Master thesis

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The cycle of plastic waste: An analysis on the informal plastic recovery system in Addis Ababa, Ethiopia

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Abbreviations

CSA	Central Statistical Authority of Ethiopia
ENDA	Environmental Developing Action in the Third World
EPA	Environmental Protection Authority
EPRDF	Ethiopian Peoples Revolutionary Democratic Forces
FAO	Food and Agriculture Organization of the United Nations
GTZ	Deutsche Gesellschaft fûr Technische Zusammenarbeit
MFA	Material Flow Accounting
MSE	Micro and Small Enterprise
MSWM	Municipal Solid Waste Management
NTNU	Norwegian University of Science and Technology
NUFU	Norwegian Council for Higher Education's Programme for Development Research and Education
NUPI	National Urban Planning Institute
OSCALDC	Office of Special Coordinator for Africa and the Least Developed Countries
SBPDA	Sanitation, Beautification and Park Development Agency
SWM	Solid Waste Management
SWMS	Solid Waste Management System
UMAS	Urban management advisory service

Abstract

This study deals with the informal plastic recovery system in Addis Ababa. The purpose of this thesis is to explore the organization and the actors involved in the system. Further, the thesis attempts to estimate the size of the informal sector, the amount of materials collected, the quality of the materials, and the economic aspects of the activities. This is followed by a discussion on the strengths and the barriers that the system faces today. In order to gain a holistic overview of the plastic recovery system, the formal solid waste management system and the private sector involvement in solid waste are described since they form an integral part of the system.

Structuration theory and an actor-oriented approach have been used, based on the interaction between the structures and the actors within the system, in order to explain why actors within the system act in the way that they do and why the system has developed in the way it has. Since this thesis is the first study on the informal plastic recovery system in Addis Ababa, the data used is mainly primary data collected during the fieldwork. Both qualitative and quantitative methodologies were used to gain a broader understanding of the system and the activities involved, and to increase the validity of the data.

This study has shown that thousands of individuals in Addis Ababa are dependent on the recovery of plastic materials in order to make a living. Moreover, the activities have showed to be economically profitable and to play an important role in solid waste management. It is argued that a lack of a formal system for the recovery of plastic materials has made it possible for the informal sector to fill the gap that the government does not fill. Further, the government's lack of awareness of the informal sector has made it possible for the recovery system to develop without interference. The governmental ignorance of the informal plastic recovery system as well as civil society's lack of trust and creditability in the government has proven to be one of the main difficulties confronting the plastic recovery system. Because of this, every attempt from the governmental side to implement new strategies within the system seems to fail, since they do not consider or consult the decisions with actors involved at the local level. The thesis highlights that it is essential that the government starts to recognize the informal sector and tries to gain their trust and credibility in order to improve the overall solid waste management system in Addis Ababa.

Acknowledgements

This study on solid waste management and the plastic recovery system in Addis Ababa, Ethiopia, July 2005, is part of my Master's Degree in Geography, at the Norwegian University of Science and Technology (NTNU). The reason for choosing this topic and Addis Ababa as study area was my interest in gaining an insight into solid waste management and recovery systems in a Third World city. Further, I wanted to be in the field in order to gain first-hand knowledge of the situation and to collect the data myself. This gave me the possibility to use my existing knowledge concerning waste and to understand the relation between theory and practice. The work has been interesting and informative in several ways. It has made me become more independent concerning my approach to my work, given me a considerable experience in terms of conducting myself in various situations, and it has made it possible for me to have a better understanding of the connection between theory and practice.

Many people have helped and been involved in different ways to greater or lesser extent. I am deeply grateful to my supervisor Axel Baudouin for the support and the direction he has given me throughout the work on this paper, and especially for accompanying me in Ethiopia for several weeks during my fieldwork in order to give advice on some of the challenges that I faced. Tesfai Hudsum, the manager of a waste enterprise, deserves credit for helping me to locate some of the micro and small enterprises operating on solid waste in Addis Ababa, for helping to find workers who were willing to be interviewed, and spending a considerable amount of time discussing various aspects of solid waste management. All of the employees at Green View waste enterprise, and especially the manager Addis Bogale, contributed much to this research. Their open-door attitude allowed me to gain valuable information about their activities. Moreover, participating in their meetings and their work gave me a deeper understanding about their main problems and their opinions on the existing practices and the situation concerning the collection of solid waste in Addis Ababa. Also, thanks are due to Engdawork Kibret and Daniel, two local assistants, who helped me greatly during the data collection. They showed me the city, drove me to all of my meetings, and assisted with the questionnaires and in translating some of my recorded interviews. Without them, I would not been able to carry out my data collection due to the limitations of time, local knowledge and language barriers.

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Camilla Louise Bjerkli

CONTENTS

LIST OF TABLE

LIST OF FIGURES

LIST OF BOXES

1. Introduction

The management of solid waste is a growing problem in many urban areas in Africa today. One of the reasons for this is that during the recent decades urban areas in Africa have experienced a rapid urbanization due to rapid population growth and high rates of migration from rural areas. To give an indication of the situation, the urban population of the world is expected to double to more than five billion people in the next 35 years, with 90 percent of the growth taking place in developing countries (Medina 2002).

Most cities in Africa with fast expansion of urban areas are characterized by lack of resources, institutional organization and the capacity to provide basic infrastructure, which in turn has caused increased problems concerning the management of solid waste. Moreover, the lack of proper land use planning has resulted in the creation of informal settlements, with narrow streets that make it difficult for collection trucks to reach many areas of the cities. This leaves a large portion of the population in the cities without any access to solid waste services. As a result, people dispose of their waste illegally in open fields, rivers, streets, and ditches. The municipalities in many African cities clearly do not have the capacity to manage the increasing volumes of waste. All of the above-mentioned factors contribute to that only 50 to 60 percent of the waste generated in urban areas in Africa is collected, while 40 to 50 percent of the waste remains uncollected in the streets. Containers overflow with garbage and rain cause streets to flood as a result of the uncollected waste clogging the drainage channels (Davas & Carole 1993). The most common disposal method for solid waste in Africa is open landfills, with no environmental control. Many of these landfills are almost full and in most cases the environmental conditions are very poor (Yirgalem Mahiteme 2001).

The insufficient handling of solid waste represents a source of water, land and air pollution affecting the urban environment and the health of the people living in the cities, and is one of the most critical environmental problems that cities in Africa are facing today. The current capacity of most solid waste management systems in Africa is inadequate and too slow to meet the increasing demand of the solid waste generated (Tadesse Kuma 2004).

The efforts by the municipalities in African countries to solve solid waste problems have mainly focused on expensive ‘end of pipe’ solutions, involving the collection and disposal of solid waste. These solutions usually require high level technology which is possible in

industrial countries but is usually not possible in developing countries. In order to find alternative ways of dealing with the increasing solid waste problem in urban areas in Africa, the focus has to shift. An environmentally sound solid waste management (SWM) should go beyond the traditional management of solid waste in order to address the root of the problem. Some of the recommendations related to a more sustainable SWM are the promotion of waste recycling and reuse. The presence of a formal recovery system in urban areas of Africa is hard to find, nevertheless such systems usually exist in highly organized waste recovery systems within the informal sectors in most cities. These activities have the potential to contribute to the solution of solid waste management problems if the governmental authorities start to recognize the potential of the recovery activities carried out by the informal sector. In order to improved urban solid waste management in African cities, the municipalities should therefore focus more on the informal waste recovery activities, in combination with efforts to minimize waste generation. Reuse and recycling of solid waste are effective ways of reducing the amount of waste needed to be collected, transported and disposed by municipalities (Zerbock 2003).

1.1. Intention and goals

The intention of this study is to explore the existing plastic recovery system in Addis Ababa, and those actors involved. The goal is to assess the potential and obstacles facing the system today.

Original aim

When I started the research, my aim was to examine the topic by combining geography and industrial ecology. I wanted to apply an industrial ecology approach, from 'end of pipe' to prevention, by emphasizing reuse and recycling activities in order to improve solid waste management. In addition, I wanted to conduct material flow accounting (MFA) in order to quantify the amounts of plastic flows in Addis Ababa and to identify where there was need for improvement in the system. As research progressed, it became clear that data on many of the plastic flows did not exist at all, so it was difficult to carry out a meaningful MFA. In addition, I found that reuse and recycling were very common activities in Addis Ababa, and did not represent the main problem in an insufficient solid waste management. It was apparent that political and social factors were essential for understanding the inadequate management

of solid waste. For this reason, the industrial ecology approach has not been used in this research.

Description of solid waste management and plastic recovery system

This thesis describes the existing solid waste management system (SWMS) and the plastic recovery system in Addis Ababa, including the formal, the private and the informal sectors. The reason for including all of these sectors is that all are involved in the plastic recovery system to various extents. The focus is on the informal plastic recycling activities.

Identification and evaluation

In order to give an overview and a description of the existing plastic recovery system, I will identify the different actors, the quantity and quality of plastic materials collected, and the organization of the recycling activities that find place within the system. With this emphasis, I will evaluate the plastic recovery system with regard to the efficiency of the system.

Barriers and strengths

In order to understand the advantages of an already established system for reuse and recycling of plastic materials it is appropriate to look at different externalities and internalities affecting the system, in order to explain the strengths and the weaknesses concerning the existing plastic recovery system in Addis Ababa. Mapping and identifying the organization of material recovery, type of materials, amount of materials collected, and the different actors involved in the system provides an overview of the plastic recovery system in the city and enables those actors who have most influence on the system to be identified. This in turn gives information about where in the system there is the potential to increase efforts in order to improve current plastic recycling activities in Addis Ababa.

1.2. Scope of the study

The first part of this report focuses on the general municipal solid waste management and the actors involved in Addis Ababa. The main reason for this is to provide an overview of the overall solid waste management practice and situation in the city. Accordingly, the study area discussed in the first part of the report is therefore restricted to the administrative border of the city of Addis Ababa.

To develop a deeper understanding of the different actors and their activities regarding waste management and plastic recovery in the city, I had to choose a more restricted area in the city. The second part of the study therefore focusses on the different actors and activities concerning waste management and plastic recycling activities in Addis Ketema sub-city (see Figure 1). The main reason for choosing this area is that the wholesaling of different types of waste materials takes place in this sub-city, in the area known as Menalish Terra, located in *Kebele*[1] 3 (see Figure 1). Moreover, this is the area where one can find the biggest market in West Africa, and where the population density is very high compared to other areas in the city. This implies that the waste generation of both inorganic and organic materials in this area is also high compared with other areas in the city. According to the solid waste team leader in Addis Ketema, 27 percent of the total waste generation in the city is generated in Addis Ketema sub-city. The third reason for selecting this as a study area is that many plastic recycling industries are located there. Lastly, there are different areas where rich are poor people live, which afforded a good opportunity to integrate both the rich and the poor people's opinions and practices concerning solid waste management and plastic recycling in the city. Further, since *korales*[2] operate in most parts of the city, the surveys and interviews with the *korales* were conducted all over the city in order to secure a reliable representative sample.

[1] *Kebele:* The smallest administrative unit in Addis Ababa
[2] Local name for an itinerant junk buyer.

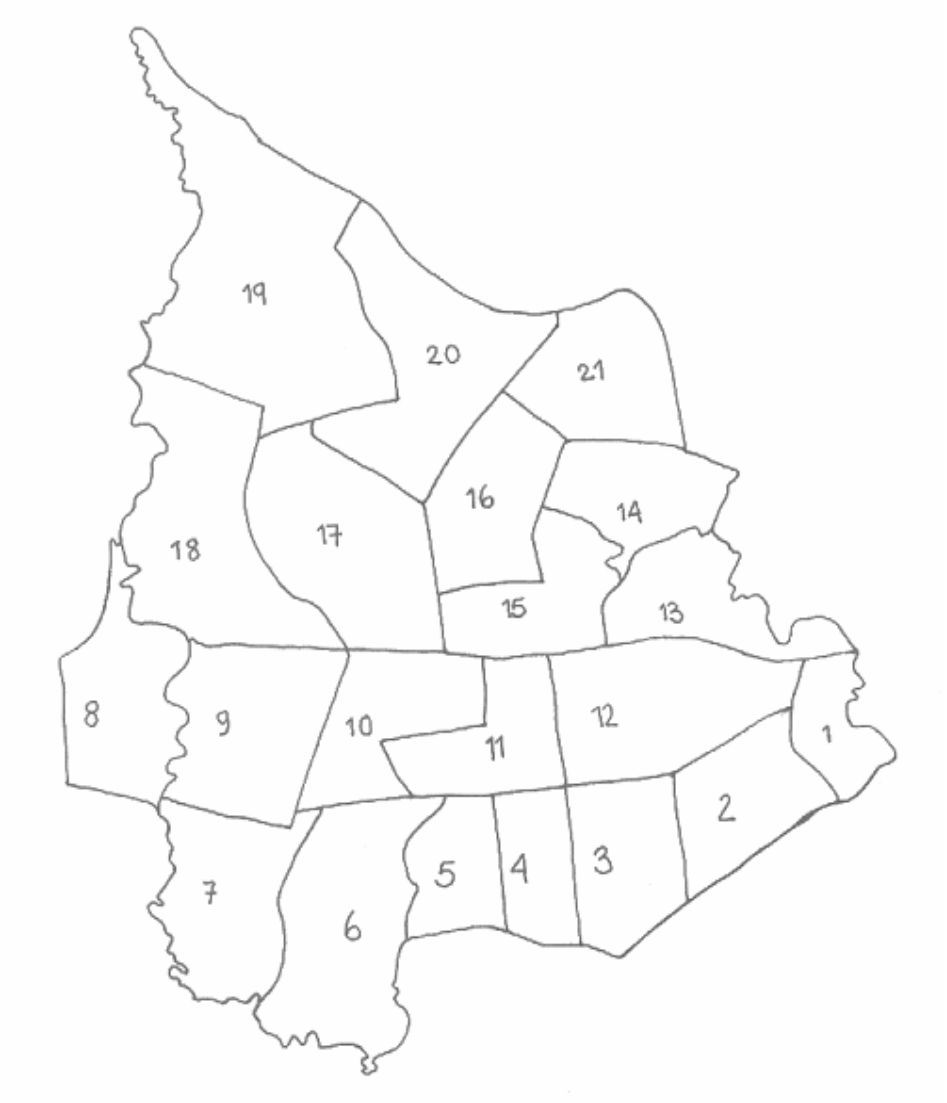

Figure 1: Map of Addis Ketema sub-city (Kebele 3: Menalish Terra, Kebele 6: households survey, Kebele 13: household survey and Kebele 15 household survey) (Source: Addis Ketema sub-city Solid Waste Management Department).

1.3. Research process and questions

This section addresses my research process and the questions that emerged during my fieldwork. The first step in the study was to obtain an overview of the current Municipal solid waste management system in Addis Ababa. Initially, my basic questions were aimed at investigating the organization and the capacity of the solid waste system in the city.

1. Review of the municipal solid waste management system:

- How much waste is generated in the city?
- How much waste is collected in the city?
- What are the components in the waste cycle?
- How is waste collected in the city?
- What type of waste disposal is used?
- Who are the main actors involved in the formal waste system?
- What are the major problems concerning the current solid waste management system in the city?

The fieldwork started by visiting several individuals involved in the municipal solid waste management in the city of Addis Ababa and Addis Ketema sub-city. In addition, several institutions were visited in order to obtain some secondary data on the topic. Further, observations were carried out during the day in order to identify the different collection activities preformed by individuals in both the formal and informal sectors. As research progressed, I found out that several micro and small enterprises (MSEs) were involved in the management of waste in the city. This led to further questions concerning the organization of the enterprises and their role in the management of solid waste and plastic recycling.

2. Micro and small enterprises in solid waste management:

- How are they organized?
- How many MSEs are operating in Addis Ketema sub-city?
- What kind of activities do they involve in concerning SWM?
- Are they involved in plastic recycling activities in the city?
- What are the major problems concerning their activities?

After reviewing the current practice of the formal SWM in Addis Ababa, I recognized that the refuse system provided basis access to different types of waste materials through organized collection, transportation and disposal. This recognition led to my third question concerning the organization and capacity of the plastic recovery system, and the different actors involved in the Plastic Waste Recovery in Addis Ababa.

3. The plastic recovery system:

- How is this system organized?
- How much plastic materials are being collected?
- Who are the actors collecting plastic materials for recovery?
- How many actors are involved in the system?
- Who is buying and using these plastic materials?
- In what way is this system financed?
- What are the major problems concerning this system?

As research progressed and I developed a better understanding of the solid waste situation and those actors involved in the city, I initiated meetings and interviews with several individuals in the formal sector and different actors in both the private and the informal sectors. In order to ensure as much comprehensive information as possible, I arranged meetings with people working for the municipality, non-governmental organizations, private enterprises, private industry, and informal enterprises and individuals. During these interviews and meetings I tried to keep in mind that their social, political, educational background and their age could affect their opinions and responses.

During the eight weeks of my fieldwork, I started to construct questionnaires for the *korales* and the household. I finally reached a point were I had obtained a fairly god overview of the SWMS and the actors involving in plastic recycling activities. During the last weeks of my fieldwork, several important questions arose concerning the link between the formal and the informal sectors and problems encountered by the actors involved in the plastic recovery system in the city.

4. Relationship between the formal and the informal sectors:

- Is there any connection between the formal and informal sector?
- What are the main problems facing the plastic recovery system?

1.4. Research on the field

In the last 20 years, an increasing number of SWM and recovery studies have been carried out in several cities in developing countries. One worth mentioning is *Urban Harvest: Recycling as a Peasant Industry in Northern Vietnam* by Michael R. DiGregorio (1994), which describes the municipal solid waste management in Hanoi and the informal and formal waste recovery system. Another researcher is Martin Medina, who has written several reports on recovery activities in developing countries, including informal recycling and collection of solid waste in developing countries (Medina 1997) and collecting recyclables in Metro Manila (Medina 1993).

With regard to studies carried out in Africa, several recovery studies have been conducted though the number are quite limited compared to those relating to other areas in the world. Nevertheless, it is worth mentioning the study by Kaseva & Gupta (1996) which deals with scavengers and recycling activities in Dar es Saalam in Tanzania.

In Addis Ababa, research concerning SWM and recovery activities has been limited. Some studies concerning solid waste management have been carried out, but when it comes to recovery activities taking place in the city, I was only able to find one report on the subject. *The cycle of waste in Addis Ababa* written by ENDA-Ethiopia[3] (1999) is the only research taking the recovery activities in the city into consideration and explores most of the materials recovered in Addis Ababa, although it is not comprehensive.

However, there are several municipal report mentioning recycling, such as *Waste Storage* written by Sanitation Beatification and Park Developing Authority (SBPDA 2004a), but this report only address the establishment of new recycling systems and does not address the existing recycling activities that take place in the city. In addition, the report *Solid Waste Management: Addis Ababa* by the National Urban Planning Institute (NUPI) & William Halcrow & Partners Ltd (1989) mentions a French technical cooperation programme that conducted a study on waste collection and recycling activities in 1985 and 1986, though I was not able to locate a copy of the latter report.

[3] Ethiopian branch of Environmental Development Action (ENDA) in the Third World.

