

SFD Promotion Initiative

Bishoftu Ethiopia

Final Report

This SFD Report was created through field-based research by UoL as part of the SFD Promotion Initiative.

Date of production: 04/03/2016

Last update: 01/08/2016

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SFD Report Bishoftu, Ethiopia, 2016

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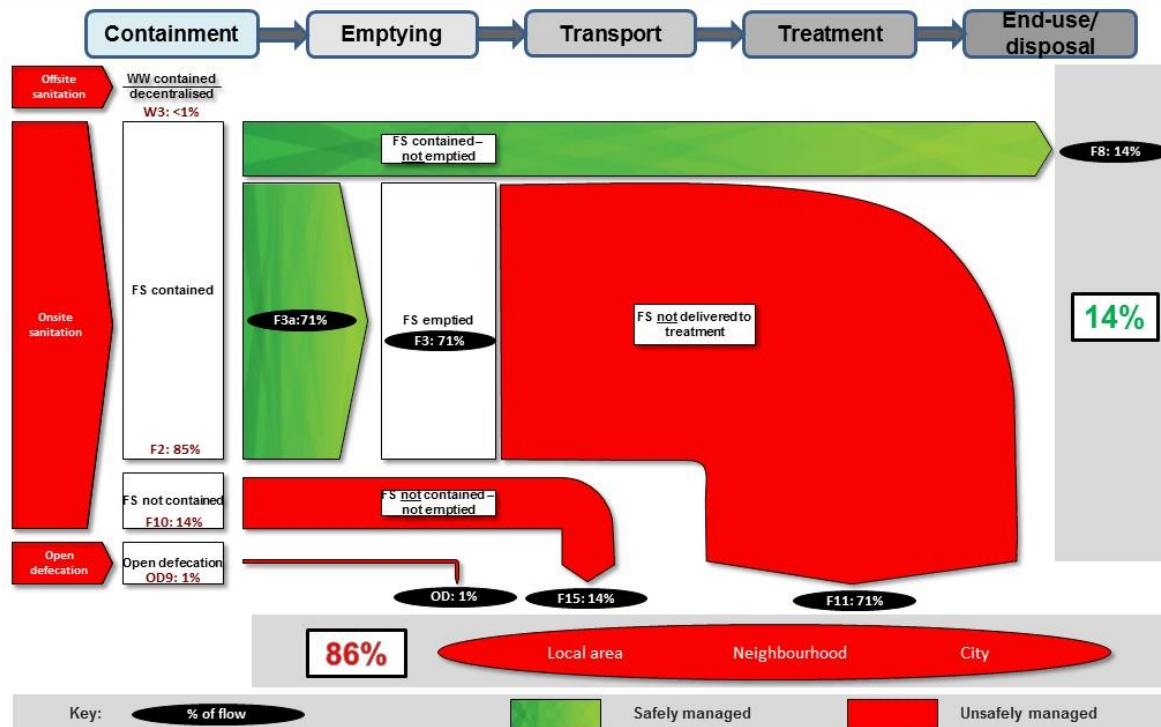
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1. The Diagram

Bishoftu, Ethiopia, 04 March 2016
Field-based assessment



2. Diagram information

Desk or field based:

The SFD was generated from field-based work.

Produced by:

University of Leeds (UoL) with support from Mr. Haile Dinku, WaSH capacity building consultant from WaterAid Ethiopia.

Collaborating partners:

WaterAid Ethiopia, Municipality of Bishoftu, Bishoftu Town Water Supply and Sewerage Service Enterprise

Status:

Final

Date of production:

04/03/2016

3. General city information

Bishoftu is in the state of Oromia, Ethiopia, approximately 47 km south east of Addis Ababa. Its topography is undulating and characterized by flat land on the north and east parts of the city, locked by several lakes, while

the south is dominated by hills (BCP, 2015). The geographical area of the city is about 15,273 ha, and it lies at an altitude in the range of 1900 m. to 1995 m. above sea level. It has a mean annual temperature of 27°C and mean annual rainfall of 746.6 mm.

Several industries operate in the city and there are opportunities for agro-industry processing, hotel and tourism development. Due to the improvements in road infrastructure, water supply, health facilities and greenery development, the population is increasing rapidly (EC, 2015). The current urban population is 128,272, not including the peri-urban areas of the city.

Physical risks to the city include flooding in the rainy season and illegal settlement with urban-rural boundary conflicts (BCP, 2015).

The city has no sewerage system; the whole population uses onsite sanitation technologies, mainly pit latrines. Faecal sludge emptying is done by vacuum trucks and discharged in an open dump.

4. Service delivery context

The Federal Democratic Republic of Ethiopia included the protection of public health in the 1995 National Constitution. The Article 90.1 states that “to the extent the country’s resources permit, policies shall aim to provide all Ethiopians access to public health and education, clean water, housing, food and social security”.

At national level, a seven year program (2013-2020) under the name of One WASH National Program (OWNP) was launched in September 2013 by the Government of Ethiopia (GoE) with additional support from UNICEF with a total budget of more than USD \$2 billion (Goyol and Girma, 2015).

In 2013, in order to meet national and global commitments, the GoE developed the Sanitation and Hygiene Strategy, Sanitation Protocol, Strategic Sanitation Action Plan. The plan was created to facilitate changes in the sanitation and hygiene situation in Ethiopia and promote improved sanitation (MoH, 2013).

There are no by-laws regarding solid or liquid waste management. There is also a gap in plans, strategies and responsibilities of the public institutions in charge to regulate and coordinate the sludge management (BST, 2016a, BST, 2016f). There is also a lack of awareness of people about the need to have proper liquid and solid waste management, making it difficult to advance towards a unifying guideline to manage all wastes within the city (BST, 2016d; BST, 2016e).

However, the Health Extension Program (HEP) is an essential service providing advice to families and improving sanitation and waste management practices at household level (BST, 2016a; BST, 2016d; BST, 2016e).

The Bishoftu Town Water Supply and Sewerage Service Enterprise (BTWSSSE) manages the city’s water supply network, while the municipality has overall responsibility for faecal sludge management. Emptying services are provided by two private companies who operate under a service agreement with the municipality, using an agreed emptying tariff structure. However, the standard of service is considered to be low and is poorly monitored

with no penalties issued for illegal dumping (BST, 2016a; BST, 2016b, BST 2016f).

5. Service outcomes

The majority of the population use pit latrines (97%), around 2% use flush toilets connected to septic or fully lined (sealed) tanks (with no outlet or overflow) which are mainly found in high-income households and hotels, spas, lodges and recreational centres focused on tourism) and approximately 1% of the population practice open defecation (BST, 2016a).

The frequency with which emptying occurs varies depending upon the number of people using the facility, but the minimum time is every three months up to more than a year. Two private companies carry out emptying services using vacuum trucks. On average they make 6 to 7 trips per day and, depending on demand, as many as 10 trips per day (BST, 2016c).

Bishoftu has no sewerage system or treatment plant. All faecal sludge is discharged without treatment either locally into the open (storm) drains, transported and discharged into Lake Chelelaka, or taken to the Golba dumpsite (BST, 2016a). The dumpsite receives all waste from the city (organic, inorganic, solid and faecal wastes) coming from industries, households, public and private institutions. It is simply an open field, with no protection or appropriate design details for the handling of wastes (Figure 1). Both the municipality and the BTWSSSE are aware of the problem of the improper final disposal of the faecal sludge. They report that they are willing to increase communication and coordination in order to improve the sanitation situation (BST, 2016a; BST, 2016f).



Figure 1 Golba dumpsite in Bishoftu (photo Credit: Oscar Veses)

All drinking water comes from groundwater sources. Wells are protected by a fence but there is no buffer zone surrounding them with both agricultural and cattle raising activities found near the wells. However, all wells are located away from waste disposal sites, latrines, septic and lined tanks. The mean water table level is greater than 15m below ground (BST, 2016f).

The situation described above is reflected in the SFD which shows that 85% of the excreta generated is considered to be 'unsafely managed'. Although no data is available on the percentage of pit latrines that are covered when full, that number is estimated to be 15% of the total faecal sludge; this percentage is considered to be safely disposed, as shown on the SFD.

Due to the poor disposal arrangements, a new waste treatment site was designed and partially built three years ago. This is in a different location to Golba and covers a land area of around 4 hectares. When completed, the site will receive both faecal and solid wastes. The solid waste landfill component – a sanitary landfill - has been completed but due to budget limitations and a lack of skilled capacity, it is yet to be commissioned. Operation is expected to start within the next year (BST, 2016a)

The proposed faecal sludge treatment plant has not been built. The new facility will include a faecal sludge drying beds with facultative and maturation ponds to treat the liquid fraction (BST, 2016a).

