

## Regulation of the Private Sector Involvement to Achieve Sustainable Solid Waste Management, Lessons from Five Ethiopian Cities

Abdulkerim Ahmed Mohammed<sup>1\*</sup> and Meine Pieter van Dijk<sup>2</sup>

<sup>1</sup>Tilburg University, TiSEM, Tilburg, Netherlands

<sup>2</sup>ISS, The Hague, Netherlands

### Abstract

In many developing countries solid waste is not collected and disposed properly, leading to public health risks for example due to water contamination. This manuscript evaluates type of Private Sector Involvement (PSI) and the regulatory contractual arrangements for Solid Waste Collection (SWC) in the five most populated Ethiopian cities. The study assesses whether these arrangements lead to sustainable SWC. Data was collected using a structured questionnaire administered to private companies in the city of Addis Ababa, Mekelle, Hawasa, Adama and Bahir Dar. We also interviewed and organized Focus Group Discussions (FGD) with local government and municipal officials, private company managers, and SMEs members. We find that the Ethiopian constitution, policies, proclamations and strategic documents for SWC clearly state the need for an integrated approach for sustainable SWC. Yet, the lack of transparency and independence of Cleaning Administration Agency (CAA) and Cleaning Administration Department (CAD) are impediments to enforce the contractual agreement and achieve sustainable SWC. The intervention of city officials, and poor financial and human resource capacity of CAA and CADs, lack of commitment to adhere contractual obligations, and the less concern of the private companies and the people towards waste handling are existing challenges. The Ethiopian government needs to improve the governing capacity of the CAA and CADs. Besides, it should commit a full scale implementation of sustainable SWM principles. Otherwise, unnecessary loss of resources and overwhelming adverse impact on the environment and on the Ethiopian public health and safety will persist prevailing.

**Keywords:** Solid waste; Sustainable; Ethiopia; Private company regulatory capacity

### Introduction

Population growth inflicts waste-related problems on the living conditions of the inhabitants in urban areas. Good living conditions require certain services to be provided and maintained in an appropriate way even though they may be costly [1]. Henry et al. [2] state the primary target of Municipal Solid Waste Management (MSWM) is to protect the health of the population, to promote environmental quality, to develop sustainability, and to provide support to economic productivity.

The storage, collection, transporting, treatment and disposal of solid waste, particularly waste generated in medium and large urban centres, have become an increasing problem with increasing populations. In most urban areas, only a fraction of the waste generated daily is collected and safely disposed off. In Nairobi for instance, generation rates as of 2009 are estimated at 1850 tons/day of which just about 33% is collected and gets to the dumpsites (JICA, 2010). In Kampala, of the 1300 tons generated daily, just about 21.7% is collected. When waste stored using non- biodegradable material instead of the skips provided by councils, this materials ends up at the dumpsite with the waste. Collection of solid waste is usually confined to the city centre and high income neighbourhoods, the slum areas are particularly vulnerable. Most parts of cities never benefit from public waste disposal. Most urban residents dispose their waste haphazardly. Waste in developing countries is not processed, reused in a cost efficient and safe manner.

As with many Sub-Saharan African cities [3-5], for a long time Ethiopia has experienced many problems related to SWM. For instance, the problem of flooding in cities' poor neighbourhoods is often blamed on garbage that blocks the drainage system. Diseases such as outbreaks of cholera, especially in wet seasons, are often directly attributed to poor solid waste management in Ethiopian cities. Low levels of access to SWC facilities and poor hygienic practices have contributed to the

spread of diseases in Ethiopia. These factors account for more than 60% of the disease burden in the country [6]. With the increase of population and rise buildings and condominium houses in the main cities of the country the problem of waste management in the cities becomes worse. The disposal sites which were in the outskirts of the city became part of the centre due to the cities sprawl. The result was a bad smell to the residents.

Lack of awareness and a badly functioning economic system have been mentioned as key causes of environmental degradation. In the same tone scholars who have written on governance speak of waste management as being one of the most visible urban services whose effective and sustainable management serves as an indicator for good local governance, sound municipal management and successful urban reforms. Waste management is very much connected to the performance of municipalities and a solid waste crisis can significantly undermine the credibility of an urban authority. SWM may not be the biggest vote- winner, but it has the capacity to become a full scale crisis, and a definite vote-loser, if things go wrong.

There are a number of academic studies on SWM in Africa. Awortwi [7] focuses on governance in multiple arrangements and the relationships between capacity and contractual arrangements.

**\*Corresponding author:** Abdulkerim Ahmed Mohammed, Tilburg University, TiSEM, 3 5000 LE Tilburg, The Netherlands, Tel: + 00251925260650; Fax: + 00251925260650; E-mail: [A.AhmedMohammed@uvt.nl](mailto:A.AhmedMohammed@uvt.nl)

**Received** August 07, 2017; **Accepted** December 12, 2017; **Published** December 19, 2017

**Citation:** Mohammed AA, Dijk MPV (2017) Regulation of the Private Sector Involvement to Achieve Sustainable Solid Waste Management, Lessons from Five Ethiopian Cities. Int J Waste Resour 7: 311. doi: [10.4172/2252-5211.1000311](https://doi.org/10.4172/2252-5211.1000311)

**Copyright:** © 2017 Mohammed AA, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Obirih-Opake and Post [5] focuses on public private partnerships (PPP), specifically the impact of decentralization and private sector participation on urban environmental management. It focuses on SWM and sustainable development issues, identifies different actors and institutional arrangements, looking at the role and interests of different actors, their successes and failures. Koppenjan and Enserink [8] show the challenges facing PPP as the potential benefits countered by the private sector's focus only on short-term return on investment. It points out the decisions by governments to contract out by pragmatic rather than ideological reasons as a problem. Katusiimeh [9] indicates the lack of regulation and transparency in Uganda. Tilaye and van Dijk [10] underline the importance of consistent power of the state in shaping the developmental role of the private sector (focus on micro enterprises).

The above literature discusses (a) PSI, (b) the regulatory and contractual arrangements implemented for SWC, and (c) the requirements for the institutional and regulatory capacities. Regulation of private sector involvement has an element of regulation 'by contract' where the regulatory rules are enforceable in a contract [11]. Some researchers argue that despite the involvement of a private sector in SWM, there is no efficiency or affectivity gain in SWM [9]. Inadequate service coverage, insufficient resources, irregular waste collection, spilling over of waste from bins and storage containers, lax attitude of people towards indiscriminate disposal on unauthorized places, and waste littering are common in developing countries with or without PSI.

A well-functioning solid waste market requires stimulation of competition for the market, reduction of information asymmetry, and reduction of transaction cost [12]. Some studies also suggest that the efficiency of private sector depends on the capacity of local government institutions to regulate and monitor performance of the private sector, and to recover cost [5]. Connected to these issues, we assess the regulatory contractual arrangements in Ethiopian cities where PSI for sustainable SWC is aspired. This study hypothesised that the current contracts for PSI in SWC fail to regulate the means of engagement, service charge, contract renewal, service zone allocation, monitor service quality, and adherence to contractual obligations. Thus, the research question is: How is the contractual arrangement for PSI formulated to achieve sustainable SWM? Moreover, we assess the regulatory capacity of the Cleaning Administration Departments (CAD) and Cleaning Administration Agencies (CAA) in each city by focusing on the human and financial resources; the independence of the regulator [13], laws governing the regulatory process, the contract, and the regulator. We offer insights into the challenges to enforce regulations and contractual agreements related to sustainable SWC.

## Theories on Regulation and Sustainable Solid Waste Management

When there is production the economic actors regularly get into contact to exchange different goods. There are two fundamental coordinating institutions: the market and the organizations (e.g. the firms). The market uses price while the organizations use their influence to perform the coordination. These two institutions coordinate the transactions together in every economy 'when, which one and how' mainly depends on the necessary and available information in the given situation. Contract performance monitoring requires service standards and indicators of outputs and outcomes specified in the contract, and these indicators are used for service quality monitoring [14,15]. Literature on contract theory stipulates that robust competition, tight

contract specifications, rigorous contract monitoring, and the use of legal means to enforce the contract are factors that complement in contractual relationship and exert control over the contractor. The findings of Fernandez [16]; however, suggest that successful contractual relationships need to be flexible and in a cooperative manner. On the other hand, the requirement for litigation to enforce criminal or administrative rules creates costs and frequently a degree of uncertainty both for regulator and regulate [17].