In the early 1980s the Norwegian consulting firm Norconsult AS produced the first report about solid waste management in Addis Ababa (Norconsult 1982). It was a comprehensive study, covering almost all aspects of municipal solid waste management. Further, in the late 1980s, the International Development Agency under the World Bank carried out a study of solid waste management in Addis Ababa as part of an integrated urban rural development project (NUPI & William Halcrow and Partners Ltd 1989). The project was conducted by William Halcrow and Partners Ltd. (UK) and the National Urban Planning Institute of Ethiopia.

It is also worth mentioning that in recent years the SBPDA has published several reports concerning solid waste management in Addis Ababa, though they are all reproductions of the studies mentioned above.

1.5. Importance of the research

Cities in developing countries such as Addis Ababa face many challenges in the management of solid waste. Increased urbanization and population growth in Addis Ababa, combined with lack of resources to provide basic infrastructure and urban services, have led to a series of problems such as increased generation of waste, and inadequate collection, transport and disposal of solid waste. This has become a major threat to the urban environment and the health of the citizens in Addis Ababa, and indirectly to other cities in the Third World.

In addition, inorganic products such as plastic are relatively new phenomena in developing countries such as Ethiopia. However, the amount of plastic products has increased rapidly in Addis Ababa as well as in other cities in Africa during the last decade. Several plastic manufacturing factories have started to produce various plastic products such as water bottles, various household items, and thin plastic bags that all shops give free to their customers to carry their groceries. Most probably increasingly more consumer products made of plastic will enter the market due to the strong substitution effects plastic materials have compared to other materials, such as less energy consumption and low cost linked to the production. Today, no formal recovery system exists in the city and activities connected with plastic recovery are carried out by the informal sector. It is therefore important to explore the system, in order to be able to handle the increasing generation of plastic waste and to manage it in a sustainable way which benefits society as a whole.

There is also a lack of research and efforts concerning plastic recovery in Addis Ababa. The municipality efforts in Addis Ababa are mainly focusing on collection and disposal of solid waste, and they have not paid any attention to different recycling activities. Reuse and recycling activities can contribute to improve the solid waste management system and other aspects of both financial and social aspects to the society as a whole. To identify the recovery system and attempt to understand the organization and the different activities carried out in all levels of the plastic recovery system is a good start to improve the plastic recovery system in the city.

1.6. Organization and content of the report

This thesis consists of 10 chapters. In *Chapter 1* intention and goals, research process and questions, importance of the research and research on the field are outlined. *Chapter 2* provides the theoretical framework of the report and addresses structure theory, the actor-oriented approach, the concept of the informal sector, and a description of scavengers and the characteristics of recovery systems in developing countries. *Chapter 3* describes the methodology used to collect both primary and secondary data. Further, the chapter addresses some of the limitations of the report and the problems encountered during fieldwork. The chapter contains a short discussion on validity, reliability and ethical principles. *Chapter 4* gives background information on geography, population, migration, urbanization, and employment. It also gives a review of the political history and the current political situation in Addis Ababa. *Chapter 5* describes the current formal solid waste management system in Addis Ababa, while *Chapter 6* gives a description of the private sector involved in solid waste management in the city. In *Chapter 7*, a description on the informal plastic recovery system is provided. *Chapter 8* presents the results from the questionnaires and interviews conducted during the fieldwork. *Chapter 9* comprises the discussion, where I attempt to employ the theory described in Chapter 2 and my own results, in order to be able to answer the questions raised in Chapter 1. A summary of the findings and the conclusion is given in *Chapter 10*.

2. Theoretical framework

In order to develop a sound theoretical approach towards the informal plastic recovery system in Addis Ababa, I make use of both structuration and actor-oriented theory. Both of these theories are necessary in order to explain why the system has developed in the way it has and why actors act the way that they do. Structuration theory highlights the important structural changes resulting from the impact of external and internal forces. Moreover, all forms of internal or external structural changes impact the society and affect the lives of individuals or social groups, which makes the actors mediators for the structural changes that takes place in society. It is therefore unsatisfactory in theoretical terms to base an analysis on structures. A more dynamic approach is therefore needed in order to understand the central role the actors play in relation to social changes. Therefore, I make use of both actor perspective and structuration theory in order to understand and explain the informal plastic recovery system in Addis Ababa, with emphasis on the central role played by human action and consciousness. In addition to these two theoretical approaches, I give a short description of the concepts 'informal sector' and 'scavengers', which will constitute background information in the analysis of the plastic recovery system.

2.1. Structuration theory

Structuration theory can help to explain why actors within the plastic recovery system in Addis Ababa act in the way that they do, and why the system has developed in the way that it has, according to earlier decisions and structures.

Structures exist in all systems, whether they are physical or social. These structures are defined as stable and durable underlying arrangements of social relations, or background conditions that form a restriction to the decisions and activities undertaken by the actors within society (Røine et al. 2001). It is therefore important to look at systems in relation to structures, since they form a background condition that restricts the decisions taken by the actors and the activities within the system, and affects the development of the system.

Anthony Giddens' structuration theory has been influential in geography (1984). His theory is not uniform, but consists of several theoretical aspects and arguments that have been developed and reformulated since 1970 to the present (Dale 2001). I therefore give a

description of Giddens' structure theory, and link his theory to the informal plastic recycling system in Addis Ababa.

2.1.1. Giddens' structure theory

Giddens believes that social structures maintain themselves only through human action, and that they do not exist independently of the actions that maintain them. Further, he believes that social structures are not only an external limitation of actions, but also represent possible postulations for action. He argues that structures do not have their own existence and do not constitute their own level of the reality, but are part of human interpretations and interactions with the real world. Giddens defines structures as '*Rules and resources, recursively implicated in the reproduction of social systems. Structure exists only as memory traces, the organic basis of human knowledge ability, and as instantiated in action.*' (Giddens 1984: 377).

According to Giddens' definition of structure above, structures are defined in relation to rules and resources, which actors use in the reproduction of social systems. Rules exist for how meanings are congenital, how they should be interpretive and rules for social attitude. According to Giddens, a knowledgeable actor knows these rules, can interpret different situations, and knows how to proceed in a situation. He divides resources in to two types: 'allocative' and 'authoritative' resources. Allocative resources include control over material relations such as economy, while authoritative resources include control over people in the form of politics. In other words, the structures represent both possibilities and limitations for an actor's actions.

A main point in Giddens' structure theory is that he views structure and actors such as mutually independent units. Structures are both a condition for and a production of human actions; the structures affect the actor's actions, while at the same time the actors create and form the structure through their actions. Giddens calls this '*structures duability*'. Social structures are both the medium and the result of the practise that forms social systems. This means that they do not exist independently of the actions that they form and control. Since they are built in a discursive dimension, it is not possible to distinguish the structures from the actors. In this way, structures, actors and actions can be linked together in a structuration process. This approach to structure implies that when an actor is acting, the structural variable

needs to be understood as guiding the actor's actions, while at the same time the actor interprets the structures. The actor's choice is shaped by the structures, but can at the same time affect and change the structure in relation to their own opinion of the situation.

Giddens understands action as a continuing process, and not as isolated individual action with a certain intention or aim. He emphasizes that actors are reflective and responsible, with a clear and conscious understanding of their own actions. Their action is based on insight and knowledge. The knowledge that actions are based on is related to a discursive consciousness, which is knowledge that humans are capable of expressing and discussing verbally. In addition, knowledge is linked to practical consciousness, which is a type of knowledge that humans have inside themselves and use in their everyday lives. Humans take this kind of knowledge for granted, and perform their actions without reflecting on how and why they do so. Even though Giddens perceive humans as knowledgeable actors with insight and knowledge, he also takes into consideration that humans have limited knowledge. He argues that unfamiliar postulations for action and consequences of actions also exist. Actions are affected by the possibilities and limitations which structures provide in the form of recourses and rules.

Further, continued action and social practice creates social systems. Giddens defines a social system as '*the patterning of social relations across time-space, understood as reproduced practices.*'(Giddens 1984: 377). An established system constitutes a social institution, where there are different roles connected to the system, including duties and rights. The actors within a social system act on basis of the structures which in turn are tied to the actors' roles (Dale 2001).

Through the structuration process the actors reflect on their actions in order to understand the structural context. In this way, structure affects the actor's actions, at the same time as the conscious actor can reflect on the structural conditions and thereby is capable of interpreting and transforming the structures. Those decisions and actions that actors take will affect the structure in the system. This leads to a dynamic system, where the interaction between the different actors and their decisions continuously leads to new structures and changes in the system. These can be either radical or incremental (Dale 2001).[4]

[4] Radical change refers to complete change the structure in the system. Incremental change implies gradual change, which takes place slowly over time.

Reflexive actors are actors who have motivation for and intention in their actions. Hence, it is always possible to explain an actor's actions, based on their motive for acting in a specific way. The background for the action is again shaped by the relationship between the structures and the actors in the structuration process. The relationship between the different actors is most vital for the changes in a system. The dynamics between the different actors require that industry, government, municipality, consumers, non-governmental organizations, and researchers work together to improve the efficiency of the system (Røine et al. 2001).

2.2. Actor-oriented approach

The actor-oriented approach regards social life as a heterogeneous process, where all societies contain repertoires of different lifestyles and cultural forms. The actors utilize these in their search for order and meaning, which play a part in reconstructing their social life. Norman Long (2001) emphasises that social actors must not be regarded as social categories based on different criteria such as class and gender, status and ethnicity, nor as passive recipients of intervention. Rather, social actors are active participants who process information and act in their dealings with various local actors as well as with actors outside their social system, which also influences the situation affecting the outcomes of the action taken by the actors. It is important to note that the different patterns of social organization that emerge result from the interactions, negotiations and the social struggles that take place between the different actors. Social action and interpretation are therefore context-specific to particular domains of social action and therefore should not be prejudged. Meanings, values and interpretations are culturally constructed. However, they are differentially applied and reinterpreted in accordance with existing behavioural possibilities or changed circumstances, to generate new cultural standards.

In order to identify the social process involved in a system, and not only the structural outcome of the interaction between actors, the actor-oriented approach emphasizes how differences in social action are produced, reproduced, consolidated, and transformed. To do this, the actor-oriented approach requires a theory of agency, which is based upon the capacity the actors have to process their experiences and act upon them. Agency implies a certain knowledgeability, where experience and desires are given meaning and purposes. In addition to the ability to command relevant skills, the actor's access to material and non-material resources and their engagement in activities also affects social action by the actors. In other

words, social action takes place within networks of relations, which involve both human and non-human components. It is therefore shaped by both routine and explorative organizing practices and is bound by certain social conventions such as value and power relations.
Long & Long (1992) state that it is important to understand intervention of new structures among actors as a complex set of historically social encounters and battles over meanings and resources, since they are linked to particular historical events and processes. There is on one side of the intervention the accumulated knowledge of previous experiences, were people process their own experience of interventions along with their experience of livelihood. They construct their own memory of these experiences, as well as taking into account the experiences of other groups within their socio-spatial networks. In this way, they may learn from the differential response, strategies and experiences of other actors within society. Intervention processes are therefore shaped by both collective and personal memories of state civic society relations, local initiatives and inter institutional struggles (Long & Long 1992).

The actor-oriented approach emphasizes the existence of 'multiple social realities'. The approach conceptualizes knowledge as a way of involving construction and order, and not as a simple accumulation of facts, or as being unified by some underlying cultural logic, hegemonic order or system of classification. Knowledge emerges out of a complex interplay of social, cognitive, cultural, institutional, and situational elements. It is therefore always essentially provisional, partial and contextual in nature, and people work within a multiplicity of understandings, beliefs and commitments. An actor-oriented approach therefore states that one set of circumstances might be responded to in many different ways because of the diversity of actions undertaken at the local level (Long & Long 1992).

The focal point of interest in the actor-oriented approach is how people negotiate and transform structures. The intervention of new structures results in actual changes in the present society and the expectation of future changes. These changes are what Long & Long (1992) call 'structural discontinuities' and they are what people react to when they decide how they are going to adapt and transform the structure and their social networks to fit into their own mental maps of their life worlds.

The aim of the actor-oriented approach is not to formulate a generic theory of society or social change based on universal principles that govern how social orders are constituted and transformed. Instead it seeks to provide a conceptual and methodological framework for

understanding the processes by which particular social forms or arrangements emerge and are consolidated or reworked in the everyday lives of people. An actor-oriented approach offers a valuable insight into the process of social construction and reconstruction. It also enables conceptualization of how local and external structures interact with each other. Social action is never an individual egocentric pursuit, but takes place within networks of relations. Nerveless, it is shaped by routine, explorative organization practice, and certain social conventions that are bound together by power relations. One of the advances of an actor-oriented approach is the focus on explaining differential responses to similar structural circumstances, even if the conditions seem to be the same. Thus, it can be assumed that the different patterns that arise are in part the joint creation of the actors themselves (Long 2001).

2.3. The informal sector

The informal sector participating in recovery of plastic waste in Addis Ababa is playing a growing role within the overall solid waste management. This section gives a brief description of the concept informal sector, which will serve as background information on those who are involved in the plastic recovery system in Addis Ababa.

The informal sector as a concept dates back to the 1950s and 1960s, when classical development theory was seen as the main key to economic growth and modernization in developing countries. In this period, African countries pursued strategies of large-scale investment in industries and agriculture. Further, the investments in industries tended to be more capital intensive than labour intensive, which resulted in a decrease in job creation. At the same time, many people in the urban areas started to carry out activities on their own initiative as a way of living, which resulted in the term ‘informal sector’ (Devas & Rakodi 1993).

The informal sector has been given several meanings by different researchers, according to their approach to the informal sector. Common to most of the approaches is that the informal sector is defined in terms of economic activities as a basis for distinguishing the informal from the formal sector. The formal and the informal sector can be distinguished in terms of the mode of production, where the formal sector make use of modern, more capitalistic production systems, while the informal sector is characterized by traditional production, which is very labour intensive compared to the formal production characteristics. Regardless,

the organization and the scale of activities within these two sectors can also be distinguished. The formal sector is usually well organized, while the informal sector has a temporary structure. Further, the formal sector operates on a large scale compared to the informal sector (Sethuraman 1981). Sethuraman defines the informal sector as: '… *small-scale units engaged in the production and distribution of goods and service with the primary objective of generating employment and incomes to their participants notwithstanding the constraints on capital, both physical and human and know how [sic]*'(1981: 17).

Such a definition of the informal sector implies the dualism manifested in the form of different modes of production. Organization and scale of operation is simply a reflection of the varying circumstances under which enterprises in the two sectors come into existence and operate. Since the definition involves both human and physical capital it reflects the value added per worker and the mode of production within the two sectors. This implies that the informal sector is labour intensive and has relatively low value added per worker compared to the formal sector, which is cost intensive and has high value added per worker.

The term 'informal sector' often refers to all economic activities which are unregistered and not regulated by government, and are therefore operating outside the formal system. The activities carried out by individuals or enterprises in the informal sector are usually engage in value-added activities on a small-scale and are often characterized as activities which provide low earning opportunities. The informal sector is often defined according to certain criteria, such as employing less than 10 people, operating in open spaces, using local materials, labour-intensive technology and a minimum of capital investment. In addition, informal sector workers tend to have little or no access to institutional credit, public services, and an organized market place. This results in a sector which lacks the necessary capital and skills in order to improve activity and economic income. In order to make an income, the creation of intense competition in terms of gender, resources and the connection with the formal sector is high (OSCALDC 1996).

In reality, in most situations there is a weak boundary between the formal and the informal sector. Many individuals and enterprises operate in a grey zone between these two sectors, where they have both formal and informal characteristics. In addition, relatively strong trade connections exist between the different actors in the systems. The formal and the informal

sector have a tendency to operate in a symbiotic relationship, where the informal sectors are suppliers for the formal sector (Medina 1997).

2.4. Scavenging and recovery activities

This section gives an overview of the literature on scavenging, an informal sector activity carried out by individuals as a source of livelihood. In order to understand and explain why individuals become involved in such an activity and what the main characteristics of this system are, this section provides background information in relation to the actors involved in the plastic recovery system in Addis Ababa. In this respect, scavenging refers to those individuals who collect the materials, such as the *korales*, street boys and the private waste enterprises operating in Addis Ababa. This section also explores individuals, who are involved at higher levels in recovery systems and their relation to the various collectors.

Scavenging has been and still is a common activity that takes place in the informal sector in developing countries. According to Michael R. DiGregorio (1994), scavenging is an occupation, a labour process and an industry which involves several activities and many individuals concerning the handling of waste materials. The World Bank estimates that 2 percent of the population in developing countries take part in such recovery activities (Medina 1997).

Socio-cultural background

Most of the scavengers in developing countries tend to be migrants from the rural areas, who come to urban areas in the hope of getting a job and improving their living conditions. Their cultural and social background may therefore be different from the majority of the population in the urban centre in which they settle. Even though scavengers are not the poorest of the poor, their occupation is one of the lowest in the society because people tend to associate them with the waste they work with. The social and economical status of the scavengers is therefore generally very low (Medina 1997).

Scavenging: an income generating activity

The scavengers do not choose to involve in such activities because of their concern for the waste management situation, but rather for economic reasons. A common characteristic of scavengers is that they regard inorganic waste materials as an economic resource. What kind

of waste materials they collect depends on the demand for the various materials and their value on the market (DiGregorio 1994).

The sources for the materials collected are usually public areas, such as dump sites, municipal refuse containers and open areas. In other words, scavenging takes place at all stages in the waste management system, from the generation site to the final disposal of waste. It is common for scavengers to make arrangements with individuals working within the public refuse system in order to have access to containers and other sources, in compensation for labour and purchase of materials. In other cases, the scavenger may be forced to pay the public refuse workers in order to secure access to waste materials.

Relationship between actors

In order to earn cash, scavengers must sell the materials they collect. Industries usually require a minimum quantity of sorted and clean materials, which encourages the existence of intermediaries and waste dealers who purchase the recyclables recovered by the scavengers. This has resulted in another common practice, where scavengers enter into agreements with traders, which usually commit the scavengers to selling all of their collected materials to one or several traders. This has resulted in scavengers all around the world being exploited by intermediaries and dealers operating at higher levels in the system. According to Michael R. DiGregorio (1994), the arrangement that scavengers make with other actors in the recovery system are usually based on ethnicity, caste or other relationship. This relationship gives the scavenger access to the materials required for collection and recovery, and implies that not all individuals can engage in this occupation.

Organization and hierarchy of a recovery system

In most situations, a hierarchy exists in the waste recovery system. The arrangement of the hierarchy is generally in the form of a division of labour and labour processes based on the degree of specialization (Figure 2). Michael R. DiGregorio (1994) distinguishes scavengers into four different kinds of occupations within the waste recovery system: foragers, scavengers, municipal refuse workers, and itinerant buyers.