6. Overview of stakeholders

The main stakeholders are outlined in Table 1. The Municipality of Bishoftu is responsible for faecal sludge management in the city.

The Bishoftu Town Water Supply and Sewerage Service Enterprise (BTWSSSE) has the mandate to deliver water supply and sewerage in the city. However, as there is currently no sewerage system, it only manages the water supply service. BTWSSSE owns two operational faecal sludge vacuum trucks, but these are not used.

Health Extension Workers (HEWs) are the main actors in advising people at household level to carry out good WaSH practices.

Two private companies provide faecal sludge emptying services in the city. They operate under signed agreements with the municipality.

Several international organisations, NGOs and the government at regional level provide funding to the WaSH sector.

Key Stakeholders	Institutions / Organizations /
Public Institutions	Municipality of Bishoftu Water Utility (BTWSSSE) Health Extension Workers (HEWs)
Private Sector	Two private emptying service providers
Development Partners, Donors	Several international institutions and NGOs

Table 1 Key stakeholders

7. Credibility of data

The main data sources include published national level WaSH policy and implementation documents – these are available online with public access. However, a literature search revealed that no local or city level documents are available with public access. The visit was therefore essential to collect data on WaSH services and, in particular, to gain access to unpublished reports on service outcomes and details of future plans for the sanitation sector in the city.

The main uncertainties of the data are the percentage of people using onsite technologies and the percentage of the population that use pit latrines that are covered and safely abandoned when full.

8. Process of SFD development

All data were collected by unstructured key informant interviews. The unstructured interviews were useful in gaining access to unpublished reports, including the technical report of the proposed new faecal sludge treatment plant and the sanitary landfill for solid waste. Some of the interviews were conducted jointly with a group of stakeholders. This allowed for an open discussion and cross-checking of data.

Key Informant Interviews (KII) were conducted with senior representatives of the public

institutions, one HEW and the owner of one of the private companies. In addition, five KII were conducted with representatives from several institutions at national level, including the Ministry of Water, Irrigation and Energy (MoWIE) and the Ethiopian Institute of Architecture in order to provide a general view on the WaSH situation at country level.

After collecting all necessary data, the SFD was produced using the SFD calculation tool and shared with the stakeholders who collaborated in the data collection (WaterAid).

9. List of data sources

BCP, 2015. Socio Economic Profile of Bishoftu City Administration. March, 2015.

BST, 2016a. Interview with Kebede Gonfa, process owner of beautification in municipality of Bishoftu.

BST, 2016b. Interview with Getu Kassa, sanitary processor of the municipality of Bishoftu.

BST, 2016c. Interview with Bekele Damise, owner of “Dadimos Liquid Waste Management”, a private company of Bishoftu.

BST, 2016d. Interview with Tsion Tamiru, Urban Health Extension Worker of Bishoftu.

BST, 2016e. Interview with Derese Abera, sanitary of the municipality of Bishoftu.

BST, 2016f. Interview with Hailu Gichile, Head of the BTWSSSE.

EC, 2015.
<http://www.ethiopiancities.org/index.php/en/>.
Consulted on 14/02/2016

Goyol, K., Girma, A. 2015. One WaSH national program (OWNP) Ethiopia: A SWAp with a comprehensive management structure. 38th WEDC International Conference, Loughborough, England.

MoH (Ministry of Health), 2013. National Sanitation Marketing Guideline. June 2013, Addis Ababa, Ethiopia.

SFD Bishoftu, Ethiopia, 2016

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Abbreviations

BTWSSSE	Bishoftu Town Water Supply and Sewerage Service Enterprise
CSA	Central Statistical Agency
CSO	Civil Society Organization
EEPA	Ethiopian Environmental Protection Authority
ETB	Ethiopian Birr
EWRMP	Ethiopian Water Resource Management Policy
FMHCAC	Food, Medicine and Health Care Administration and Control
GTP	General Growth and Transformation Plan
GTP II	General Growth and Transformation Plan II
GoE	Government of Ethiopia
HEP	Health Extension Program
HEWs	Health Extension Workers
KII	Key Informant Interview
JMP	Joint Monitoring Program
MDG	Millennium Development Goal
MWA	Millennium Water Alliance
MoE	Ministry of Education
MoFED	Ministry of Finance and Economic Development
MoH	Ministry of Health
MoWIE	Ministry of Water, Irrigation and Energy
SNV	Netherlands Development Organization
NPHOSS	National Protocol for Hygiene and “On-Site” Sanitation
NWI	National WaSH Inventory
OWNP	One WaSH National Program
UAP	Universal Access Plan
UNICEF	United Nations Children's Fund
WASH	Water Sanitation and Hygiene
WIF	WaSH Implementation Framework
WRDF	Water Resources Development Fund
WASH	Water Sanitation and Hygiene
WHO	World Health Organization

1 City context

Bishoftu is an Ethiopian city located in the state of Oromia at a distance of 47 km from Addis Ababa (Figure 1). The urban population is 128,272 from which 47% are males and 53% are females (WaterAid, 2013). The city also hosts for workers from the surrounding towns of Dukem, Gelan, Finfinne and Mojo (BCP, 2015). Due to the improvements in road infrastructure, water supply, health facilities, sanitation infrastructure, and greenery development, the population is increasing rapidly (EC, 2015).

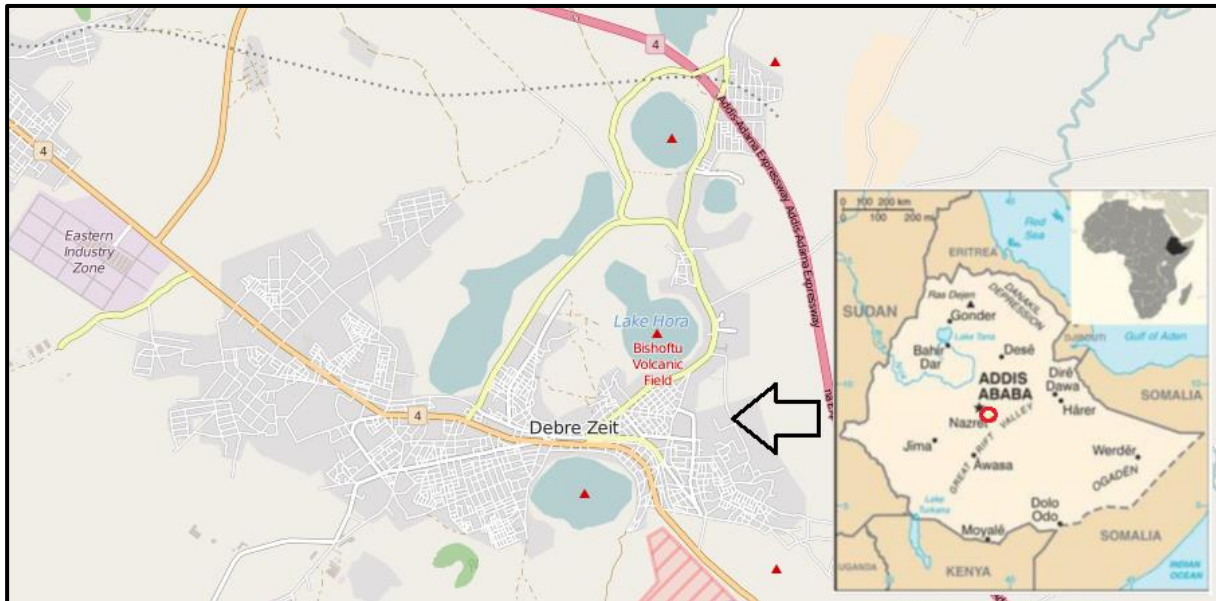


Figure 1: Location of Bishoftu, also known as *Debre Zeit*. Adapted from (Lindfors, 2010) and (OPS, 2016).

The city topography is undulating and characterized by flat land on the north and east parts of the city, locked by several lakes, while the south part is dominated by hills (BCP, 2015). The city is about 15,273 ha with an altitude in the range of 1900-1995m above sea level. It has a mean annual temperature of 27°C and mean annual rainfall of 746.6 mm. Physical risks of the city include flooding and illegal settlement with urban-rural boundary conflicts (BCP, 2015). There are also seven lakes in the city with a great variety of flowers and birds (EC, 2015).

Several industries operate in the city and there are opportunities for agro-industry processing, hotel and tourism development. Bishoftu has economic links to the surrounding areas, towns and the capital, Addis Ababa. The city imports grains, livestock and fuel supply and exports agricultural, manufacturing and commercial products to Addis Ababa (BCP, 2015). There are currently 159 operational projects with a total investment capital of 3,397,821,638.00 ETB (Ethiopian Birr, the local money) on sectors such as agriculture, education, hotels and tourism, manufacturing and trade (BCP, 2015).

