*Stakeholder meeting with SWM workers.*



*Consultation with waste collection workers they are filling a questionnaire about their opinions on the SWM system.*

services. But the local business community would also adversely influence urban development by polluting the urban environment unless proper care and mitigation measures are taken. Academic institutions do also have a role in the discourse of sustainable urban development through research and training. As such universities and training institutions are key stakeholders for knowledge sharing and dissemination.

During the Urban Sustainability Review process the current solid waste collectors were identified as a key stakeholder and important knowledge carriers about how the system operates now. The 14 Micro and Small Enterprises (MSEs) that are licensed through the city Kebeles were invited to share their opinions on what the challenges are and what they suggest in order to improve the solid waste management. A majority of the MSE waste collectors are women (85%) and they have been in harsh working environments, with exposure to hazardous materials, heavy lifting, exposure to cuts and injuries from glass and needles. The stakeholder meeting also included a training component on occupational safety and how to handle hazardous waste.

### 3.4 Developing an overview of the current situation

In order to develop a thorough understanding of the current situation of solid waste management in the city the working group started to collect information by engaging the stakeholders they had identified in previous steps. The stakeholders included households, solid waste collectors, NGOs, local administration departments, businesses etc to give their opinions on the issue.

The format for engaging with stakeholders and other information gathering was carried out in several different ways, engaging in workshops to add to SWOT and grid analysis, distributing questionnaires, in field consultations and plenary meetings. The working group recorded the information given by the stakeholders to provide diverse and complex view of the current situation of solid waste management

in the city, and produced this USR. The USR also includes review of secondary data like existing studies and plans.

A large group from the municipality, experts from the SWM department, kebele administrators and the communications department gathered to add to the assessment of the present situation and to add to the SWOT and the GRID analysis. The SWOT analysis investigates how the experts view the overall strengths, weaknesses, opportunities and threats that the city faces in terms of solid waste management.

Further stakeholder consultations were held with the City Cabinet, Solid Waste collectors working in the city, NGOs and private institutions and local government representatives. The solid waste management department was responsible for inviting the various stakeholders to the workshop where the analysis was carried out. The USR is composed of results of these discussions.

#### Consultation with waste collector representatives from micro and small enterprises

The waste collectors are a central stakeholder group for the project. Their current work environment is very poor and it is crucial to have their input on how to improve the solid waste management system.

This stakeholder meeting was held with the workers who are directly involved in solid waste collection in the city districts/Kebeles. The purpose was to learn about the workers view of their working conditions and challenges they face.

The waste collection workers are primarily women (about 85% of the total). They have low and unreliable income and very poor working environment. Several of the waste collectors are new in the city having migrated from rural areas and several of the workers do not read and write. The consultation was organized using questionnaires so that the workers could help each other with reading the questions, the working group helped the workers to record their responses.

The meeting started with a short introduction to the project and the SymbioCity approach as well as a short lecture on occupational safety of waste collectors. The waste collectors' input was collected through questionnaires and





*Female solid waste collectors making their way back from the informal dumpsite. The access road is very steep and often slippery.*



interviews regarding the current solid waste collection system, safety measures, and the how waste is handled today and the need of operational supports.

The stakeholder meeting with the waste collectors conveyed the that:

1. They appreciated that the municipality invited them to discuss on waste management issues.
2. The waste collectors pointed out that for them to do a good job and get clean streets public awareness is very important.
3. The collectors inform people not to dump waste in nature and to refrain from burning or burying waste, but they don't get much response from the inhabitants.
4. The collectors said that they do not have equipment to protect themselves and often get injured at work.
5. The waste collectors said that it is not possible to always make it to the formal dumpsite outside the city
6. The expressed concern that changes to the system was going to be made, they feared that bringing in vehicles will put them out of a job.
7. They expressed concern that non-sanctioned waste collectors who do not pay the license fee.

#### **Workshop with business community and NGOs**

The business community, Academics and NGOs active in Debre Berhan were also consulted on their view on the SWM system. The consultation started with a short presentation by the working group, giving a background to the invitation and what the project hopes to achieve. The consultation then carried on in a traditional big hall fashion with each representative stating their comments and the others reacting to them.

Several of the participants were already involved in activities to try and assist the municipality to improve solid waste management. Several of the business operators saw it as a clear risk to their businesses that they do not have access to proper waste management. The representative from the tannery said that they have tried to find someone who can process their waste product but they have not found anyone. The hotel operators voiced their concern with the lack

of clarity at the dumpsites where their collectors had been turned away despite that they were willing to pay the gate fee, resulting in illegal dumping of waste.

Several of the representatives also expressed willingness to assist the municipality with awareness raising, purchasing safety equipment etc.

#### **Consultation with broader municipality**

The purpose of the meeting was to collect the municipal staffs input on the current situation and get their assistance with identifying strengths, weaknesses, opportunities and threats regarding waste management in the city of Debre Berhan.

The main strengths that were identified was that Debre Berhan has a favorable location in the highlands with relatively low temperatures and proximity to Addis Ababa and other cities. Debre Berhan has a university and produces and attracts skilled professionals and labourers. The city has strong community that is involved in the urban development through the Kebele organization, Debre Berhan is a ULGDP-city and the city and a new industrial park in under construction.

Some of the key issues that were identified to address in the future urban planning was to increase the capacity to implement projects and plans within the municipality, improve the situation for the urban poor, focus more attention to eco-system services and urban development impact on the environment, create jobs, improve solid waste management, improve liquid waste management, improved housing, increase facilities for sport and recreation as well as improve payment for municipal services and increased general budget for the municipality.

The working group also did an activity called walk through evaluation. The group jointly walked to several parts of the city to see how solid waste was handled in practice and to be able to ask questions and analyse the spaces together, what is good in the place, what is bad, how can it be improved.

The walk-through evaluation included the most vulnerable areas with informal housing that are especially affected by the illegal dumping. Many of the informal waste collectors live in informal settlement and are storing materials there. Materials that bring many hygiene problems as well as health hazards.



*Consultation meeting with business community, academia and local NGOs.*



The outcome of the workshop was the following:

### Have + Want

- Proximity to Addis Ababa and the recycling industry there.
- Strong support for robust development strategies and projects through UIIDP.
- Debre Berhan University – strong academic resources to use for improved knowledge and awareness.
- Well educated civil servants.
- Strong religious groups.
- Industry park.
- Hospital.

### Want + Don't have

- Accountability in municipality service delivery.
- Coordination between departments.
- Alternative communication other than road, airport or train connection.
- City park.
- Higher economic activity.
- Sewage treatment.
- Sanitary landfill.
- Recycling industry.

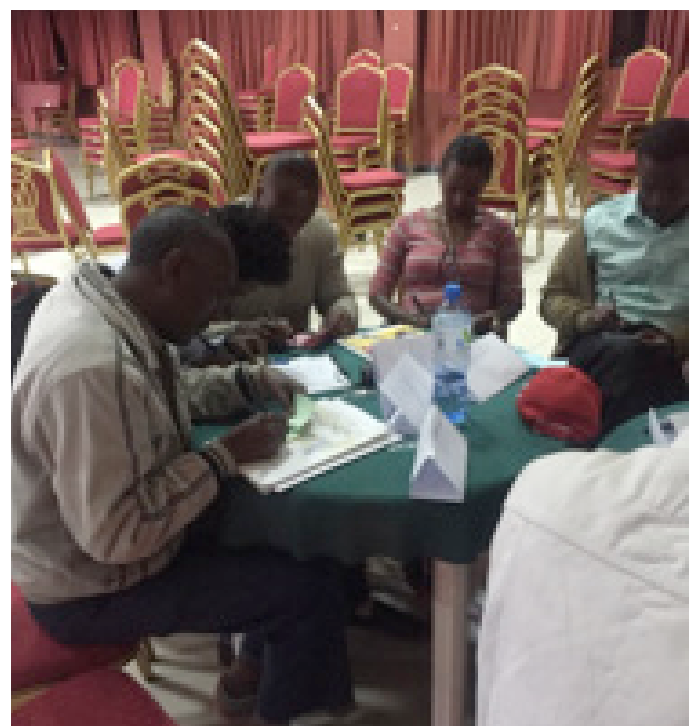
### Have + Don't want

- Poor awareness of SWM issues.
- Poor sewage/drainage systems.
- Poor electricity supply.
- Poor recovery of cost for municipal services.
- Poor data on the number of citizen actually living in the city, the census becomes outdated quickly.

### Don't have + Don't want

- Population decrease.

*GRID analysis.*



*Working group and municipality colleagues in discussion.*



*Above: SWOT presentation.*

*Below: The result of the consultation was also presented to a wider community of city workers and Kebele administration workers. At the meeting they were given opportunity to comment on the process so far and express interest to pilot suggested improvements from later work stages.*



*Walk through evaluation, top left visiting a qoralliew in the outskirts of an informal settlement.*



## 4. The current situation – Debre Berhan

### 4.1 Brief Introduction to The City

Debre Berhan city was established in 1454 by Emperor Zerayaqobe and is one of Ethiopia's oldest cities. It is situated in the highlands of Amehara national regional state and the city administrative center for north Shewa Zone, Debre Berhan city administration and Basonaworana district. The city is located at 130 kilometer north east direction from Addis Ababa, with close connections to other major cities Dessie and Mekelle. The climate is characterized by the high altitude bringing cool temperatures. Debre Berhan city is located at about 2750 meter above sea level. The annual average temperature of the city ranges between 4°C in the coldest month (August) to 26 °C in the hottest month (April). Average annual rainfall ranges between 800 to 1100 mm.

According to the latest official population projection of Ethiopia (FDER\_CSC2013) for all regions at Wereda level from 2014–2017, Debre Berhan has a population of about 114 000. However this number is likely outdated and the figure is closer to 150 000 in 2018.

**Table: Population projection for Debre Berhan**

Year	Population projection
2014	96,556()
2015	102,114()
2016	107,827
2017	113,693

Source: Ethiopia (FDRE\_CSC 2013).

The total area of administrative boundary of the city is about 18000 hectar of land. The city Administration is further sub divided in to nine urban kebele (subcity administrative unit) administrations and five rural kebles. Debre Berhan is like most other urban centers in Ethiopia experiencing rapid population growth. The city is unable to meet the demand for affordable housing, currently informal settlement in northern part of the city is increasing.

The dominant economic activities in Debre Berhan are manufacturing industries, tanneries and blanket factories. Agriculture in the outskirts of the city provides a livelihood for a large share of society. Debre Berhan is home to one of the Government funded universities University of Debre Berhan, there are also several colleges and trade-schools. Other institutions in the city are banks, hospitals both public and private, clinics and higher secondary and preparatory schools (Debre Berhan city five year strategic plan, 2006).

### 4.2 Spatial Dimensions

#### Urban Form and Architecture

Debre Berhan city has not had structured urban planning and design for long. The city has had organic growth and does not have coherent architecture. Most of the existing built environment is not coherent or well planned. However as new areas are developed urban planning is now part of the procedure. There are no high rise buildings in the city but along the main road the new buildings are constructing with four-eight floors. Other than the main street the houses are low 1–3 floors and other non-vertical forms excluding the urban agriculture.

The green area/not built area ratio of the city is 18% of the city total area, 10 percent of that land is not developed. The roadside greenery and medians left open for green development also contribute to the green space. The coverage of the street lighting is very low and measure 4 km along the main road. St. Trinity Church is the main landmark and heritage of the city which is located on the main road from Addis to Dessie. The church is a destination for many pilgrims and visitors to the city.