In addition, DiGregorio (1994) divides the recovery system into two circuits. The lower circuit where the collection of materials takes place and the upper circuit that represents the trading and transformation of materials collected for recovery. The lower circuit usually in

involves the foragers, scavengers and itinerant junk buyers who form the lowest level of the system. The upper circuit is occupied by small traders who constitute the connection with those working at higher levels in the system. Higher up in the system there are the traders, which usually operate from a fixed location. Since they have their own place to store materials, they can receive a higher volume of materials than the small traders, and have a more convenient space to separate the materials. The next level in the hierarchy comprises the dealers and agents, who form the upper circuit of the recovery system. These actors deal with large volumes of waste, which require large areas for sorting and reprocessing of the materials. These actors also have access to labour capital, so they are able to sort the materials into much more finer grades, which are acceptable to the plastic industries which use the materials in the production of new products. To be able to maintain a stable supply of materials, the dealers often establish an agreement with those actors working at the lower levels in the hierarchy (DiGregorio 1994). In relation to the lower and upper circuit, DiGregorio places the municipal refuse workers outside and in-between the two circuits, because their participation in the recovery system is a supplemental activity to their work in the public sector. Further, he also places the small traders in-between the two circuits, because he believes that they constitute a link between the lower and the upper circuit and at the same time share characteristics with those individuals operating on the lower circuit. In addition to those collecting materials at source, the small traders function as mediators and earn money through the transfer of recovered materials. The function of small traders may vary based according to local conditions, and depends on the degree of organization of the upper circuit. In general terms, where the structure and organization of the upper circuit is strong, those on the lower circuit are unable to move to the upper circuit because the strong structure forces down the prices on the lower circuit.

Distinction between the actors at the lower circuit

It is important to understand the differences between the different occupations because the differences can sometimes seem indistinct. Although the activities are very similar, the motivations for the activities are quite different. At the bottom of the hierarchy, there are normally the foragers that collect materials for recovery for their own consumption, or for sale. Hence, their motives are different because unlike the others they usually collect materials for their own survival and are not driven by economic benefits or the demand for waste materials. Scavengers perform their activities based on economic benefits which are driven by a market demand for recovered materials. On the other hand, those who work within the

public refuse system already receive a salary for their work but they collect and trade recovery materials in order to earn some extra income. Their access to the waste sources also makes it very easy for them to collect and separate different kinds of inorganic material for recovery. Itinerant junk buyers are those who are buying materials for recovery at source, before the materials enter the waste cycle and are collected other individuals (i.e. mentioned above). In addition to the fact that the itinerant junk buyers buy the materials at source distinguishes them from the other individuals, the materials they collect are also cleaner compared to the materials that have already entered the waste cycle and have become soiled by other waste. According to Michael R. DiGregorio (1994), the itinerant junk buyers differ from the others because they buy the materials they collect, which therefore allows them to access materials of a higher value compared to other collectors. In addition, their relation to capital might force them to enter into arrangements with small traders, which constitute the link between the lower part of the system and the higher level of the system.

Even though the social status of the various actors within a recovery system may be different in relation to type of activity, income and working conditions, all of the individuals share at least one common characteristic, namely the relationship they have to waste as a resource.

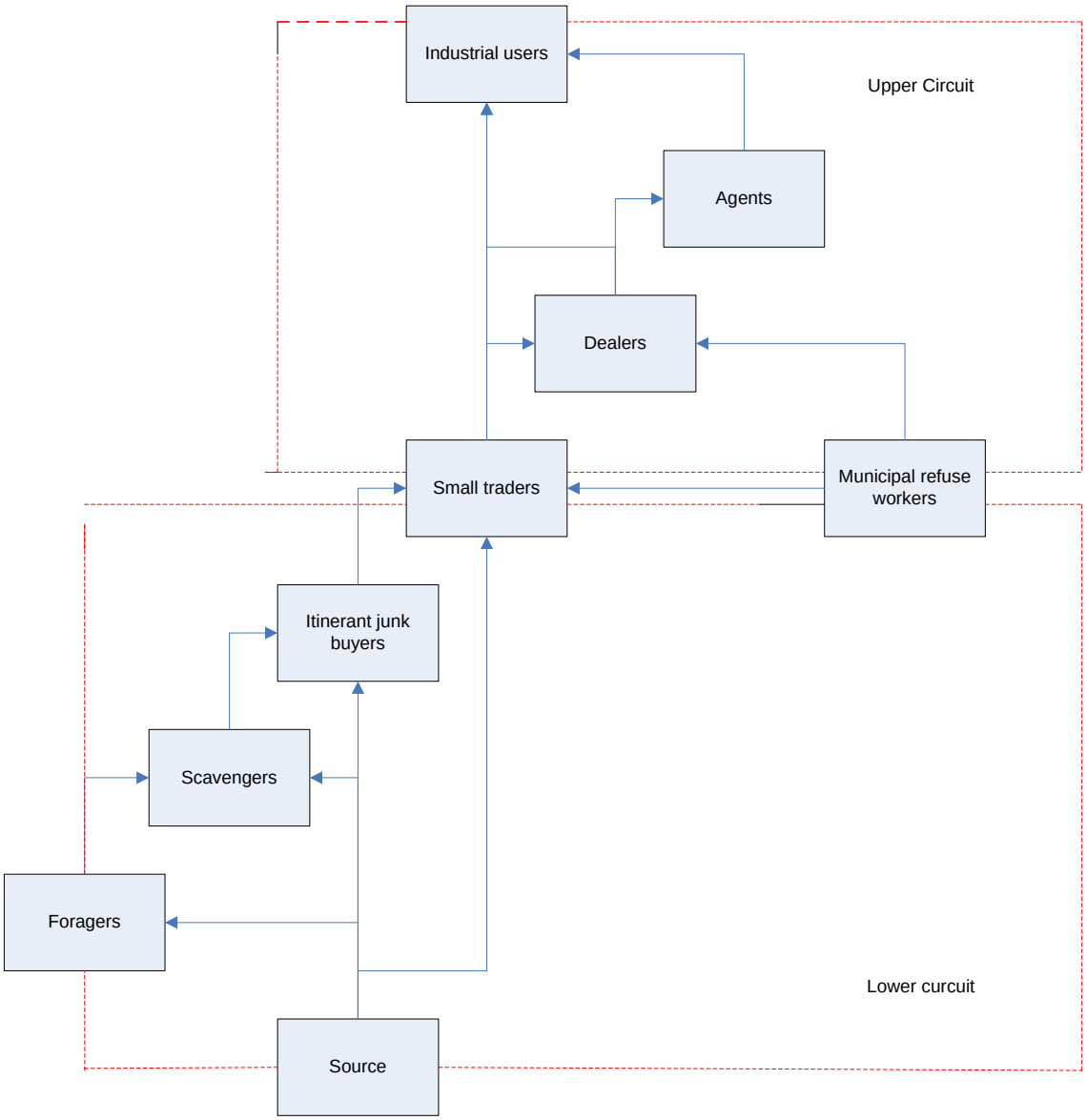

Figure 2: Organization and hierarchy of a recovery system, divided into the lower and the upper circuit (DiGregorio 1994).

The whole recovery system is a highly organized system, with individuals performing various activities. Some might be involved in several activities at the same time, and some may be more involved in the system than others, which make the system quite complex. In order for a recovery system to develop in a society, some basic conditions have to exist. First, there must be a demand for recovered materials, second there must be a supply of recovered materials in order to meet the quantity and quality demand. Lastly, people must be willing to become involved or participate in such activities.

3. Methodology

Methodology refers to the systematic way of collecting, analysing and interpreting data in order to produce a result relating to a research problem. Not all methods are suitable for collecting the data needed in relation to the approach. Choice of methodology therefore needs to be based on the problem and the theoretical approach, which in turn will affect the perspective a researcher holds on the real world (Lindsay 1997). Within methodology, it is common to distinguish between a qualitative and quantitative approach. I give a short description of these two approaches, and the relationship between them in the following sections. Further, in this section I argue and explain the choice of methodology used in the field. Some of the problems encountered during the work on this report will also be mentioned, to better understand some of the limitations with this study. The last part of this section discusses the reliability and viability of the methodologies used and ethnic principles.

3.1. Qualitative approach

A qualitative approach is a systematic way of collecting and analysing data, and is a common approach for studying problems that requires a deeper analysis and comprehension of social phenomena.

In general, qualitative methodology is used to describe human relations and the construction of social phenomena. A common characteristic of the qualitative approach is that the data the researcher analyses are usually in the form of texts describing human actions, intentions and perspectives. The nature of the texts have depends on the methods researchers use. Common methods within this approach are interviews, observations, surveys, and document analysis. Qualitative methods have been criticized for being too subjective and for containing too few units and too many variables, which makes it impossible to make generalizations (Limb & Dwyer 2001).

3.2. Quantitative approach

A quantitative approach is a formalistic and a structured way of collecting data. Quantitative methods are characterized by measurable data which can be expressed in numbers or other quantities. This gives a basis for the presentation of frequencies, distributions and

correlations. Quantitative methods have been criticized for being too narrow and too positivistic when it comes to answering questions relating to human behaviour (Ringdal 2001).

3.3. Relationship between the qualitative and quantitative approach

Qualitative methods aim to develop a more in-depth understanding of a problem, while quantitative methods emphasize numbers and structure. With a qualitative approach the intention is to gain a total understanding of the reality, while a quantitative approach is used to look at characteristics and occurrence, which are independent in relation to the totality. Another difference between these two approaches is that qualitative research is based on a subject-subject relationship between the researcher and the informant, where a mutual influence exists. By contrast, quantitative research is based on a subject-object relationship between the researcher and the informants where the researcher stands outside and observes the phenomena (Thagaard 2002).

3.4. Combination of qualitative and quantitative methods

Researchers will be either neutral or objective when they apply quantitative or qualitative methods. As mentioned above, both of the approaches have methodological limitations. It is therefore favourable to combine these two approaches in order to reduce the limitations and increase the quality and the flexibility of the data (Robinson 1998). The combination of these two approaches is often referred to as triangulation. Even though triangulation can enhance, illustrate and clarify research findings, it can also lead to contradictions. Some researchers have argued that such an approach is time consuming, which can limit the scope of the study (Brannen 1992).

This research was carried out using a combination of qualitative and quantitative methods. The reason for choosing to combine the two methods was to overcome some of the limitations with the use of only one of the approaches, and to increase the validity of the results.

3.5. Methodology used in the field

The various methods used in order to collect primary and secondary data will be examined in more detail in the following sections.

3.5.1. Primary data

Since very little research had been done concerning plastic recycling in Addis Ababa, I had to collect much of the data myself. To collect the data I used structured interviews, unstructured interviews, standardized surveys, observation, and even participated in some of the activities involving the collection of solid waste.

Interviews

The interview guide I used with the individuals in the private and informal sector was relatively structured. The questions were fixed in advance, though the order of the questions was decided during the course of the interview. The reason for choosing relatively structured interviews was to allow the possibility to be flexible and to adjust the questions to each of the informants. In addition, I also wanted to be open to the possibility of obtaining other information from the informants that could be of interest to the study.

Structured interviews were conducted with several micro and small enterprises in Addis Ketema sub-city (Appendix 12.1.2). These interviews were conducted to obtain more information about the activities that the enterprises carried out, and the enterprises' experiences, opinions and feelings concerning their activities. Structural interviews were also conducted with waste material buyers in Menalish Terra, in Mercato (Appendix 12.1.1). The reason for this was to acquire information on the organization of their activities, type and amount of waste materials, and their relationship with the *korales*, micro and small waste enterprises, different industries, and the municipality in the city. These structural interviews employed a combination of quantitative and qualitative methodology.

In addition, some unstructured interviews were conducted with several key informants: Ato Kinfe Mesfin, manager at the SBPDA; Ato Mesfin, team leader for solid waste management in Addis Ketema sub-city; Ato Kebede Faris, head of Chamber of Commerce and Deutsche Gesellschaft fûr Technische Zusammenarbeit (GTZ) Waste Management Project; Ato

Gethaneh Gebre, of the Environmental Protection Authority (EPA); Ato Tekahun Basha, project coordinator for Geshe Abera Molla Association; Ato Negali, manager of micro and small enterprises in *Kebele* 13, Addis Ketema sub-city; Ato Tadesse Amera, the team leader for micro and small enterprises in Addis Ketema sub-city; and Ato Brano, of ENDA-Ethiopia. The interviews were conducted in order to gain information about the current solid waste practice and plastic recycling activities in Addis Ababa, and to hear their opinions on the solid waste situation in the city.

Standardized Surveys

Standardized surveys are a common method used to collect primary data in order to examine attitudes and opinions among informants. Within this method, there is a qualitative and a quantitative approach. The quantitative approach aims at describing the conditions, while the qualitative approach focuses explaining why things are as they are. Within the quantitative approach, it is common to manage the data statistically, assuming the collected data are valid for the whole population, which in turn presupposes a representative sample (Flowerdew & Martin 1997). In order to describe the plastic recovery system and to generalize some of the results for the whole system, I chose to make use of both approaches.

Surveys of households (Appendix 12.2.3) and of the collectors in the informal sector (Appendix 12.2.1) were conducted during the eight and tenth weeks of my fieldwork session. These surveys were developed to obtain statistical data and opinions on solid waste management that could be used to support my assumptions and observations relating to the different activities concerning separation and handling of solid waste at household level and the activities involving the collection of plastic materials by the *korales* in Addis Ababa.

Waste management at household level

Three *kebeles* in Addis Ketema sub-city (*Kebeles* 6, 13 and 15) were selected for collecting data on separation, handling, and the household opinions of solid waste situation in the area (Figure 1). The reason for selecting these areas was the different socio- economic status of the inhabitants and the activities operating in the three different *kebeles*. *Kebele* 6 is characterized by rich people, *Kebele* 13 is an area where the majority of people living there are poor, and *Kebele* 15 is an area where rich and poor are living together and where there is a lot of commercial activity.

All of the questionnaires were translated into Amharic (Appendix 12.2.2 and 12.2.4), which is the official language in Addis Ababa. The reason for this was to reduce misunderstandings as much as possible during the data collection. The questionnaires were translated by a lecturer in the Department of Geography at Addis Ababa University.

Because of the limited time allocated for my fieldwork, it was not possible to conduct all of the questionnaires myself. Therefore, two Ethiopian assistants were appointed to conduct the standardized questionnaires. The reasons for choosing these two assistants were that they knew the area, they know the language, their English was good, and they had been assisting me since I had arrived in Addis Ababa, so I trusted them both. They were instructed to go to every tenth household in each *kebele*. The questionnaires were distributed to 150 households: 50 in *Kebele* 6, 50 in *Kebele* 13, and 50 in *Kebele* 15.

Collectors in the in formal sector

One standardized survey was developed for the *korales* involved in the recovery of plastic materials in the informal sector (Appendix 12.1.1). The main reason was to collect and analyse statistical data on their activities, their social organization, and their opinions on different aspects relating to their job. I started to conduct these questionnaires myself with a translator, by visiting different parts of the city and asking the collectors passing by if they had time to fill out the questionnaires. However, due to problems that are discussed in Section 3.6, the two assistants ultimately conducted the questionnaires. Altogether, 63 collectors in the city responded to the questionnaires.

Observation

Observation means that the researcher is present in the situation where the study takes place, and observes persons and activities involved. This kind of sampling method is suitable to generate information about how people relate to each other and the organization of their activities (Thagaard 2002).

Observation can be carried out either actively or passively in the informant's environment, and openly or concealed. Participant observation means that the researcher participates in the activities with the informants. This gives the researcher a good understanding of the tasks involved, the informant's actions, and the relations between the two. Passive observation is suitable in situations where the researcher's presence may affect the informants (Thagaard

2002). I made use of both active and passive observation, and both open and concealed observation. Active observation was conducted when I participated in waste collection together with Green View, a waste enterprise located in Addis Ketema sub-city. Further, I participated in a waste campaign in Addis Ketema sub-city and in a waste expedition at Addis Ababa museum. Passive and concealed observations were used daily when I walked passed some youngsters collecting waste from the municipal containers, when a *korale* passed me in the street, and when I walked or drove through Menalish Terra. Moreover, when I walked over bridges, I always looked to see whether a lot of waste had been thrown into the river or not, and if I walked past a container I registered whether it was full or empty.

3.5.2. Secondary data

Secondary data have been used to gain background information about the formal solid waste management system in Addis Ababa and informal recovery systems in other developing countries. Most of the secondary data has been collected from municipal reports, reports conducted by non-governmental organizations, and from published reports, articles and books.

Document analysis

Document analysis is a methodology where certain texts provide the source of data for research. The documents are secondary data since they have been written with another intention and within another context. Good documentary analyses suppose a positive source review. The reason is that the data can easily be misinterpreted if there is lack of mutual understanding of the concepts, the way of thinking and the context of the documents. A full consideration of the documents' intention and function at the time when they were written is therefore very important in relation to the source evaluation. A good rule is to double-check the information by comparing it with another document (Repstad 1993). In this study document analysis has been used to find background information about SWM in Addis Ababa. Moreover, document analysis has also been used to compare my own findings on the topic in order to evaluate the validity of my data.

3.6. Problems encountered

Problems entering Menalish Terra and the various actors

The main problems concerning this fieldwork were to how to access different individuals working in the informal sector, such as the *korales*, waste buyers (wholesalers), and plastics factories.

Several attempts were made to arrange meetings with some of the individuals working in buying and selling waste. First, I had some difficulties in entering Menalish Terra. It was obvious that people did not appreciate my presence and most of the time they shouted at me adversely and on one occasion someone even tried to hit me. I will return to what I believe are the reason for such behaviour later in the report. During my research, I tried to make contact with the wholesalers in different ways. First, I went to the area with my translator. I explained my intentions and asked them if they were willing to answer some questions, though none of them were willing to talk to me. One week later, I tried again and I was fortunate to meet one wholesaler in the area who was willing to talk to me. Unfortunately, after a week he refused to talk to me again. I also tried to make contact with the wholesalers through a hotel owner in the area who knew some of them, but yet again they refused to talk to me. Further, I tried to make contact with them through people working for GTZ in the area. After three weeks, I was able to have an interview with one wholesaler, though some days later I received a message that all the wholesalers in the area had decided not to talk to me. I was therefore left with no other options than to give up, mainly because of limited time. The possible reasons for such behaviour will be discussed in more detail in section 9.6 to 9.10.

Attracting too much attention as a white girl

The second problem concerning the collection of data was encountered during conducting the interviews with the *korales*. The main problem was the numbers of curious people who gathered around us. To start with, when I was conducting the questionnaires myself, at least 10people were standing around listening, making jokes, and offended the collectors and myself. This might have had an affect on some of the answers. Thus, it became obvious that being a white girl I attracted too much attention. Hence, I decided to let the two Ethiopian assistants conduct the questionnaires for me. A second problem with the *korales* was that several of them were not even willing to answer the questionnaires, which might have had

something to do with the informal aspect of their activity and because they was suspicious of my intentions. To begin with, none of the *korales* were willing to talk to me, so I started to tell them that I had the same occupation as they did in my home country in Norway (which was partly true) and that I was interested in their work in order to learn from them. This made it easier to gain acceptance among the *korales*, though some of them still did not trust me and were not willing to talk to me. This again led to a question concerning ethical principles, which I will come back to in Section 3.8.

Undisclosed actors

The third main problem encountered during my fieldwork was to find out who was buying the plastic from the wholesalers in 'Menalish Terra'. The wholesalers did not want to tell me who they sold their plastic to. I also asked several persons working with solid waste management in the city, but they did not know. I telephoned almost all of the registered plastics factories in the city and all of them responded that they were not using plastic waste in their production. At this stage, I was close to abandoning my study. The question was where did the collected plastic go? After calling almost 150 plastics factories out of 170 in the city, and visiting several factories, only two factories were willing to have a meeting with me and at these meetings my assumptions were confirmed and my questions answered.