There are different industry types operating in the city. These industrial activities include agroindustry, chemical, construction, leather, mineral processing, paper, textile, furniture, plastic and metal with a total capital of 1,994,235,590.00 ETB and giving employment to more than 8,000 people (BCP, 2015). There are also 34 NGOs (non-Governmental

Organizations) available in the city working in the education sector, health, agriculture environment protection and women and youth development (BCP, 2015).

Regarding infrastructure, the city possess a mix of gravel, asphalt, cobblestone and earth roads, telephone lines and a connection to the national grid. There are also two government hospitals, three health centers and twenty six private clinics (BCP, 2015).

Solid waste is collected by dump trucks, tractors and horse-drawn carts, discharging the waste in an open dump. The main water supply is potable underground water with a pipe system connected to forty two distribution points. Storm water discharge is made by an open ditch system with a total length of 224km (BCP, 2015).

2 Service delivery context analysis

2.1 Policy, legislation and regulation

2.1.1 Policy

The Federal Democratic Republic of Ethiopia included the protection of public health in the 1995 National Constitution. The Article 90.1 states that “to the extent the country’s resources permit, policies shall aim to provide all Ethiopians access to public health and education, clean water, housing, food and social security”.

Since that time, several documents have been redacted to guide the implementation of national policies regarding water and sanitation (WaSH) developed by the government. The main ones are listed as follows:

- Ethiopian Water Resource Management Policy (1999).
- Universal Access Plan for Water and Sanitation (2005).
- National Sanitation and Hygiene Strategy (2005).
- National Protocol for Hygiene and “On-Site” Sanitation (NPHOSS) (2006).
- Needs Assessment to Achieve Universal Access to Improved Hygiene and Sanitation by 2012 (2007).
- National Sanitation and Hygiene Implementation Guideline (2011).
- Urban Sanitation Universal Access Plan (2011).
- One WaSH National Program (OWNP) (2013).
- National Sanitation Marketing Guidelines (2014).

The Ethiopian Water Resource Management Policy (EWRMP) developed in 1999 by the Ministry of Water Resources, currently the Ministry of Water, Irrigation and Energy (MoWIE), aimed to promote the development of adequate management of water resources in Ethiopia to contribute to the accelerated economic growth of the country.

In 2002, decentralization of powers and functional responsibilities from federal to local government was a major step toward the development of WaSH infrastructures (WaterAid, 2013). In 2006, The National Protocol for Hygiene and “On-Site” Sanitation (NPHOSS) was

produced by the Ministry of Health (MoH) to “follow the national strategy for hygiene and sanitation improvement with its focus on universal access (100% hygienic and sanitized households) in primarily rural or peri-urban environments” (MoH, 2006).

In 2010, the General Growth and Transformation Plan (GTP), developed by the Ministry of Finance and Economic Development (MoFED), is the first phase to attain the goals and targets set in the Millennium Development Goals (MDGs) at a minimum, including those related to WaSH. Although water and sanitation are seen as priority areas, the only goal set is to have “better and closer access to safe water and sanitation facilities”, with no other specification whatsoever (MoFED, 2010).

A seven year program (2013-2020) under the name of One WASH National Program (OWNP) and the related WaSH Implementation Framework (WIF), was launched in September 2013 by the Government of Ethiopia (GoE) with additional support of UNICEF with a total budget of more than USD \$2 billion, the largest ever developed in the WaSH sector in Ethiopia (Goyol and Girma, 2015). The Program will be carried out in seven years and accomplished in two phases; Phase I from July 2013 to June 2015 and Phase II from July 2015 to June 2020. This program is the main tool of the GoE to achieve the targets for sanitation and hygiene proposed in the Universal Access Plan (UAP), outlined in section 2.2.1.

In Bishoftu, there are no by-laws regarding solid or liquid waste management. There is also a gap in plans, strategies and responsibilities of the public institutions in charge to regulate and coordinate the sludge management (BST, 2016a, BST, 2016f). There is also a lack of awareness of people about the needs of having proper liquid and solid waste management, making it difficult to advance towards a unifying guideline to manage all wastes within the city (BST, 2016d; BST, 2016e).

However, the Health Extension Program (HEP) is an essential service providing advice to families and improving sanitation and waste management practices at household level (BST, 2016a; BST, 2016d; BST, 2016e). Thus, there needs to be more coordination among the institutions and a clear strategy to address urban sanitation.

2.1.2 Institutional roles

The institution in charge of monitoring sanitation and hygiene interventions in Ethiopia is the Ministry of Health (MoH) with more than 38,000 Health Extension Workers (HEWs). They work at community and household levels to promote the use of improved sanitation facilities and eradicate open defecation (Jones, 2005).

The Ministry of Water, Irrigation and Energy (MoWIE) is responsible for water policy, coordination and monitoring whereas the Ministry of Education (MoE) tries to build an education and training system which assures quality and equity education. The Ministry of Finance and Economic Development (MoFED) is responsible for budgeting and managing economic resources in both federal and regional governments.

In recent years, profound dialogue and collaboration between the MoWIE, MoE and MoFED has been carried out to monitor and report the status of WaSH in the country including the launch of the OWP, among others (Jones, 2005).

There are five divisions in terms of governance and administration of the WaSH sector in Ethiopia (Girma and Suominen, 2013):

1. Federal government, with its capital in Addis Ababa.
2. Nine Regions and two city administrations (each with a Water Bureau).
3. Over 70 Zones (Some of the Zones are important for ethnic reasons, and have autonomous status. These are called “Special Zones”.)
4. 805 Woredas (Districts). Each Woreda has a Water Office.
5. Around 16,000 administrative Kebeles (comprising several villages or “peasant associations”).

The organizational arrangements of the OOWNP are depicted in Figure 2.

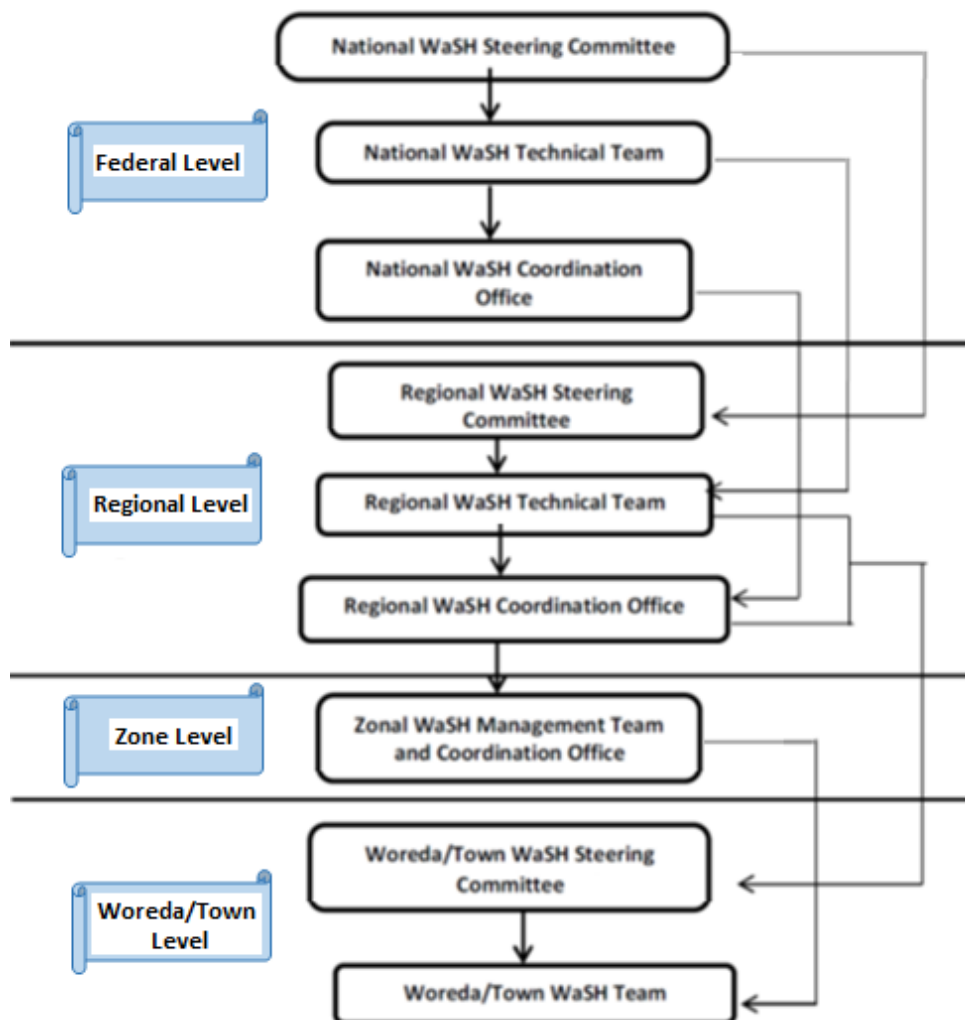


Figure 2: Organizational arrangement for OOWNP implementation. Adapted from (GoE, 2013a).