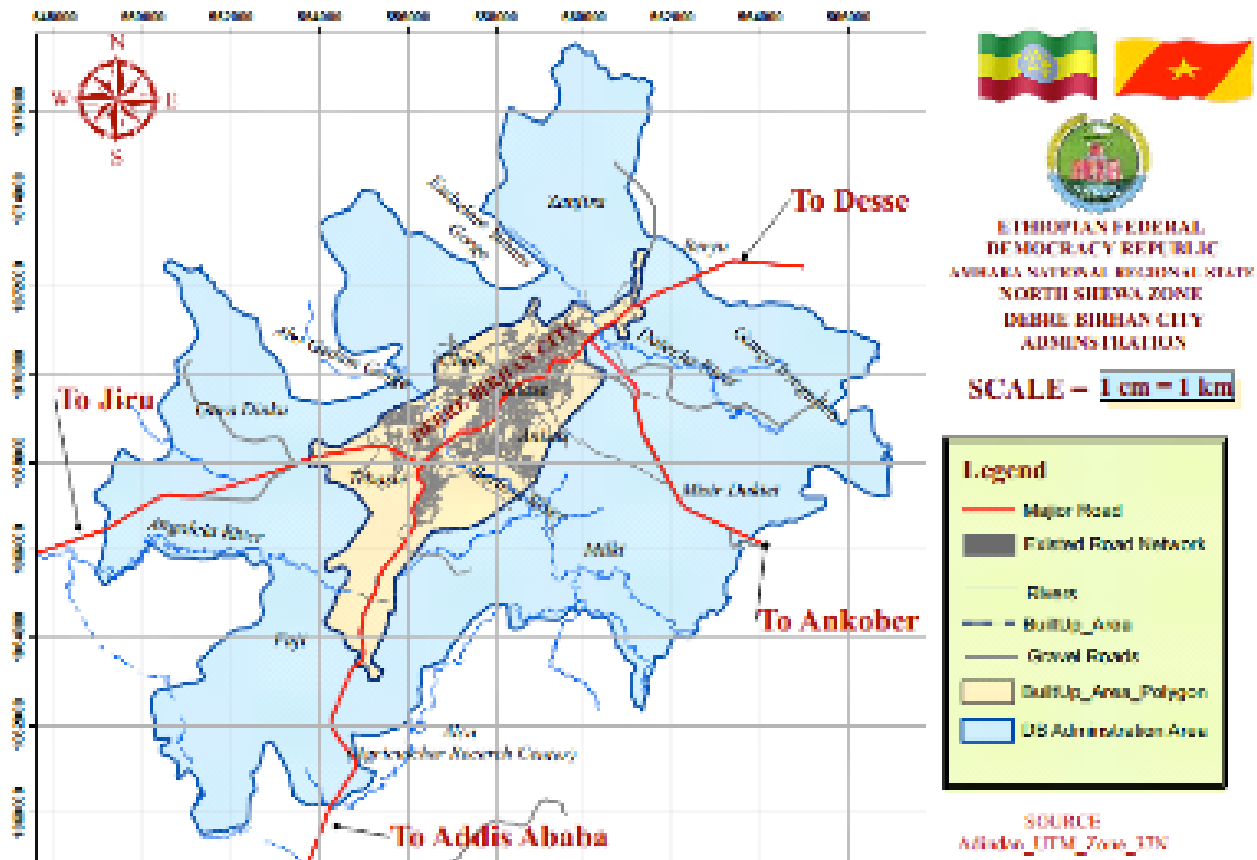
Morning over central Debre Berhan.

#### Housing

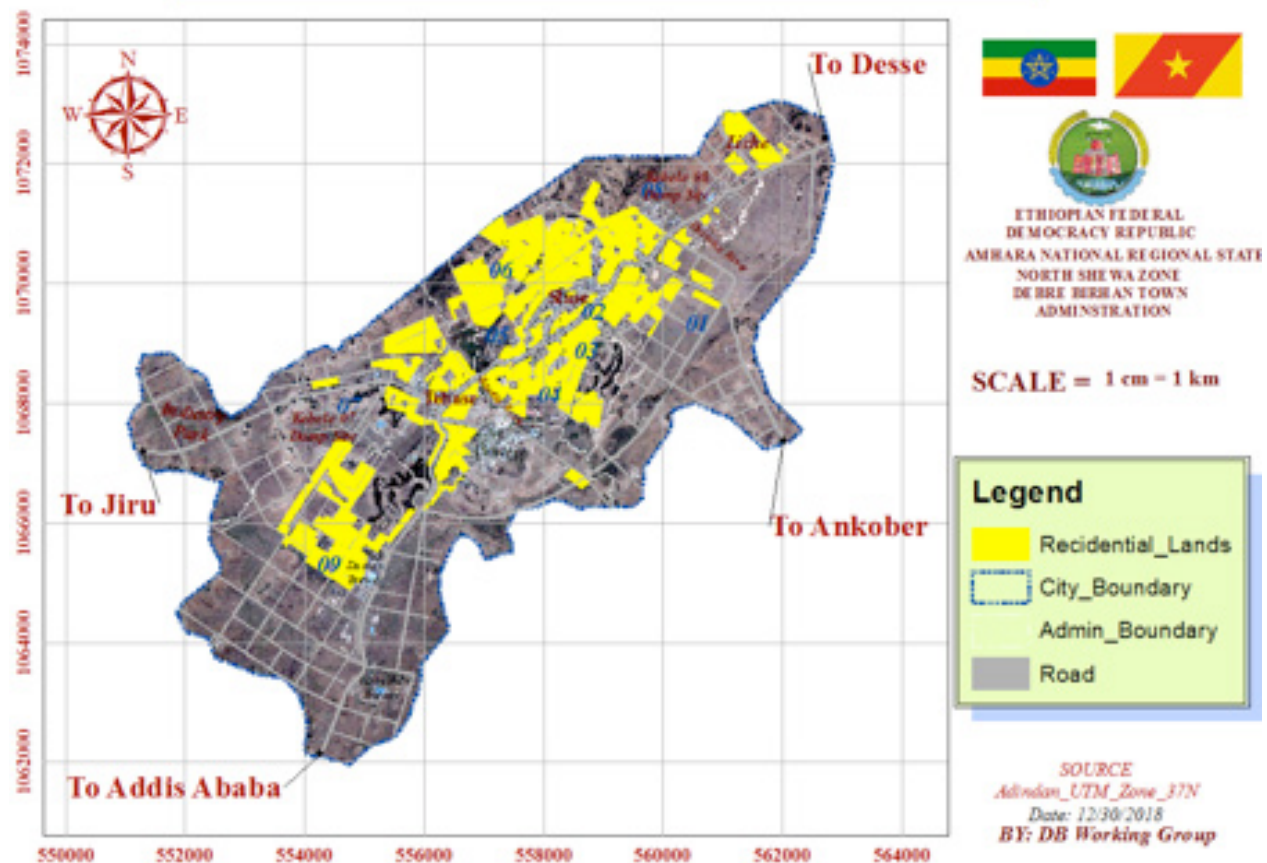
Most of the built area in the city consists of homes, these are often low structures built in the traditional compound structure. A compound with fencing/wall holding 1–4 houses and several families. Often one family is the owner of the compound and they act as landlords to the others. Private housing is often delivered in two ways in the city, by tender and by forming housing union association. As the urban population is increasing at a high rate, the shortage of housing has become one of the major challenges for the city administration. This is also leading to urban sprawl as it is currently more affordable with horizontal expansion and more costly and less common with vertical developments.



## DEBRE BIRHAN CITY ADMINSTRATIN AREA

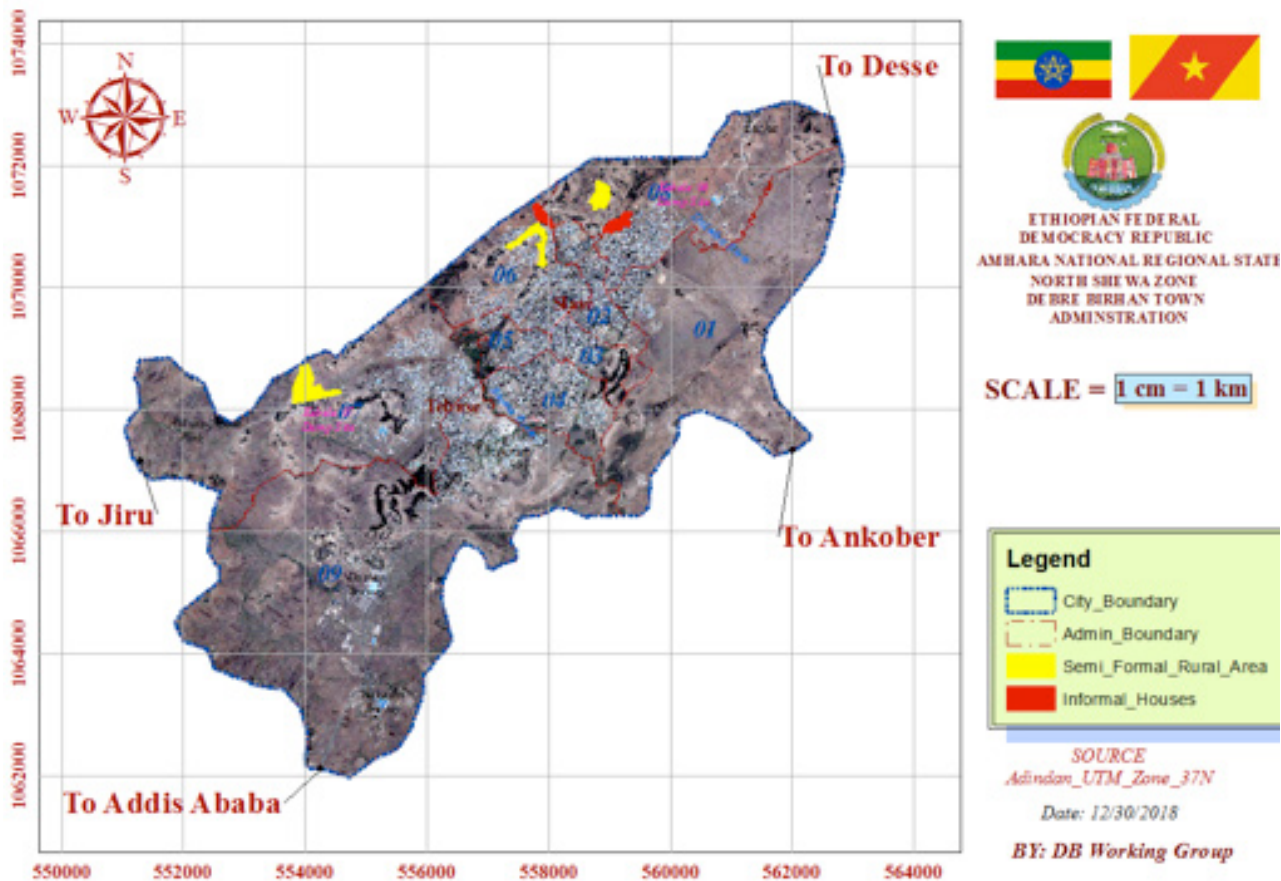


## RESIDENTIAL HOUSING AREAS MAP



Land dedicated to housing in Debre Berhan.

# INFORMAL HOUSES LOCATION MAP



*Concentration of informal settlement, these areas are also severely affected by informal dumping of solid waste.*

The city is working to develop alternatives like low-cost high-rise housing and increased number of rental units. The high need of housing leads to the informal settlement that is done by un-lawful sales/rent of agricultural land to the population or simply by squatters to build structures on land where they do not even have informal permission to stay.