There are two basic schools of thoughts on regulatory theory; positive and normative. Positive theories of regulation examine under which conditions regulation occurs [18,19]. These theories of regulation include theories of market power, interest group theories that describe stakeholders' interests in regulation, and theories of government opportunism that describe why restrictions on government discretion may be necessary for the sector to provide efficient services for customers. In general, all these theories stipulate that regulation occurs for three reasons. First, regulation occurs because government is interested in overcoming information asymmetries with the operator and in aligning the operator's interest with the government's interest. Second, the customers desire protection from market power when competition is non-existent or ineffective. Customers would like to see regulation of user charges and quality of service. Finally, regulated businesses desire protection from rivals, and from government opportunism.

According to Jamison and Berg [18], normative theories of regulation generally explain that regulators should encourage competition where feasible; minimize the costs of information asymmetries by obtaining information and providing operators with incentives to improve their performance; provide for price structures that improve economic efficiency; and establish legitimacy of regulatory processes that provide for regulation under the law and independence.

The primary rationale for government regulation is to remedy market failures such as monopoly power, externalities and information asymmetries or deficiencies. The gaps between formal rules (regulation) and actual practice do influence private sector performance depending on institutional capacity and political context at the local level. Private sector involvement in SWC calls for a greater and more efficient role of sector specific regulation.

Market failures are regulated through two forms of regulation of public services: regulation of the market conduct and market regulation [11]. In connection to this, Oduro-Kwarteng [12] mentions that the regulation of the market conducted by independent regulator (formal regulation) concerns monopoly regulation. The regulation of market conduct constrains the behaviour of market suppliers in areas such as quality, pricing, and access to information. The monopoly regulation is strictly limited to service that cannot be unbundled. For monopoly regulation, there is competition for the market where governments create competitive conditions through service contracts, leases or concessions and firms compete not for individual consumers in the market but for the right to supply the entire market. On the other hand, market regulation seeks to promote competition through regulation by contracts and legal restrictions and rules regarding both market entry and the shape of corporate entities operating in the market.

Regulating and monitoring the private sector needs to consider the interest of all stakeholders. Oduro-Kwarteng [12] considers regulation rules and contract by focusing the theoretical case on local government interest, public interest and private sector interest and these are combined to test relationships suggested by the agency capture and

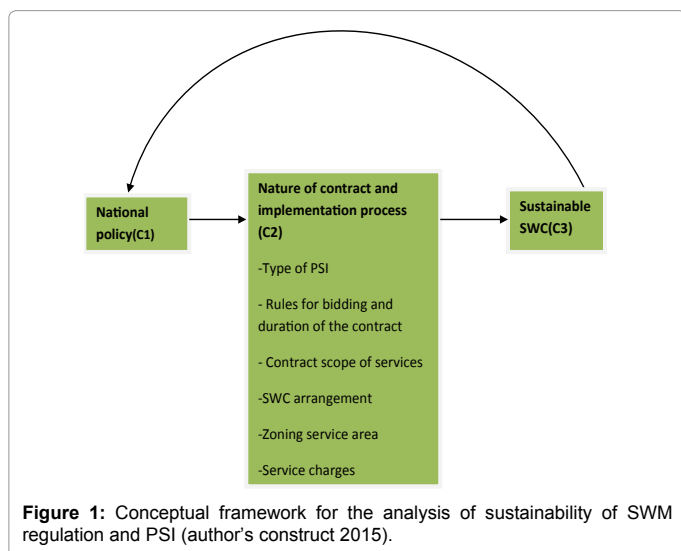
public interest theories of regulation. He adds that the theoretical framework for analyzing regulation is based on market failure framework (regulation of monopoly power, asymmetric information, and externalities) and a contrasting theoretical case of public interest or agency capture perspective for explaining regulation.

Municipalities' offices responsible for SWM need some autonomy. A regulator may be considered as autonomous when it "retains some autonomy from pressures of highly concentrated interests of industry and other state institutions" [20]. A high degree of independence stems the risk of the regulator being captured, that is the risk of the regulator acting in favor of a given party (ies). Regulatory reforms includes the principles of regulatory governance i.e., transparency, participation measurement and evaluation [21].

Economic analysis of regulation has noted a long time ago that regulatory agencies are constrained in their ability to regulate by asymmetries of information between themselves and those they oversee [17,22]. If an agency has no access to the cost models of a particular industry it may be difficult to set appropriately price control measures.

There are various definitions for sustainable solid waste management, emphasizing the value of sustainable SWM. Dorvil [23] states that sustainability aims at providing the best outcomes for the human and natural environments presently and in the future. It is a concept relating to the continuity of economic, social, institutional and environmental aspects of human society. Sustainable SWM involves a system that is capable of maintaining itself over a long time without reducing the resources it needs [24]. Common to most definitions of sustainable SWM are the three important interrelated aspects of environmental (planet), financial (profit) and social (people) sustainability. The concept entails that, environmental sustainability requires SWC and disposal which impose a great burden on the environment to be considered as resources that should be transformed in a closed-cycle system. This can be done by restoring various natural cycles which, in turn leads to a smaller loss of raw materials, energy and nutrients.

Our analysis identifies the main barriers in the contractual arrangement that affect sustainable SWM. We consider three components (C1-C3, Figure 1) for analysis. They are national policies (C1), nature of contractual arrangement (C2) and the sustainability evaluation (C3). C1 considers national policies that are relevant for SSWM. C2 then looks at the type of SWM contracts used for the PSI.



Rules for bidding and duration of the contract; contract scope; zoning service areas and service charges are investigated. Moreover, CAA and CADs enforcement capacities are examined [25]. Component C3 then evaluates the outcomes of the SWM sector in terms of sustainability. In this component, the contents in the contract are evaluated whether they lead to the cost recovery and environmental sustainability. In addition, the presence of corruption, transparency, and dependency are identified. Analysing the components, we provide recommendations for the feasibility of contractual agreement implementation which leads to achieving sustainable SWM in Ethiopian cities, which could be relevant for other developing countries as well.

## Materials and Methods

We collected data during two fieldwork periods in five Ethiopian cities: Addis Ababa, Mekelle, Bahir Dar, Hawas and Adama, between June 2014 and September 2015. We used surveys and interviews for primary data collection, followed by a reconnaissance visit and observation. There are three categories of respondents: government authorities, managers of private companies, and SMEs members. Below we briefly describe these categories.

We interviewed experts from government offices that work on environmental and social aspects including: the Ethiopian Environmental Protection Agency Ministry of Environment and Forest (EPA), the Addis Ababa Cleaning Administration Agency (CAA), and the Ethiopian Privatization and Public Enterprises Supervising Agency (EPESA). We also visited company managers. These were key managers from the private companies, who were willing to collaborate in this research. These have managerial positions as well as knowledge of the SWC practices of their respective companies. The managers are supposed to be in a position to provide detailed information regarding their organization's SWC practice.

There are more than 500 MSEs in Addis Ababa, five in Mekele (grown to large private companies), 20 in Adama and 12 in Bahir Dar and 16 in Hawasa. Finally we interviewed 25 MSE members, individuals mainly from poor sections of society who are involved in SWC. We have used snowball sampling as the address of the MSE members is geographically disbursed. These MSEs are individuals who have got support letter from Kebele officials to be member in MSEs. These are individuals directly involved in SWC under their associations.

In this study, guided open interviews are employed, and Focused Group Discussions (FGD) were conducted. The responses remained open-ended and this enabled respondents to produce as much information as they wish to provides. This is mainly based on the belief that this approach will allow respondents to describe and analyze their experiences or feelings in their own words without being constrained by any form of framework. The FGD was conducted in Addis Ababa. This discussion had conducted in Ayer Tena with private company managers and CAA exerts. A total of eight individuals, two experts from CAA and three private company managers, two MSEs members and one city resident were included in the FGD. The FGD lasted 80 minutes in average.