A summary of the institutional roles of each WaSH structure is presented in Table 1.

Table 1 Summary of the duties and responsibilities of WaSH structures. Adapted from (GoE, 2013a).

Institution	Duties and Responsibilities
National WaSH Steering Committee	-Reviews and endorses the National WaSH Strategic Plan and Annual WaSH Plans -Oversees the proper functioning of the WaSH Program
National WaSH Technical Team	-Regularly monitors program implementation -Designs programs for experience-sharing within and outside the country
National WaSH Coordination Office	-Preparation of manuals, guidelines and generic training materials -Maintains national WaSH management systems and records -Promotes and facilitates national networks among WaSH actors
Regional WaSH Steering Committee	-Ensures the establishment and functioning of WaSH structures in the region
Regional WaSH Technical Team	-Facilitates inter-sectoral communication and cooperation -Regularly monitors program implementation and provides guidance
Regional WaSH Coordination Office	-Ensures Woredas have consolidated WaSH plans -Maintains regional WaSH management systems and records
Woreda WaSH Team	-Prepares consolidated Woreda WaSH plans (strategic and annual) -Review and monitor WaSH program implementation at woreda level -Support training and engagement of artisans in the private sector

In addition to those institutions, about 100 Civil Society Organizations (CSOs) work in water and sanitation service delivering, hygiene promotion, piloting new approaches and reaching remote areas and groups. CSOs have also created the Water and Sanitation Forum to coordinate planning and implementation of WaSH activities even in conjunction with the Millennium Water Alliance (MWA) (GoE, 2013a).

Finally, The Urban Health Extension Program (UHEP) targets the wellbeing of urban populations through selected high-impact interventions, which include improving sanitation and waste management services and practices (BST, 2016a; BST, 2016d; BST, 2016e). There are 40 HEWs directly addressing the community on sanitation and hygiene education and promotion based on 16 health packages (BST, 2016d; WaterAid, 2013).

2.1.3 Service provision

Except Addis Ababa, which is equipped with a sewerage system to serve part of the city and an ongoing project to expand it (ETP, 2016a; ETP, 2016c), the rest of the cities in Ethiopia have onsite sanitation systems. Service provision is maintained by the following institutions (Stolz et al. 2013; ETP, 2016e):

- Sewerage utilities. Septage collection, treatment and disposal is mainly conducted by the utilities. They are also responsible for technical interventions, operation and maintenance, customer services and financial and administrative aspects.
- Sanitation and beautification agencies. They administer public latrines.
- Municipality. In some cities, municipalities provide septage collection, treatment and disposal.

The Bishoftu Town Water Supply and Sewerage Service Enterprise (BTWSSSE) is mandated to provide sewerage and faecal sludge management services. They have two vacuum trucks, each one with a capacity of 8m³ (Figure 3). They were purchased one year ago (in 2015) but they have not been used at all (BST, 2016f; BST, 2016g). The reason is that the municipality is currently managing the faecal sludge in the city with a signed agreement with the private sector (BST, 2016a; BST, 2016b). There are five private companies with a license to operate but only two remain active and provide emptying and disposal of the faecal sludge through a tariff for the service provision (BST, 2016a; BST, 2016b).



Figure 3: Two operative vacuum trucks with no current use by the BTWSSSE (photo credit: Oscar Veses).

There is a lack of communication and coordination between the BTWSSSE and the municipality. The city administration is planning to transfer the management of the faecal sludge to the BTWSSSE (BST, 2016a; BST, 2016f).

In addition, there are 50 solid waste containers and small enterprises with a total of 120 members engaged in solid waste collection (BCP, 2015).

2.1.4 Service standards

Following the Ethiopian Constitution, The Food, Medicine and Health Care Administration and Control (FMHCAC) issued the *Proclamation No. 661/2009* to address waste handling and disposal and the availability of toilet facilities in articles 30 and 31, respectively (Table 2).

Although there are national quality standards regarding the maximum concentration of several chemicals that can be discharged into the receiving waters for several industries such as tanneries or processing of steel, among others (EEPA, 2011), there are no quality standards set for wastewater or sludge disposal.

However, in the “Guidelines for Social, Environmental and Ecological Impact Assessment and Environmental Hygiene Impact Assessment and Environmental Hygiene in Settlement Areas”, a draft from the Ethiopian Environmental Protection Authority (EEPA) from 2004, it is stated that “latrines should be connected to digesters to produce both biogas and slurry as organic fertilizer. As a minimum, they should be connected to a compost pit and the human waste should be used to produce compost”.

Table 2 Articles related to WaSH in Proclamation No. 661/2009.

Waste handling and disposal (art. 30)	Availability of toilet facilities (art. 31)
<p><u>30/1.</u></p> <p>“No person shall collect or dispose solid, liquid or other wastes in a manner contaminating the environment and harmful to health”</p>	<p><u>31/1.</u></p> <p>“Any institution providing public service shall have the obligation to organize clean and adequate toilet facilities and keep it open to its customers”</p>
<p><u>30/2.</u></p> <p>“Any wastes generated from health or research institutions shall be handled with special care and their disposal procedures shall meet the standards set by the executive organ”</p>	<p><u>31/2.</u></p> <p>“Any city or rural administration shall be responsible to provide public toilet and ensure its cleanliness”</p>
<p><u>30/3.</u></p> <p>“It is prohibited to discharge untreated waste generated from septic tanks, seepage pits, and industries into the environment, water bodies or water convergences”</p>	<p>----</p>

According to several interviews with the head of the BTWSSSE (BST, 2016f), people from the municipality (BST, 2016a; BST, 2016b) or HEW (BST, 2016d), the WaSH situation has improved if compared to 10 years ago.

Reports related to socio-economic aspects of the city as well as water quality assessments are not published online and were only accessible locally. However, both the municipality and the BTWSSSE provided any document, study or report if it was requested and available, always collaborating in the process of data collection.

At local level, there is a lack of data availability and reliability regarding the percentage of people using onsite sanitation technologies. However, at national level, the Central Statistical Agency (CSA) conducted a survey in 2007 where this information could be extracted. More recently, a study conducted by WaterAid in 2013 showed the percentage of people using pit latrines but not any other sanitation technology (WaterAid, 2013).

It is known that illegal dumping occurs but there is a lack of law enforcement (BST, 2016a). Manual emptying is practiced in special conditions as explained in section 3.6.

2.2 Planning

2.2.1 Service targets

Ethiopia’s water and sanitation coverage was reported as 19% and 5% respectively in 1990 (Defere, 2015). Since that time, important progress has been achieved. The Millennium Development Goal (MDG) target was to achieve a 56% of people with sanitation coverage. According to the National WaSH Inventory (NWI), in 2011 national access to water supply

and sanitation was 52.1% and 63%, respectively (GoE, 2013b), suggesting almost a complete accomplishment of the MDG target.

Despite that improvement, those numbers indicate that the practice of open defecation (37%, over 35 million people from 2011 data) result in a risk of disease infection and/or transmission. However, there are differences between people living in rural areas practicing open defecation (43%) and people living in urban areas (8%) (Jones, 2015).

The GoE developed the Universal Access Plan (UAP), a document setting the following targets for sanitation and hygiene within the government’s policy (Girma and Suominen, 2013):

- 98.5% access to water supply, and reduction of the proportion of non-functioning facilities to 10%.
- All Ethiopians will have access to basic sanitation by 2015.
- 77% of the population will practice hand washing at critical times.
- Safe water handling and water treatment at home.
- 80% of communities in the country will achieve open defecation free status.

Targets after 2015 and the following years, proposed by the World Health Organization (WHO), the Joint Monitoring Program (JMP) and UNICEF have also been set and are outlined in Table 3 (JMP, WHO/UNICEF, 2013).

Table 3 Proposed targets for WaSH within the years 2025-2040.

	Water	Sanitation	Hygiene
2025		*Open defecation free status.	
2030	*Universal basic drinking water in schools and health centres. *Universal basic drinking water at home.	*Universal adequate sanitation in schools and health centres.	*Universal adequate handwashing in schools, health centres and households.
2040	*Progress towards intermediate drinking water at home.	*Universal adequate sanitation at home. *Progress towards safe management of excreta.	

Emptying of pit latrines, septic tanks or fully lined (sealed) tanks is carried out by either the municipality or one of two private companies; customers pay a tariff for this service. According to the municipality (BST, 2016a), the percentage of people practicing open defecation is very low (around 1%).