The map above shows the location of informal housing settlements. The red spots show where the main expansion areas are. It is primarily around the open marketplaces and central commercial area that there seems to be a high concentration of informal houses.

## Public and Green Space

The lack of long-term urban planning for Debre Berhan is visible when it comes to the quality and structure of public space. There is no structured planning to provide green corridors or consistent green space in the city, however natural elements still provide this function. The river flowing through the city from north to south has a buffer zone around it. However there are often informal settlements set up here and the area is heavily affected by illegal dumping of solid waste. The main roads also make out green pathways. The road medians are constructed to hold greenery, but it is challenging to maintain plants and trees with so many grazing livestock wondering the town.

There are proposed public spaces/parks in the city, most of them are not functional and have not been developed.

The city does not have urban recreational space other than two youth centers that offers space to play basketball and other sports, and the Derbra Berhan stadium that holds a football pitch and is often used for large gatherings.

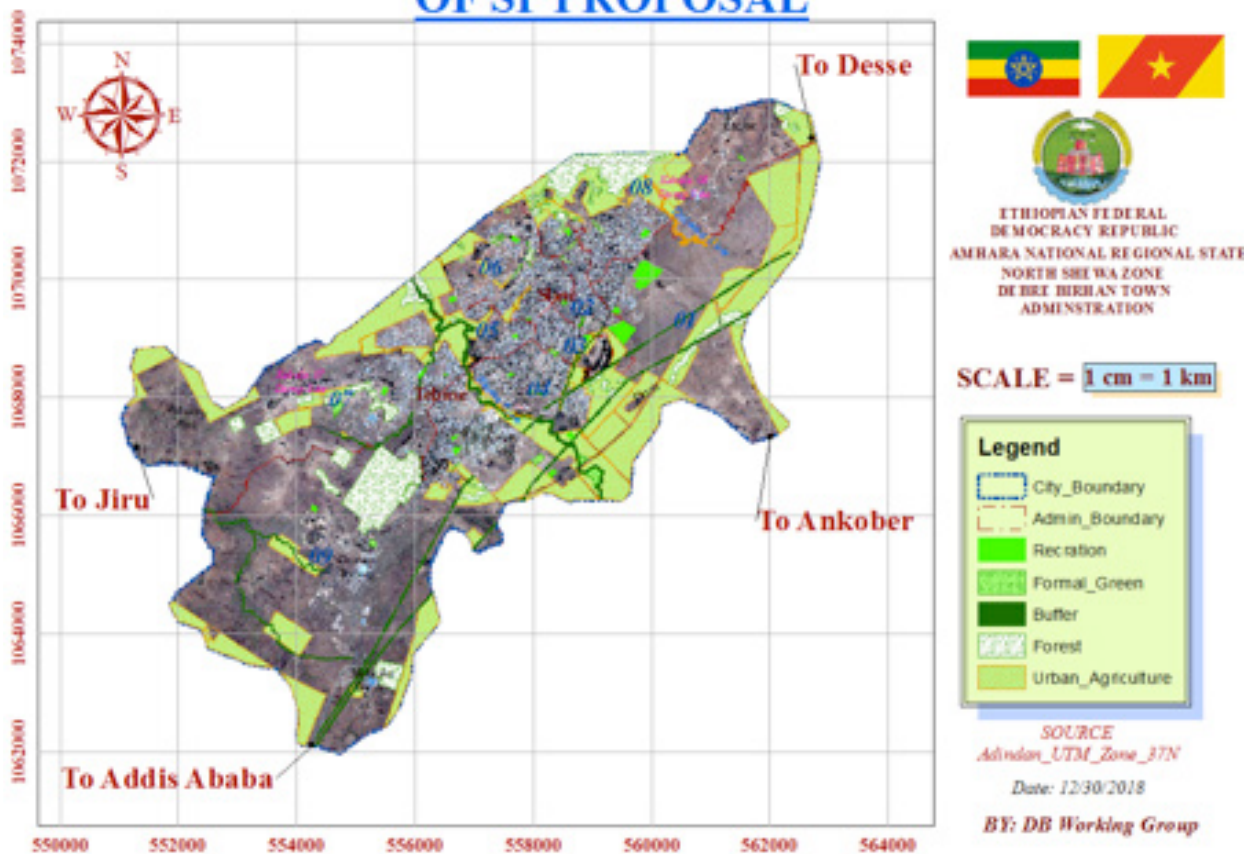
The map on page 23 shows that the southern, northern and south-eastern part of the city has more urban agriculture. The city of Debre Berhan has as a goal, in line with the national urban development agenda, to increase urban greening. The city administration are aware that the green space per capita is currently not met in the city.

Urban agriculture is a key livelihood for many of the city dwellers. The land is farmed in small plots and the major crops are teff, cabbage, lentils, beans and potato. Many residents also keep animals such as chickens, sheep and cows.

On the hills surrounding Debre Berhan there are forest clusters. There are severe penalties in place to prevent that the trees are cut down and used as firewood. However since firewood/biomass is the main energy source for many families the forests are under pressure and are diminishing.

During the diagnosis of the current situation the working group had a session on ecosystem services and concepts such as payment for eco-system services. Ecosystem services are the ecosystems direct and indirect contribution to humans wellbeing. The ecosystem services are often divided in 4 categories: 1) Supporting, 2) Provisioning, 3) Regulating, 4) Cultural. The supporting services are the foundation for the other services and include habitat, biodiversity,

# 



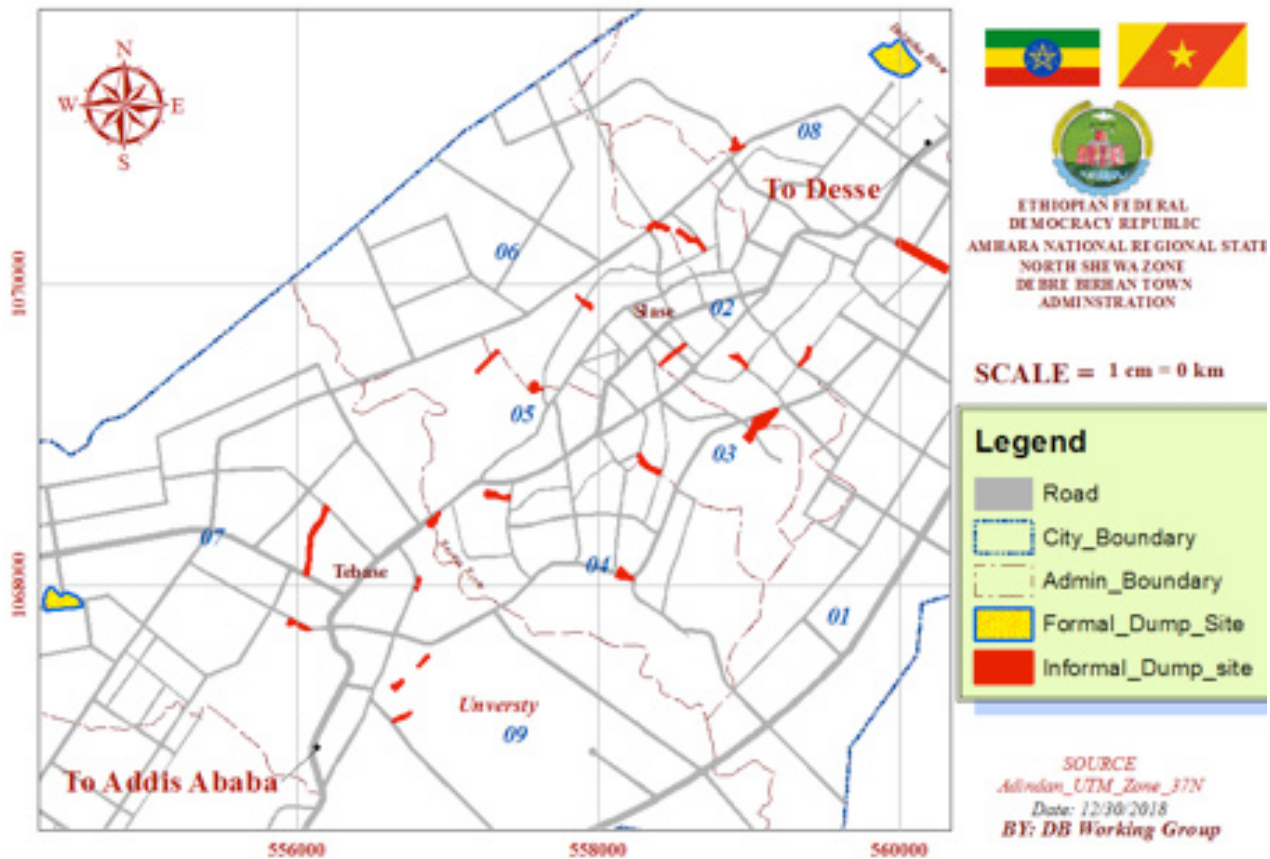
Green space structure in Debre Berhan.



Construction of green midline barrier on the main through street of central Debre Berhan.



# THE MOST POLLUTED INFORMAL DUMP SIT MAP



soil formation etc. The provisioning services are the outputs from the ecosystems such as energy and food. The regulating services include water purification, air purification and pollination. The cultural services are aspects such as recreation, social interaction and health. The working group did an exercise to analyze the most important ecosystem services for Debre Berhan. The following was identified:

**Water purification** – Debre Berhan has high quality ground water. This means that the residents have clean drinking water but also that industries such as beer and bottled water companies have established their presence in the city. These companies provide many much needed jobs in the city. The poor waste management is a threat to the quality of ground water.



*Tree plantation alongside a street.*

**Food** – Many of the residents of Debre Berhan are relying on farming for their livelihood.

**Biomass** – Biomass is the most important energy source for the residents. Either in form of dung, charcoal or regular firewood. The need for biomass is increasing with the growing city and this puts pressure on the local green areas and vegetation.

**Health** – Green spaces and vegetation are important for human health. The current situation with much littering, many informal dumpsites burning and burying of waste is affecting the health of the residents in Debre Berhan.

As mentioned previously a very serious problem with the few areas that are saved for as public and/or green space is that they are heavily affected by informal dumping. Informal dumpsites are scattered and present in several locations around the city. There is a need for strong coordination among the various institutions/stakeholders in order to properly manage solid waste and to prevent informal dumping.



**Table: DB Water Supply Customer Data.**

Customer Type	Private	Public	Commercial	Gov/NGO	Univ.	Industry	Total
no	13578	76	930	462	22	24	15092

## Water

The main water supply are from the 10 bore holes of ground water that produce about 100L per second. There is also a reservoir of about 3300 cubic meter capacity. The average daily production of the water is 6087 cubic meter that cover 82% supply of the city. The water supply reaches a high number of households in Debre Berhan, compared to other Ethiopian cities, and the total number of customers with water supply service is over 15000 households.

The city does not have centralized wastewater treatment. Most households have septic tanks or pit latrines. There is an area for dumping latrine and septic sludge close to the formal dumpsite south west of the city. The large industries use their own plants to treat liquid waste. The drainage utility is provided for each road that is built in the city. The total length of the drainage is 45 km.

**Table: DB Water Supply bill Prise for residential service.**

Consumption l	Price/l
0-5	7.50
5-10	8.50
10-15	9.50
15-25	10.50

Source: DBWSSSO.

According to the willingness to pay study conducted as part of the stakeholder analysis, an average family pays about 30 birr per month for water. There are however variations ranging from 10 to 40 birr for average households and small businesses paying around 200 birr per month.