A structured questionnaire distributed to 40 companies was administered and filled out by the researcher. A list of 20 registered private companies was taken from Addis Ababa Cleaning Administration Agency (CAA), and another list of 20 companies was taken from Cleaning Administration Departments (CADs) of the municipalities in the remaining four cities. A structured questionnaire distributed to 40 companies was administered and filled out by the researcher. Prior to data collection the questionnaire was pre-tested

for ease of understanding and content validity. Four private company managers were contacted and invited to fill the questionnaires in Mekelle city. Company managers and MSE members were asked to criticize the questionnaire for ambiguity, clarity and appropriateness of the items used to operationalise each construct. The Mekelle city municipality official and experts were also requested to assess the extent to which the factors sufficiently addressed the topics investigated. Based on the feedback received, the instrument was modified accordingly and used to collect information about the study.

The questionnaire for private companies contains 107 questions of which 83 are measured on a five-point Likert- type scale with anchors ranging from strongly disagree, disagree, cannot tell, agree and strongly agree, very poor (1), poor (2) fair (3) good (4) very good (5) and binary scale (Yes/No) 6 questions [12]. The interview guide for municipal officials and selected residents were 10 open ended questions and 7 yes / No questions. Secondary sources comprising of available archive records and document analysis were used. Secondary data were collected from private companies monthly reports, contract agreement documents and CAA and CADs official waste related documents.

## Results and Discussion

### Solid waste collection in Ethiopian cities

We now discuss the Ethiopian national policies (C1), local institutional capacities (C2a), the type of SWM contracts in use and the private sector involvement (C2b), and the sustainability evaluation (C3). We summarize the evaluation through Table 1. The section ends with a discussion of challenges.

The national policies for SWC are reviewed for this study. Reviewing the 1995 Ethiopian constitution with respect to the area SWC is imperative. Article 41 (Economic, Social and Cultural Rights), Article 44 (Environmental Rights), Article 90 (Social Objectives), and Article 92 (Environmental Objectives) are reviewed next. Besides, article 44 of the Ethiopian constitution underscores environmental rights. According to this section of the constitution, all persons have the right to a clean and healthy environment.

Social objectives are described in Article 90. It is declared 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 (Article 90(1)). There are also stated environmental objectives in the constitution of Ethiopia. One asserts that the government shall endeavor to ensure that all Ethiopians to live in a clean and healthy environment (Article 92(1)) and the design and implementation of programmes and projects of development shall not damage or destroy the environment (Article 92(2)). Besides it states that people have the right to full consultation and to the expression of views- in the planning and implementation of environmental policies and projects that affect them directly, Article 92 (3), and the government and citizens shall have the duty to protect the environment (Article 93(4)).

There is a mix of national environmental policy, laws and regulations (proclamations) as well as international environmental frameworks that have been endorsed by the country. The overall environmental policy states that its goal is to improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through the sound management and use of natural, men-made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

Parameters	Number of Companies Operating				
	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa
Service contract	20	4	6	5	5
<b>Means of Engagement</b>					
Open competition	0	4	0	0	0
Application	20	0	6	5	5
<b>Duration of Contract</b>					
1 year	20	0	0	5	5
2-4 years	0	0	0	0	0
5 years	0	4	0	0	0
More than 5 years	0	0	0	0	0
<b>Contract Renewal</b>					
Automatic renewal	20	0	0	5	5
<b>Restriction on Service Area</b>					
Available	0	4	0	5	5
Not available	20	0	6	0	0

Note: Source: filed survey result 2015

Table 1: Nature of contracts.

The environmental pollution control proclamation No. 300/2002/ [26] is addressing the issue of pollution. This proclamation declares that no person shall pollute or cause any other person to pollute the environment by violating the relevant environmental standard (Article 3 (1)), and the Authority or the relevant Regional environmental agency may take an administrative or legal measure against a person who, in violation of law, release any pollutant to the environment (Article3(2)), [27].

The Solid Waste Management Proclamation (No. 513/2007) [28] states that "Urban administrations shall create enabling conditions to promote investment in the provision of SWM services" [28]. According to Prevention of Industrial Pollution Council of Ministers Regulation (Regulation No.159/2008) [29], factories in the industrial sector of the country shall minimize the generation of pollutants to an amount not exceeding the limit set by the relevant environmental standard and dispose of it in an environmentally sound manner (Article 4 (1)), and have the obligation to handle equipment, inputs and products in a manner that prevents damage to the environment and animal health (Article4(1)) (FDRE 2008) [30].

Moreover, the country has signed and ratified with proclamations a number of international conventions on environment including the Stockholm Convention on Persistent Organic Pollutants Ratification Proclamation (ratification proclamation No. 279/2002) [27], the Rotterdam Convention on prior informed consent procedure for certain hazardous chemicals and pesticides in international trade, the Cartagena protocol on bio- safety to the convention on biological diversity (ratification proclamation No. 362/2003), Vienna convention and the Montreal protocol on control of Ozone layer depleting substances (ratification proclamation 716/2011), the Kyoto protocol on the reduction of greenhouse gases (ratification proclamation No. 439/2005), Basel Convention on the Control of the trans- boundary movements of hazardous wastes and their disposal (ratification proclamation No. 192/2000), UN framework convention on climate change (ratification proclamation 97/1994), Bamako convention (ratification proclamation No. 355/1995), the UN convention to combat desertification (ratification proclamation 81/1989), and the convention on biodiversity (ratification proclamation 98/1986).

The existing two types of SWC service private providers in Ethiopian cities are private companies and SMEs (Small and Micro Enterprises). There are a total of 40 private companies in the five Ethiopian cities

twenty of them are in Addis Ababa, 4 in Mekelle 6 in Adama, 5 in Bahir Dar and 5 in Hawasa operating in a contractual agreement with CAA and CADs. Each of them possesses one vehicle at least. There are more than 600 SMEs in the five study cities except in Mekelle. Each of the SMEs is a group of 10 to 20 individuals without any vehicle. The focus of this study is on the forty private companies.

House to house and communal collection of SWC are practiced in study cities. SMEs in Addis Ababa and in Adama collect waste from households and take it to transfer stations. SMEs in Bahir Dar and Hawasa collect waste from households, hotels and institutions. Private companies in Addis Ababa collect waste from hotels and institutions and take to landfills while the companies in the other cities take it to transfer stations and landfills. CAA and CADs' vehicles collect waste from transfer points (communal containers) to the disposal site. This is not practiced in Mekelle. It is observed that the communal containers in Ethiopian cities are prevailing in the poor neighbourhoods where there are high population density and poor access roads.

### Nature of SWC service contracts in the cities

There is service contract form of PSI for SWC in all the study cities. In such a contract, local governments are responsible for regulating and paying the private companies. Means of engagement to service provision vary from city to city. In Addis Ababa and Hawasa, private companies and SMEs sign service contract through application to the CAA and CADs.

In Adama, private companies and SMEs make the agreement directly with customers providing that they have informed CAD with application letter. Then, they get a direct service payment from residents. CAD in Bahir Dar organizes SMEs for SWC if it gets a report from Kebelle (lowest level administration) that they have first established an association for SWC. Moreover, they are encouraged to upgrade to private companies.

In Mekelle, private companies used to engage in service delivery by way of automatic renewal until 2012. Then after, they are requested for CAD's open competition bidding. Other cities still practice automatic renewal without a clear procedure. They are even allowed to continue working despite having their contract expired. The competitiveness of the bidding practices affects unit costs, local governments that bid the service competitively enjoy a cost saving compared to those that renew their contract with the existing company [28]. According to CAD officials and company managers, such a bidding-driven contract is a recent phenomenon which is transparent and free from political interference.

However, companies in other cities provide SWC service without any competitive bidding. This practice is vulnerable to corruption and political interference. A case disclosed by two company managers in Bahir Dar shows that without competition and clear procedure, a company was allowed by city officials to provide service and was granted starting capital. In this process, CAD's committee members were not involved. Similarly, a company manager in Addis Ababa tells the story that his application for SWC service delivery was rejected for no reason despite claiming he had met the requirements, such as a vehicle with tight-body, open truck with metal cover, one manger, one casher, one accountant, one supervisor and one environmentalist. However, other companies were accepted for no different reasons. This could be a clear case of regulatory capture with rent-seeking behavior of the officials. Connected to this, Awortwi [7], remarks award of contracts as of 2003 was largely based on agent's connections with people in higher authority than on any process of competitive bidding.