However, there is no plan to build a sewerage network and treatment plant for the city due to a budget limitation (BST, 2016a) but there is an ongoing project to handle all solid wastes and treat the faecal sludge in a proper way, as stated in section 3.7.

In addition to that, proper access to drinking water needs to be improved to meet the proposed targets for WaSH within the years 2025-2040 since the water supply coverage is 76% of the population, as it will be showed in section 3.8.

2.2.2 Investments

The OWNP objective is “to contribute to improving the health and well-being in rural and urban areas by increasing water supply and sanitation access and the adoption of good hygiene practices in an equitable and sustainable manner” (GoE, 2013b). The total budget is distributed in four main components: Rural and Pastoral WaSH, Urban WaSH, Institutional WaSH and Program Management and Capacity Building. The costs of these components are shown in Table 4.

Table 4 Distribution of the budget designated for WaSH in the OWNP.

Component	Destination	Water supply ¹	Sanitation and hygiene ¹
1	Rural and Pastoral WaSH	USD 1.03 billion	USD 0.4 billion
2	Urban WaSH	USD 786 million	USD 95.7 million
3	Institutional WaSH	USD 545.7 million	
4	Program Management and Capacity Building	USD 178.8 million	

¹USD exchange rate in 2013

Urban WaSH budget designated to sanitation and hygiene is mainly assigned to desludging equipment and facilities and management of wastewater and public toilets in selected locations. Institutional WaSH budget is designated to improve water supply, sanitation facilities and hygiene practices at health institutions and schools (GoE, 2013b).

USD78.6 million (out of USD178.8 from the component 4) are designated for urban WaSH program management and capacity building, including training, post-construction management support, equipment, tools, and support to monitoring and reporting. Finally, there is also an amount of money from the project designated to train WaSH professionals (GoE, 2013b).

Apart from the OWNP, the GoE created in 2002 the Water Resources Development Fund (WRDF) to promote development of viable and sustainable urban water supply and sanitation services throughout the country (GoE, 2013b). International aid funding plays an essential role for funding WaSH activities since 61% of water budget and 70% of sanitation budget is financed by external agencies such as donors and NGOs (Girma and Suominen, 2011). Donors involved in the WaSH sector include the Department for International Development, the European Development Bank, the World Bank and the Government of Italy. International NGOs such as WaterAid, Netherlands Development Organization (SNV), Plan International and about 70-100 local NGOs are active in the sector (Stolz et al. 2013).

Local budget for WaSH comes from the Oromia regional budget but there was not possible to access to a number. However, it was found that the World Bank provided with a budget of 143 million ETB for the build of the boreholes used for groundwater supply in the city (BST, 2016g).

There is no budget assigned for the construction of new facilities such as pit latrines since the national policy states that the household itself has the obligation to build its own pit latrine (or any other sanitation system) to contain the faecal sludge (BST, 2016a).

Finally, the promotion of activities related to the WaSH sector at household level mainly lies on the Health Extension Workers (HEWs).

2.2.3 Policy and Program Initiatives

A further revision of the GTP, currently under development (GTP II), includes a target to increase the proportion of households using latrines to 93% in all Ethiopia by 2017 (Jones, 2015).

2.3 Reducing inequity

2.3.1 Current choice of services for the urban poor

There is no sewerage system and thus, no offsite sanitation options available. All people use on-site sanitation facilities, no matter of their social status.

Although there is an obligation for each new household to have a pit latrine, the poor people who cannot afford to build one rely on communal or public latrines since the government or the municipality does not provide any kind of funding for such purpose (BST, 2016a; BST, 2016d).

The practice of open defecation has decreased in the period 2007-2015, going from 11% down to around 1% according to the Municipality of Bishoftu (BST, 2016a).

2.3.2 Plans and measures to reduce inequity

The OOWNP states that, first it is necessary to identify and target areas with low access to safe water or improved sanitation and once they are identified, propose priority action plans to reduce inequity in the areas identified. In concordance with this, reducing regional and social disparities in access to safe drinking water and improved sanitation must be accomplished. Gender disaggregated indicators are to be used to track gender equity in roles and benefits (GoE, 2013b).

The budget for the OOWNP clearly prioritizes the water supply over sanitation and hygiene both at rural and urban levels (Table 4). This is in concordance with previous reports where different policies in developing countries have been assigning higher budget and thus, more importance, on water supply over sanitation and hygiene over the last years (Sandec/Eawag, 2015).

One of the major problems, not only in Bishoftu but also in all Ethiopia, is the lack of awareness of people (and also the local authorities) regarding WaSH (BST, 2016a; BST, 2016d; BST, 2016f, ETP, 2016a; ETP, 2016d). For that reason, the Health Extension Program (HEP) “targets the wellbeing of urban populations through selected high-impact interventions, which include improving sanitation and waste management services and practices” (ACIPH, 2015).

All HEWs in Bishoftu are females, previously trained as nurses, becoming HEWs after training according to the policy developed by the MoH. Each HEW is responsible for the training of 60 households on education, awareness creation and monitoring of the WaSH practices (WaterAid, 2013: BST, 2016d; BST, 2016e). HEWs provide advice and capacity building on how to make a latrine, how to manage solid and liquid wastes at household level, good hygiene practices, etc.

There are a few initiatives to produce biogas from faecal sludge at household level as well as some private initiatives to turn cow dung into biogas, but they are insignificant in relation to the whole population that relies mainly on regular pit latrines with no intention to transform the faecal sludge into an added-value product (BST, 2016a).

2.4 Outputs

2.4.1 *Capacity to meet service needs, demands and targets*

According to the municipality and the private sector, the capacity to meet service needs, demands and targets is fine (BST, 2016a; BST, 2016c). However, the already-mentioned problem of lack of coordination between the municipality and the BTWSSSE is a problem that remains unsolved (BST, 2016a; BST, 2016f). The HEW interviewed complained that the number of HEWs working in the city is not enough to provide a good service for all the population (BST, 2016d).

2.4.2 *Monitoring and reporting access to services*

Before 2004, all WaSH interventions in the country were project-based and therefore, there was no integration between water supply, sanitation and hygiene. However, GoE’s policy on the WaSH sector is now being addressed jointly. That is the reason why MoH, MoWIE, MoE and MoFED share the responsibility for achieving WaSH targets set by the GoE’s policy (GoE, 2013b).

The OOWNP entitled the MoH to operate a monitoring system to develop one plan, one budget and one report for the WaSH sector (Jones, 2015). In Table 5, a summary of the monitoring responsibilities from organizations at different levels currently being taken by the WIF under the frame of the OOWNP is presented.

Table 5 Summary of monitoring responsibilities at different levels. Adapted from (Jones, 2015).

Institution	Responsibilities
<i>Kebele WaSH Teams</i>	<ul style="list-style-type: none"> - Study data and complete analysis of Kebele WaSH situation - Prepare monthly, quarterly and annual WaSH progress reports and send the Woreda - Conduct quarterly WaSH progress review meeting with WaSH stakeholders
<i>Woreda WaSH Team</i>	<ul style="list-style-type: none"> - Conduct technical assessment every 3 years - Prepare monthly, quarterly and annual WaSH progress reports and send the Zone/Regions - Conduct quarterly WaSH progress review meeting with WaSH stakeholders
<i>Region/ Zone Coordination Office</i>	<ul style="list-style-type: none"> - Prepare Regional Annual WaSH Plan - Prepare monthly, quarterly and annual WaSH progress reports and send the National WaSH Coordination Office - Conduct quarterly WaSH progress review meeting with WaSH stakeholders
<i>National WaSH Coordination Office</i>	<ul style="list-style-type: none"> - Prepare and propose investment plan, loan/grant applications and national annual WaSH plan - Prepare monthly, quarterly and annual WaSH progress reports

Between 2010 and 2011, a National WaSH Inventory in all regions (Somali region was later added in 2014) was carried out by the MoWIE with financial support from the World Bank and UNICEF (ETP, 2016b). This has provided the country with a first baseline of the WaSH sector at a national level. Furthermore, a successful initiative between UNICEF and Akvo (a not-for-profit foundation) used mobile phone software (Akvo FLOW) to collect WaSH inventory data in the Somali region in 2014 has the potential to open new possibilities on future data gathering and analysis (Jones, 2015). It can be said that both the development of OWNP and NWI has strengthen the monitoring and reporting activities of the WaSH sector in the country but needs further follow up (Jones, 2015).

All census studies regarding population and sanitation preferences among people are carried out by government institutions and by the municipality at local level. Reports on the city background, water supply and monitoring analysis and the one on the design of the new sanitary landfill were only accessible upon arrival on the city since neither of them were published on the internet.