## Energy

The distribution of the power access is not sufficient. Hence there are two substations which distribute 25 megawatt for the city and surrounding. The new substation distributes 250 megawatt for the industry parks and the surrounding area, yet power interruption is frequently occurred. The high-tension power line pass through the city have power radiation. Even though there is a recommendation of a 15 m buffer radius, some area is occupied by residential activities. The coverage of the power meter estimate to be 15,100 households. The average usage of the energy is 5 kw per household. the remaining households uses other sources of energy like dung, charcoal, fuel, solar panels.

**Table: Stakeholder mapping.**

Consumption rate (kWh)	Price (cents kWh)
1-50	27
50-100	35
Greater than 100	69

## Mobility

Like most urban centers in Ethiopia the intra-city transport rely mostly on horse carts and moto-taxis. There about 300 public horse carts and around 70 cargo carts. There are over 1000 Bajaj (tri pod vehicles) and also 84 minibuses operating in the city.

There are also inter-city busses that stop in Debre Berhan at the main bus station. Also about 400 bicycles are registered in the city.

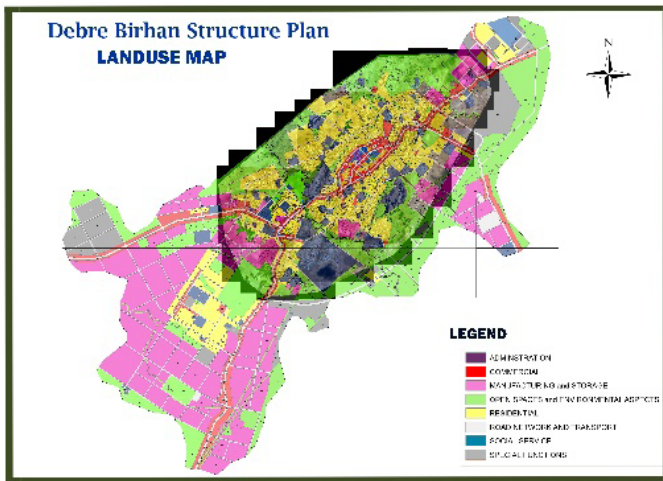
Debre Berhan city have four main routes in the directions od Addis Ababa, Dessie, Jiru, and to the historical landmark of Ankober. The bus station covers above half hectare in the centre of the city is serve medium and mini bus to travel 27 towns. The congestion around the station increase during market days. Also the many visitors to the bus station bring commercial activity for the surrounding area. It is also a large source of littering. The bus station does not have waste bins.



Bus station.

## Urban Structure and Land Use

Debre Berhan city has a structural plan and local development plans to form planed urban structure. The existing urban structure of city is linear which was based on the main route from Addis to Desse.



Debre Berhan Land use map, Source-Structural plan 2015.

### 4.3 Asset and Opportunity

Debre Berhan city is located 130 km from the capital city Addis Ababa which takes one and half hour to travel by car. The proximity to the capital city is an advantage. The city is also close to the upcoming construction of rail way and highway covering the trade line of Djibouti- Awash–Dessie. This is also seen as an opportunity for the city development.

The altitude is 2750 m above sea level which makes temperatures moderate compared to other parts of the country. The south east side of the city has access to ground water which makes provides the city with clean drinking water and has attracted beer factories to the area.

Beginning from the establishment period of Debre Berhan, the city is capital for Kingdom of the Ethiopia. The major historical events and the nearby religious places are potential to attract visitors.

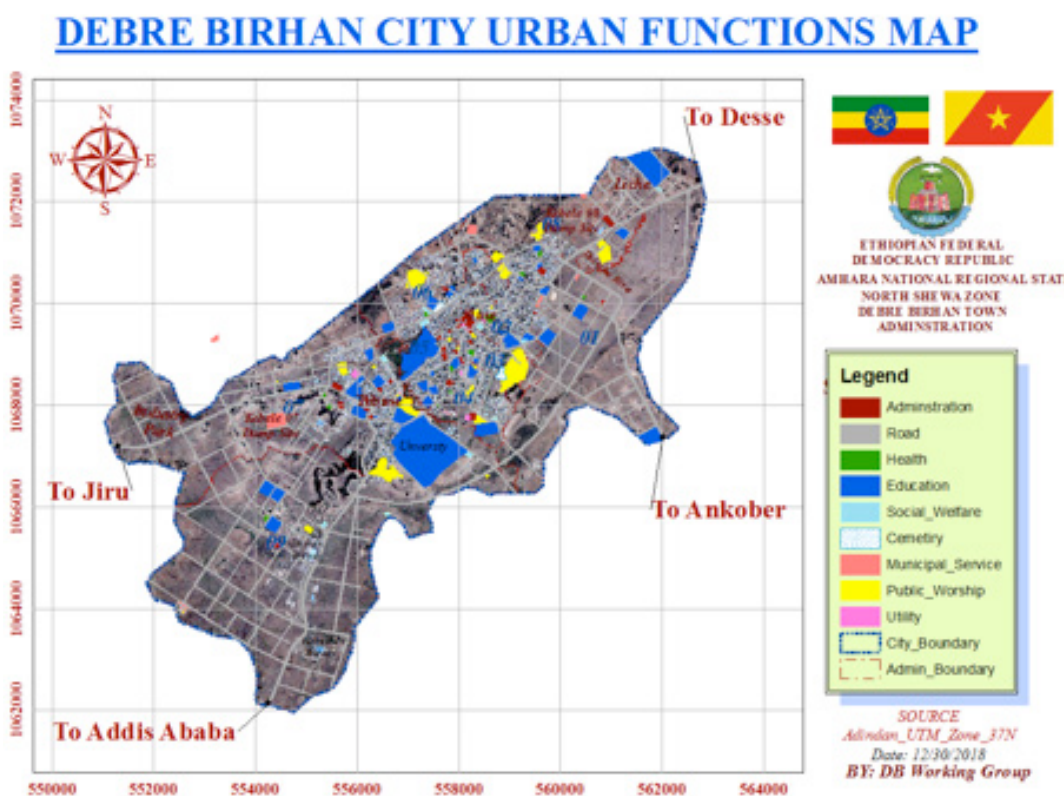
Debre Berhan is one of the cities chosen by the federal government to be a centre of industry. Industry and university are services that help the city to develop by bringing educated manpower, decrease unemployment, provide products, boost commercial movement while university produce educated manpower, support the city with study and knowledge, and enhance economic activities in the city. Dalecha and Beresa rivers are foremost assets the city has. Beresa river is one of the tributary rivers of Abay, the longest river in Ethiopia.

### 4.4 Key Challenges

The presence of the large sectors, educational institute like university, TVET college, other private college and industries bring high rate of migrants from rural area to the city which might be followed by informal settlement development that challenges the management of solid waste produced. In addition to the waste produced, the emission from the industries and the moving vehicles pollute the environment.

Due to the high rate of development the existing planned area of the city has become scarce in relation to the services needed. The Steep Topography on some inside and outside area of the city could be hard for settlement, also be a barrier for the upcoming expansion. Currently the city suffers from the insufficient land use provision for the demand requested.

Debre Berhan city is 696 km away from the regional government capital of Bahirdar. The distance and limited road access from Bahirdar challenge the communication and guidance from regional government. Also the poor road access from rural kebeles and areas makes the rural urban linkage difficult.



## 5. The Human City: Socio-Cultural Dimensions

The people of Debre Berhan are young and the city is growing rapidly. Many of the newcomers to Debre Berhan come to find work in the industrial parks around the city. Debre Berhan's strategic location close to the capital but with cheaper living conditions makes it an attractive city to many. The city also attracts travellers who want to see the historic sites including the Trinity church.

Common livelihoods in the city are farming, micro and small businesses, industry workers and trade activities. The government is a key employer but there is large unemployment of both low-skilled workers as well as graduates of different levels. Job creation and sustainable livelihoods are important objectives of the national and local government. The waste management and circular economy sector has been identified as one of the potential sectors that could generate more jobs. The city administration also has strong focus on improving health and educational levels in the city to further support the improvement the city's living standards.

### 5.1 Education Services

There is a wide range of educational institutions in the city. The primary school institutions have increased in order to offer universal access to primary school education. Even though, in theory, children have access to schooling there are children who are not attending primary school since they have to work to support themselves and their families. In the current waste system there are many children involved in collecting and picking waste to sell to scrap dealers.

The students in school programs are however increasing and there seem to be equal representation between men and women.

Schools have been identified as important institutions to spread awareness about hygiene and proper solid waste management.

### 5.2 Health Services

The health status of people affects the welfare and the productivity of the society. The health status of a society is mainly affected by environmental condition, personal hygiene, nutritional value, shelter, etc. It is essential to provide adequate and improved health services. Poor solid waste management adversely affects the health of the residents and hence reduces productivity. Improving public health is a key synergy linked to the project of improving solid waste management in the city. People living in poverty are more affected by dis-

eases since they have less access to potable water, have bad living conditions and live close to informal dump sites.

### 5.3 Sports and Recreation

The City Administration, organize many types of sport such as football, volleyball, athletics, taekwondo. The city has also youth centres that organize recreational activities for youngsters. There is high pressure on these resources since the city is growing rapidly. The city is currently not meeting master plan goals in terms of available public space for recreation and sports facilities.

### 5.4 Security

Debre Berhan has had some unrest in connection to different political events. Since the beginning of 2018 the political tensions have decreased, and the security situation has been primarily good. There have been times of political tension that have resulted in closed schools and government offices. Community policing has been playing a great role in ensuring sustainable peace and security in the city. At each kebele, the public is actively taking part in keeping peace and security of their respective neighbourhoods. The public has also built houses for community police officers, invested in equipment for them and pays their monthly salary. The prevalence of peace and security has in turn been contributing to continuous economic development.

### 5.5 Information and Communications Technology

Most people in Debre Berhan have access to a phone. The phone service is not always reliable and is at time deliberately turned off during times of unrest. Internet services are available to most via wireless, internet cafes, hotels and offices. Few households have fixed internet connection in the homes. Citizens with access to smart phones access news and other services online however this is not available to a large share of the population.

### 5.6 NGOs and Civil Society

There are several Non-Governmental Organisations, community and religious groups that are active in Debre Berhan. Most citizens are active in religious groups in some way as re-

ligion plays an important role in a majority of Ethiopians life.

The City administration encourages cooperation with civil society, and view them as key stakeholders to achieve Ethiopia's development plan, the Growth and Transformation. There are active NGOs in the city, a few of them are focused on improving waste management, namely Emmanuel Development Organisation and the local branch of Rotary. Also religious groups are partners in improving living conditions in the city, many of the churches and mosques are organizing community clean-up days and can be helpful in informing their followers about improved solid waste management.

## **5.7 Key Assets and Opportunities**

State wide the common and known, local indigenous social institutions like, Edir, ekub, religious organization which are the glue that fix the policy and strategy with the community make them the strong asset that the city have on social dimension. The high growth rate of population can be positive attribute. The strong social bond, hospitality, support and comfort of each other, the culture, norms and trends are described as the good elements of the city population.

## **5.8 Key Challenge**

Poverty is the foremost well-known problem of our country as well as of our city. It limits the awareness and knowledge of the society and don't allow them to live but rather surviving.

Women's role in society is a challenge. Gender inequality and low participation of women result in low awareness of the population, an inclusive planning process for creating a clean city requires women to be on board.

Lack of appropriate places to spend time for the children and youth is also a large problem. Leaving young people idle without prospects for the future often leads to unwanted behavior and in some cases problems such as violence and drug addiction.

## **5.9 Key Trend**

The expected output from the educated population is positive behavioral change. But the reality shows that the trend is not improved solid waste management. The community are not using even the few waste baskets that are placed on the main road but instead leave the solid waste everywhere. Absence possibilities to sort waste at source.