The quality of secondary data

It was also very difficult to find secondary data about solid waste management and recycling. There are very few publications on solid waste management, and most of them are mainly reproductions of the research done by the Norwegian firm Norconsult in 1982, and by Gordon in 1995. Furthermore, it proved impossible to locate information relating to the research done by Gordon, despite many reports referring to it. Concerning data on the informal plastic recovery system, only one research had been conducted on the topic that had been published. Another problem that I faced during the collection of data for my research was that several reports operated with different data. This forced me to double-check all data that I found, which was quite time consuming.

Although the plan was to collect more data for waste collectors, waste buyers and plastics factories, given the problems mentioned above, the numbers of informants concerning the wholesalers, the *korale*, and plastic industries involved in the research are in fact relatively limited.

3.7. Validity and reliability

An important aspect in research is to make sure that the results of the research are reliable and valid. However, it is difficult to avoid problems concerning reliability and validity in a research situation. The principle of subject-subject relationship between the researcher and the informant implies that the research process affects both parties (Thagaard 2002). In my case, the environment I studied was unfamiliar to me. Therefore I used much time getting to know the individuals involved in order to gain their trust so that they would be willing to talk openly with me. I told them about the aim of my research, repeatedly making it clear that I had not been sent from the municipality or the government. I also participated in different events whenever I had the possibility, such as taking part in waste campaigns, waste collection and waste exhibitions. During my research, I came to know some of the individuals quite well. I felt that I had developed a good relationship with these individuals, whether they were working in the private or the public sector. Concerning the actors working in the informal sector, I had some difficulty in developing good relationships since from the start they seemed very suspicious of me. However, by cross-checking the information I received from them and the information I acquired through talking to other persons about the topic, I consider that the data collected are reliable. Since the situation and the social environment was unfamiliar to me as a researcher, I also spent quite some time discussing the information collected with several people in the private and public sector, in order to check that I had understood the information correctly.

3.8. Ethical principles

Scientific research requires that researchers conduct themselves according to ethical principles. The relation between the researcher and the informants is very important in qualitative research because the informants can be affected by the research in several ways. Within the research community, several ethical principles are recognized.

The informant's approval

The most important principal concerns the informant's approval, which implies that the informant has to volunteer to become involved in the research process, and has the right to be informed about the aim of the study. In addition, the informant has the right to interrupt their involvement in the research process. This contributes to ensuring that the informants have control over their own participation in the research process.

Confidentiality

Another principle is the requirement relating to confidentiality. This principle aims to secure that the information given by the informants is kept confidential. This means that the researcher has to preserve an informant's anonymity if the informant requests this.

Consequences

The third ethical principle involves the consequences the research can have for the informants. Those who take part in the research process should not be exposed to physical or social embarrassment. It is therefore important that the researcher does not ask the informants questions that are too probing and which can lead to that the informants having problems after the interview. The interview should therefore be arranged in a way that preserves the informant's integrity, where the researcher takes the informant's evaluations, motives and self-respect into consideration (Thagaard 2002).

Most of the informants in the informal sector were sceptical about talking with me and becoming involved in the research. However, all the informants used in this research volunteered to take part in the research process and were able to interrupt their involvement if they wanted to, and several did exercise this option, namely some of the *korales*, wholesalers and the plastics factories. The main reason for interrupting their involvement was that they were afraid about my intentions for conducting the research and whether the government had something to do with it. Furthermore, all of the informants in the informal sector chose to remain anonymous. Therefore, the names in this report are not the real names of the informants. As mentioned in Section 3.6, I told some of the *korales* that I had the same occupation as them back home in Norway, and that I was interested to learn more about the activity they carried out. This may have been contrary to the first principle about my aim and intention with the research. Nevertheless, the *korales* still could have chosen whether to be involved in the research or not.

4. Background information about the study area

This chapter gives some background information about Addis Ababa, including geography, population, urbanization, employment, and the organization of the government. This is essential in order to explain and understand some of the aspects related to the plastic recovery system in Addis Ababa.

4.1. Geography

Addis Ababa is the capital city of Ethiopia and was founded in 1887. The city is located in the central highland of the country, with an elevation c.2400 metres over sea level, which makes Addis Ababa the highest capital in Africa. Due to the high elevation, the climate is comfortable, with air temperatures between 20 and 25 degrees Celsius during the day and between 7 and 11 Celsius during the night, throughout the year. Average rainfall is 1200 mm per year, with the major rainfall occurring between July and September. The city covers an area of 530 km^2, with a topography that slopes down from the Entoto Mountain in the north to the southern border of the city, cut by a number of steep-sided valleys with rivers and streams (Girma Kebbede 2004).

4.2. Population

Ethiopia has one of the fastest growing populations in the world. The population growth for the whole country is currently around 3 percent per year. The high growth rate is a result of the country's birth rate which is 4.5 percent, and is also among the highest in Sub-Saharan Africa. By contrast the death rate has been falling, from 3.1 in 1950 to 2.3 in 1975 and to 1.5 in 2000. Moreover, the country's population will continue to grow for several decades to come because the large portion of the population is relatively young. Population forecasts therefore indicate that over the next 20 years the country's population will double. This means that the population will double from 70 million today to 140 million by the year 2025 (Girma Kebbede 2004).

During the last 37 years, the population in Addis Ababa has increased dramatically. The total population increased from 644,190 in 1967 to 1,423,182 in 1984. From 1984 to 2001, the population increased to 2,570,000 and has reached 2,805,000 today (Girma Kebbede 2004).

According to the Central Statistical Authority (CSA) (2004), the population in Addis Ababa is estimated to be 2.8 million. At the same time, the European Union operates with a total number of 5 million people. However, it is difficult to give the exact population size of Addis Ababa, since the last population census was conducted in 1994, i.e. more than 10 years ago. It seems more reasonable to estimate a total number of between 3.5 and 4 million people (Interview Dr Solomon 2004).

4.3. Urbanization and migration

Ethiopia is one of the least urbanized countries in the world, with about 80 percent of its population living in the rural areas. Still, the country as a whole and Addis Ababa in particular have been experiencing one of the fastest urbanization processes in recent years. Between 1984 and 2000, urban areas with a population over 50,000 grew at an average rate of 6.7 percent per year. In the early 1940s less than 3.5 percent of the total population lived in urban areas, though by 1960 the number had increased to 8.5 percent, to 11.4 percent in 1984, and to 15 percent in 2000 (Girma Kebbede 2004). Problems relating to poverty, landlessness, diminishing agricultural income, drought, and famine force rural people to migrate. Rural immigrants are attracted to urban areas such as Addis Ababa, in their search for employment and better earning opportunities. Migration accounts for a significant portion of the growth of Addis Ababa. In 1994, 46.4 percent of the city's population were migrants. Therefore, urban areas such as Addis Ababa will most likely continue to grow, due to natural increase of the population and to continued migration from the rural areas of the country (Girma Kebbede 2004).

4.4. Expansion of the city

Addis Ababa has shown a remarkable spatial expansion in recent decades, due to natural population growth and increased migration from the rural areas. In the 1920s the city was estimated to be 33 km^2 in area. By 1984 the area had increased to 223.6 km^2, by 1990 it was 518.7 km^2, and in 1994 it had increased further to 530.21 km^2 (Girma Kebbede 2004) (Figure 3). This rapid expansion has resulted in an unplanned physical development of the city, with the formation of informal settlements. As much as 85 percent of the population live in slums and informal settlements (Devas & Rakodi 1993). A unique characteristic of Addis Ababa is that most parts of the city are not segregated according to income. In older neighbourhoods

the rich, the middle classes and the poor are living side by side. However, the disparity in housing quality between these groups is conspicuous. The residences of the rich are often built with bricks, cement, and have steel doors in the walls surrounding and protecting their houses. By contrast, the houses for the poor are made of a mixture of grass and soil transformed into plaster walls and are enclosed by old rusted steel plates (Girma Kebbede 2004).

The government and the municipality in Addis Ababa have been unable to provide or facilitate investment for necessary housing, infrastructure and amenities to accommodate urban growth. As a result, the urban environment in Addis Ababa is under constant stress due to poor environmental infrastructure, rapid population growth and inadequate planning. The majority of the urban population are badly housed and lack basic services. Housing, water supply, sanitation service, drainage transport network, and health services have not been able to keep pace with the growing urban population. This has resulted in deteriorating urban living conditions and increasingly serious health problems (Yirgalem Mahiteme 2001).

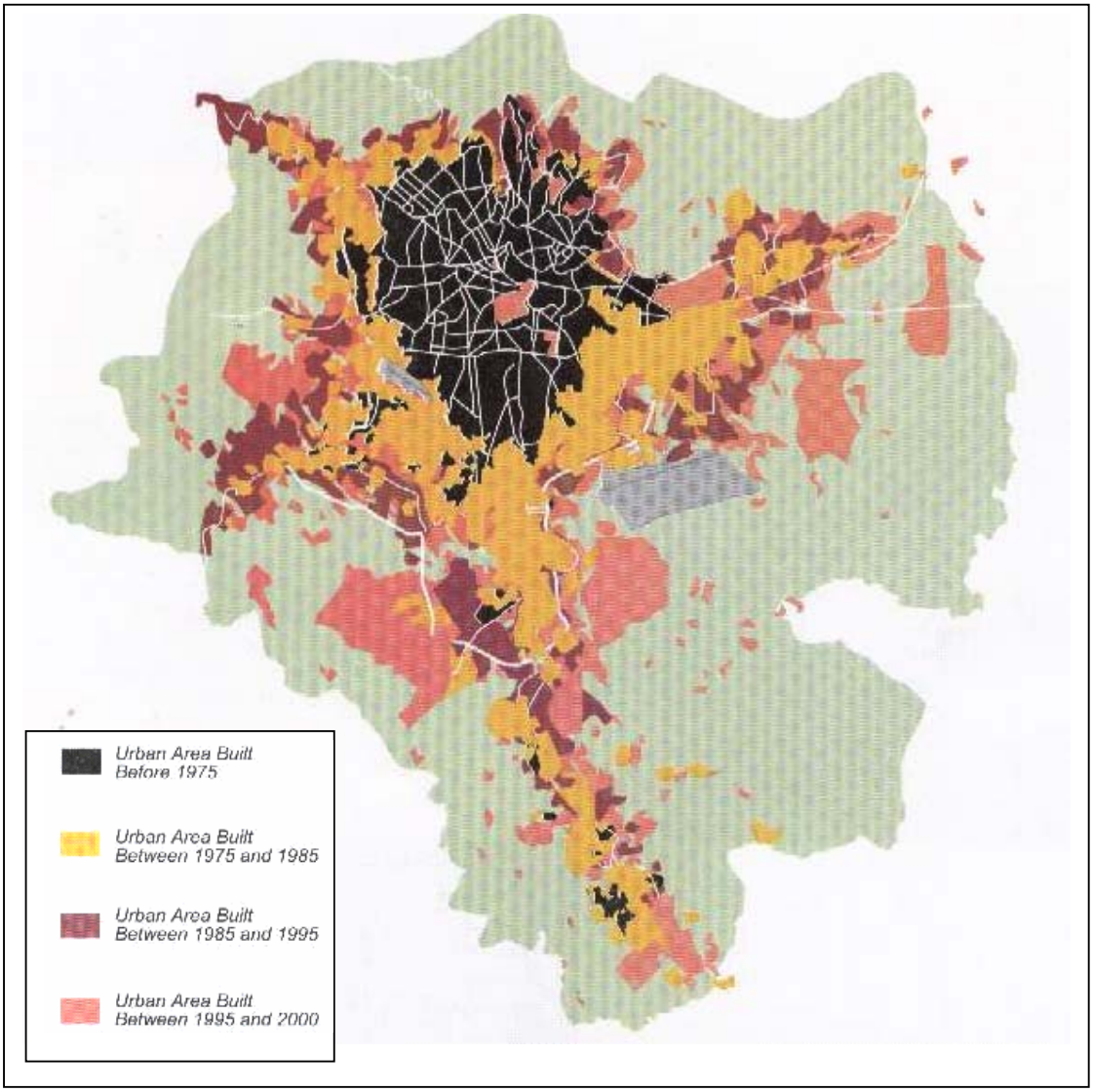

Figure 3: Map of the expansion of Addis Ababa (ORAAMP 2001).

4.5. Employment and the informal sector

Unemployment is a widespread problem in African countries as well as in Addis Ababa. The unemployment problem in Addis Ababa is very serious and has increased at an alarming rate in recent years. The total unemployment rate in 1976 was 9.6 percent, in 1984, it increased to 10.5 percent, and in 1994 it reached 34.7 percent. Young people between 15–19 and 20–24 are among those that accounted for the highest rate of unemployment in 1994. These age groups count for 56 percent of the total of unemployed people in Addis Ababa (CSA 2004). The unemployed obtain their income mainly from informal sector activities, so the informal sector is an important source of income and employment for the urban poor in Addis Ababa;

61 percent of the unemployment in Addis Ababa is in the informal sector, which puts Addis Ababa among those cities with the highest employment in the informal sectors in the world (GTZ UMAS 2000: 41).

4.6. Politics and governance

This Section briefly assesses the historical and the current political situation in Addis Ababa in relation to governance. This is essential in order to understand many aspects facing the informal plastic recovery system operating in the city today.

Historical review

The city of Addis Ababa is over 100 years old and was established as the capital of Ethiopia in the late 19th century by Emperor Menelik II. The present political situation has its roots in history and can be traced back to 1974 when the Derg took over power. The politics since 1974 have affected Addis Ababa in a number of ways. To be a member of the ruling workers party of Ethiopia became an essential condition for employment in the municipality. As a result, most of the people who worked in the municipality were mostly party members. Hence, upward accountability dominated the organization and the practises of the municipality. Amateur politicians rather than competent professional managers governed the city, a practice which has continued until today and is one of the main factors for the poor quality of the urban governance and the inadequate urban services in Addis Ababa (Meheret 1999).

In 1975, nationalization of urban land and rental houses took place in Addis Ababa. This resulted in a decrease in revenue income for the local government. For instance, between 1969 and1972 more than one-third of the state revenue came from building and land taxes. Nationalization has thus affected Addis Ababa's self-sufficiency and its capacity to improve urban infrastructure and services within the city (Meheret 1999).

When the Ethiopian Peoples Revolutionary Democratic Forces (EPRDF) took the power in 1991, the city of Addis Ababa assumed a multiple identity. Addis Ababa serves as a seat for the government of the Oromia Regional State and as an autonomous local government authority, with an elected council and a city governor. Further, the city has been organized as an authority responsible for 24 different functions, each with their own sectoral bureaus.

Moreover, Addis Ababa is authorized as the capital of the federal government of Ethiopia (Meheret 1999).

Organizational structure of the government

The organizational structure of the government in Addis Ababa (Figure 4) comprises an elected council, the Addis Ababa city council, which is responsible for administration in the city for a period of five years. The main function of the council is to establish laws. The head city government is constituted by 15 members of the city council, and responsible for the everyday management of Addis Ababa. The head city government is further, divided into three sub-divisions: Economic affairs, Social affairs, Administration and Finance. These sub-divisions each have five members, which report to the head city government. The city executive and legislative responsibility lies with the same actors that constitute the government. The elective council formulates laws and the 15 members of the council who constitute the city government have responsibility for implementing the laws and regulations (Meheret 1999).

Today, the city is divided into 10 administrative sub-cities: Arada, Addis Ketema, Lideta, Cherkos, Yeka, Bole, Akaki Kaliti, Nefas Slik, Kolfe Keranio, and Gulele. Each of them has an average population of 300,000[5] and these sub-cities are further divided into 204 *kebeles*,[6] which form the smallest administrative unit in the city (SBPDA 2003).

[5] This number is based on the population census from 1994 and is therefore just an estimate.
[6] The *kebeles* are currently under reorganization, and the number will reduce to c.100 (Interview 2004).

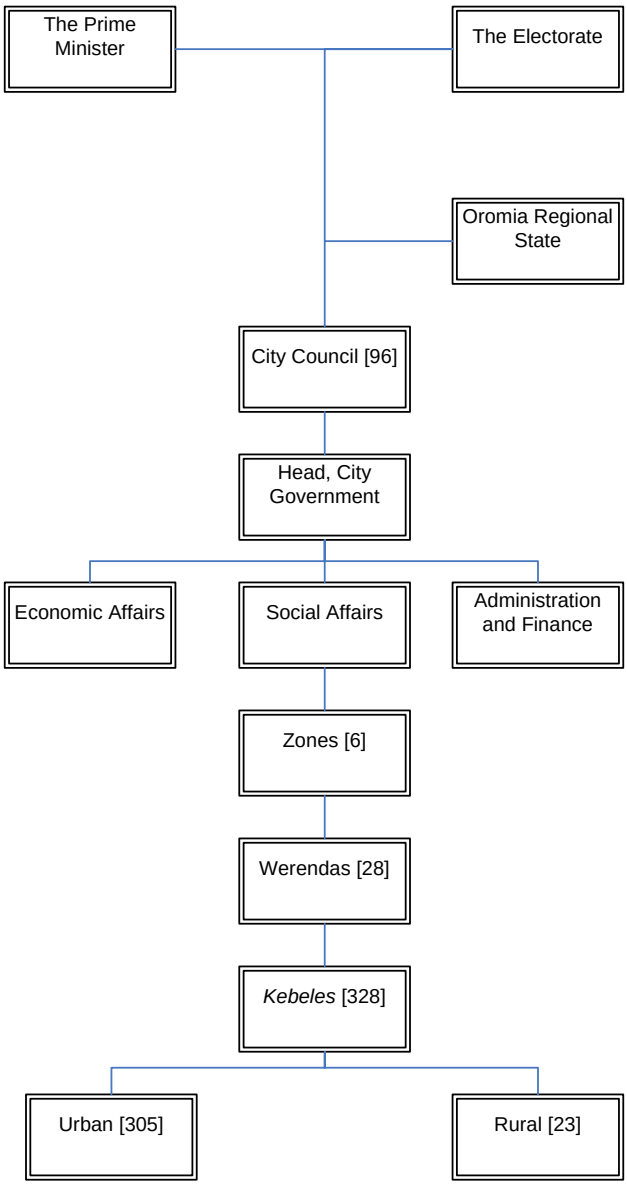

Figure 4: Organizational structure of the government in Addis Ababa (Meheret 1999).

5. Refuse solid waste management in Addis Ababa

This chapter provides an overview and a description of the existing system concerning municipal solid waste management in Addis Ababa. Because of an increased concern for human health and the urban environment, the municipality has recently paid more attention to the increasing generation of solid waste in the city and its collection, transportation and disposal. This chapter describes the municipal solid waste system in Addis Ababa at the time when fieldwork was undertaken in Autumn 2004.