Although there is an agreement between the municipality and the private sector for providing service on the faecal sludge management, there is a problem in terms of lack of monitoring of service standards. Just one person from the municipality monitors the number of trips of the trucks to the dumpsite and reported that “everything is ok” (BST, 2016a; BST, 2016b). Both the municipality and the BTWSSSE are aware of the problem of the improper final disposal of the faecal sludge and stated that they are willing to increase the communication and coordination between those two organisms (BST, 2016a; BST, 2016f).

2.5 Expansion

2.5.1 *Stimulating demand for services*

Although there is not much experience in sanitation marketing in Ethiopia, part of the national budget for OWNPs is assigned to urban WaSH program management and capacity building as mentioned in section 2.2.2. The responsibility of promoting household sanitation and good hygiene practices lies in the town health office under the town/city administration. The idea of using trained HEWs for sanitation and hygiene promotion at household level was launched by the GoE and increased the WaSH promotion in the country (Stolz et al. 2013).

The GoE developed a National Sanitation Marketing Guideline to foster sanitation marketing and promote, with the participation of the private sector, the use of different technologies to assess sanitation issues. The guideline also includes approaches including micro and small enterprise development agencies, microfinance institutions and technical and vocational education and trainings in the woredas to identify and develop appropriate environments for the private sectors (MoH, 2013).

In order to meet national and global commitments, the GoE developed in 2013 the Sanitation and Hygiene Strategy, Sanitation Protocol, Strategic Sanitation Action Plan. This plan was created to facilitate changes in the sanitation and hygiene situation in Ethiopia and promote improved sanitation (MoH, 2013).

The lack of law enforcement is also a challenge, since the municipality does not issue penalties for illegal dumping (BST, 2016a; BST, 2016b). As previously stated, the HEWs are the main actors in order to advise people on the importance of having adequate WaSH practices at household level.

2.5.2 *Strengthening service provider roles*

The OWNPs include a section to promote and strengthen private sector capacity by generating information, training and business opportunities in the WaSH sector (GoE, 2013b). According to Stolz et al. (2013), there are several individual consultants and consultancy companies doing capacity building activities in the WaSH sector. However, there is no policy framework for private-sector engagement on faecal sludge management or any particular government institution responsible for promoting private-sector engagement in urban waste management (ACIPH, 2015).

The National Hygiene & Sanitation Strategic Action Plan for Rural, Peri-Urban & Informal Settlements in Ethiopia is a guideline that includes several targets such as capacity building of the private sector, creation of lines of credit, development and promotion of products and services that respond to consumer preferences (GoE, 2011). However, it is only targeted for rural, peri-urban and informal settlements, not for urban areas (GoE, 2011).

According to the head of the BTWSSSE, there is a plan to improve the water supply system. The design is already completed but some gaps in the funding and some technical issues need to be addressed (BST, 2016f).

There is a complaint coming from the private sector since no institution provides capacity building to the private sector. In an interview with the owner of one of the two companies operating in Bishoftu, it was stated that even when he started operating in the business of faecal sludge management, neither the owner nor the workers had any kind of proper training (BST, 2016c). He was complaining that he had to learn everything by trial and error. However, there is a willingness to receive appropriate training either from the municipality or any other institution (BST, 2016c).

3 Service Outcomes

3.1 Offsite technologies

There is no sewerage system (BST, 2016a).

3.2 Onsite technologies

There is no wastewater or faecal sludge treatment plant. All the faecal waste is either discharged to Lake Chelelaka, to the drains of the city or taken to the Golba dumpsite (BST, 2016a).

According to the municipality, there are 26,798 pit latrines with normally one latrine per household (WaterAid, 2013). With an average of 4.5 people per household (WaterAid, 2013), it is therefore estimated that 120,591 people out of 128,272 (around 94%) use pit latrines. This includes 11 public latrines and 41 communal latrines. This 94% relates to the number of people using pit latrines according to the WaterAid study carried out in 2013 (Table 6). The updated value of 97% provided by the municipality will be used for the SFD calculation.

3.2.1 Flush toilets

Flush toilets (locally known as water closets) are only found in high-income households and hotels, spas, lodges and recreational centres, focused on tourism. All flush toilets are connected to fully lined tanks (sealed) with no outlet (often referred to locally as septic tanks).

3.2.2 Pit latrines

These latrines mainly consist of a squatting slab over a pit. Pit latrines are used by the majority of the population (BST, 2016a).

3.2.3 Ventilated Improved Pit latrines (VIP)

People who can afford to build a ventilated improved pit latrine to reduce fly and odour nuisance by ventilating the pit by means of a pipe, use this type of latrine (BST, 2016a).

3.3 Usage

Table 6 shows a comparison of data from three sources on usage of sanitation technologies by percentage of population. These include a study carried out by the CSA in 2007, by WaterAid in 2013 and estimates provided by the municipality for this study.

Table 6 Percentage of people using different sanitation technologies according to three data sources.

	CSA (2007)	WaterAid (2013)	Municipality of Bishoftu (2016)
No toilet	11%	No data	1%
Flush toilet	8%	No data	2%*
VIP latrine	10%	94%	97%
Pit latrine	71%		

*The 2% is calculated by subtracting the 98% (97%+1%) from the 100%

3.4 Categories of origin

Categories of origin can be classified as households, shared or communal latrines, public toilets and institutional toilets. A brief description of each origin is presented as follows.

3.4.1 Households

The majority of people use pit latrines or VIPs (Table 6).

3.4.2 Shared or communal latrines

There are 41 communal pit latrines; people with less economic resources who cannot afford to build a latrine use shared or communal latrines.

3.4.3 Public toilets

There are 11 public toilets (Figure 4) which are open from 7a.m. to 6p.m. They have latrines but also a bathroom with a shower. The municipality owns the toilets and gives permission to a private company to run them. They charge 1 ETB for toilet use (toilet tissue is also provided) and 0.5 ETB for urinate use. Normally, around 20 to 30 people use these public toilets, making a total around 220-330 people per day. They are connected to a septic tank or a fully lined (sealed) tank, which is emptied every 3 to 6 months, depending on the demand (BST, 2016a).



Figure 4: Inside and outside of a public latrine (photo credit: Haile Dinku).

3.4.4 Institutional toilets

In prisons, educational institutions, public institutions, hospitals, and some local restaurants and hotels pit latrines remain the preferred option. The inside and outside of a pit latrine of a public institution can be seen In Figure 5. It can be seen from this picture that there is a poor maintenance of the facilities.



Figure 5: Inside and outside of a public institution latrine (photo credit: Oscar Veses).

However, in high standard hotels, lodges, etc., especially those located near the lakes, a flush toilet connected to a septic or a fully lined (sealed) tank is the normal arrangement.

3.5 Motorised Emptying

Motorised emptying is the main option used to empty pit latrines, septic tanks and fully lined (sealed) tanks. This is carried out by two companies. An interview was conducted with an owner of one of the companies. This company has two trucks: one with a capacity of 10m³ (purchased in 1998 with a final cost of 35,000 euros and showed in Figure 6) and other with a capacity of 14 m³, both equipped with a long hose in case the latrine is not easily reachable. In such cases, the loss of pressure head means the emptying is difficult and the service provider has to revert to manual emptying (BST, 2016c).



Figure 6: 10m³ vacuum truck owned by one of the private companies (photo credit: Oscar Veses).

The private companies make an average of 6 to 7 trips per day; in some cases this increases to 10 trips, depending on the demand (BST, 2016c). The frequency of emptying varies depending upon the number of people using the facility but the minimum time is every three months, up to more than a year (BST, 2016c).

This company has four workers with a driver and an assistant per truck and serves not only households but also several institutions such as hotels, industries, etc. All the faecal sludge is either discharged into the Golba dumpsite or discharged illegally (BST, 2016a; BCP, 2015) with the company charging a household between 600 and 700 ETB per emptying service (BST, 2016c).

3.6 Manual Emptying

Manual emptying is not practiced regularly, only in very few special cases when there is a blockage of the hose due to the fact that people do not use the latrine properly. This blockage includes different wastes such as plastics, bottles, garbage, etc. that can be found in some pit latrines (BST, 2016c). The interview with the owner of one of the companies stated that in general, workers use proper equipment (gloves, masks, etc.) in these situations. However, due to the difficulty of using gloves when handling equipment (hard to operate wearing them), they do not wear gloves but they wash their hands afterwards (BST, 2016c). Nevertheless, this indicates a potential risk for the workers' health.

3.7 Treatment, end-use and disposal

The main disposal site is at Golba dumpsite. This site is just an open field, not a structured sanitary landfill (Figure 7a, b). All wastes (organic, inorganic, solid and faecal wastes) coming from industries, households, public and private institutions are dumped into this field. Although these wastes are not completely mixed together, it can be noticed that they are not properly handled.