### Duration

The duration of the contract is a five-year time in Mekelle; whereas, one year in Addis Ababa, Bahir Dar and Hawasa. Adama's contract duration is not clearly mentioned. The private company managers in Mekelle confirmed that the five-year contract duration is adequate to make cost recovery of the investments. However, the one year contract in the other cities creates uncertainty and lack of confidence to involve into SWC. This is due to the frustration of investment risk of involving loan repayment, default, and the inability to recovery funding cost [29].

The experience of PSI in Ethiopian cities is a recent phenomenon. As shown in Table 2, private companies who provide service for more than a decade are only four, two in Addis Ababa and two in Mekelle. In other cities, they do have less than five years of experience. Initially, PSI started in Addis Ababa and Mekelle and later extended to the other cities. Companies in Addis Ababa and Mekelle started operation in the early 1999s, whereas other cities in the late 2008s. There was a complete termination of PSI across the cities in the year between 2005 and 2009. This was due to the less attention given to PSI by city administrations while SMEs received more attention, according to CAA and CADs' officials.

The interview with private company managers in the three cities of Addis Ababa, Bahir Dar and Hawasa shows that companies do not intend to stay in SWC business. This is because of the less consideration given to them by CAA and CADs. In this regard, Bjerkli [30] finds that the real practice in SWM in Addis Ababa by the government was apparently organizing as many SMEs and cooperatives as possible to boost higher employment figures within the city. Tilaye and van Dijk [10] also discovered unpredictable policy changes in Addis Ababa city. The government first made the private enterprises organize as SME associations and later they could become private companies. From the FGD with CAA officials, we have noticed that even now the plan of the Addis Ababa city administration is to nurture thousands and thousands of SMEs in SWC. This is done through actively promoting self-help groups and cooperatives including women through linking these associations with financial institutions, investment and working capital needs of their members.

The strategic document for SWC of CAA underpinned the need for training and development of SME private providers. In the document, the importance of establishing links to new market outlets for their recyclable waste domestically is mentioned. In connection to this, the current private companies in Mekelle are living examples. The FGD with CAD officials and company managers in Mekelle city shows three private companies have already emerged from SMEs. Initially, the three private companies "Dliet, Fana and Sporedn" started SWC service as SMEs with a capital of 350 Birr using horse carts. They had 14 crew members with a salary of 50 Birr each.

Service zones are restricted only in Mekelle, Bahir Dar and Hawasa.

Years of Experience	Cities				
	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa
1	2	1	1	1	1
2	3	1	1	2	3
3	2	0	4	0	1
4	11	0	0	1	0
5-9	0	0	0	1	0
10 - 15	2	2	0	0	0

Note: Source: filed survey result 2015

Table 2: Service experience.

CAD officials have confirmed that such zone restrictions are made in reference to administrative districts (locally known as sub-cities and “Kebeles”). Types of generators and kinds of wastes are not considered for service area demarcation. There are four service zones in Mekelle city. “Dliet Sanitation and Service Plc have been operating in the sub-city of Kedmay Weyani; “Ezana Service Agency” in Adi Haqi; “Fana” in Semen, and Ayder; and “Sporden” in Hadnet. The five service zones in Bahir Dar are “Sefene selam and Gishabay”; “Fasilo and Belay Zeleke” “Hidar 11 and Shimabo”; “Shimbit”, and “Ginbot 20 and Tana”. The five service zones in Hawasa are “Tabor”; “Menaheria and Misrak”; “Haiq Dar and Addis Ketema”; “Bahil Adarash”, and “Mahal Ketema and Tulla”.

Private company managers in those three cities believe that such a demarcation practice impedes them from reaching out to wider areas despite their potentials. Besides, it discourages competition for the market among private companies and degrades service coverage of SWC. The lack of competition among private providers violates the foundation of market-based policies and contrasts the government’s expectations of cost-saving and quality improvement.

A previous study in Addis Ababa; however, reveals that the absence of a well-defined service area appeared to be one of the controversial issues and remains a source of conflict among different actors engaged in SWC [10]. This result in inefficiency as up to three or more different collectors may work in the same area and street at the same time. Absence of demarcation also exerts extra expenses as each enterprise deploys their employees to the sparsely and haphazardly located clients.

The Interview with company managers in Addis Ababa city reveals the lack of demarcation as well as transparency in assigning private companies to big institutions. For instance, a company manager disclosed that officials in Addis Ababa permitted a private company of their choice to provide SWC service at Bole International Airport without a clear procedure. He added, “This company collects 100, 000 ETB per month without a clear calculation of meter cube of waste disposed by it”. Another case in Adama city shows that private companies have been noticed favouring only rich neighbourhoods. CAD officials admit that such preference singles out users who cannot afford the service fee. This implies the need for legal restrictions and rules regarding both markets entry and the responsibilities of private providers operating in the market to avoid the negative externality of waste collection i.e., uncollected waste [11].

In order for the CAA and CADs to effectively monitor the quality of service rendered by the waste companies, they need to have access to information from the waste companies. This information includes vehicle tour schedule, performance targets, meter cubic of waste disposed of and revenue from SWC and cost incurred. Their role is to monitor and regulate the solid waste companies.

The results show that 36 out of 40 companies said the performance targets pertaining to the regulations of the private waste companies are not clearly spelt out in the contract signed. Exceptionally, the four company managers in Mekelle confirmed that performance targets are set in the service contract and monitored by the CAD. Company managers in Mekelle rated that the clearness and measurability of performance targets set in the contract are adequate enough. This matches with the standard manual of the Mekelle city. This manual stipulates SWC frequency to be carried out once in a week and only house-to-house. The minimum of two vehicles are required from a private sector to be involved in the SWC. The vehicles need to be tight-body, open truck with metal cover. The minimum human resource requirement to be fulfilled by the private sector should include one manger, one casher, one accountant, one supervisor, and one environmentalist. In addition, a private company should have three workers for waste sorting, one clerk, and two guards. Unlike this, Addis Ababa, Adama, Bahir Dar and Hawasa do not have well-defined measurable performance targets. The SWC frequency to be carried out in a week is not mentioned in Addis Ababa, Bahir Dar and Hawasa. Worst, there is no standard at all in Adama. Contract performance monitoring requires service standards and indicators of outputs and outcomes specified in the contract which show service quality [14,15].

As shown in the Table 3, 32 companies said the CAA and CADs are able to get information on meter cube of waste collected. They believe CAA and CAD has adequate access to information on their meter cubic of waste disposed off. The CAA and CADs keep records of the amount of solid waste to be disposed. There are workers in charge of controlling the disposal sites in the city of Addis Ababa, Mekelle, Bahir Dar and Hawasa. This helps CAA and CADs to calculate the service payment to private companies. Yet, it is not true in Adama where companies collect service charge directly from customers.

The researchers observed an expert appointed in controlling the amount of waste disposed by the companies in the four cities except in Adama. Their duty is primarily to check the load of the vehicles whether it is to the full level of container. The vehicles have a load capacity of 7 m<sup>3</sup> in Bahir Dar, 8 m<sup>3</sup> in Mekelle and a size of 7 m<sup>3</sup>, 8 m<sup>3</sup> and 24 m<sup>3</sup> in Addis Ababa. Each amount designates a waste to be disposed per trip; any less load than this is not accepted in each city. This type of practice is not monitored in Adama.

All the 40 companies admitted that their revenue and cost information is accessed by CAA and CADs. Though CAA and CADs know the revenue as they themselves pay companies, they disclosed that the information on cost and revenue is not properly reported. This implies the lack of transparency from the side of the private companies which according to the CAA and CAD officials is intended to avoid the high tax imposition. Related to this, Vickers and Yarrow [22], and Scott [17] remark that such asymmetries of information constrained regulatory agencies ability to regulate. If an agency has no access

Indicators of access to information	Adequate					Inadequate				
	Addis Ababa	Mekelle	Adama	Bahir Dar	Haws	Addis Ababa	Mekele	Adama	Bahir Dar	Hawasa
Clear and measurable performance targets information In the contracts	0	4	0	0	0	20	0	6	5	5
CAA and CAD's access to meter cube information from company	18	4	0	5	5	2	0	6	0	0
CAA and CAD's access to revenue information from company	20	4	6	5	5	0	0	0	0	0

Note: Filed survey result, 2016

Table 3: CAA and CADs access to information.

to the cost models of a particular industry, it may be difficult to set appropriately either fair or stringent price control measures.