5.1. Administrative organization of solid waste management in Addis Ababa

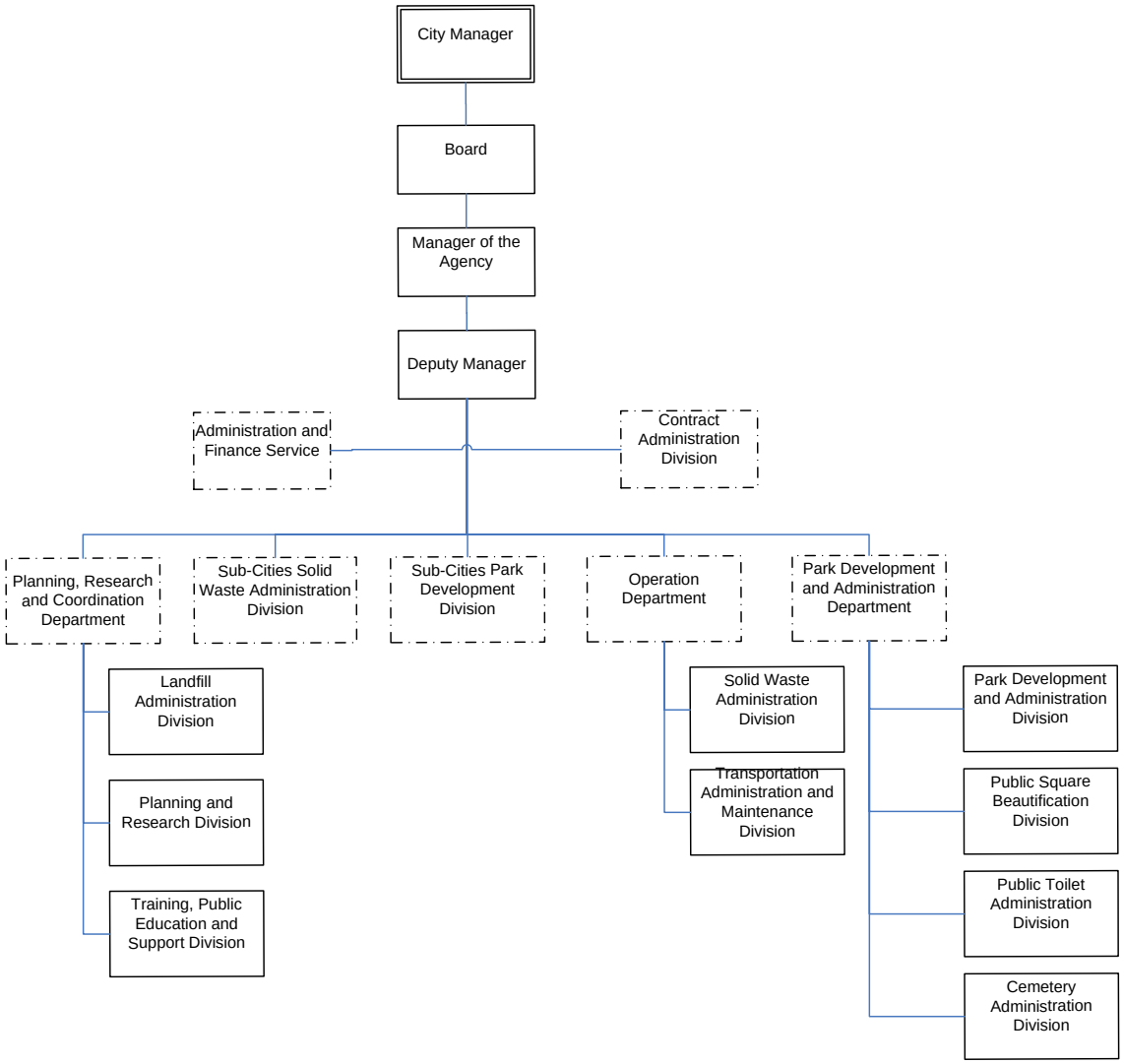

Figure 5: Administrative organization of the solid waste management in Addis Ababa, 2003.

Since January 2003, the Sanitation Beautification and Park Development Agency (SBPDA) have taken over the main responsibility for the SWM in the city. Moreover, they are responsible for the collection, transportation and final disposal. To manage this, the SBPDA has developed five main administrative units (Figure 5). One is the section for planning, research and coordination, which is divided into three sub-divisions and is responsible for administration of the dump site 'Repi', planning and research, public education, and support within the SWM in the city. The second unit is a division for SWM, which been established in each of the 10 sub-cities. The third administrative is responsible for the sub-cities' park development. The fourth is an operations department, which is divided into a solid waste administration division, and a transportation and maintenance division. The fifth administrative unit is the park, development and administration department. This includes the park and administration division, public square beautification division, public toilet division, and the cemetery administration division.

The local government (SBPDA) in Addis Ababa has the main responsibility for the establishment and overall management of the SWMS, for the inhabitants' living conditions, and for public health in the city. This involves responsibility for sanitation, collection, transportation, and disposal of solid waste in the city. The main duties are therefore to formulate and implement laws and regulations to coordinate the SWM and to implement the various laws and regulations from the national government. This involves responsibility for establishing mandatory standards, procedures, coordination of the 10 sub-cities, giving technical support and training in relation to SWM, conducting research on the area, and managing the economy across the different divisions. The local government is also in charge of establishing guidelines for design, operation and maintenance of the overall solid waste management system. This includes promotion of waste minimization and reduction, source separation, material recycling, and development of a policy that aims to eliminate barriers to waste reduction, recycling and recovery activities (SBPDA 2003).

Since January 2003, power has been decentralized to the 10 sub-cities, which now have responsibility for the day-to-day activities concerning SWM, including collection, transportation and street sweeping. The main function of the sub-cities authorities is to develop a plan and a budget which secure long-term SWM and ensure that the SWM in the sub-cities is efficient. They are responsible for developing collection services, adopting and

implementing taxes, governing and controlling the micro and small enterprises working with solid waste, and maintaining statistics on solid waste.

The *kebeles* are the smallest administrative units in the city. The main responsibility of the *kebeles* is to keep the districts clean. This includes follow-up and control that people do not dispose of their refuse illegally and penalizing those who discard their waste in open areas, observing how dwellers handle solid waste in the area, and arranging solid waste campaigns and cleaning the area (SBPDA 2003).

5.2. Collection systems

Three different municipal systems have been established to collect solid waste in Addis Ababa: collection through municipal containers, collection from different institutions, and the house-to-house collection.

Municipal container system

The intention with this system is to collect waste from different waste generators, mainly the households. The purpose of the containers is to function as municipal collection stations, and the containers are therefore located on open spaces near the main roads in the city, where the households and other generators deliver their waste to the containers. The municipal container system accounts for 67 percent of the waste collected in the city. There are two types of containers, large 8 m^3 open steel containers and 1.1 m^3 plastic containers with covers. Totally, there are 512 steel containers [7,8] and 479 plastic containers for the collection of the waste generated in the city. Transportation of the larger steel containers to the landfill is done by 38 collection trucks.

Collection from institutions

Institutions have access to 10 large steel containers. These containers are delivered and picked up to order, which costs 11 birr/m^3 (1.31 USD).

[7] This number is uncertain, since several reports operate with different numbers. After checking the actual number in Addis Ketema sub-city myself, I found out that there were in fact 26 8m^3 containers, though the report said there were 51.
[8] This number includes the containers used to collect waste from different institutions.

House-to-house collection

This collection service is available for those households which are located near the main roads. Because of inadequate infrastructure in the city, it is impossible for the collection truck to access many areas of the city. Sixteen Nissan trucks collect the waste from the households twice a week. This collection service handles 33 percent of all the waste collected in the city.

In addition to the collection systems mentioned above, street sweeping is performed every day all over the city. This work is done manually, with simple equipment such as a brush and a bag or a wheelbarrow to carry the collected waste. The collected waste is disposed of in the municipal containers located at several places in the city. According to a report conducted by SBPDA, 503 km out of a total of 575 km of main roads are being swept 6 days a week. This activity accounts for 6 percent of the collected waste (SBPDA 2003).

5.3. Transport

There are 72 lift tucks, but only 35 to 40 of them are used daily because the average age of the trucks is more than 5 years and they are inadequately maintained. Moreover, one truck can only transport one container to the landfill site which lies 13 km outside the city centre. The transport system is therefore time-consuming because the truck has to drive 26 km in total to unload one container (SBPDA 2003).

5.4. Final disposal

Today, there is only one landfill site where all the waste collected by the municipality is disposed, namely the site known as ‘Repi’ or ‘Koshe’, the local word for ‘waste’, and it is located in Kolfe sub-city, 13 km south-west from Addis Ababa city centre. It covers an area of 25 hectares of prime farmland. It is an open landfill, where the waste is deposited, spread out, levelled by a bulldozer, and then compacted by a steel studded wheeled compactor to reduce the volume (Tadesse Kuma 2004). The landfill was developed c.40 years ago and until year 2002 the waste disposed on the landfill is estimated to have been 9.5 millions cubic metres (SBPDA 2003).

When the landfill was established, the only factors that were considered in selecting the site were hauling distance, availability of land and the distance from the city. There were no evaluations of the underling soil structure, topography, climate, surface water, and the hydro

geological conditions of the area. Both domestic and industrial waste are dumped at the site without any form of special treatment, and the waste is not covered with soil to prevent the harbouring of disease vectors, odours, air pollution, and other hazards. There is no drainage system and the site is not enclosed from the surrounding environment. In addition, there is a lack of guidelines for the site and no gas ventilation has been established to prevent fires. As a result, the nearby surface water and groundwater is vulnerable to contamination by leaching, and contains high amounts of chloride, organics, metals, hydrates and other contaminants .

There is no doubt that the dump site in Addis Ababa is improperly managed. It attracts all types of disease-spreading insects. The stench can be smelt several kilometres away from the site. When the site was chosen, it was located at a safe distance from the settlements, but today the site is no longer at the periphery of the city. The city has gradually extended towards the site and many residential neighbourhoods now surround the dump site (Yirgalem Mahiteme 2001).

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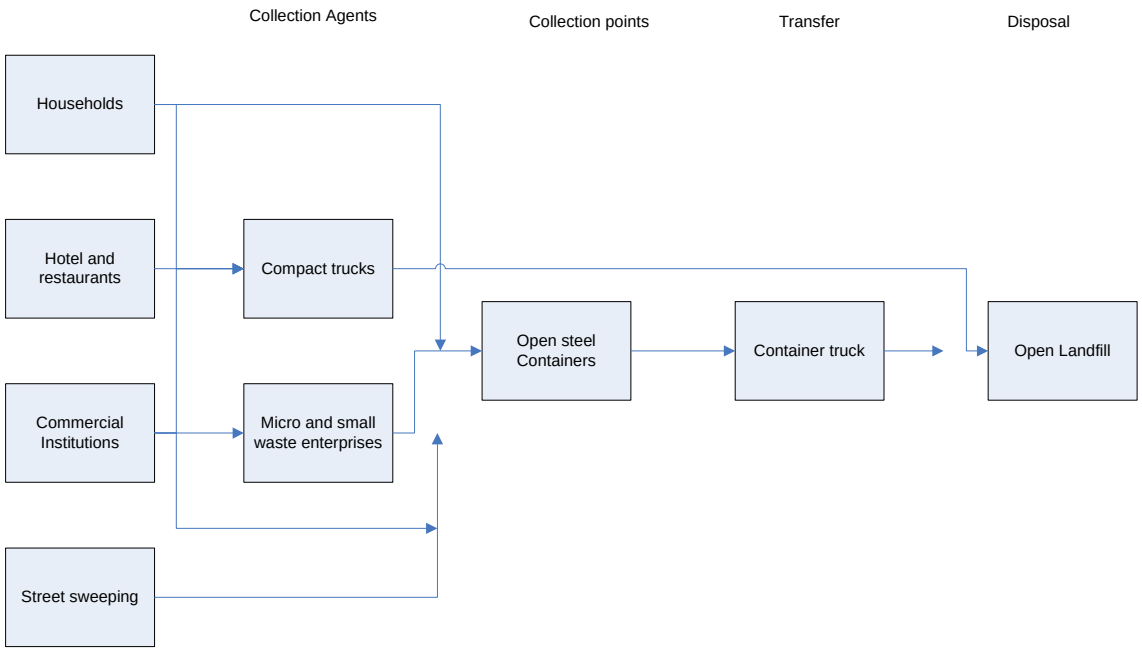

Figure 6: An overview of the formal solid waste management system in Addis Ababa, 2004.

5.5. Waste generation

The sources of solid waste in Addis Ababa include household waste, street sweeping, and commercial, industrial and institutional waste. It is difficult to calculate the exact quantity of solid waste produced or generated in the city. It may be possible to measure the amount of waste collected by the municipality and the micro and small enterprises operating in the collection of solid waste in the city. However, the measurement of the amount collected, would not represent the actual amount of solid waste generated. Not all waste is collected, a significant portion of the waste is simply thrown into ditches, along the roadsides and into the rivers, it is also burned at household level, and some street boys and a huge number of others collect inorganic materials such as plastic, metal, paper, aluminium, wood, and glass. All these factors make it difficult to accurately measure the amount of waste generated in the city. Several reports from the municipal government and also by Gordon have estimated the generation of waste in the city, but from experience I do not believe that these estimations reflect the actual amount generated.

Seasonal variation

There are also variations in the amount of waste generated on different days and in different seasons. Market days yield more waste than other days of the weeks, and there is more waste during the dry season than in the wet season. The main reason for this is that the rain washes the streets and carries the waste into the rivers. In addition, the wet season is not the main season for harvesting, which generally means a reduction in the amount of waste from vegetables and fruits.

Estimation of waste generation

To give an indication of the waste generation in Addis Ababa, it is helpful to consider Gordon's waste generation estimations. According to Gordon's estimations referred to in a report written by SBPDA (2003), the generation of waste is very low and is estimated to be 0.15–0.252 kg/GNP/day. If the current population of 3,035,138 with a waste generation of 0.353 kg/GNP/day is taken into account, the waste production of the city is 765 tons or 2295 m^3 per day.

Nevertheless, the waste generation per GNP is quite low compared to other countries in Africa. Tanzania has a generation rate of 1 kg/GNP/day, Ghana has 0.4 kg/GNP/day, Zimbabwe 0.7 kg/GNP/day, and Uganda generations waste at a rate of 0.6 kg/GNP/day.[9]

Source of waste

Figure 7 shows the source of waste generation in Addis Ababa: 76 percent of the waste collected is generated by households, 18 percent by institutions and 6 percent from street sweeping. The percentages are taken from a comprehensive study by the Norwegian consultancy NorConsult in 1982, which produced the most recent estimates for the city. However, it is reasonable to presume that the distribution or percentages is very similar today.

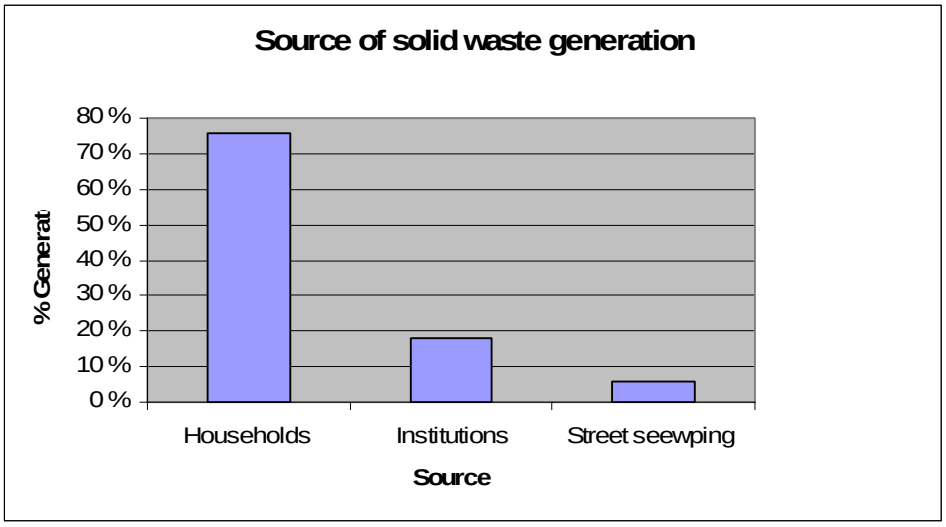

Figure 7: Source of solid waste generation (SBPDA 2003).

5.6. Collection rates

According to the SBPDA (2003), 65 percent of the waste generated in the city is collected and disposed of by the municipality, 5 percent is recycled, and 5 percent is composted. The remaining 25 percent is left uncollected in the streets, ditches, rivers, sewerage system, and in open areas in the city (Appendix 12.4, photographs) (Figure 8). In another report by the SBPDA from 2003, it is argued that 15 percent of the total generated waste is recyclable and that 4 percent is recycled informally.

[9] World Resources 1998–1999 p. 278, Data Table 9.3 Urban Data (www.aiid.org/publ_dietz1.htm).

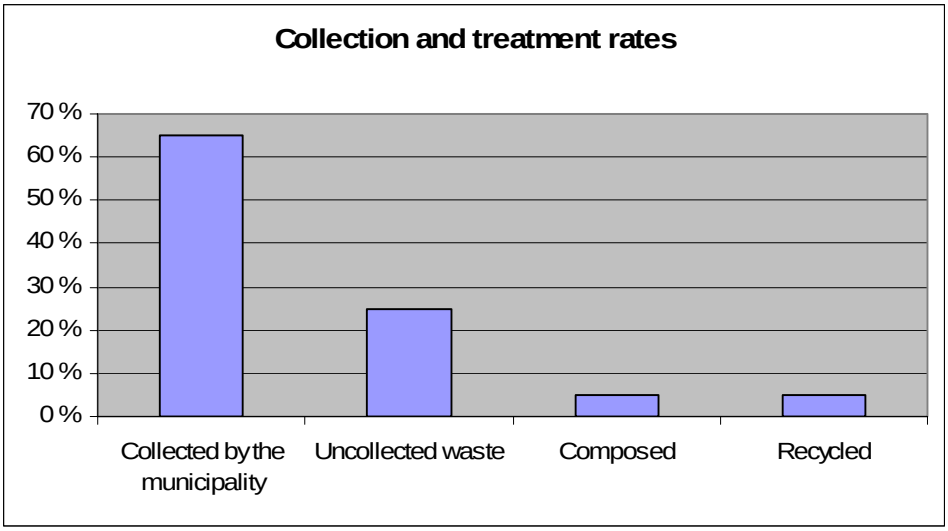

Figure 8: Collection and treatment rates of solid waste in Addis Ababa (SBPDA 2003).

5.7. Waste composition

About 60 percent of the waste generated in the city is organic (Appendix 12.4, photographs), which results in a waste composition with a high amount of humidity and a high density. Gordon estimated the density to range from 205 to 370 kg/m^3, with an average density of 333 kg/m^3 (SBPDA 2003).

The waste composition in Addis Ababa varies according to the time of the year, and in different parts of the city. The organic component of the waste content (fruits, leaves, vegetables) is much higher from September to January in all parts of the city, and decreases from February to August, when the production of organic materials decreases as a result of heavy rainfall. In areas where the living standard is high, materials such as plastic and metal constitute a higher portion of the waste than in poorer areas. The composition of the solid waste in Addis Ababa is shown in Figure 9.