Figure 7a, b: Golba dumpsite (photo credit: Haile Dinku and Oscar Veses).

This open field has no protection such as a fence or any proper design (drainage line, multiple layer design, etc.) to handle any waste. Animals such as birds or dogs can be seen feeding themselves with the wastes and also flies and/or mosquitoes are easily found in the area. Locals also complain about the strong odours that come from the site, also creating a potential health risk for the people.

Water runoff is collected in a drainage system distributed through the city with no treatment at all. This network can also serve for grey water collection points and even for improper solid waste disposal as seen in Figure 8.



Figure 8: Drainage system (photo credit: Haile Dinku).

Some illegal dumping might occur to some of the lakes located in the city, especially wastes coming from hotels, resorts, lodges or recreational centres located near them, contributing to the deterioration and contamination of the waters from those lakes (BST, 2016a; BCP, 2015). For the purposes of the SFD project, illegal dumping and disposal at the Golba dumpsite are both considered unsafe practices.

A new waste treatment site, in a different location to Golba and designed by a private company (Figure 9), includes both a faecal sludge treatment plant and a sanitary landfill for solid waste. The sanitary landfill was built three years ago, but due to a budget limitation and a lack of skilled and professional people to run it, it has not been commissioned (BST, 2016a). According to the municipality, it is planned to start the operation of this new sanitary landfill within a year (BST, 2016a).



Figure 9: New solid waste sanitary landfill site (photo credit: Haile Dinku).

The 4 ha. waste treatment site design period is around 15 years, depending on the population growth and the increase on the different economical activities within the city and all wastes (organic, solid and liquid) will be handled separately in 3 different zones (BST, 2016a).

The faecal sludge treatment plant has not been constructed; the design includes drying beds with facultative and maturation ponds for treatment of the liquid fraction, in addition to a biodigester for energy production.

3.8 Drinking water supplies in the city

All drinking water comes from groundwater sources. Groundwater is pumped out of wells, stored in reservoirs located at different sites and then distributed throughout the city. There are 16 functional wells with a total production of 213 l/s (Figure 10). Calcium hypochlorite is added manually on a daily basis at the mouth of the water wells and sometimes added to the reservoirs. Chlorinated water is distributed to the people through private taps and public stand pipes. This distribution network includes 24,000 private taps and 53 functional (8 more in ongoing projects) of public stand pipes to serve the general public, in addition to 29 hydrants for emergency cases (BCP, 2015).

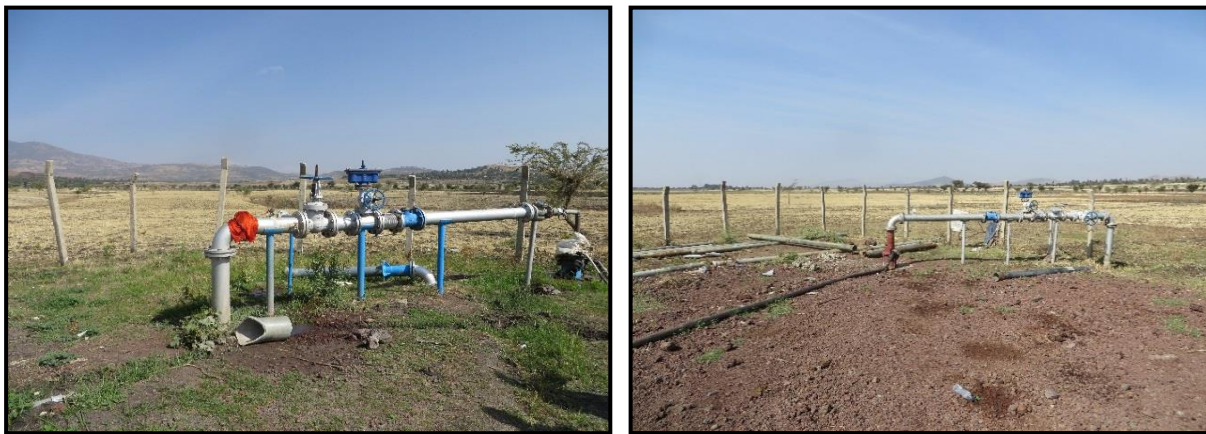


Figure 10: Two functional groundwater wells (photo credit: Oscar Veses).

It can be observed from Figure 10 that only a fence separates the well from the outside, being common the practice of agriculture (corn, wheat, vegetables) and farming activities (cows) near the wells (with no buffer zone protection).

Seventeen key performance indicators are used to evaluate the state of the drinking water supply including cost of water production, per capita consumption, and non-revenue water, among others. The water supply coverage is 76% of the population. This number does not mean that 24% of the population has no access to water but they have access to less amount of water than the values stated by the GTP (BST, 2016f).

Water quality is evaluated through measuring different physico-chemical parameters and biological tests at different wells and selected taps in the city every three months by the Oromia Water, Mineral & Energy Bureau (Table 7).

Table 7 Parameters/tests used to assess water quality.

Type	Parameter/test
Physico-chemical	Odor, pH, Temperature, Total Dissolved Solids, Conductivity, Turbidity, Color, Fluoride
Bacteriological	E-Coli/100ml, Total Coliform/100ml

There is no control or monitoring of the presence of heavy metals or organic compounds in the water but some cross-contamination might occur (especially from organic matter coming from farming activities, nitrates and phosphates from fertilizer use or even pesticides/herbicides that are extensively used in agriculture in the area).

For example, in some points monitored in 2013, the presence of coliforms was detected in some wells and some samples taken from tap water, ranging from 1 to 5 total coliforms per 100ml (OWMEB, 2013).

3.8.1 Ground water pollution assumptions

There are no studies regarding the soil type near groundwater sources (BST, 2016f). According to the head of BTWSSSE, the mean water table is 15m (BST, 2016f). All wells are located away from waste disposal sites, latrines, septic tanks and fully lined (sealed) tanks but some cross-contamination due to agriculture and farming activities might occur as stated in section 3.8.

3.8.2 Levels of uncertainty

The main uncertainty of the data is the census on the percentage of people using onsite technologies and the percentage of latrines that are covered and safely abandoned when they get full. The lack of reliable data resulted in use of the assumptions described below in section 3.9.

3.9 SFD Matrix

The data outlined in Table 6 shows three different data sources regarding the percentage of people using onsite sanitation technologies. It was decided to use the latest data (from municipality of Bishoftu) as this refers to the current situation.

Since there is no data on emptying and transport the following assumption was made. Assuming that humans produce an average of 1 l/day of excreta (around 0.8 l of urine plus 0.2 l of faeces) (Franceys et al. 1992), the total sludge produced per month is:

$$\frac{1L}{day * person} * 30 \frac{day}{month} * 128,272 person * \frac{1m^3}{1,000L} \approx 3,848m^3$$

According to the municipality, a total of 2,500 to 3,000m³ of faecal sludge per month is collected and discharged in the Golba dumpsite (BST, 2016a). Therefore, assuming on average 2,750m³/month is collected and discharged, around 1,098 m³/month (29%) of faecal sludge remains unaccounted for.

From that 29%, 1% is coming from open defecation practises, leaving a 28% of the sludge unaccounted. There is no data that indicates how much of this faecal sludge is safely buried and how much is not safely buried. Therefore it is assumed that 50% of the faecal sludge is safely buried (i.e. the latrines are safely abandoned) and 50% of the faecal sludge is not safely buried (i.e. the latrines are not safely abandoned). Therefore, it is estimated that 14% of the total population uses pit latrines that are never emptied but abandoned when full and safely covered with soil – i.e. excreta is safely managed. While 14% of the population use pit latrines that are never emptied but abandoned unsafely i.e. excreta is unsafely managed (e.g. pit latrines that are failed, damaged or collapsed, etc.). Of the remainder, 71% of the population uses pit latrines and septic or fully lined tanks (sealed with no outlet or overflow) that are emptied and the faecal sludge either discharged to open drains or at the Golba dumpsite.

Table 8 summarizes the types of the sanitation containment systems currently in use. This table shows the description of the system, how it is defined in the SFD calculation tool and its reference and the percentage of people using each system.

Table 8 Estimation of the containment systems for the SFD matrix calculations.