## 6. The Green City: Environmental Dimensions

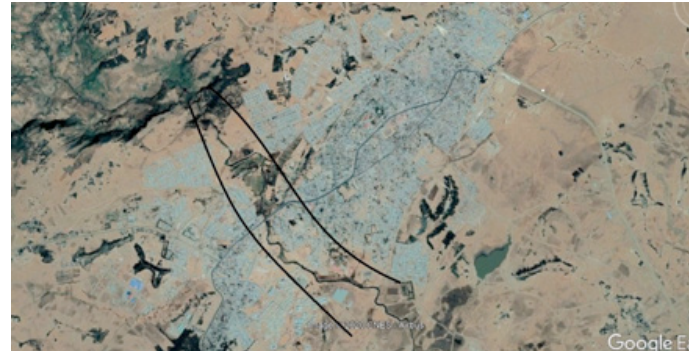
### 6.1 Current situation

In recent years development of urban land use and physical planning has taken special consideration to include public green areas, sport fields, forests and urban agriculture. According to the structural plan of the city of the Debre Berhan 18% of land has been allocated for this purpose. However the city is falling short of achieving quality use of the land and much of it is just wasteland.

The urban population in Debre Berhan is actively engaged with agricultural activities including dairy farming, cattle rearing, apiculture, horticulture. Domestic animals are visible throughout the city and green areas are often under large pressure from grazing animals.

The main nature corridor through the city is the river Beresa and the buffer zone around.

Only a small primary network of asphalt roads and sidewalks are paved in the city, the rest of the roads are cobble stone or dirt roads. The building density is low in most parts and leaves space for trees and plants. In the center of



*Map of main green corridor in Debre Berhan.*

the city the density is higher and there is very limited green features. There is little planned blue green infrastructure to support ecological functions. Drainage ditches follow main streets and are often cement lined. The drainage is often used for wild dumping of solid waste, causing pollution, blockage, odor, vermin and flooding.



*Main street in Debre Berhan, it hold the entryway to the stadium to the right and trinity church to the left. Two of the most visited places in the city with very little green infrastructure.*



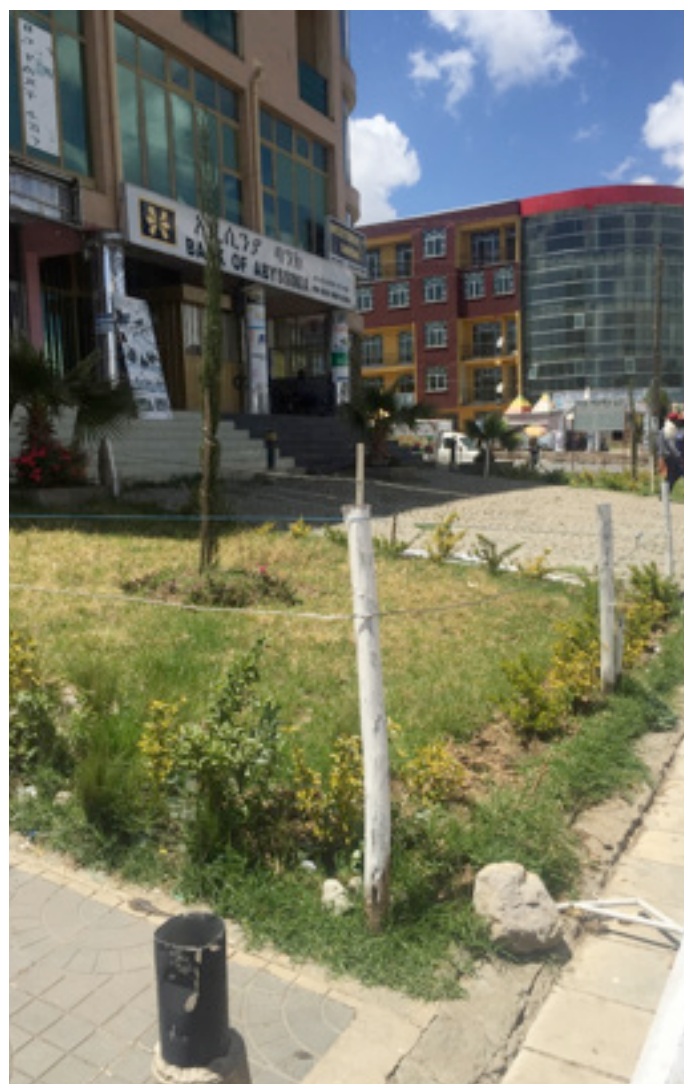
## 6.2 Key Assets and Opportunities

Debre Berhan's location on high altitude limits the habitat for flora and fauna. The city has tried to increase vegetation but has had challenges with plants not surviving in the cool air.

According to the municipality there is increasingly more awareness about environmental issues among the residents, they see the importance the natural environment has for life in the city. Debre Berhan city administration is collaborating with partners from civil society to promote tree planting and environmental awareness. The community engagement to protect the local environment is an important opportunity to build on, the community members who are interested in environmental issues can help to influence their neighbours to also take action to protect the local environment.

The city's key environmental asset and opportunities are:

- High quality ground water.
- Fertile soil.
- Low effects of climate change so far.
- Beresa and Dalecha river.



*Attempt to protect urban green from grazing animals.*

## 6.3 Key Challenges

The fast urbanization rate, putting pressure on urban expansion and new construction is currently taking place on land that in the masterplan was meant for greenery. Increased land value in the city is also causing some impediments for further achieving the ambitions for public green space. The city needs to provide new land for housing and commercial projects that generate jobs and income, making it hard to motivate developing land as green space.

The fact that the urban population is involved in urban agriculture also puts pressure on the available green infrastructure. When new plants are put in, they need to be protected from grazing animals (cows, goats, donkeys etc) who are present in most areas of the city. The lack of infrastructure for proper sanitation and solid waste management is also causing a large toll on the natural environment. Close to half of the urban population lack access to potable water taps in their homes and rely on community wells or trucks, many also use local water bodies for their water needs. The water quality in the water bodies differ with seasons but the quality is of course affected by the wild dumping and lacking infrastructure for liquid waste.

As Debre Berhan is located on high altitude the weather is cold, even seasonal frost is a problem for plant and greeneries.

Other challenges are:

- Industrial waste pollution into city dump sites.
- Conflicting interest with urban expansion and protection of open and green space.
- River side pollution and contamination from solid waste.
- Low forest and green coverage.
- Lack of awareness about green and sustainable environment.

## 6.4 Key Trends

- The community and the administration bodies are becoming more aware and take an interest in greenery and plants.
- Increased contamination of air and soil by waste and emissions from commercial activities and industries.



*Clogged drainage in central Debre Berhan.*



## 7. The Urban Economy: Economic Dimensions



*Debre Berhan open market.*

### 7.1 Current situation

The main activities are trading and small-scale service businesses, industries and agriculture. At the trade markets a wide variety of commodities are traded, they are operational throughout the week but the main day is Saturday.

#### **Financial Institutions Services**

The presence of financial institutions that can provide capital for businesses is one of the driving factors for attracting and developing businesses. There are several banks in the city, and also a few insurance companies. Furthermore, the micro-financial institutions playing a pivotal role, by providing credit to micro and small enterprises for those who usually have limited access to regular bank loans.

#### **Investment Activities**

Debre Berhan has been selected to be a city with industrial development and has already a few industrial manufac-

tures. The government want to expand the industries and have invested in the development of industrial parks. The availability of low-cost manpower is also a factor for attracting investors.

The city administration has been facilitating the acceleration of investments to the city, making land available for industrial companies.

The local government: The municipal budget, budget allocations, revenue and tariffs, key investments.

Debre Berhan city administration follows the national growth and transformation plan and wants to enhance service delivery and increase infrastructural coverage to eradicate poverty and improve the welfare the community.

The municipality is receiving budget support from the national level and also other sources. For almost one decade the City administration has been supported by the World Bank.

One of the funding programs is ULGDP/UIIDP (Urban Institutional and Infrastructure Development Program). It aims to build on and consolidate capacity-building efforts, supporting improved performance in the planning, delivery and sustained provision of priority municipal services and infrastructure. Over the years the city has gained experienced and capacity of effective and responsive planning to meet service delivery priorities identified by citizens, improved financial management and mobilization of own resources and more effective operations and maintenance of infrastructure assets, improved dissemination to the public of budgets/plans and performance measures and effective implementation.

#### **Revenue Collection**

For local revenue collection, efforts have been made towards promoting compliance and equipping tax collection institutions with adequate legal power which will further boost revenue mobilization. The City is speeding up the implementation of the tax reform program through further enhancing the capacity of tax collection institutions, implementation of the TIN system, improvement of the presumptive tax system, development and implementation of an audit program to cover all taxes and expansion and improvement of the administration of the Value Added Tax (VAT).

The municipality has not enforced revenue collection for waste collection. Households pay MSE collectors directly and is not a revenue stream that is controlled by the municipality currently. The municipality does intend to increase fee-based cost coverage for urban services but there are many challenges. Both in the capacity and systems in place to collect and administer the fees but also due to the difficulty to introduce new fees in times of unrest and political instability.

#### **The citizens: Employment, affordability, informality, livelihood and consumption**

Unemployment has been and continues to be the key challenge that Debre Berhan faces. The unemployment rate is close to 20 percent according the office of Finance and Economic Development. Street vending and informal employment is very common.

Workers with low skills are engaged in shoe-shining, vending, loading and unloading etc, as they have little chance of accessing better-paying jobs.

gricultural towns sustain the demand of the city's food consumption. Presence of the investment areas in the city help to access the products that manufactured.

- Revenue collected by the revenue and custom office.
- ULGDP-help the city in aspect of infrastructure construction, small enterprise, and urban greenery.
- Tourism.

## **7.2 Key Challenges**

Unemployment is the major nation-wide problem. The system of annual revenue collection is weak and influences the city's budget allocation. Also the absence of adequate technology has its own impact on the economic activity. Even though the budget is insufficient, unable to well managing the allocated budget is a challenge.

## **7.3 Key Trends**

The payment for municipal service show budget deficiency, the result being under financed infrastructure such as waste management system. Better cost recovery could increase the number of solid waste enterprises. The lack of attention and budget shortage are key reasons for the poor waste management system, which also has consequences for the attraction of tourists and visitors. The current economic situation with a majority of the community living in poverty makes it difficult to extract sufficient fees. It is therefore likely that the budget will have to be supplemented for some time, or that the solid waste management system is improved at very low cost.