### Regulation of unit price, user charges and cost recovery

The views of the private companies on regulation of charges are presented in Table 4. Except six private company managers in Adama, the other 34 said that CAA and CADs set unit prices and user fees alone. From the CAA and CADs' FGD, it was noticed that exclusively city officials set the price for SWC. There is neither upward review of improvement in user charges nor payment for SWC which are tied to the rate of inflation, fuel, labor, or consumer price index. Companies complain that this affects their revenue and cost recovery. All company managers unanimously disclosed that there is no subsidy from CAA and CADs for SWC services.

The collection of user charges by private companies is a concern related to revenue generation and cost recovery for SWC. It varies in the five cities. CAA and CAD in the four cities, except in Mekelle, offer equal service payment to SMEs where each cooperative member gets a monthly salary of 1500 ETB or 71 USD per head irrespective of the amount of solid waste they collect. They are also required to save 20% of their income. On the other hand, CAD pays a lump sum of 324850 ETB or 15395 USD per month for only one company in Bahir Dar. In Addis Ababa, CAA pays a monthly service payment of 47 ETB or 2.22 USD per/m<sup>3</sup>. CAD in Mekelle pays 27 ETB or 1.27 USD per/m<sup>3</sup>, whereas in Hawasa, it pays 25 ETB or 1.18 USD per/m<sup>3</sup>.

Only in Adama, private companies collect service charge of 40 ETB or 1.9 USD per hh /month directly from customers in the rich neighbourhood while 14 ETB or 0.66 USD per hh/month in the poor neighborhood. This can be attributed to the differences in the living standards, ability and willingness to pay.

From the survey, it was discovered that there is very low service payment for SWC in Ethiopian cities. The FGD with CAA officials in Addis Ababa shows CAA collects more than 30 million ETB or 1421800 USD per month through water bill from the city residents. Other FGD results have also shown that all cities, but Adama, collect service charge in the same way. Though varied the service payment in each city is, all companies complain that the payment is low. From an interview with CAA officials in Addis Ababa, it was found that from the total of 30000 million ETB collected for the purpose of SWC only

2 million birr is allocated for SWC budget. This could mean 28 million ETB is not spent for SWC.

This low service payment is not only for the private companies but also for SMEs. The interview with SMEs members indicated that the monthly income members get is unsatisfactory even to afford medical and education expenses. In connection to this, Wilson et al. [25] confirm low salary is paid typically between US \$ 25 to 50 per month for primary waste collectors. This might mean that SWC is given less priority by local governments in developing countries. Again this implies the effort towards PSI in SWC in Ethiopian cities is neither to increase companies' efficiency through cost recovery nor to secure meaningful employment opportunity through SMEs development.

### Regulation of quality of service and contract monitoring

Regulation of quality of service in terms of monitoring of companies' compliance to regulations, monitoring of quantity of waste collected, and CAA and CADs' adherence to the terms and conditions in the contracts was assessed. The results of the views of the private companies across the five cities are presented in Table 5.

Monitoring of SWC needs information about performance targets, number of trips made, cubic meter of waste disposed of, revenue and cost incurred. CAA and CADs' access to such information can also determine to which extent they carry out regulation procedures.

As it is shown in Table 6, 32 respondents said monitoring of the companies' compliance to regulations and standards set in the contracts was inadequate. Concerning the monitoring of companies' quantity of waste collected and their output by CAA and CADs, 36 companies said it was adequate. They added that CAA and CADs in all the cities have workers appointed in the disposal sites to keep records on the waste disposed. The payment is based on these records.

The CAA and CADs have an obligation of supervising the private companies. The contract management and supervision of the private sector by the CAA and CADs are rated inadequate by 37 companies. The interview, with these companies show this is due to the limited capacity and funds of CAA and CADs.

Monitoring of SWC includes daily inspection of service areas and container sites; issuing warning letters, and terminating contracts for

Indicators	Agree					Disagree				
	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa
<i>Tariff Setting</i>										
CAA and CADs set unit prices and user fees alone	20	4	0	5	5	0	0	6	0	0
SWC services subsidized by CAA and CADs	0	0	0	0	0	20	4	6	5	5
<i>Tariff Level</i>										
Unit prices for SWC service are low and do not cover cost	20	0	6	5	5	0	4	0	0	0

Table 4: Companies' views on regulation of unit price and user charges.

Service charge and unit price	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa
Amount	CAA pays 47 ETB or 2.22 USD/m <sup>3</sup> for private companies. 1500ETB or 71USD per month for MSEs	CAD pays 27 ETB or 1.27 USD/m <sup>3</sup> per month. 1500ETB or 71USD per month for MSEs	Private companies and MSEs collect service charge of 40 ETB or 1.8USD/hh/month from customers in the rich neighborhood while 14 ETB or 0.66USD/hh/month from the rest	CAD offers equal pay to the private companies emerged from MSEs /1500ETB or 71USD and lump sum of 324850 ETB or 15395 USD for private company	CAD pays 25 ETB or 1.18 USD/hh/month for private companies. 1500ETB or 71USD for SMEs

Table 5: Service charges and collection fee (unit price) and cost recovery.

poor performance. Service quality is also monitored through residents' complaints. Service quality is a concern in a contractual arrangement. In this regard, the FGD result reveals that the supervision and monitoring is better in Mekelle than in the other cities. The private companies provide monthly reports to the CAD. The interview with CAD officials in Mekele shows that there are service quality monitoring and supervision. A company manager in Mekelle said, "Inspection on service delivery is carried out by CAD twice per month". We have also observed drivers putting their signatures on the residents' log books during waste collection.

CAD officials in Mekelle mentioned that any private company which wants to terminate its contract should inform the CAD two months before. Moreover, private companies which breach a contract for the first time will receive a warning letter from CAD, whereas a second breaching will result in a fine of 3,000 ETB, and a reduction of 20% of its monthly payment. Worst, a third breaching will terminate the contract.

From the FGD in the other four cities, we have noticed that regular monitoring of quality of service was poor because of lack commitment and inadequate capacity of the CAA and CADs. 34 of the respondents said that CAA and CADs do not adequately enforce the sanctions indicated in the contract. Oduro-Kwarting [12] remarks an experience in Ghana where the municipality assigns the responsibility for monitoring the performance of service providers by private firms. Provider shall co-operate fully with the monitor. This means allowing the firm to have access at all times; to inspect work being carried out under the agreement; to inspect all records and documents maintained by the service provider; and to inspect the service provider's vehicles, plant, stocks of spare parts and workshop facilities. They shall submit monthly reports in an acceptable format to the regulating firm. The reports should include changes in the registers of those receiving service; summaries of waste collections; complaints received and remedial actions taken, and changes in staffing and summaries of vehicle performance and down time. Moreover, they shall attend

monthly meetings at the request of the regulator firm where operational and other issues of mutual interest may be discussed.

### CAA and CAD's adherence to contract obligations

CAA and CADs are obliged to promulgate by-laws to assist the private companies in their service, conduct public education regularly, and pay companies according to the specifications in the contract. The companies were asked about their views on CAA and CADs' adherence to contract obligations and the result is summarized in Table 7.

26 companies agree that CAD provides designated and accessible disposal sites. The researcher observed the landfills which are called Koshe in Addis Ababa, Adi Kolem in Mekelle, Dispoara in Hawasa, Sebatabit in Bahir Dar and Torah in Adama. 30 companies' managers admit that CAA and CADs do not provide designated and accessible container and sanitary sites. Disposal sites in the five cities are difficult to drive through due to the muddy nature of the sites and because companies dump waste after the gate of the sites

The newly constructed engineered landfill cost millions of ETB in outskirts of Addis Ababa, Oromiya region faced a problem from the local people, and temporally quitted giving service. The local people complain that the waste is detrimental to their health and land value.