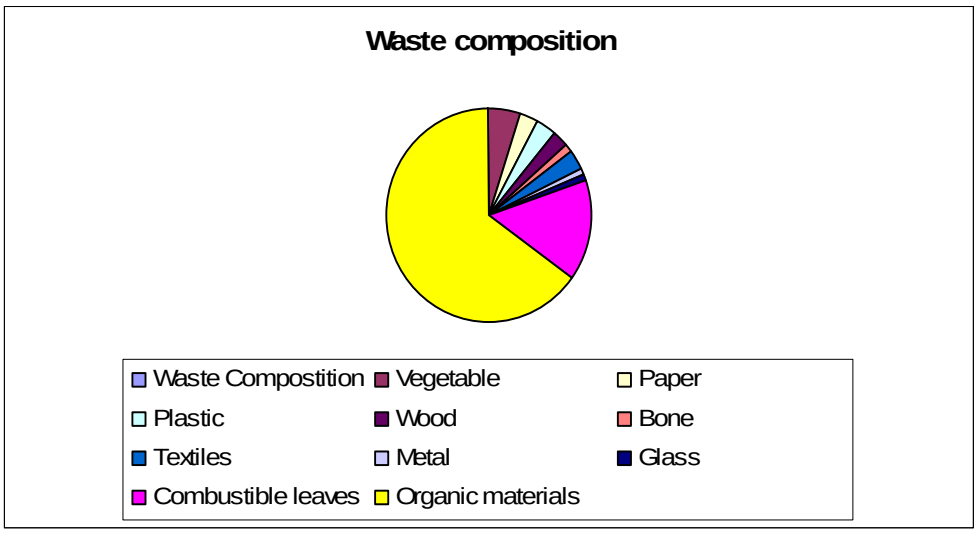

Figure 9: Waste composition in Addis Ababa (SBPDA 2003).

5.8. Labour force

In July 2003, there were 1907 employees within the formal refuse system in Addis Ababa. The majority (58 percent) were employed as street sweepers, 26 percent as container inspectors, and 11 percent as garbage drivers (Table 1) (SBPDA 2003).

Type of work	Number of employees
Administration	23
Street sweepers	1107
Head of streetsweepers	30
Logistics responsible	10
Truck drivers	212
Container controllers	505
Mechanists	10
Team leaders	10
Total	1907

Table 1: Type of work and numbers of employees within municipal solid waste management (SBPDA 2003).

5.9. Economy

The central government allocates the budget for the SWM in Addis Ababa. According to the SBPDA (2003), 1 percent of the total budget for the city is used to manage solid waste.

Today, none of the households are charged for the collection of solid waste carried out by the municipal government, though different institutions such as hotels and industries are charged a fee of 11 ETB/1.31 USD per m^3. However, this does not cover the full cost of collection, transportation and disposal, which is about 20 birr per m^3. Taking the latter cost as a basis, it means that the municipality would need c.10 million birr to cover the solid waste collection and disposal costs, which amounts to an average of 26 birr per household per year, or 2.2 birr per household per month (Girma Kebbede 2004).

5.10. Inefficiency in the municipal solid waste management system

Location of containers

As mentioned in section 5.2 the settlement pattern and the infrastructure in the city make it almost impossible for the trucks to access many areas of the city. Therefore, the municipal containers are located near the main roads which means that a large proportion of the city's population has to carry waste over a distance of between 0.5 and 1 km. Today, one container serves 7367 people (SBPDA 2003), which results in a large proportion of the population throwing their waste illegally into ditches, rivers and open areas.

Overcrowded containers

There is no map available showing where the containers are located in the city nor has a collection route or a schedule over how often the containers should be emptied been worked out. Consequently, the containers are picked up randomly, which leads to several containers remaining full for several days or weeks before being picked up and transported to the landfill. Many of the containers are overfull when the collection trucks pick them up, so it is quite common to see a lot of garbage lying around the containers. This waste is rarely picked up, which leads to bad odours in the vicinity. It also attracts animals, which eat the garbage lying around the containers. In addition, since the intention is to empty twice a week, the large steel containers do not have covers and the waste is therefore not protected from rain or sun, which leads to decomposition (Appendix 12.4, photographs) (Tadesse Kuma 2004). However,

it should be mentioned that this problem had decreased during the last few years, especially since the municipality has started to employ container inspectors who check that people or waste enterprises throw their waste into the container, and clean up afterwards. This is certainly the case for Addis Ketema sub-city, though the situation in the other sub-cities was not confirmed during fieldwork.

Shortages of containers

Shortage of containers, limited access to containers in many areas in the city, and shortage of open space on which to locate the containers are the main problems concerning the municipal container system in the city (SBPDA 2003).

Lack of collection schedule and collection trucks

The main problem with the house-to-house collection service is that the schedule varies and depends on the availability of trucks. A collection schedule not worked out for the timing and regularity of collections, which means that households do not know when the collection trucks are due. Another problem is that the poor maintenance of the trucks leads to many of them being out of order and therefore not able to carry out the collection (Interview, 2004). Thus, when the garbage trucks pass by in a neighbourhood they sound their horns to let people know they are coming so that they can come out and meet the trucks with their waste. The problem is that the trucks do not wait long enough, so those who do not manage to carry out their waste in time are forced to go to the nearest container. All of these factors contribute to the inefficiency in the house-to-house collection of waste (Interview, 2004).

6. The private sector within solid waste management

The present solid waste management system in Addis Ababa relies on the municipality, which is expected to provide a full range of waste collection and disposal services. Nevertheless, in the last five years some micro and small enterprises have started to developed in the sector, filling the gap that the municipality has not able to successfully. The private sector involved in SWM in Addis Ababa is constituted by private enterprises or individuals which operate with valid and registered licenses from the municipal government. The municipality's intention with the integration of the private sector in SWM in Addis Ababa is to make the management of solid waste more efficient in term of the rate of collection, to reduce the municipal expenses, and to improve the urban environment. In addition, the municipality aims to create jobs for 10,000 people within this sector (Interview 2004).

6.1. Collection, transport and disposal

In Addis Ababa the private sector consists mainly of micro and small enterprises which collect waste from households and several institutions using push carts. The waste is then transported and disposed of in the municipal containers. In addition, some of these enterprises also sort some materials for composting, reuse or recycling, but this activity is still very limited.

According to interviews conducted with seven enterprises in Addis Ketema sub-city, altogether they served 6170 households and 1070 establishments, i.e. a total of 7240 clients, which constitutes 2.2 percent of the population in Addis Ketema sub-city. The total amount of waste collected from these clients was on average 129,06 m^3/day (Interview 2004).

All of the enterprises interviewed were involved in the collection of waste, and only one of them was sorting out inorganic materials for recovery. All of the other enterprises informed that their employees usually sorted out inorganic materials while they were working. The materials were then sold in order to earn extra income.

6.2. Labour force

According to research published by SBPDA in April 2004 b, c.150 micro and small enterprises exist within SWM in Addis Ababa. In addition, according to Addis Ketema sub-city administration the total number of waste enterprises in Addis Ketema is currently 42. If the number of enterprises operating in Addis Ketema is compared with the total number of enterprises working in the city, then the former number seems small. According to these data, 28 percent of the enterprises are working in Addis Ketema. However, taking into consideration that some of them are operating informally the actual number may be much higher.

Seven waste enterprises operating in Addis Ketema sub-city were included in this study. In total, they had 196 employees. If we multiply this number with 6 (42 enterprises), we arrive at an estimate of 1176 people working within SWM in Addis Ketema.

Formal and informal activities

Most of the waste enterprises are operating formally, but some of them operating in an informal way. This means that their activities are not registered by the municipal government and as a result they do not pay taxes. Others again, are registered by the government but try to avoid paying taxes if possible, in order to keep their expenses as low as possible. After talking to various waste enterprises operating in Addis Ketema sub-city, it became clear to me that many of these registered by the government and paying taxes did not state their exact number of clients and employees, in an attempt to avoid the expenses becoming too high. As an example, I talked to one manager of one enterprise that is registered by the government and learned that he says that he has 70 clients to the government when in reality he has 200. Several waste enterprises are operating in a grey zone between the formal and the informal sector. Therefore, it is difficult to assess the correct number of people involved in this sector, but the number is definitely higher than the number the SBPDA operates with (Interview 2004).

6.3. Problems facing the private sector

High competition

All of the enterprises mentioned that there is strong competition between enterprises because of the municipality's creation of new waste enterprises in the area. As a consequence, the prices for the service they provide had decreased dramatically in the previous year. In addition, many of the enterprises had recently lost many clients because the new enterprises offer the same service at a lower price. Further, the new enterprises have their papers stamped by the government, which in some cases can result in clients feeling obligated to choose the new enterprises developed by the municipality.

Lack of regulations

Today, there are no regulations governing private waste collection sector. Different enterprises are operating in the same area, and in some areas there are no enterprises operating. The latter are usually very poor areas where households do not have sufficient money to pay for such a service. The municipality has suggested that there should be a limit of 300 clients for each enterprise. However, with no price regulation, some enterprises cannot operate economically. In many areas the prices are down to as low as 3 birr per month, and if this figure is multiplied by 300 clients it amounts to a monthly income of 900 birr. This is not much, and if the municipality were to introduce such a regulation they would need to regulate the prices for the services. In this case, it is not certain whether the households would be willing or able to pay such a price for the service. What about the poor people, who are not able to pay? Would the municipality compensate the enterprises or would the enterprise perform this service for free?

Overfull containers

Another problem facing the private sector are that the containers are often full, which leaves people without anywhere to dispose of the collected waste.

Lack of support

Another problem that the enterprises mentioned was that although they would like to start different recovery activities they lacked the knowledge, the economy, and an area to carry out these kinds of activities (Interview 2004).

7. The plastic recovery system in Addis Ababa

So far I have described the formal solid waste management system in Addis Ababa, and it has become clear that the municipality's role in plastic recycling is absent and that they mainly focus on collection, storage, transportation, and disposal of solid waste. As a consequence, most of the collection of plastic for reuse and recovery in the city is performed by the informal sector in the absence of the government provision. This Chapter describes the plastic recovery system in Addis Ababa based on my fieldwork carried out in Autumn 2004.

7.1. Organization of the plastic recovery system

The organization of the recovery system has a complex structure including different waste generators such as households, institutions and industries, and continuing with systems for reuse, separation, collection, buying and selling of recyclables, transformation, use of recyclables and final disposal (Figure 10).

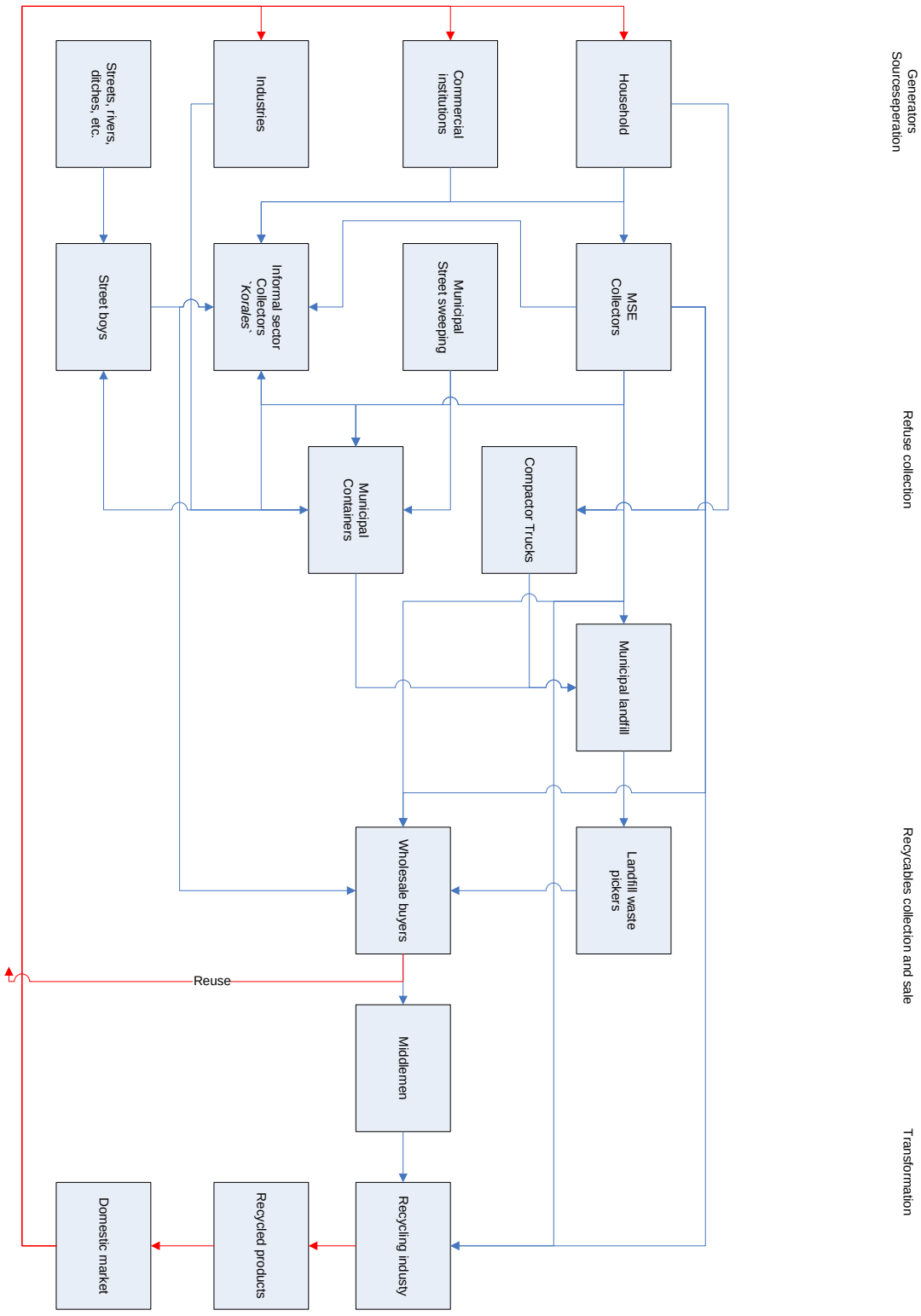

Figure 10: Overview of the plastic recovery system in Addis Ababa.

7.2. Source separation and collection

The sorting of waste for recyclables takes place at various levels in the waste management process. The first level of source separation in the waste recovery system in Addis Ababa is the households. At this level, plastic materials are considered valuable and are therefore usually sorted out for reuse. Thus, the materials are used several times before they lose their utility value and are considered as waste. At this level too, plastic materials are thrown into the waste cycle, given away to old or poor people, and either sold or given away to *korales*, depending on the income of the household. Several collectors represent the second stage in the plastic recovery system. The collectors can be divided into four groups: street boys (Appendix 12.4, photographs), private sector enterprises, scavengers' operations at the municipal landfill, and the *korales* (Appendix 12.4, photographs) who form the largest group of collectors in the city (Interview 2004).

Korales

If one walks in any part of the city one will undoubtedly see or meet *korales*. They are everywhere and easily identified as either men or boys walking in the street with bags over their shoulders. Moreover, if one listens it is possible to hear the *korales* calling out in a very special way. Several times I tried to understand what they were shouting, but without success. In fact, *korale* is an abbreviation of '*Korkoro Yaleh*' ('Have you got any scrap metal?') which the collectors call out when they are walking around different parts of the city, collecting materials for recovery. The name may have arisen some time ago when they only collected metal. Today they buy plastic materials along with other materials such as metal, glass, wood, and old shoes. When households hear the calling and have some materials at home that they consider of no value, they go out and negotiate a reasonable price with the *korales* or just give the items away. All collected materials are brought to the wholesaler directly, because none of the *korales* have their own place to store the materials. They only store the materials themselves on Saturdays and Sundays when there is not much to collect[10] and the wholesalers in Menalish Terra have a day off. Many of the *korales* walk with their bags to Menalish Terra, but if their bags are very heavy it is common for the *korales* to take a minibus. According to

[10] Based on a conversation with a *korale* and through observation, is not common for households to sell materials to the *korales* during the weekends.

my observations, the busiest time during the day in Menalish Terra is between 14.00 and 16.00.[11]

Street boys

Another group of collectors in the informal sector consists of young boys who sit near the municipal containers and wait for some valuable materials to arrive which they can collect and sell to the *korale*. At several places in the city I observed boys sitting nearby containers every day, all day long.

Private sector

Some of the collection crew in the private sector collect plastic at the same time as they are collecting solid waste from households and institutions. Open, push collection vehicles give them easy access to sort out and collect plastic materials from the mixed waste. The majority of the waste enterprises in the city only engage in the collection and disposal of solid waste, but in certain cases the employees are collecting plastics for themselves and are selling them to *korale* or to wholesalers in Menalish Terra. Some waste enterprises sort out and collect plastic, which they sell to a wholesaler in Menalish Terra or directly to a plastic factory, in addition to collection and disposal of solid waste. In these cases the waste enterprises have inspectors to check that the employees do not sort out plastic materials for their own purposes. These activities are very common in Addis Ababa (Interview 2004).

Scavengers at the municipal landfill

The last group of collectors are those who collect different kind of materials at the municipal landfill site Repi. According to SBPDA (2003), the number of collectors operating at the landfill is 300–500. The quality of the plastic materials collected at this stage in the system is generally of a much lower quality compared to those collected by the *korales* and the waste enterprises. The main reason for this is that the separation of plastic materials has already taken place earlier in the system, such as at the household level. Therefore, the plastic materials that reach the landfill site are of a much lower quality.

[11] In Ethiopian time: from 08.00 to 10.00 in the afternoon. Ethiopian measure time in 12-hour cycling starting at 06.00 and 18.00. In other words, their seven o'clock is our one o'clock and vice versa

7.3. Trade of recyclable materials

The third level in the plastic recovery system comprises those who buy the plastic materials from the collectors, often called wholesalers. The most common way of selling the collected plastic materials is directly to the wholesaler located in Menalish Terra in Addis Ketema sub-city (Figure 1). The different wholesalers specialize in one or several types of materials. Some specialize in metal, wood, tyres, electricity products, old shoes, and plastic, while others specialize in a combination of these materials. They buy most of their plastic materials in small quantities from the *korales*, some from the private waste enterprises operating in the city, and some from other sources. It is very common for wholesalers to have an agreement with several *korales*, where the wholesaler provides working capital in exchange for rights to the materials collected by the *korales*. One wholesaler told me that most of the wholesalers have an agreement with at least 10 *korales*, but the actual number may be much higher (Interview 2004).

The wholesalers pay per kg, depending on the quality and the shape of the materials. The volume of materials purchased in this area is high. The wholesalers are suppliers of used plastic materials to several plastics factories in the city. At this level the plastic are washed before they are sold for reuse to a small artisan or to plastics factories. Box 1 gives a brief description of one of the wholesalers currently operating in Menalish Terra.

Box 1: A wholesaler in Menalish Terra

Mustafa is a young man in his early twenties who buys and sells different kinds of plastic and metal waste materials. His father started this business, but already at the age of 6 Mustafa began to help his father, and when he was 12 years old he was old enough to start working full time for his father. Today he has taken over the business and is running it with the help of two of his brothers.

Mustafa buys different kind of waste materials, but mainly metal and plastic. The reason for this is that the value of metal and plastic is substantially higher than other waste materials. He buys the materials from his collectors who in turn walk around different parts of the city and buy waste materials from the households. The number of collectors that work for him varies according to the demand for plastic and metal waste. Usually, around 10 collectors are working for him, but the number can increase to 50 if the demand is high. Every morning he gives his collectors money to buy materials from the households. In the afternoon, the collectors return with their bag full of plastic and metal waste materials. He does not have any idea of how much he buys each day because it can vary depending on whether it is a good or a bad day and what the demand for such materials are. Usually, he buys materials for 500 to 800 birr a day. He does not know how much he earns, but he told me that he buys waste materials from his collectors for 0.10 to 0.35 ETB and sells the same materials for 0.35 to 0.75 ETB, according to the quality and the shape of the materials. He sells the materials further to small industries or factories that use them in the manufacture of new products.