## **7.2 Key Assets and Opportunities**

As the asset of sector of economy, micro and small enterprises main purpose is creating job opportunity, transfer technology, saving and credit, to produce import substitute material and to build self-reliance. The trade industry and marketing office deals with registering, controlling and licensing the commercial activities protecting consumers in the city. Local government allocate, distribute budget and collect revenue. the agricultural products from nearby ag-

## 8. Urban Solid Waste Management (thematic focus)

### 8.1 Current situation

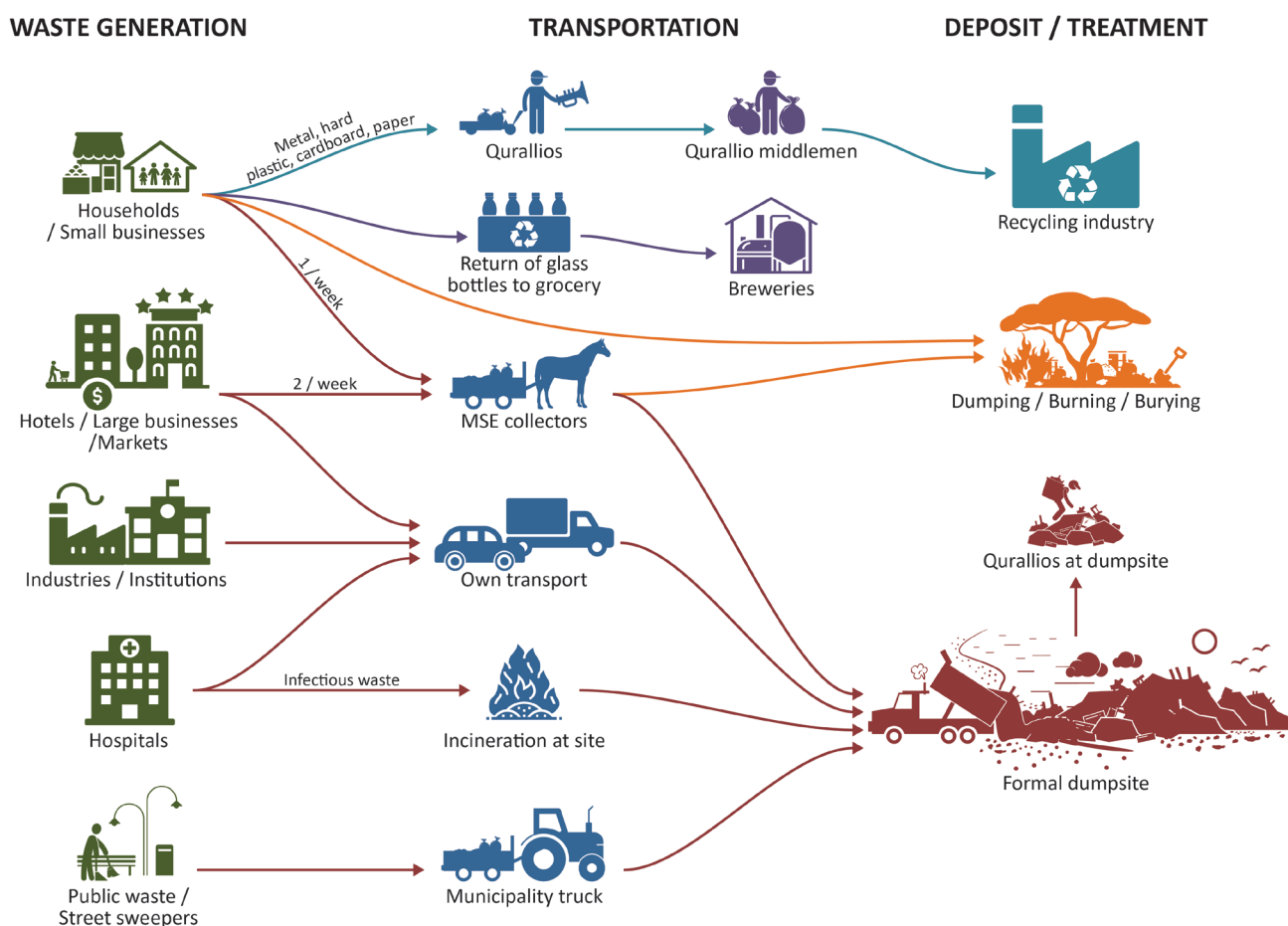
The working group has mapped the current situation of solid waste management in Debre Berhan. Below is a diagram of the current situation, shows that much of the waste ends up being dumped on the ground, burnt in open fires or buried.

The households in Debre Behan collect their solid waste in plastic bags known as “Madaberia”. A few households use other collection methods like metal sheets and used plastic baskets for handling waste at their compound/yard. Very few households sort their waste at source, for example compost, rather households use the Madaberia bags for all waste material.

Many residential areas in Debre Berhan have door-to-door waste collection. This collection is carried out by officially organized MSEs using horse carts that have been supplied by the municipality. Waste collection is also carried out by informal solid waste collectors operating without

sanction from the local government. The informal collectors operate irregularly and use any number of means to collect waste; on their shoulders, on donkeys and hand carts. Informal collectors and maybe sometimes also organized MSEs dump the waste in area-based containers, streams, under bridges and in ditches. Door-to-door collection is not offered in certain areas, such as informal housing areas.

Primary solid waste collection at household level, 55.2% of the residents’ waste is being collected by door-to-door waste collecting cooperatives, which implies larger portion of residents of the city properly disposes its refusals. However, a significant portion of the residents 26.3% of the household surveyed still dumps wastes in any open area nearby. Such practices have its own negative impact on the overall efficiency of the waste management system.



Overview of current waste management system in Debre Berhan.



**Table: Amounts of sorted waste in Debre-Brehan. Sources: Debre-Brehan structure plan.**

SN	Source of waste	Amount in (m <sup>3</sup> ) per Day			
		Collected	Not collected	Total	%
1	Residential housing	147	12	159	40.2
2	Commercial units	117	1	118	29.8
3	Industries/factories	15	3	18	4.5
4	Institutions	49	7	56	11
5	Others	39	5	44	11
	Total	367	28	395	100

Sources: Debre-Brehan structure plan (By: Da-Ya consulting planner and engineering, 2014).



*Transfer/uncontrolled official dump site.*



*Waste collection with horse cart on the way to the informal dump site.*



*Informal collector of materials for recycling, not seldom children are working to supplement the family income.*

## 8.2 Informal Solid Waste Collectors

Informal waste collection is common in Debre Berhan. This includes both collection of household waste as well as waste meant for recycling. The informal collectors are often dumping the waste at informal dumpsites around the city. Daily labourers, not seldom children, collecting non-segregated solid waste from households and business establishments at negotiable fees. The waste is dumped in the rivers, under bridges and unoccupied places.

## 8.3 Solid Waste Collection Efficiency

According to the data obtained from the municipality residential, commercial establishments and public service institutions are the major waste generators. These are followed



*Informal dumping in urban neighborhoods in Debre Berhan.*

by industry, transport and agriculture sectors. The data also reveals that the amount solid waste dumped in open space or backyards and in the rivers is higher than wastes formally collected and dumped in the existing dumping site.

On the other hand, according to a sample survey assessment and physical observation a good proportion of waste from domestic sources and business establishments including hazardous wastes are burned, also part of household waste is used as source of fuel and animal feed.

## 8.4 Solid Waste Burning and Burying

With the absence of adequate, consistent and coordinated door to door waste collection, lack of awareness of the negative impacts of poor solid waste management and with a large portion of the residents accustomed waste burning and burying in their compounds and outside this practice is widely used. Also the fact that waste is frequently burned by the main roads by road sweepers, who are municipality employees, gives the image that the municipality accepts the practice.

## 8.5 Current waste transporting vehicle park of the municipality

Debre Berhan has no dedicated vehicle to assist in the waste collection.

The formal involvement of the private sector in waste collection and transportation is so far limited. There is one vacuum truck, emptying septic tanks in the entire city despite huge demand. Lack of planning and accountability issues might have contributed to the lack of interest from the private sector.

## 8.6 Solid Waste Composting, Reuse and Recycling

Except the waste collectors (“Qoralew”) who buy old and used metal scraps, plastics, bottles and textiles and shoes, there is no formal recycling and reuse practices and initiatives in Debre Berhan so far.

The municipality has identified that composting could be good activity to create jobs for micro and small enterprises. A few years ago there was a cooperative that had a small compost but they stopped operation after the land they were occupying was used for other purposes. During stakeholder consultations, we learned that some of the waste collectors had been trained on how to prepare compost and that they would be very interested to work with it if they were awarded some land. The presence of several small scale and commercial farms in and around the city creates market potential for composting product.





*Qoralew storing jeri cans before transport to recycling industries in Addis Ababa.*

## 8.7 Solid Waste Disposal

The main existing open and uncontrolled solid waste dumping site is located in an old quarry in the north eastern corner of the city. There is also a dumpsite to the south west further away from the built up area that would be the more preferable place to dump waste, but the long distance makes it used mainly by household close by.

Except from the visual effect the informal dumpsite has on the surrounding environment, the dumpsite contributes to uncontrolled spreading of waste transported by wind and water.

During the rain period, flooding is a recurring problem in Debre Berhan. The floods create problems with erosion by the river and inaccessibility to the dumpsite due to flooded roads. The waste is then disposed at the entrance of the dumpsite, along the wall to a prison which is located next door to the dumpsite.

The dumpsite attracts both people and animals looking for salvageable materials or food. The risk of exposure to pollutants or vermin that carry diseases and the risk of getting injured or infections is high at the dumpsite.

## 8.8 Existing Institutional, organizational and human capacity

The institutional setting for solid waste management cascades down from the national level to the municipal level who are responsible for planning and implementing the rules and regulations on solid waste management

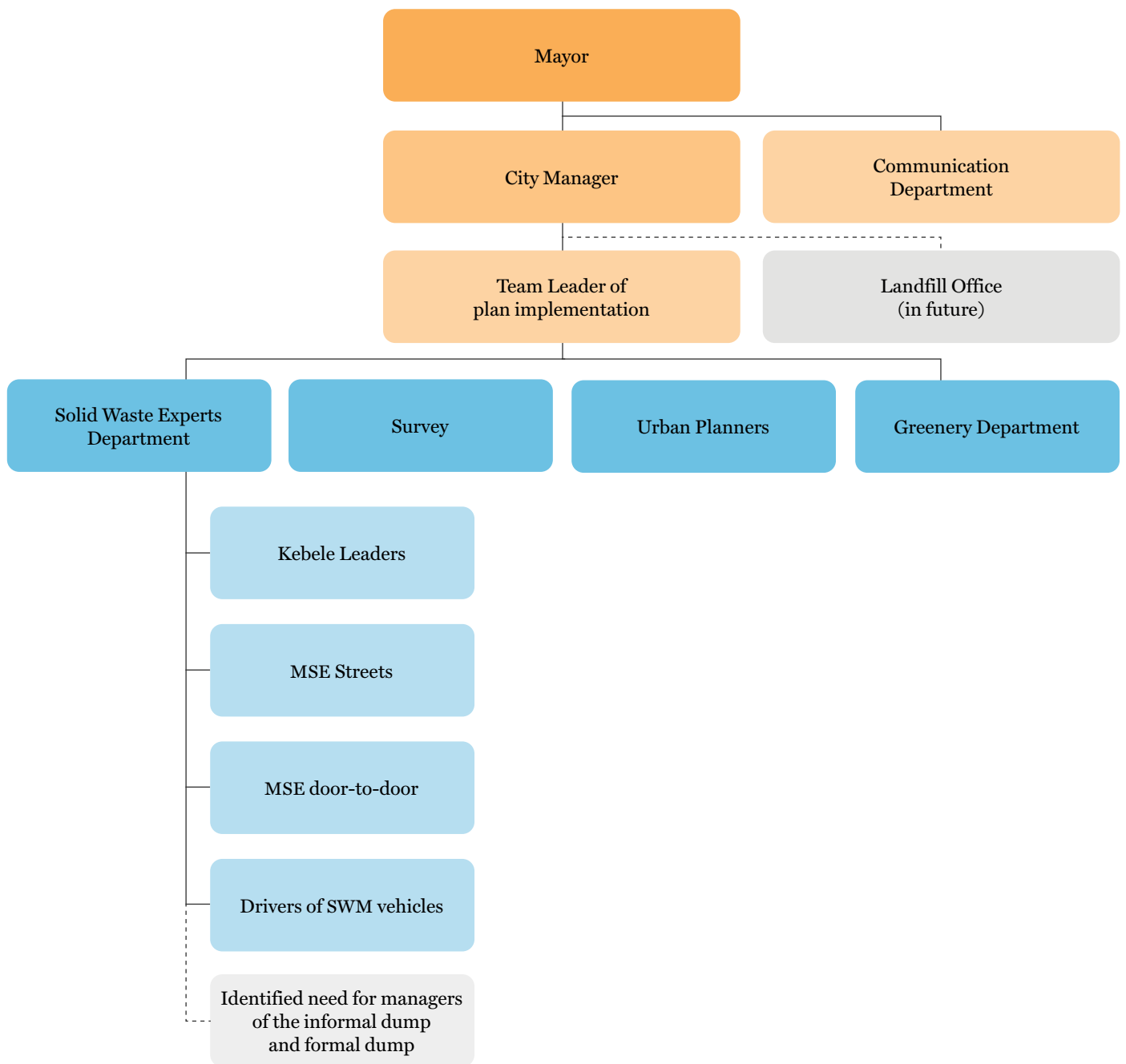
The solid and liquid waste management of Debre Berhan is organized around the position of the City Manager. SWM is an office in the City Managers Office.