All respondents said that the CAA and CADs promulgate by-laws to assist companies in their service. All five cities have by-laws to assist the companies in the delivery of their services. It is found that CAA and CADs as a legal entity have powers conferred on them by the local government act proclamation 513/to promulgate by laws to govern and regulate sanitation through public participation. The by-laws are adopted from the federal laws to regulate solid waste and sanitation service. These by-laws are to be adhered by the companies and residents to ensure good sanitation practices. The FGD result shows these by-laws do not promote effective SWC, in view of the rampant indiscriminate dumping of solid waste.

Regulation indicators	Adequate					Inadequate				
	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa
Monitoring of companies service quality and compliance to regulations and standards set in the contracts.	2	4	2	0	0	18	0	4	0	0
Monitoring of quantity of waste collected and output of company.	20	4	0	5	5	0	0	6	0	0
Contract management and supervision of the private sector by the CAA and CADs	1	1	1	0	0	19	3	5	5	5
CAA and CADs's enforce sanctions in the contracts signed with the companies	2	4	0	0	0	18	0	6	5	5

Note: Filed survey result, 2016

Table 6: Companies' views on regulation of quality of service.

Indicators	Agree					Disagree				
	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa
Provides designated and accessible disposal site	12	0	4	5	5	8	4	2	0	0
Provides designated and accessible container/sanitary sites	4	2	2	1	1	16	2	4	4	4
Promulgates by-laws to assist companies in their service.	20	4	6	5	5	0	0	0	0	0
Conducts public education regularly	20	2	2	2	3	0	2	4	3	2
Pays companies within 45 working days after date of claim	12	0	*	0	0	8	4	*	5	5
Pays interest charges if payment delayed beyond 3 months.	0	0	*	0	0	20	4	*	5	5

Note: \*Payment is directly from customers

Table 7: CAA and CAD's adherence to contract obligations.



CAA and CADs are obliged to conduct public education regularly on sound environmental practices. Although 29 out of the 40 companies agree with the presence of public education, they said that it is not implemented regularly. As a result, the attitude of the people is not as it should be. From the interview with companies, we noticed that the attitude of the people is even negative towards waste collection. A company manager said, "Let alone sorting waste, they are careless even to set out waste". Another manager added that their doors are often found closed during collection time.

According to the company managers part of the contract is not adhered. 22 company managers said CAA and CADs do not pay within 45 working days after date of claim. They come across a delay of to three months. For them, a delay for payment has an immense impact on their operations. A company manager in Mekelle mentioned that last time the companies were forced to stop giving service for six days because of the three months delay in payment, this has accentuate occasional interruptions, and even a total halt of service delivery for three days which caused some filthy corner of the city. In addition to this, all company managers in the five cities, except in Adama where companies collect service payment directly from customers on time, said that CAA and CADs do not pay interest charges for payments delayed.

CAA and CADs apply enforcement of by-laws and contract rules on companies. On this issue, the views of the company managers are presented in the Table 8. They do have differing views as 34 of them disagree the by-laws were enforced; 37 of them also disagree that the fines for defaulting the by-laws were not punitive enough; 38 of them assert that the monitoring of compliance was not effectively done, and 35 of the companies said the environmental health standards and sanitary regulations were not strictly observed and enforced.

The document review of the Environmental Protection Agency (EPA) reveals that there exists fundamental principles for the by-laws. The by-laws have the principles: (a) Cities have the relevant, responsibility to ensure that all waste generated within their jurisdiction is collected, transported treated, disposed of or recycled in accordance with the by-laws and (b) Such collection, transportation, treatment, disposal or recycling takes account of the waste management hierarchy set out in the bylaws of the subsections.

The underlying principles of these By-laws is to establish a waste management hierarchy in the following order of priority (a) waste avoidance, waste minimization, and waste reduction; (b) reuse; (c) recycling, reprocessing and treatment, and (d) disposal. Moreover, the main objectives of the By-laws is to ensure that waste is avoided, or at least minimised, re-used, recycled, recovered and disposed of in an environmentally sound manner. Even though the principles are written in the document, they are not properly implemented by CAA and CADs as our interview with the officials confirmed. One of the manifestations of this is absence of sanctioning offenders or residents

when they disobey the by-laws.

Concerning the violation of contractual agreement, there are measures to be taken. In the city Adama, the dispute between the companies with CADs is referred to the court. This may have positive impact on SWC investment since it builds the confidence of both parties. Fernandez [16] suggest that successful contractual relationships need to be flexible and in a cooperative manner. On the other hand, Scott [17] remarks the requirement for litigation to enforce criminal or administrative rules on regulates creates costs, delay and frequently a degree of uncertainty both for regulator and regulate.

### Companies contractual obligations

Companies' contractual obligations include achievement of daily collection target; the use of professional and technical personnel in service delivery, and ensuring the container sites are free of litter. Also companies need to ensure the collection crew wears protective clothes every time when carrying out SWC services. Companies should also cover all waste containers during transporting.

From the 40 companies, 31 said they achieve their daily targets. However, 9 companies said they were sometimes unable to meet the daily target due to vehicle breakdowns and lack of funds for regular maintenance. As it is shown in the Table 9, all the companies use technical and professional personnel in the discharge of their duties. However, the supervisors and managers of some of the companies are low-qualified. The data in the Table 10 shows companies human resources and their qualifications.

Table 10 shows all companies do not have managing director. 23 of the 40 companies said they run their company with employed managers/administrators. However, in the rest 17 companies the owners themselves are the managers. Out of the 40 managers, only 15 managers have qualifications above Diploma. The relative competence of managers depends on the level of qualifications, number of years of experience and lengths of managerial experience. From the survey it was found that, 22 private companies have supervisors. Of whom, four are above Diploma and the rest are below that. In general, only 13 companies have accountants. Only five of them are above Diploma. From the 40 companies, only three companies have Workshop Staff (Mechanics), two of them are above Diploma. 11 companies have sanitary expert in which seven are Diploma. All private companies have cashers. From these, eight are qualified above Diploma. 11 companies have purchasers. Among these, eight are Diploma. Only seven companies have auditors with two of them above Diploma. This suggests that there is a shortage of qualified professional and technical personnel in most of the companies. This renders to limited capacity of companies to execute effective SWC services. Lusthaus et al. [15] points out that the human resources of an organization have influence on the organizations' performance. The measures of operation management capacity include both the technical and

Indicators	Agree					Disagree					Cannot tell	
	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa		
The by-laws of the CAA and CADs and national laws on environmental sanitation are enforced.	3	0	3	0	0	15	4	3	5	5		2
The fine for defaulting by-laws is punitive enough	0	0	3	0	0	20	4	3	5	5		
The monitoring of compliance to solid waste service standards set in the contracts is done effectively.	0	2	0	0	0	20	2	6	5	5		
The environmental health standards and sanitary regulations are strictly observed and enforced	2	1	2	0	0	18	3	4	5	5		

Table 8: Companies views on enforcement of legislation

Indicator	Agree					Disagree				
	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa
Company achieves daily collection target in the contract	17	4	*4	3	3	3	0	2	2	2
Company's use professional and technical personnel required	20	4	6	5	5	0	0	0	0	0
Company cover waste containers during transporting	18	4	4	4	4	2	0	2	1	1
Company collection crew use protective clothing	20	4	6	5	5	0	0	0	0	0
Company keeps container site free of litters and clean	12	4	3	3	3	6	0	3	2	2

Note: \*Daily collection agreements made with customers

Table 9: Companies' views on their adherence to obligations in the contracts.

Posts Held	Companies' Human Resources & Qualifications		
	Number of Companies	Diploma & Above	Below Diploma
Managing Directors	0	-	-
Managers/Administrator	*40	15	25
Engineers	0	-	-
Operation Supervisors	22	4	18
Accountant	13	5	8
Workshop Staff (Mechanics)	3	2	1
Sanitary Expert	11	7	4
Cashier	40	8	32
Purchaser	11	4	7
Auditor	7	2	5

Table 10: The companies' human resources and qualifications.

managerial quality of employees [15].