Mustafa likes his job, but he is afraid for the future. Mustafa told me that the local government had decided to invest in new premises in the area where he currently operated. Just few days ago, he received a letter from the government stating that he had to collect all his belongings and remove them from the area as soon as possible. If he did not do that, the government were going to take all his possessions. Mustafa told me that he pays rent and tax for the area he operates from. Further, he said that the government did not offer a new area to him or those working in the same occupation as him, so he is afraid that he is going to lose his job, and he does not know what to do if that happens. This is the only work he has been doing since he was a little boy and he has no education and work experience in other fields. Therefore, he is afraid that he will be without any job in the future (Interview, 2004).

7.4. Transport

The wholesalers usually collect enough plastic materials to fill a truck, which they usually hire for the purpose of transporting the plastic to the buyers. If the amount of plastic is less, they use their own private cars for transport (Appendix 12.4, photographs) (Interview 2004).

7.5. Transformation of collected materials

The highest level in the plastic recovery system in Addis Ababa is represented by the local plastics factories, which use the collected plastic in the manufacture of new plastic products. All of the factories have to import raw materials from abroad. Through interviews with several plastics factories, I found that most of them import the raw materials, mainly from Saudi Arabia and Belgium. These raw materials are relatively expensive, and hence the final plastic products are too. Therefore, plastics factories also buy large quantity of collected plastic waste from the wholesalers in Menalish Terra.

As one of the most useful items in the solid waste, plastic is used to make plastic pellets for recycling. These pellets are used to manufacture different kinds of plastic items and different products used in industrial activities. Plastics are becoming increasingly important in various industrial sectors. Major industrial sectors using virgin and recycled plastic in Addis Ababa are construction, electrical goods, and household plastics containing PVC (polyvinyl chloride), PP (polypropylene), PE (polyethylene), and PET (polyethylene terephthalate). PVC is widely used by several factories in the production plastic shoes for local consumption, which are usually produced of 100 percent plastic waste. PET is generally used for making mineral water and soft drinks bottles, which are easy to recover. Another use of plastics is the production of shopping bags made of either PP or PE, but which are posing a major threat to the environment in Addis Ababa today (Box 2). Thus, plastics for household use constitute for the principal source of plastic waste in the city as well as the main input for the recycling industry (Interview 2004).

Box 2: Plastic bags

Among the most disgusting and unsightly yet ubiquitous items in solid waste in Addis Ababa today are the discarded low-density polyethylene (LDPE) plastic bags. The quantity of LDPE plastic bags in solid waste management has increased dramatically during the last 10 years and is expecting to increase due to their convenience for carrying groceries and subsequently for refuse. Shops usually hand out these bags free of charge to shoppers. These thin plastic bags do not contribute much in terms of volume to municipal solid waste, but the main problem is the disposal of these bags in streets, streams, rivers, ditches, gardens, parks, and trees and they are therefore a serious environmental hazard as well as compromising the aesthetics of the urban and rural landscape. The plastic bags are usually made from non-biodegradable substances, which do not break down readily in the environment but take several thousand years to degrade. Currently, they are not recycled in Addis Ababa and most urban household waste contains them (Girma Kebbede 2004).

7.6. Formal or informal actors

Most of the activities carried out in the plastic recovery system in Addis Ababa, find place in the informal sector to a greater or lesser degree. However, it is difficult to categorize the plastic recycling sector in Addis Ababa strictly into either the formal or the informal sector. Some of the actors such as the plastics factories can be classified as formal industries, yet some of their activities operate under informal circumstances. Therefore, there is not a strict boundary between the formal and the informal sector in the plastic recovery system. The plastics factories and some of the micro and small waste enterprises fall into a grey zone between the formal and the informal sector. They usually operate on the formal side of the law because they require licences to operate, but at the same time they operate in an informal way when it comes to activities concerning plastic recycling. In addition, all of the collectors can be categorized as informal actors. Further, the wholesalers located in Menalish Terra can be placed within the informal sector, since even though they are paying taxes and rent for the land to the municipality their activities operate in an informal way because they do not pay taxes for the activities.

8. Results

This chapter presents the results from the survey conducted for the households and the *korales* in Addis Ababa, 2004.

8.1 Handling of waste at household level

The survey conducted for the households in Addis Ketema sub-city included altogether 19 questions, but as research progressed many of the questions were no longer relevant. Therefore, only four of the questions from the survey are included in the discussion below.

8.1.1 Source separation at household level

The surveys conducted in three *kebeles* in Addis Ketema sub-city showed that the majority of the households in all three *kebeles* separated waste to a greater or lesser degree. Figure 11 shows the percentage of source separation at household level. It can be seen that households in *Kebele* 15 had the lowest percentages of source separation; only 14 percent stated that they separated waste. This figure is low compared to *Kebeles* 6 and 13, where 48 and 46 percent respectively stated that they separated waste. This pictures changes considerably when it comes to the question of whether the households separate waste sometimes. In this case, 64 percent of the households in *Kebele* 15 stated that they separated waste sometimes, while only 24 percent in *Kebele* 6 and 12 percent in *Kebele* 13 stated that they separated waste sometimes. Further, the survey showed that 42 percent of the households in *Kebele* 13 did not separate waste, 28 percent in *Kebele* 6, and only 4 percent of the households in *Kebele* 15 stated that they did not separate waste. From this it can be concluded that waste separation is most common in *Kebele* 15, due to the low percentage of people who do not separate their waste. Separation of waste is lowest in *Kebele* 13, with as much as 42 percent of the population not separating their waste.

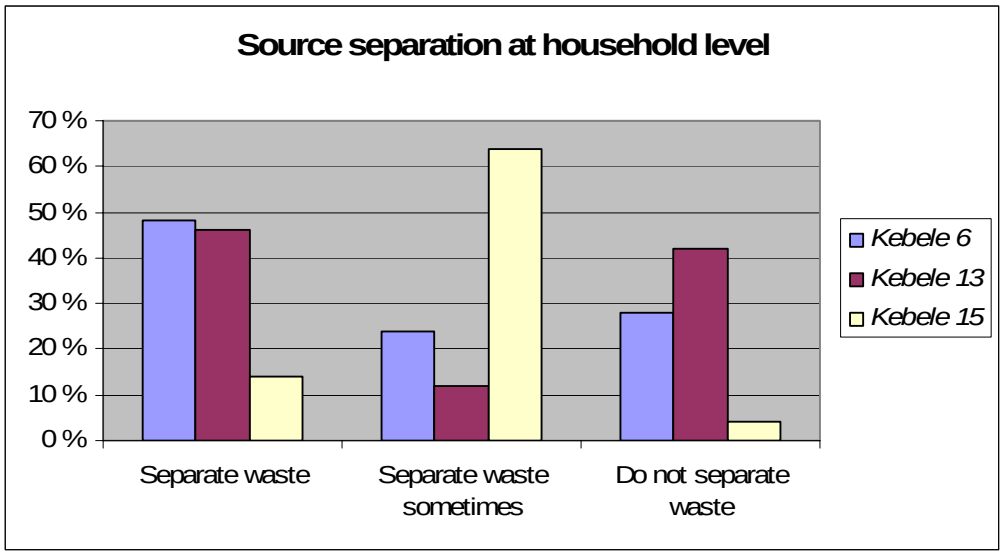

Figure 11: Percentage of source separation at household level in three *kebeles* in Addis Ketema sub-city.

8.1.2 Recovery practice at household level

Figure 12 shows that the trade of waste materials is common in all three *kebeles*. However, in *Kebele* 15 trade of waste materials is more common then the other two *kebeles*. In *Kebele* 15 82 percent of the households stated that they traded waste materials, while 54 percent in *Kebele* 13 and 36 percent in *Kebele* 6 stated that they traded waste materials.

When it comes to reuse of materials the practice is not as common as trade. Moreover, reuse is most common in *Kebeles* 15 and 13, where 62 and 56 percent respectively of the household stated that they reused materials, while only 18 percent of the households in *Kebele* 6 reused materials.

Some of the households give some of their materials away, but it is not as common as trade and reuse. Figure 14 shows that household in *Kebele* 13 had the highest percentage of giving materials away compared to the other two *kebeles*.

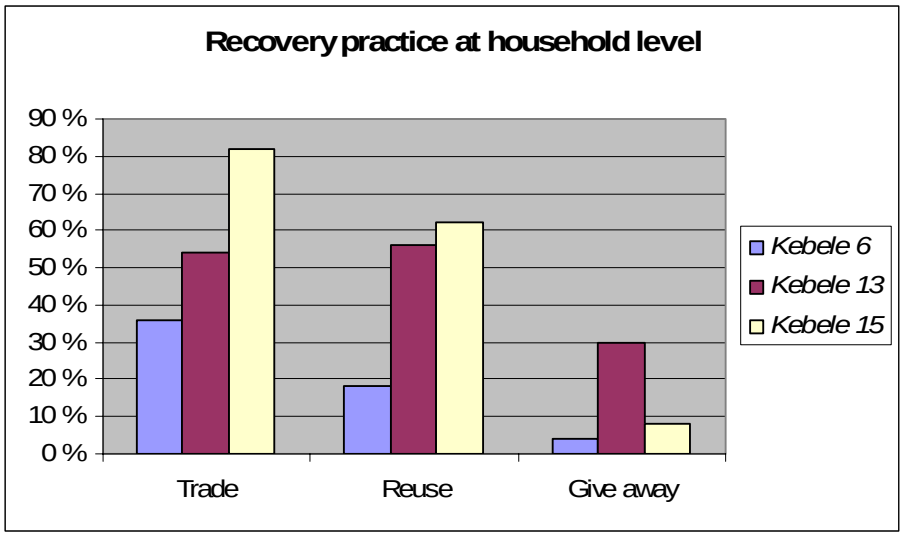

Figure 12: Percentage of recovery practice at household level in three *kebeles* in Addis Ketema sub-city.

8.1.3 Receivers of materials from households

The survey conducted shows that the *korales* receive most of the materials for recovery from the households in all three *kebeles*. *Kebele* 15 traded most materials with the *korales*, where 82 percent stated that they sold the materials to the *korales*. In *Kebele* 13.5 percent traded materials with the *korales*, while only 36 percent of the households in *Kebele* 6 traded materials with the *korales*.

When it comes to exchange,[12] the practice is not as common as trade and constituted 24 percent of the household in *Kebele* 15, 10 percent in *Kebele* 13, and 7 percent in *Kebele* 6.

[12] Usually conducted by men walking around the city and exchanging households items in return for other used materials.

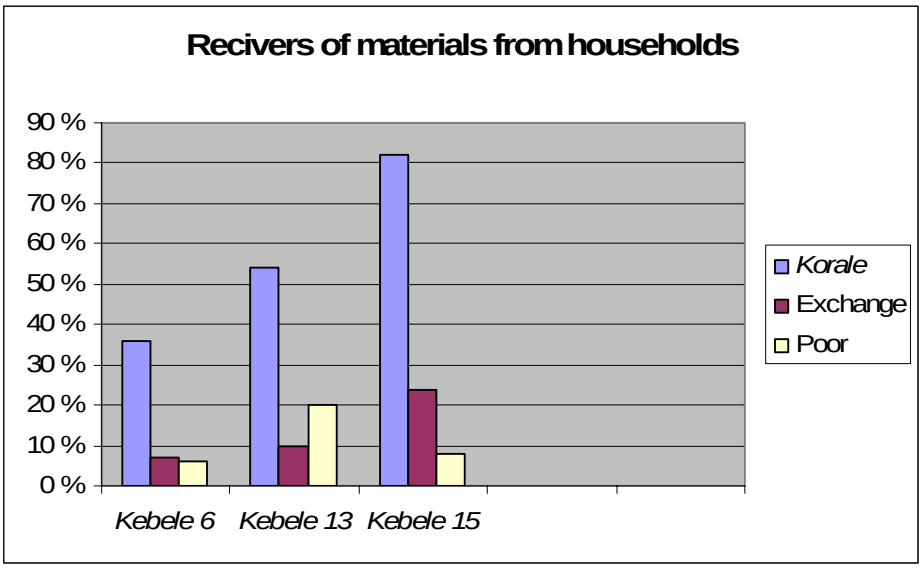

Figure 13: Percentage of receivers of materials to recovery in three *kebeles* in Addis Ketema sub-city.

Waste separation at household level was found to be highest in *Kebele* 15 and lowest in *Kebele* 13. This is somewhat surprising, since *Kebele* 6 is an area where household incomes are higher than in the two other areas. Moreover, the trade of waste materials was common in all *kebeles*, except for *Kebele* 13, where the reuse of materials was 2 percent higher than the trade in materials. Again, *Kebele* 15 had the highest percentage of trade and reuse of materials, while *Kebele* 6 had the lowest percent. Further, the survey showed that the *korales* were the main receivers of materials for recovery.

8.2. The informal plastic recovery system

The only actors within the plastic recovery system that I was able to conduct a survey on were the *korales*. Therefore, this chapter is limited to the results that I obtained from the questionnaires. However, through interviews and observations I developed a good understanding of the other actors operating in the system, as described in the previous chapter and to some extent in this chapter.

8.2.1. Gender

All of the *korales* who participated in the survey were male. In addition, during the fieldwork I did not see or hear about any female collectors. Therefore, it can be assumed that males dominate this occupation within the recovery system. With regard to the wholesalers and the intermediaries, no comprehensive studies were conducted, but from observations and conversations with various actors within the system I concluded that males dominate this occupation within the system too.

8.2.2. Age

The survey showed that the *korales* vary in age from 17 to 62 years old, and that the average age is 28 years.

8.2.3. Origin

The results from the survey are presented in Figure 14. Of the total, 39.7 percent of the *korales* were Gurage, 38.1 percent were from Addis Ababa, and 23.8 came from other areas of the country. This shows that 63.5 percent of the *korales* were migrants from the rural areas in the country.

All three wholesalers operating in Menalish Terra whom I talked with were Gurage. I also talked to some other people who knew the area and the wholesalers, and was told that most of the wholesalers were Gurage.

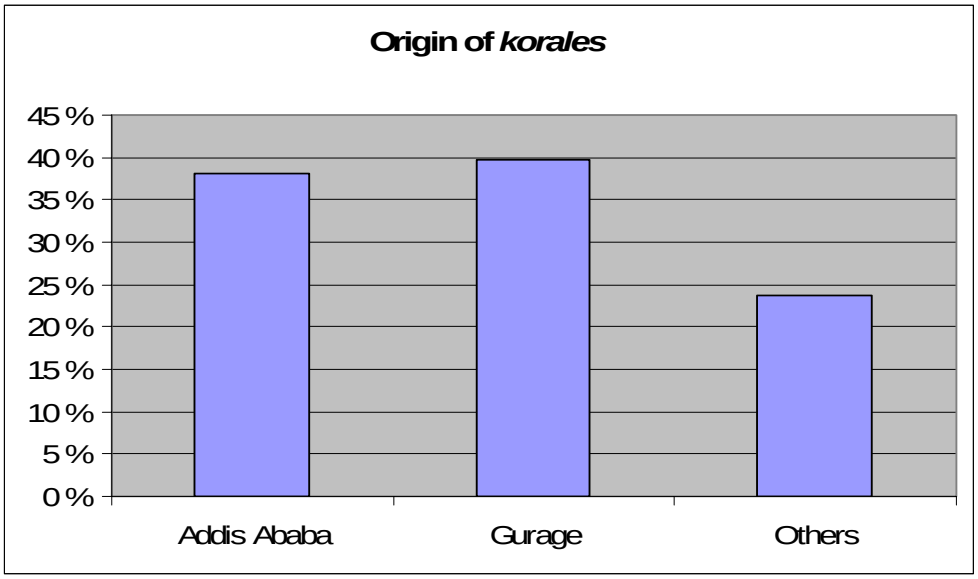

Figure 14: Percentage of the *korales* divided by origin.

8.2.4. Education

The large majority of the *korales* have some educational background. The surveys conducted with 63 *korales* in Addis Ababa during the fieldwork showed that 14.2 percent of the *korales* were illiterate and 20.6 percent (aged 1–4 years) of the informants had not finished elementary school, while 38.1 percent (4–5 years) had finished elementary school, and 14.3 had received 5 to 8 years of education. A total of 12.7 percent of the *korales* did not answer this question. The results are presented in Figure 15.

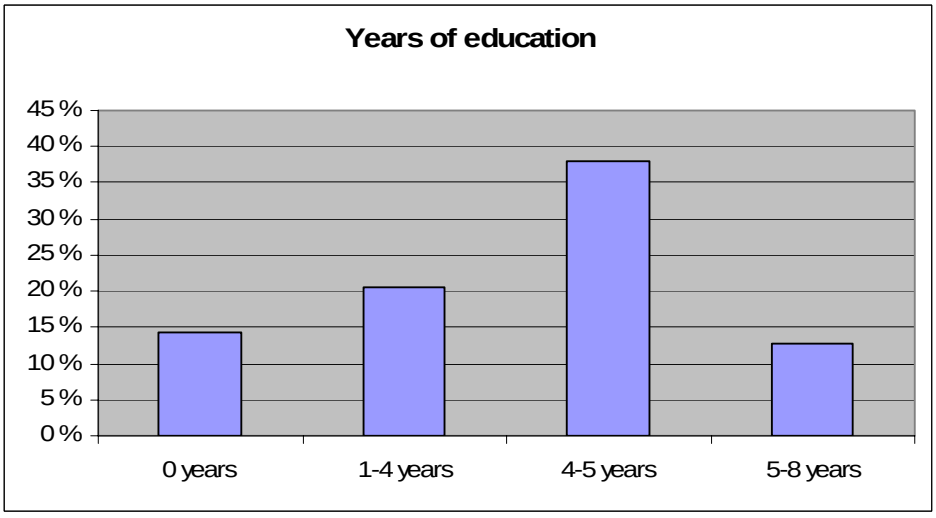

Figure 15: Years of education of the *korales.*

8.2.5. Labour force within the plastic recovery system

Since most of the activities are operating in the informal sector, and some in a grey zone between the formal and the informal sector, they are not registered by the municipal government. As a result, it is difficult to estimate the number of people working in the recovery system in Addis Ababa. Moreover, since research on this topic has never been conducted in the city previously it is even more difficult to be certain about the numbers involved.

Korales

As a rough estimate, some say that the *korales* number 3000, others say 15,000. I attempted to make my own estimate by hiring some people to help me count the *korales* entering Menalish Terra between 10.00 and 16.00 hours one day, and by the end of the day the total number counted was 2208 (Figure 16).