The city has 15 formally organized solid waste collecting cooperatives each having 10 members on average, making up a total of 150 waste collectors. The solid waste management unit at the municipality consists of 2 professionals at the city administration level, there are also in each kebele a person responsible for organizing the local level. They assist in forming the MSEs who handle the door-to-door



*Official dumpsite by the river, access is not prohibited leaving humans and animals vulnerable to the many hazards of the dumpsite.*





*Organizational structure solid waste management in Debre Berhan.*

collection and also supervise the work. During stakeholder consultations it was made clear that the Kebele staff do not have very clear directives on how to carry out the work and they have very little possibility to influence the performance of the workers.

The city administration staff reported that they are understaffed and also rely on workers/colleagues who do not have enough knowledge about how to implement better solid waste management. “The existing staff both in number and professional composition are not in a position to manage efficiently and effectively the waste management system” said one of the staff members. The working group noted that to make improvements for the solid waste management system it will be important to create a common vision of what the solid waste management system is going to look like and how the city is going to get there.

## 8.9 Waste Sector Financing

### Operational Cost against Service Charge Fee

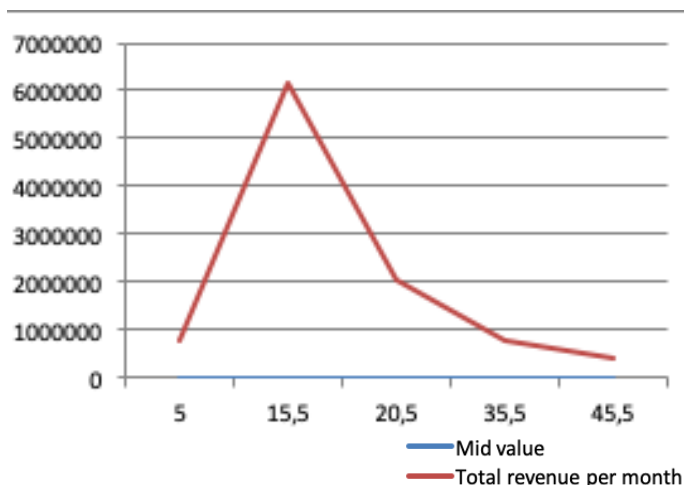
The budget for SWM is not allocated depending on how much that is needed to operate the system for the entire city but rather allocated as a percentage of the spending available for the purpose.

The current cost of collecting 1 cubic meter is calculated Birr 148. However, the demand side of the services are not considered or mapped by the city administration. As a result of this lack of information the working group and the SymbioCity facilitator and National Urban planner with support from SKL International performed a *Willingness-To-Pay study* to find out more about how the citizens value the current solid waste management service and what improvements would be worth to them.

In the study 200 households in Debre Berhan were selected randomly and were asked a set of questions regarding the size of the household, the household income and their opinions about solid waste management services and attitudes toward improved service provision.

The survey showed an average household size of 4,5 people and with an average income of 2500 Birr per month. In the survey 48% owned their home while 52% were renting or squatting. 61% of the respondents reported being unsatisfied with the current service provision naming low frequency of collection, poor collection service in the sense that so much waste was left in the wrong places was mentioned as root causes. Of the respondents about 70% answered that they would be prepared to pay more for an improved service. The study also showed the amount most people were willing to pay for solid waste management, showing a sharp decline of willingness to pay after 15,5 Birr per sack.

**Figure 2: Total Revenue of Improved solid waste collection service per month.**



*Mid Value of Maximum Willingness to pay.*

## 8.10 Solid Waste Management Fee

Currently the waste collectors charge a monthly fee of 30 to 50 birr per households. For business depends on the amount of waste they produce, but usually around 10 Birr per sack. There are many households who are not paying a collection fee and are not using waste collection services. This of course means that they are disposing of waste in unwanted ways such as burning or burying. The willingness to pay study indicates that there is room to increase the fee for solid waste collection in order to improve services and coverage.

Debre Berhan with large coverage of water supply and metering has the opportunity to add payment for SWM services on the waterbill.

## 8.11 Key Assets and Opportunities

The willingness to pay study shows that a majority of the surveyed population are in favour of increasing charges somewhat if the service is improved. There is also opportunity to create more jobs in solid waste management since there is not currently service in the whole city. There is an existing management structure that can be better utilized for more effective management of the solid waste in the city. Funding programs such as the ULGDP/UIIDP could add opportunities to enhance the infrastructure in order to improve the system.

There are several NGOs and private initiatives who are working to improve solid waste management. These organisations will be important stakeholders for the city to interact with in order to speed up improvements. Also religious organisations are important channels who can assist the city in informing the citizens about changes coming and why it is a health risk to keep the current solid waste management practice. The educational system has also been identified as an important partner for improving solid waste management

## 8.12 Key Challenges

A key challenge has been the lack of awareness about the sustainable solid waste management among both residents and public officials. Many existing rules and by-laws, like the national plastic bag ban, are not implemented. The low level of ownership and organization of this sector has many reasons, lack of accountability, ownership and municipal funds are a few.

The role of regional urban planning, through the regional planning institute, influencing the city structure without taking SWM into account is another problem. New areas are developed without strategies for how solid waste will be handled, exacerbating the problem.

There has been poor coordination between the municipal sectors as well as among the line institutions to implement changes on solid waste management. A clear vision of how the solid waste management system should function is needed and as well an implementation plan and proper follow up.

## 8.13 Key Trends

The key trends have been the rapid urbanization growth and the increase in per-capita waste generation creating a large increase of solid waste in the city. The focus on SWM by the municipality has increased since the start of the SymbioCity project, however there is still great room for improvement in coordination and collaboration among stakeholders in the city.

## 9. Conclusion: Key Urban Sustainability Issues

Results of the urban sustainability review yields that Debre Berhan has good opportunities as well as challenges on the way towards sustainable urban development. The city is urbanizing rapidly and hence is enjoying the overall growth benefits from the macroeconomic level. The location close to the capital is also an advantage, with close access to the recycling factories in Addis Ababa. However the city is also under pressure to develop urban systems and function to create a livable and successful city. For the city to develop in a sustainable way, it needs to address the following key issues:

- A. Poor awareness of sustainable waste management practices and their implications in the community.
- B. Lack of adequate solid waste treatment options
- C. Lack of cooperation with stakeholders other than the municipality.
- D. Lack of adequate space for SWM.
- E. Financial sustainability issues.
- F. Lack of comprehensive solid waste collection service.

The improvement SWM rests on the degree to which the various stakeholders engaged are aware of what to do. Awareness spans from households to waste collectors to responsible city officials. Sustainable management can only take place given a good understanding of the matter. Likewise treatment options and stakeholder consultations and inputs is a good start towards sustainable waste management in the city. Effective SWM also relies on the availability of enough resources in terms of both financial and human capacity. These are the key issues identified by the working group and the many contributing stakeholders.

The following key assets/opportunities should be leveraged in developing the city:

- A. Stakeholder coordination is vital in addressing sustainable urban development in the city.
- B. Awareness creation at all levels in the city would benefit the urban sustainability for Debre Berhan.
- C. A sustainable financing source such as from households on the basis of fees attached to water bill could alleviate the financial bottlenecks that the sector (SWM) is currently facing.
- D. While maintain the safety and security of the current waste collectors it is also vital to train more skilled personnel in the area of SWM.
- E. The issue of planning especially in coordination with regional urban planning institute is vital. The city's

voices need to heard at regional level. Proper and adequate spaces for solid wastes must be included during the process of structure plan revision.

- F. Issues of accountability and planning need to be addressed at all levels in the city.



# 10. Vision and objectives for a new Solid Waste Management System

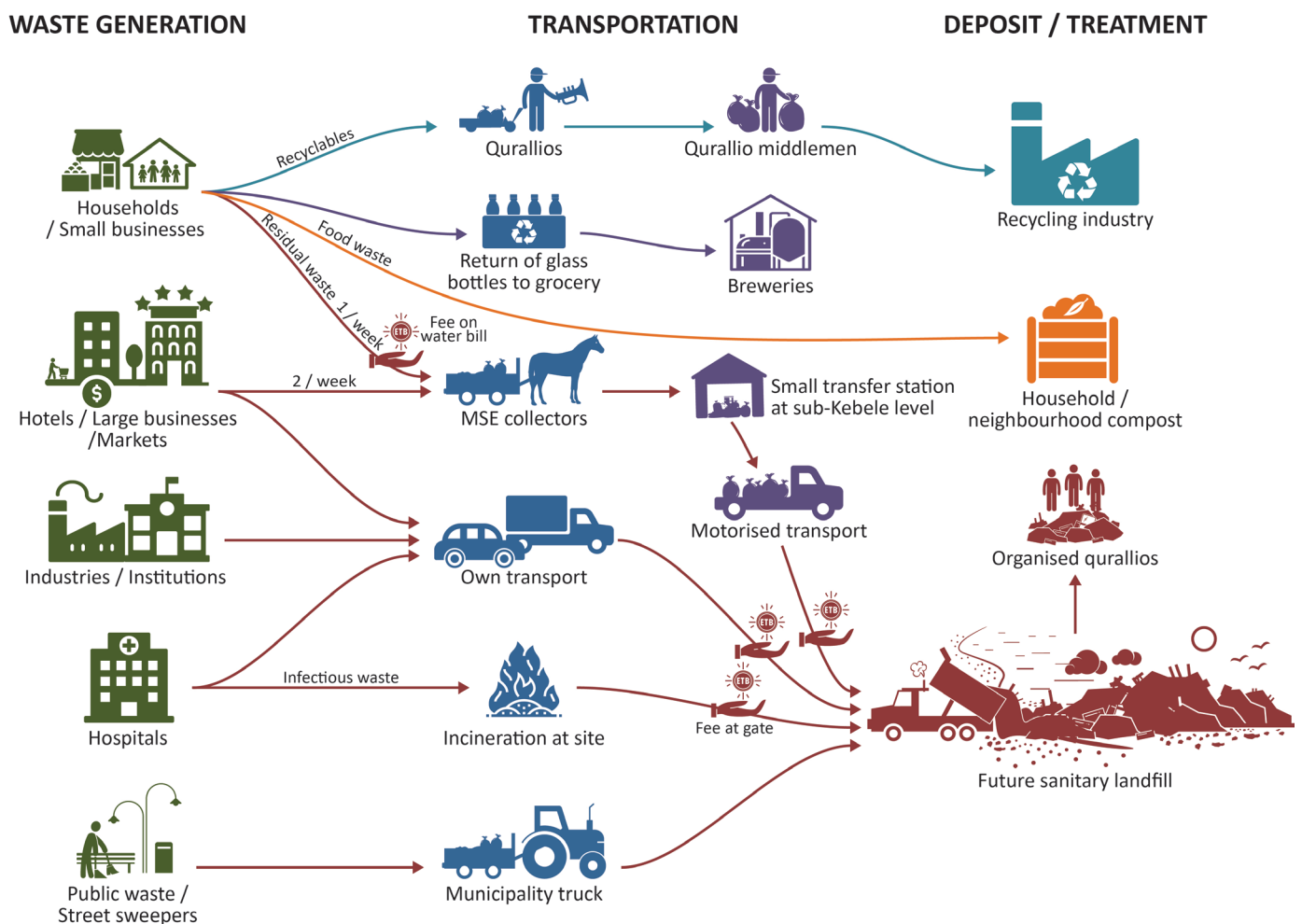
Based on this analysis the working group have together with the stakeholders formulated a vision for the project as well as objectives and indicators. The working group has also identified a future image of what they would like the solid waste management system to look like.