SFD system description	SFD calculation tool reference	SFD system reference	% of population using system
Open defecation	T1B11C7TOC9	L20	1
Containment (septic tanks and pits) failed, damaged, collapsed or flooded - connected to water bodies, or open ground or 'don't know where'	T1B10C7TOC9	Reference L18	14
Pit (all types), never emptied but abandoned when full and covered with soil, no outlet or overflow	T1B7C10	Reference L12	14
Lined pit with semi-permeable walls and open bottom, no outlet or overflow	T1A5C10	Reference L11	70
Fully lined tank (sealed), no outlet or overflow	T1A3C10	Reference L10	1

Note: The method described above to estimate the proportion of population using pit latrines that are safely abandoned is sensitive to the overall population data. For example, the urban population data is from 2007 (CSA, 2007), assuming an annual population growth rate of 2%, the total population in 2015 would be around 150,000 people leading to a total faecal sludge production of 4,500m³/month. This would mean that around 1,750 m³ /month (4,500m³-2,750m³) of sludge is not accounted for, making a total around of 19% (instead of 14%) of the total faecal sludge that is disposed safely in abandoned latrines.

4 Stakeholder Engagement

The municipality of Bishoftu was contacted ahead to gain permission to undertake this study. Seven Key Informant Interviews (KIIs) were conducted to primary stakeholders in relation to faecal sludge management. A telephone call was made upon arrival in Ethiopia to the municipality of Bishoftu (Mr. Haile Dinku from WaterAid kindly did that call in Amharic) to explain the project and to arrange the days of the field trips. Those KIIs included stakeholders from the municipality, private emptier, health extension workers, technicians, etc. All interviews were conducted either in the offices of the stakeholders or during the visits to different places of interest such as the dumpsite, the groundwater wells, etc.

In addition to those interviews, five more KIIs were conducted to different stakeholders in Addis Ababa in order to provide with an overview of the sanitation situation in Ethiopia. Previous to the field visit, an introduction letter explaining the project was sent through email to the different stakeholders in Addis Ababa to explain the project and to set up a day for the interview. Those KIIs included stakeholders from the MoWIE, the Ethiopian Institute of Architecture and the Addis Ababa Water and Sewerage Authority, among others.

The city had very few documents available on internet. The visit was essential to collect data and to have access to unpublished reports. The visit was also essential to gain knowledge about the current situation of sanitation as well as gaining insight to the WaSH sector plans.

Another benefit from the visit was to have first-hand data on the emptying systems used by the emptying service providers (private sector), tariffs charged to people for their services or how they solve situations such as blockage of the hose due to the improper use of latrines. This increases the quality of the data collected and provides a better understanding of the working capacity, responsibilities and quality of the service provided by the private sector.

4.1 Key Informant Interviews

All data were collected by unstructured key informant interviews. The unstructured interviews were useful to have access to unpublished reports or even the technical report of the existing project related to the construction and operation of the new sanitary landfill. Some of these interviews were conducted jointly with different stakeholders.

For example, the interview with the owner of the private company was done in the presence of the process owner of beautification from the municipality of Bishoftu. This allowed for an open discussion and several data provided from the municipality was crossed-checked with the private owner such as the total volume of faecal sludge produced in the city. Finally, just to mention that all interviewed people answered any question asked and they are willing to participate in further discussions and projects in the future.

4.2 Focus Group Discussions

Unfortunately, focus discussion groups were not carried out since the field visit lasted only one week and it was difficult to set up a convenient day for the main stakeholders due to their tight schedules. However, as mentioned in section 4.1, some interviews were conducted jointly with different stakeholders, allowing for an interchange of opinions and views regarding the sanitation situation and for data triangulation. Vivid discussions on the main challenges that need to be addressed were taken during this jointly-made interviews and it is

suggested for the future that all the primary stakeholders in the city such as the municipality, the BTWSSSE, the private sector, HEWs, among others, could celebrate a meeting (maybe on a monthly basis) to share their views and interests on the WaSH sector and to address jointly the main problems and challenges of this sector.

4.3 Observation of service providers

Several observations of service providers included the visit to the dumpsite, visits to public and institutional toilets, visit to the new dumpsite and interviews with the private sector or HEWs. The field visit to the dumpsite helped to understand how the faecal sludge is discharged and make a visual assessment on the current situation of the disposal site (there was an opportunity to see how the solid wastes are dumped in the open field but not for the faecal sludge). The visits to the public and institutional toilets were useful to understand how the sanitation technologies operate and how they contain the faecal sludge. Some KIIs were conducted during these visits, this allowed for cross-checking of data and also to take photographs to provide with more credibility on the observations.

5 Acknowledgements

This report was compiled as part of the SFD promotion initiative project funded by the Bill and Melinda Gates Foundation. The field-research was conducted in close collaboration with WaterAid in Ethiopia. We would like to thank all people that contributed to this project, especially those who participated in the interviews for providing the information needed. Special thanks are given to Mr. Haile Dinku from WaterAid for his assistance and support, acting as a facilitator and a translator for the project.

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- BST, 2016b. Interview with Getu Kassa, sanitary processor of the municipality of Bishoftu.
- BST, 2016c. Interview with Bekele Damise, owner of "Dadimos Liquid Waste Management", a private company of Bishoftu.
- BST, 2016d. Interview with Tsion Tamiru, urban health extension worker of Bishoftu.
- BST, 2016e. Interview with Derese Abera, sanitary of the municipality of Bishoftu.
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7 Appendix

7.1 Appendix 1: Stakeholder identification

Name of organisation	Name of contact person	Position	Influence (high/medium/low)	Interest (high/medium/low)
Municipality	Kebede Gonfa	Process owner	High	High
Municipality	Getu Kassa	Sanitary processor	High	High
Dadimos Liquid Waste Management	Bekele Damise	Private company owner	High	High
Municipality	Tsion Tamiru	Urban health extension worker	High	High
Municipality	Derese Abera	Sanitary	Medium	High
BTWSSSE	Hailu Gichile	Head	High	High
BTWSSSE	Deqefu Demise	Technical head	High	High
Ethiopian Institute of Architecture	Tesfaye Hailu	Chair holder of infrastructure design and construction	Low	High
MoWIE	Tamene Hailu	Coordinator of the national WaSH inventory	Low	High
Addis Ababa Water and Sewerage Authority	Ato Yared	Engineer	Low	High
Horn of Africa Regional Environment Centre and Network	Kassahun Bedene	WaSH Project Coordinator	Low	High
JSI	Birhanu Genet	Senior Environmental Health Advisor	Low	High

7.2 Appendix 2: Tracking of Engagement

Comment: List stakeholder that was directly engaged in the study.	Date of Engagement	Purpose of Engagement	Maximum 100 word summary of outcomes
Kebede Gonfa	18/01/2016	Introductory call to gain permission to do field work	Interview conducted to provide a view on the WaSH situation and to provide unpublished data and reports on WaSH.
Getu Kassa	18/01/2016	To know about the role of municipality on WaSH	Interview conducted to provide a view on the WaSH situation and to provide unpublished data and reports on WaSH.
Bekele Damise	18/01/2016	Gain knowledge on private sector situation	Interview to know how the vacuum trucks operate, tariffs of emptying, etc.
Tsion Tamiru	19/01/2016	Situation of HEWs and their work	Information on the work of the HEWs was obtained: training, monitoring, etc.
Derese Abera	19/01/2016	Situation of HEWs and their work	Information on the work of the HEWs was obtained: training, monitoring, etc.
Hailu Gichile	21/01/2016	To know about the water supply situation	Information about the drinking water supply and plans to increase the capacity, leakage, water coverage, etc.
Deqefu Demise	21/01/2016	Field visit to groundwater wells	Information on the groundwater wells: situation, capacity, etc.
Tesfaye Hailu	16/12/2015	Introductory email was sent to him to see the willingness to participate in the project	Interview was conducted to gain knowledge about the WaSH situation in Ethiopia on national level.
Tesfaye Hailu	14/01/2016	Introductory email was sent to him to see the willingness to participate in the project	Interview was conducted to gain knowledge about the WaSH situation in Ethiopia on national level.
Tamene Hailu	02/12/2015	Introductory email was sent to him to see the willingness to participate in the project	Interview was conducted to gain knowledge about the WaSH situation in Ethiopia on national level.
Tamene Hailu	15/01/2016	Introductory email was sent to him to see the willingness to participate in the project	Interview was conducted to gain knowledge about the WaSH situation in Ethiopia on national level.
Ato Yared	29/01/2016	Introductory email was sent to him to see the willingness to participate in the project	Interview was conducted to gain knowledge about the WaSH situation in Ethiopia on national level.
Kassahun Bedene	16/12/2015	Introductory email was sent to him to see the willingness to participate in the project	Interview was conducted to gain knowledge about the WaSH situation in Ethiopia on national level.
Kassahun Bedene	14/01/2016	Introductory email was sent to him to see the willingness to participate in the project	Interview was conducted to gain knowledge about the WaSH situation in Ethiopia on national level.
Birhanu Genet	25/11/2016	Introductory email was sent to him to see the willingness to participate in the project	Information about the organizations in charge of WaSH in Ethiopia was acquired

7.3 Appendix 3: SFD matrix