From the total companies, 36 state that they cover waste containers during transporting. Different types of vehicles are observed serving for SWC. The FGD shows compactor trucks are used only in Addis Ababa. Only in some of the other cities, there are some vehicles which have lids to cover waste containers. Waste littering from vehicles during transporting was observed in all the studied cities.

All private company managers confirm that their crews use protective clothes; for they provide them with gloves, safety headgear, safety foot wear, safety eye wear, overall and ID badge for workers. It was evident our personal observation with some private companies that they do so. However, our observation in Addis Ababa, Mekelle and Bahir Dar city, disclosed that some crew members in some private companies were not wearing safety clothes during their operations. In fact, some of them put a piece of cloth on their face for the purpose. Consequently, it is likely they become vulnerable to any form of infection from waste handling.

Although companies are obliged to keep the container sites free of litter and clean, only 27 agree to do so. A mismatch was observed between the responses of the company managers and existing fact on the ground since there were litters at the collection points during our observation. In all the study cities, there exists a health risk due to the delay of removing waste littering around the containers and households on time. It is worse, especially within communities where waste generating rates are high with low collection frequencies [12].

### Regulatory capacity and autonomy of CAA and CADs

The regulatory capacity and autonomy of the CAA and CADs to regulate the private sector activities was assessed using four indicators as shown in Table 11. Most of the companies perceive the regulatory

capacity of the CAA and CADs to be inadequate. Also, the financial autonomy was perceived to be low. The main challenge facing the CAA and CADs in the five cities, except in Adama where there is direct agreement with customers, is the lack of decision making power over financial matters. All financial matters are decided by the city officials. According to FGD with CAA and CADs official, city officials have the power to shift the budget of SWC to any other purpose. This could be one reason for low payment to private companies. With the growing population in the cities and its consequence in increasing waste generation, a failure to use the whole budget will aggravate the problem of SWC. Not being independent from city officials, CAA and CADs find it difficult to manage SWC service. Laurent [21] points out a lack of clear responsibility lines between the various stakeholders affect service delivery.

In order to evaluate the human resource capacity of CAA and CADs, human resource data of each city have been reviewed. In this regard, CAA and CADs are all not well-staffed with the right personnel. Relatively, there are qualified personnel at the management level. The manager and the vice manager are MA holders in Addis Ababa, but MA and BA holders in the remaining cities. The national Business Process Reengineering (BPR) demands qualified human resource. Environmentalists and urban managers should take the post of the managers and vice managers. However, these posts are taken by people with different qualifications. The salary level of employees could be considered as an indicator for the capacity of the regulatory. Based on the BPR guide, uniform human resource requirement and salary specification are set in the payment system of each city. As operational measure for the quality of employees, average salaries are used as proxy [31]. Lusthaus [15] points out that the human resources of an organization affect or shapes the organization's performance that the quality of the workforce stems from having the staff attending lifelong

Regulatory capacity and autonomy indicators	Not adequate					Adequate				
	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa	Addis Ababa	Mekelle	Adama	Bahir Dar	Hawasa
<b>Regulatory Capacity of CAA and CADs</b>										
Accountability of the CAA and CADs to local administration and environmental office	10	1	6	5	5	10	3	0	0	0
Independence of the CAA and CADs in regulating the company's services	20	2	4	4	5	0	2	2	1	1
Resources and capacity of CAA and CADs to monitor service quality and non compliance of service delivery	20	2	4	5	5	0	2	2	0	0
Frequency of monitoring companies' compliance to service quality and standards	20	2	6	5	5	0	2	0	0	0
<b>Financial Autonomy of Assemblies</b>										
Autonomy to set level of user charges	20	4	*	5	5	0	0	*	0	0
Autonomy to set level of price per cubic meter for service contract	20	4	*	5	5	0	0	*	0	0
Autonomy of the CAA and CADs (level of budget for solid waste)	0	0	*	0	0	20	4	*	5	5
Autonomy to implement national sanitation policy on cost recovery	20	4	6	5	5	0	0	0	0	0
<b>Managerial Autonomy of Assemblies</b>										
Autonomy of the CAA and CADs to terminate contract of nonperforming company	20	0	6	5	5	0	4	0	0	0
Autonomy to enforce by-laws and prosecute free riders	20	0	6	5	5	0	4	0	0	0

**Note:** \*in Admama CAD is not involved in service payment, private companies make agreement directly with customers, therefore the 6 private companies in Adama did not respond.

From the total companies, 27 said that the accountability of the CAA and CADs to local administration and environmental office is inadequate. Also, 34 of the companies said the independence of the CAA and CADs in regulating the companies' services is inadequate. 36 of them said the resources and capacity of CAA and CADs to monitor service quality and noncompliance of service delivery is also inadequate. Another 38 said the frequency of monitoring companies' compliance to service quality and standards is inadequate.

All company managers, except in Adama where private companies and customers together set level of service charge, said the autonomy of CAA and CAD to set level of user charges and the autonomy to set level of price per cubic meter for service contract are both inadequate. However, still with the exception of Adama other cities confirmed that the level of budget for solid waste is adequate since the residents pay sufficient money for sanitation purpose through water bills.

All companies also asserted that the autonomy of CAA and CADs to implement national sanitation policy on cost recovery is inadequate. Except in Mekelle, all companies said that the autonomy of the CAA and CADs to terminate contract of nonperforming company is inadequate. Similarly, except in Mekelle, they confirmed that the autonomy of CAA and CADs to enforce by-laws and prosecute free riders is inadequate.

**Table 11:** Regulatory capacity and autonomy of CAA and CADs.

learning and training sessions. However, the FGD with CAA and CADs shows that there are only short-term training programmes, and only a rare opportunity to extend further education at higher level.

Moreover, there is turnover of managers and experts as the FGD with CAA and CAD officials shows. Moreover, reshuffling is also common in the CAA and CAD managerial posts which might impede proper execution based on a given plan.

The capacity of the CAA and CADs to facilitate, regulate and monitor SWC is hampered by a number of factors. According to one of the CAA official, the main constraints of solid waste collection are weak capacity of CAA and lack of political will. The experts in the CAA advise politicians in the city administration on what to do, but the politicians decline to accept their advice. This indicates the politicians' lack of commitment towards achieving sustainable SWM.

In relation to the remark above, Fernandez [16] suggests that successful contractual relationships are not discrete, arms-length transactions that are programmed and controlled but rather dynamic relationships that are managed in a flexible and cooperative manner. In Ethiopian cities, there is power relation imbalance as CAA and CADs

have more control over the private companies. CAA and CADs are, in turn, directly under the control of city officials (politicians) which determines the fate of sustainable SWM.

## Conclusion

This study focuses on the regulation of the private sector involvement in SWC in five cities in Ethiopia. The regulation issues assessed are mainly the autonomy of CAA and CADs; scope of the contracts and specifications; regulation of user charges; monitoring of service quality; access to information; monitoring of companies compliance with regulations and supervision; and adherence to the regulations in the contracts signed with the companies.

The bottlenecks of the contract, legislation, and financial arrangements for involving private companies in SWC were explored and the main findings and implications were identified and presented based on priority of importance. Ethiopian cities adopted and designed their contractual arrangement for PSI in SWC based on the strategic plan of the Ministry of Urban Development (MUD) for SWM. The plan conceived the three important interrelated aspects of financial (profit), environmental (planet), and social (people) sustainability through PSI in SWM [24]. However, the implementation of the

contractual agreements has many problems. This is mainly due to first, the non-autonomous status of CAA and CADs. Second, the low executive capacity of such institutions. CAA and CAD are non-autonomous to set level of user charges and level of price per cubic meter for service contract. Companies are not involved when setting price for SWC service. The mandate is taken by city officials. Fixing low price per meter cube of waste contributes to the failure of cost recovery. This suppresses the interest of private companies to make profit from SWC service which, in turn, affects the public interest to get quality service. Companies find it challenging to stay in SWC business. The current contractual obligation enforcement is not workable from the perspective of the positive theories of regulation since it fails to align the operator's interest with the government's interest [18]. Moreover, the procedure of CAA and CADs to permit private companies to tender service or/and renew contracts is not through competitive bidding. Favouring only some companies to be engaged in SWC service, to renew their contract and to get better service zone are attributed to regulatory capture by government interest groups. This practice not only makes the system vulnerable to corruption but also inhibits potential effective providers from involving in SWC. This induces ineffective and low-quality SWC services.