## Vision:

*Debre Berhan will be an exemplary clean and green city, with more jobs in SWM and greenery, with a community that is well aware of sanitation and hygiene and are satisfied with the SWM service provision.*

Below is an illustration of how the municipality of Debre Berhan would like to organize solid waste management in

the city. It includes at household level source separation of waste in three fractions 1) Organic 2) Recyclables 3) Residual waste. The MSE collectors would still be operating in the residential areas but would drop of the waste at smaller kebele level transferstation to allow for more efficient transport of waste to the future sanitary landfill and recycling industries. Hotels and large business would continue to organize collection by themselves to encourage private sector involvement. Also industries and large institutions have to organize their own collection and transport of waste and they will be charged a gate fee to dispose of waste in the landfill. An important difference is also that the fee for SWM would be bundled with the water bill, making it easier for the municipality to control the process.



Debre Berhan's envisioned future SWM system.

**Key Issue: Poor planning and accountability to carry out the planned tasks**

**Objective A**

Increase planning for SWM in all levels (household, Kebele, city administration) and develop metrics for follow-up for SWM department.

Indicator A

No of LDP plans or structural plan that have considered SWM.

Indicator B

No of new construction properties that have indicated solid waste management space.

Indicator C

Presence of a follow-up metrics in connection with the yearly plan for the SWM department.

Target by 2020

7 LDP have included SWM.

1 follow-up based on developed metrics has been performed on the SWM department

Approval from City Council to have SWM as a part of permits for new construction (focus on commercial buildings and condominium buildings).

Target by 2025

1 structural plan have considered SWM issues.

50% of new construction properties that have indicated solid waste management space.

4 follow-up has been performed on the SWM department (yew-up).

## Key Issue: Lack of budget for SWM services, management and treatment

### Objective A

Increase financial sustainability of the SWM system by increasing governmental support, citizen contribution (fees and voluntary contribution) and external donors.

### Indicator A

No of households and businesses who pay the city administration for SWM services.

### Indicator B

Amount allocated to SWM from the city administration budget.

### Indicator C

No of proposals to improve solid waste management system.

### Indicator D

No of volunteers who are participating in greenery and SWM projects.

### Target by 2020

50% of households and businesses with water meter are paying SWM fees to the city administration.

The SWM budget will increase by 100%.

4 proposals to improve solid waste management.

The number of volunteers will increase by 10% (from 2018).

### Target by 2025

100 % of households with water meter are paying SWM fees to the city administration.

1% of the city administration budget.

10 proposals to improve solid waste management.

The number of volunteers will increase by 25% (from 2020).



**Key Issue: Lack of comprehensive SWM collection services**

**Objective A**

Improve household and business SW collection service in each Kebele and reduce informal dumping.

Indicator A

No of household that have a dedicated collection service (either door-to-door, or designated common place).

Indicator B

No of businesses that have a dedicated collection service.

Indicator C

No of identified informal dumping areas that are cleaned up.

Target by 2020

75% households will have a dedicated collection service (either door-to-door, or designated common place).

50% of businesses have a dedicated collection service.

2 (out of 5) of the worst informal dumpsites are cleaned.

Target by 2025

100% households will have a dedicated collection service (either door-to-door, or designated common place).

100% of businesses have a dedicated collection service.

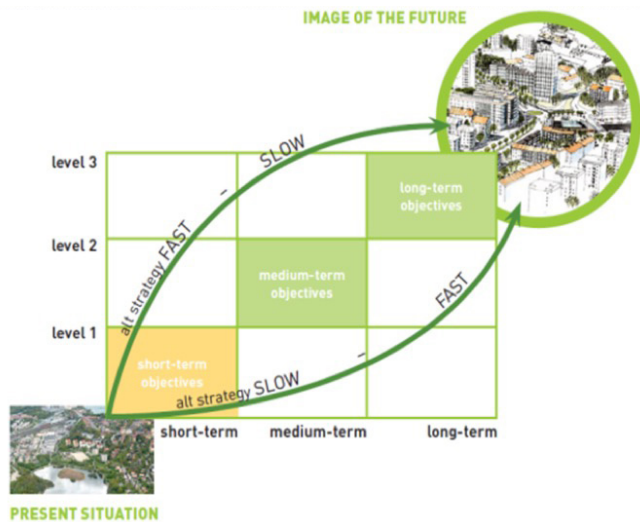
5 (out of the 5 identified in 2018) of the worst informal dumpsites are cleaned.

<b>Key Issue: Poor SWM treatment facilities with large environmental impact</b>
<p>Objective A Improve SWM treatment facilities and management practices at the facilities.</p>
<p><u>Indicator A</u> No of infrastructure proposals to improve SWM treatment facilities.</p> <p><u>Indicator B</u> Strategies to reduce impact of current solid waste management treatment facilities.</p> <p><u>Indicator C</u> No of waste collection and treatment workers who have appropriate protective gear and knowledge of occupational hazards.</p>
<p><u>Target by 2020</u> 1 infrastructure proposals to improve SWM treatment facilities. 1 strategy document developed regarding management practices of current SWM facilities. 100% waste collection and treatment worker have appropriate protective gear and knowledge of occupational hazards.</p> <p><u>Target by 2025</u> 2 infrastructure proposals to improve SWM treatment facilities. 100% waste collection and treatment worker have appropriate protective gear and knowledge of occupational hazards.</p>
<b>Key Issue: Poor cooperation with stakeholders</b>
<p>Objective A Improve cooperation with stakeholders (University, collages, regional government, religious leaders, circus Debre Berhan).</p>
<p><u>Indicator A</u> No of research projects relating to SWM in D.B.</p> <p><u>Indicator B</u> No of religious groups who have been invited to participate on awareness campaigns regarding SWM.</p> <p><u>Indicator C</u> No of experience sharing (for other cities and regional government) activities in D.B or elsewhere.</p>
<p><u>Target by 2020</u> 1 research project relating to SWM in D.B. All religious groups (30) have been invited to participate on awareness campaigns regarding SWM. 3 experience sharing (for other cities and regional government) activities in D.B or elsewhere.</p> <p><u>Target by 2025</u> 2 research project relating to SWM in D.B. All religious groups (30) have been invited to participate on awareness campaigns regarding SWM. 6 experience sharing (for other cities and regional government) activities in D.B or elsewhere.</p>

# 11. The next steps

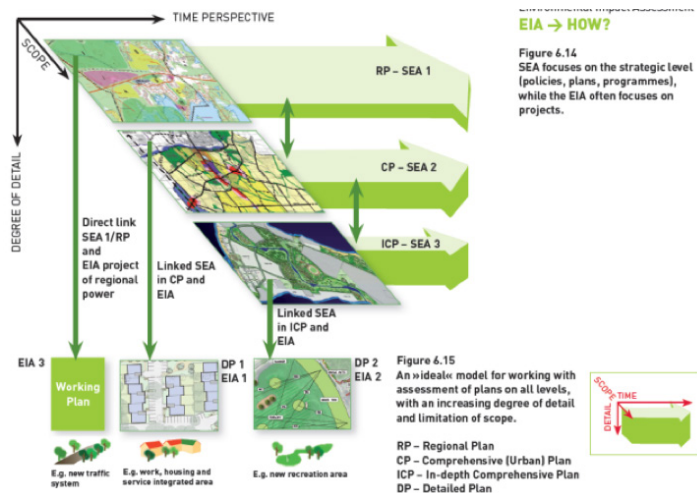
The coming steps in the process is to continue to collaborate with the stakeholders and develop alternative solutions for how to reach the ambitious vision and objectives. The

SymbioCity approach is an iterative process where information is updated as more information is developed throughout the project, therefore the objectives might be updated.



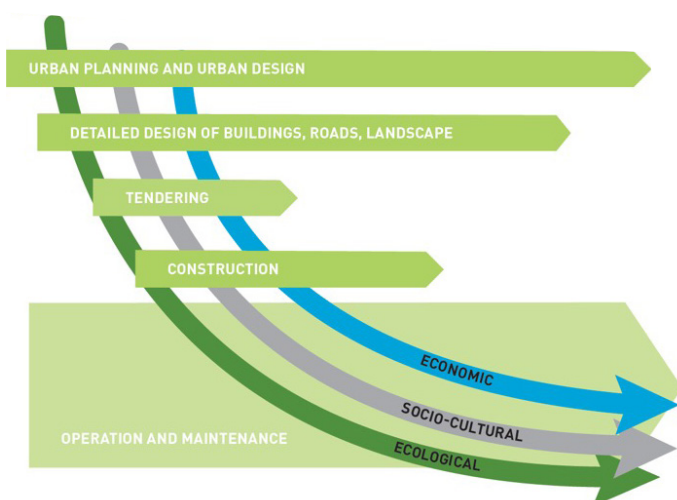
## Step 4. Develop alternative proposals

Alternatives are now identified, since urban challenges are complex and often have multiple solutions. For any solution or investment to be relevant in both the short and the long term, it is essential that alternatives are flexible and focused on synergies between different urban systems. Solutions should prevent environmental problems, or at least mitigate them.



## Step 5. Analyse impacts

The economic, social, environmental and spatial impacts of alternative proposals should be evaluated as a basis for informed decision-making. Impact analysis is an important step in developing integrated and innovative proposals, and also a core aspect of sustainability reviews. Best practice requires special attention to the conditions of the urban poor.



## Step 6. Implementation and follow up

The final proposal may highlight one preferred alternative or combine several options. Synergies between different systems are vital for optimising the effects of the planning process and on the quality of the built environment.



## Thank you

The working group would like to thank all parties who have participated in the project so far and ask for your continuous support throughout the continued project. Should you have any questions please don't hesitate to contact the working group at the municipality compound in Debre Berhan.



**SymbioCity supports local governments in addressing several of the Sustainable Development Goals (SDGs) and in implementing the principles of the New Urban Agenda. The overall goal is to improve living conditions with a special emphasis on the urban poor.**



**SymbioCity**

**SKL International**  
AFFILIATED TO THE SWEDISH ASSOCIATION OF LOCAL AUTHORITIES AND REGIONS

**Swedish Association  
of Local Authorities  
and Regions**

SymbioCity is based on Swedish municipalities' approach to urban development and experiences from implementing this in transition- and developing countries. Since 2010, with funding from the Swedish International Development Cooperation Agency (Sida), the Swedish Association of Local Authorities and Regions (SALAR) and SKL International have used SymbioCity as an approach and a method to promote sustainable urban development and contribute to the alleviation of urban poverty around the globe.

To learn more about SymbioCity please see [www.symbiocity.org](http://www.symbiocity.org), call phone +46 (0)8 452 70 00 or send us an e-mail on [info@sklinternational.se](mailto:info@sklinternational.se)