Regarding access to information, CAA and CADs does not have right information about performance targets, number of trips made, revenue and cost information. Such lack of information constrained regulatory agencies ability to regulate. If an agency has no access to the cost models of a particular industry, it may be difficult to set appropriately either fair or stringent price control measures. It is also sticky for future strategic plan concerning PSI and SWM in general.

The obligations of CAA and CADs and private companies in the contracts are not strictly adhered in payment for service, lack of daily inspection of service areas and container sites; failure to issue warning letters, and contracts termination for poor performance are weaknesses of CAA and CADs. Companies fail to clean container sites free from litters. CAA and CADs and private companies are unable to conduct regular public education on sound environmental practices. There is no system to receive residents' complaints. Practically, the enforcement of by-laws and sanctions of companies for non-compliance with terms and conditions in the contracts are left undone. Inadequate physical and human capacity of CAA and CADs for planning and monitoring of quality of SWC service are the causes for the failure. Besides, the lack of commitment of CAA and CAD workers for monitoring and inspection of SWC identified as a problem. Further research is needed to find out why there is a poor commitment of CAA and CADs towards regulatory enforcement, and low environmental awareness.

Regulation of PSI for sustainable SWC in Ethiopian cities is not well-practiced. We felt that the term "sustainable waste management" is used as an alibi rather than as guidance for strong action in Ethiopian cities. Unfortunately, its effect is already taking its toll on us. Consequently, the Ethiopian government is better to secure unified, workable contractual arrangement for SWM and ensure its enforcement. Absence of monitoring of CADs on SWC service results negative externality in Ethiopian cities. Companies show interest to provide service only in the areas where the user charges were high. This is because of the better payment from the people in the rich neighbourhoods. The poor neighbourhoods are overlooked. Fearing such exclusion, municipalities in Ghana appointed companies in the areas where the user charges were low which led to low profit and inadequate private finance [32]. The abandoning of the poor neighbourhood could have been remediated by applying Pay As You

Through (PAYT) principle. Despite its implementation challenges, PAYT has been proven to have potential for cost recovery in low income communities in developing countries. The PAYT is even practiced in USA and parts of Europe and it is now a mechanism that promotes solid waste source reduction, recycling, and diversion from landfill [33].

Moreover, municipalities, city officials and different stakeholders in Ethiopian cities need a clear division of roles, responsibilities and competence. Government should support practical implementation of SWM, i.e., building of landfills, and provision of public education. National project of evacuation of wastes from illegal dumpsites into newly constructed sanitary landfills all over Ethiopia is strongly recommended for better healthy environment. After all, CAA and CADs need to be capacitated in terms of their human resource and financial capacity. Moreover, they need to be autonomous to decide over environmental issues in each city.

### Acknowledgements

We would like to thank Professor Reyer Gerlagh from Tilburg University for his constructive comments. This work was supported by the Netherlands organization for international cooperation in higher education (Nuffic), under grant no. NICHE/ETH/020, and coordinated by Tilburg University.

### References

1. Guimarães B, Simões P, Marques RC (2010) Does performance evaluation help public managers? A Balanced Scorecard approach in urban waste services. *J Environ Manage* 91: 2632-2638.
2. Henry R, Yongsheng Z, Jun D (2005) Municipal solid waste management challenges in developing countries, Kenyan case study. *Waste Manag* 26: 92-100.
3. Kaseva M, Stephen M (2003) Appraisal of solid waste collection following private sector involvement in Dar es Salaam City, Tanzania. *Habitat Int* 29: 353-366.
4. Kassim SM, Ali M (2006) Solid waste collection by the private sector: Households' perspective—Findings from a study in Dar es Salaam city, Tanzania. *Habitat Int* 30: 769-780.
5. Obirih-Opareh N, Post J (2002) Quality assessment of public and private modes of solid waste collection in Accra, Ghana. *Habitat Int* 26: 95-112.
6. Haylamicheal ID, Desalegne SA (2012) A review of legal framework applicable for the management of healthcare waste and current management practices in Ethiopia. *Waste Manag Res* 30: 607-618.
7. Awortwi N (2003) Getting the fundamentals wrong: Governance of multiple modalities of basic services delivery in three Ghanaian cities.
8. Koppenjan JF, Enserink B (2009) Public-private partnerships in urban infrastructures: reconciling private sector participation and sustainability. *Public Adm Rev* 69: 284-296.
9. Katusiimeh MW, Mol AP, Burger K (2012) The operations and effectiveness of public and private provision of solid waste collection services in Kampala. *Habitat Int* 36: 247-252.
10. Tilaye M, van Dijk MP (2014) Private sector participation in solid waste collection in Addis Ababa (Ethiopia) by involving micro-enterprises. *Waste Manag Res* 32: 79-87.
11. Ballance T, Taylor A (2005) Competition and economic regulation in water: The future of European water industry. IWA Publishing, London, UK.
12. Oduro-Kwarteng S (2011) Private sector involvement in urban solid waste collection. Performance, capacity and regulations in five cities in Ghana. Erasmus University Rotterdam, CRC Press/Balkema, Netherlands.
13. Gilardi F (2002) Policy credibility and delegation to independent regulatory agencies: A comparative empirical analysis. *J Eur Public Policy* 9: 873-893.
14. Cointreau-Levine S, Coad A (2000) Private sector participation in municipal solid waste management.
15. Lusthaus C, Adrien MH, Anderson G, Carden F, Montalván GP (2002)

- Organizational assessment: A framework for improving performance, IDRC.
16. Fernandez S (2005) Accounting for performance in contracting for services: Are successful contractual relationships controlled or managed. The Public Management Research Conference, University of Southern California, Los Angeles, California.
17. Scott C (2004) Regulation in the age of governance: The rise of the post regulatory state. Edward Elgar Publishing, UK.
18. Jamison MA, Berg B (2008) Annotated reading list for a body of knowledge on infrastructure regulation.
19. Oduro-Kwarteng S, van Dijk MP (2013) The effect of increased private sector involvement in solid waste collection in five cities in Ghana. *Waste Manag Res* 31: 81-92.
20. Wu I (2005) Traits of an independent communications regulator: A search for indicators with teaching module on ethics and corruption.
21. Luchetta G (2009) A composite indicator of regulatory capacity.
22. Vickers J, Yarrow G (1988) Regulation of privatised firms in Britain. *Eur Econ Rev* 32: 465-472.
23. Dorvil L (2007) Private sector participation in integrated sustainable solid waste management in low-and middle income countries. University of St. Gallen, Switzerland.
24. van de Klundert A, Anschütz J (2001) Integrated sustainable waste management - the Concept. Gouda, The Netherlands.
25. Wilson D, Whiteman A, Tormin A (2001) Strategic planning guide for municipal solid waste management.
26. FDRE (2002) Federal democratic republic of Ethiopia, environmental pollution control proclamation No. 300/2002. Addis Ababa, Ethiopia.
27. FDRE (2002) Federal democratic republic of Ethiopia, environmental impact assessment proclamation No. 299/2002. Addis Ababa, Ethiopia.
28. Lingard H (2001) Improving solid waste reduction and recycling performance using goal setting and feedback. *Constr Managet Econ* 19: 809-817.
29. Hardcastle C, Boothroyd K (2003) Risks overview in public-private partnership. *Public-private partnerships: managing risks and opportunities*.
30. Bjerkli C (2013) Governance on the ground: A study of solid waste management in Addis Ababa, Ethiopia. *Int J Urban Reg Res* 37: 1273-1287.
31. Nachum L (1999) The origins of the international competitiveness of firms: impact of location and ownership in professional services industries. ITC, Ginebra (Suiza).
32. FDRE (2007) Federal democratic republic of Ethiopia, solid waste management proclamation no. 513/2007. Addis Ababa, Ethiopia.
33. Skumatz LA, Green K (2002) Variable-rate Or" pay-as-you-throw" waste management: Answers to frequently asked questions. Reason Foundation.