Taking into consideration that the *korales* entering Menalish Terra were only counted from 10.00 to 16.00, if the total number of *korales* counted is divided by 6 hours, it gives an average of 368 *korales* per hour. Most probably some *korales* entered the area before 10.00 and after 16.00, so using 368 *korales* as an average number per hour and multiplying it by four more hours to include those entering between 08.00 and 10.00 and between 16.00 and 18.00, then the number of *korales* increases by 1472 to give a total number of 3680. it is likely that not all of the city's *korales* went to Menalish Terra to sell their waste on this particular day, so if it is assumed that 20 percent of the *korales* went elsewhere, a further 736 more *korales* can be added to the total, bringing it to 5152. The area is quite big and in addition to the main entrance gates there are also several small roads that enter the area. I had only placed people to count in the main roads entering the area, so it is reasonable to assume that at least 20 percent of the *korales* were not counted. Thus, on this basis, the total number of *korales* operating in the city is estimated at c.5000 individuals. Still, this is only an estimate and it is not possible to be certain about the actual number of *korales* in the city.

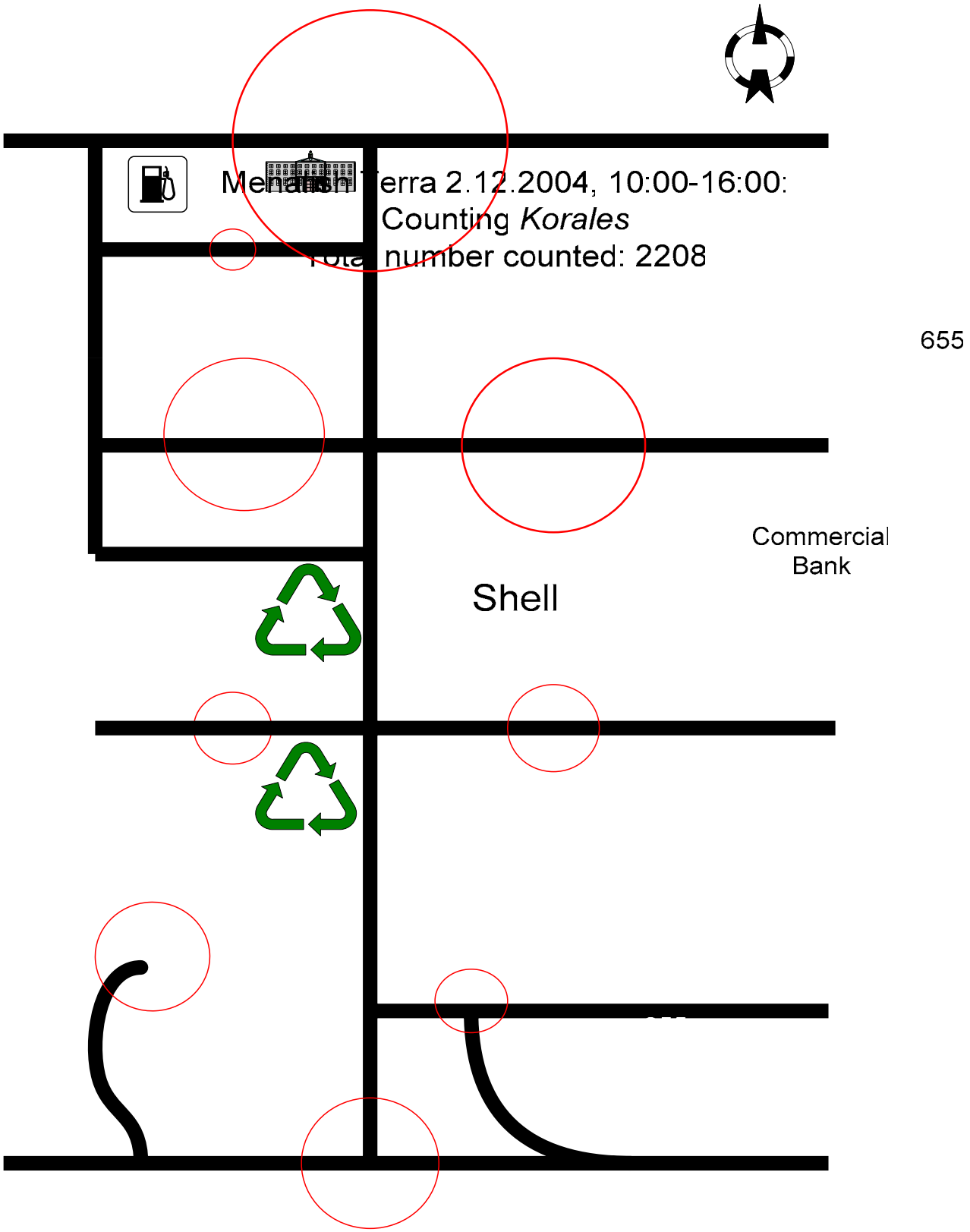

Figure 16: Location map showing where the *korales* were counted in Menalish Terra, and the number of *korales* counted in each location.

Wholesalers

There are about 300 wholesalers in Menalish Terra,[13] who buy and sell different kinds of materials. They have at least two employees to help with purchase and sale of materials, the packing and organization of the materials, and keeping track with the accounting. Assuming there are 300 wholesalers, and that at least two people are working for them, this gives a total of 900 people working in Menalish Terra buying and selling used materials.

Plastic factories

The number of plastics factories registered at the municipality is 170 (Appendix 12.3), but most likely some of them are operating in the informal sector. The next question is how many of them are operating in the recovery system in the city. Again, it is very difficult to give an exact number because their recovery activities are not registered by the municipality. In addition, after contacting almost 150 of 170 plastics factories in the city, all of them rejected the suggestion that they were using recovered materials in their production, with the exception of only one plastic factory which admitted using recovered plastic in their production. The factory also informed that in fact nearly all of the plastics factories in the city were using plastic waste in the production of new plastic products. They also informed that if a plastic can costs 11 ETB/1.31 USD it means that the can are made of recovered materials because the production costs for a plastic can made of virgin materials is 12 ETB/1.38 USD and the market price is c.20 ETB/2.31 USD. I wanted to check this for myself, so I went to Mercato and asked about the price of a plastic can in different local shops. None of the shops operated with prices above 11 Ethiopian birr. Again, it is very difficult to give an exact number for the plastics factories operating in the recovery system in Addis Ababa. However, if the prices of raw materials are taken into account, and considering that some are using recovered plastic materials in their production, it is difficult to imagine that the other factories can compete in the same market given the differences in production costs.

This suggests that there are several thousand individuals operating within the recovery system in Addis Ababa, which contrasts greatly with what the Norwegian consulting firm Norconsult stated some 23 years ago (1981: 2–5): ‘Very few people if any can live from scavenging activities in Addis Ababa. At most scavenging provides a small additional income to already desperately poor people’.

[13] After asking to 10 different people working in Menalish Terra about how many wholesalers there were, all of them responded 300–500, which I have taken to be a reliable range.

8.2.6. Working hours

According to the survey conducted, the *korales* work an average of 6.6 hours per day. The longest working day was 10 hours and the minimum was 4 hours. The latter is not high, and may indicate that the amount of materials available for collection is high, since the *korales* only work until their bags are full.

8.2.7. Source of collection

All of the *korales* collected plastic materials from the households. In addition, 7.9 percent also collected materials from the street, 9.5 percent collected materials from containers, 6.3 percent collected materials from the municipal landfill, and 3.2 percent collected materials from garages (Figure 17).

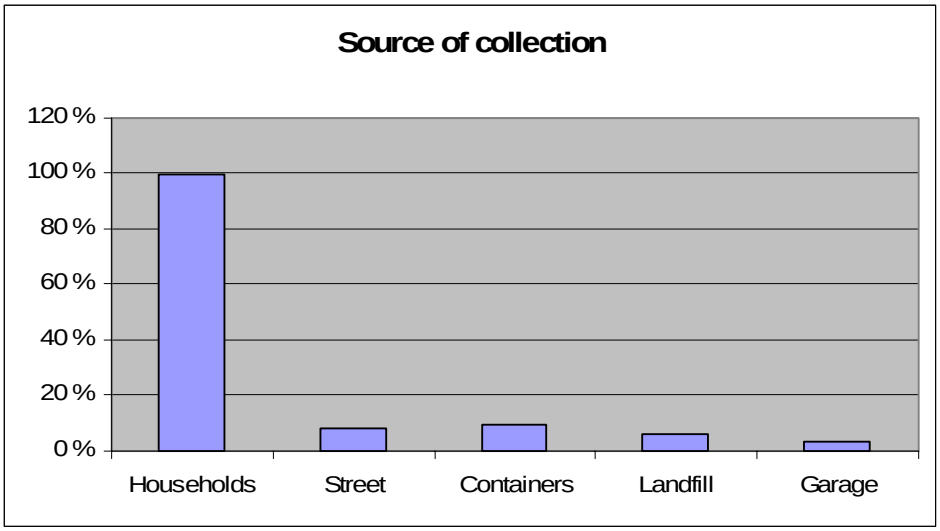

Figure 17: Source of materials for collection by the *korales*.

8.2.8. Amount of plastic collected

On an average day a *korale* collects around 15 kg of mixed materials.[14] Assuming there are 5000 *korales*, the number estimated in Section 8.2.5, 75 tons of mixed materials are collected each day. After observing the *korales* and looking in their bags, and based on the survey conducted, I would estimate that 30 percent of the materials collected are plastic. This results

[14] This number is based on interviews with several *korales* and through observations.

in a collection rate c.23 tons a day, i.e. 161 tons a week, or 690 tons a month and 8395 tons a year, for plastic materials.

8.2.9. Season variations

Of the total, 69.8 percent of the *korales* stated that there are seasonal variations in the amount of material available for collection, 11.1 percent said that there was little variation in the amount of materials, while 17.5 percent stated that there was no seasonal variations in the amount of materials available for collection.

The results of the questionnaires showed that most of the *korales* did not relate to an increase or a decrease in the price of materials. In response to both questions (Appendix 12.1.2, question 16 and 17), 54 percent of the *korales* said that they collected the same amount as usual, regardless of an increase or decrease in the price of materials collected. In response to both questions, 44.4 percent stated that the amount that they collected varied depending on the price paid for the materials.

8.2.10. Quality

Those materials collected for sale at the municipal landfill Repi are often of lower quality than materials collected in the city. The reason for this is that valuable materials have already been removed at the source by the generators, by the *korales*, or by foragers working within the city. As a result, the plastic materials arriving at the landfill are generally broken and contaminated by other waste, which reduces their quality and hence their value.

In Addis Ababa the only requirement the plastics factories has when it comes to using plastic waste in their production concerns the colour of some of the products. Some of the products manufactured require transparent or a bright white colour which can only be obtained by using virgin materials.

The recycling enterprises combine waste materials with virgin materials in production. Increased prices of virgin imported plastic have led entrepreneurs in Addis Ababa to change the composition of their inputs. The trade-off between cost and quality determines whether entrepreneurs continue using secondary materials or not. In Addis Ababa, there are no

regulations or quality standards for recycled products. The plastics manufactured from materials recovered from waste are always inferior to those using virgin materials.

Plastic goods cannot be produced without generating waste, so primary recovery is common in most plastics factories. Primary waste plastics are plastics generated from the production of plastic products by the plastics factories. The quality of the primary plastic waste is almost as high as the virgin plastic materials. The waste is pure and therefore suitable for reuse in production, and using the same equipment as the virgin materials.

8.2.11. Value

The value of the plastic materials at household level varies depending on the shape, quality and size of the plastic products. Nevertheless, it ranges between 0.15 birr up to 5 birr. In addition, the *korales* sell their plastic materials to wholesalers whose prices also depend on quality, though wholesalers pay per kg of plastic materials at a rate of c.5 birr. Further, the wholesalers also sell their plastic materials to plastics factories, where yet again the price per kg depends on the quality of the materials. The value of the plastic materials for the wholesaler is currently c.3 to 7 birr.

8.2.12. Link upward in the system

All of the *korales* sold their materials in Menalish Terra. In addition, 76 percent of them stated that they had a contract with a wholesaler in the area, while 24 percent of them stated that they did not have a contract and instead sold their materials to those who gave them the highest price. This may indicate that some of the *korales* are not as poor as previously assumed and that they have enough money to buy materials from the households themselves.

8.2.13. Income generation

The income generation in the plastic recovery system in Addis Ababa differs sharply between the various groups at different levels within the system. Waste collectors such as foragers and scavengers sell plastic waste at a survival level, obtaining cash from their collected materials that are sold mainly to the *korales*.

The *korales*' income varies according to how fortunate they are on any given day. The survey showed that the minimum wage for 88.9 percent of the *korales* ranged from 0 to 10 Ethiopian birr, while only 7.9 percent stated that their minimum income varied between 10 and 20 Ethiopian birr for one day. Further, 76.2 percent informed that their maximum income for one day is between 10 and 30 Ethiopian birr, while 20.6 percent stated that their income could be as high as 30 to 60 Ethiopian birr. If their maximum income is compared with the average income in Ethiopia, the *korales* income is higher than the average salary for an Ethiopian, which is c.300 Ethiopian birr/month (MEDAC 2000). However, if the average minimum daily wage of 5 birr is used, then the *korales*' income amounts to only 150 birr/month, which is far lower than the Ethiopian average wage. Thus, although it is difficult to estimate the actual income from the activities carried out by the *korales*, it was clear that the income from collecting materials was either generally lower or higher than the average income of an Ethiopian salary.

Income also varies substantially depending on the modality of the collectors. The *korales* that are operating higher up in the lower circuit have higher incomes than those who work in the street and at the municipal landfill. The main reason for this is that the *korales* usually buy the materials directly from the generators. Therefore, the quality of the materials is usually much higher than the material that has been thrown into the municipal waste cycle. On the other hand, the wholesalers have a much higher income compared to the *korales* and other collectors operating in the lower circuit, mainly because they operate at a higher level in the system. In addition, the wholesalers can make high profits because they operate in a monopolistic market, which enables them to determine the prices. Moreover, they buy materials at retail and sell at wholesale. The wholesale buyers can therefore frequently modify the prices on the plastic waste materials.

One wholesaler told me that he bought around 200 kg materials each day, and paid about 5 birr per kg, which gave a total expenditure of 1000 birr each day. Further, he sold the materials for 7.5 birr per kg, which generated a profit of 500 birr each day. This was also the case for the other two wholesalers I talked to, though it should be mentioned that this information is not reliable because it is only based on interviews with three out of at least 300 wholesalers operating in the area. However, it is clear that the wholesaler's income was far higher than the daily incomes of the *korales*.

8.2.14. Reasons for participating in plastic recovery

79.4 percent of the *korales* said that the main reason for becoming involved in such an activity is because they did not have any other job opportunities, and they worked as collectors in order to make ends meet. One of the *korales* stated: 'To begin with I started as a *korale* on a temporary basis in order to earn a daily income because I did not have any other job alternatives, but now this is what I do for a living'. Another *korale* said: 'I could not afford to pay taxes for the farming land, so I had to travel to Addis Ababa in order to get a job and to earn an income and this was the only job I could get'.

The wholesalers have another reason for taking part in this activity too. Most of the wholesalers have developed as a family business for generations, and because the profit is good and this is the only work they know how to do, and hence they continue.

Plastics factories choose to become involved in the plastic recovery system mainly because of increased competition within the market, increased price of imported raw materials, and increased demand for cheap and low quality products. One manager at a plastics factory said: 'Because of the increased price of raw materials, we have no other choice than to use plastic waste in the production process, in order to be able to stay competitive in the market'.

The main reason why actors within the plastic recovery system participate in such activities is not for the sake of reducing the environmental impact that plastic products have during their life cycle, but rather it is the result of the economic profit these kinds of activities generate. In addition, because the unemployment in Addis Ababa is very high, people are forced to involve in such activities in order to earn a daily income. Another reason for the increased participation within this system is the increase in demand for plastic products within the market.

8.2.15. Length of stay

Most of the *korales* said that their activity was just a temporary occupation until they could find another job. Nevertheless, 22.2 percent of the *korales* had been working for more than 10 years in this kind of activity and 11.1 percent had been involved for between 9 and 10 years. Further, 12.7 percent had worked from 7 to 8 years, 17.5 percent had been working between 5 and 6 years and 22.2 percent had been working between 2 and 4 years (Figure 18). It was

unexpected to learn that 63.5 percent of the *korales* had been involved in this kind of activity for more than 4 years, and it indicates that many of the individuals that choose to involve in such an activity continue for a considerable time.

Figure 18: Length of stay for a *korale* within the system.

When it comes to the wholesalers, one of them had worked for 20 years, another for 18 years and one for 10 years. Even though these figures cannot be reliably used as a basis for estimations for all of them, the wholesalers apparently remain in their occupation for a long time.

8.2.16. Working conditions in the plastic recovery system

The working conditions within the recovery system are not good, especially for the lowest level of workers, such as the scavengers, foragers and the *korales*, who collect waste from all over the city. Waste picking is abhorred almost universally, but very little is done to assist waste pickers.

The wholesalers work with other handicaps to those of the collectors, such as harassment and extortion by local authorities and larger enterprises. Informal sector entrepreneurs and workers frequently lack the technology to optimize recycling methods and to deal with new waste materials. They are also usually denied assistance in financing that large established firms can access as matter of course.

Recovery and recycling impose significant health risks on those involved, especially when they are carried out informally. Industries using recycled feedstock are in many cases more polluting than those using virgin materials. Such industries tend to be small-scale in developing countries, so they are often not subject to environmental regulations. Environmental improvement should therefore include providing assistance to such small industries.

8.2.17. Problems facing the actors

The main problems that the *korales* are facing in relation to their work are encounters with *Doroyes*:[15] 44.4 percent of the *korales* stated that the *Doroyes* beat them and take their money. In contrast, 52.4 percent of the *korales* said that they did not experience any problems concerning their activities. This indicates that in one way or another the *korales* are accepted within the society.

In addition, the main problems that the wholesalers mentioned in relation to their work were the local government and the uncertainty regarding the land they operated from. This was stated by all three of the informants.

The plastics factories informed that their main problems were currently the increased prices of raw materials and high levels of competition. In addition, they mentioned that the increased taxes imposed by the government made it even more difficult to stay competitive in the market (Interview 2004).

8.2.18. *Korales* plans for the future

Most of the *korales* involved in this survey had some visions about their future: 36.5 percent wanted to be traders, while 28.6 percent wanted to study and work for the government. This is very interesting, based on their present situation where the government is one of their biggest fears with regard to their informal activity. Further, 19.1 percent of the *korales* had no plans for the future, 7.9 percent stated that they wanted a better job, and at least 3.2 percent stated that they wanted to go back home and continuing farming. This shows that most of the

[15] *Doroyes* is the local name for street boys who do not have jobs.

korales do not want to work with this kind of activity, but that they do it because they do not have any other choice.

In contrast to the *korales*, the wholesalers had no plans for their future. They only hoped that the government would not take away the land they operated from so that they could continue with their activities.

9. Plastic recovery analysis

This section of the report discusses various aspects of the informal plastic recovery system in Addis Ababa today. I start the analysis of the informal plastic recovery system with a discussion of the organization of the plastic recovery system in Addis Ababa based on my own findings presented in chapter 7 and 8 in relation to literature on scavenging and recovery activities covered in Section 2.4.

Further, I discuss the actors in relation to the social and physical structures which are operating within the system. There is a strong emphasis on the relationship between the local authorities and the actors within the informal plastic recovery system. Some of the main benefits and problems facing the system today are also discussed.

9.1. Plastic recovery as an evolving informal industry in Addis Ababa

In recent years, urban areas in Ethiopia such as Addis Ababa have increasingly started to adopt Western consumption habits, including the use of plastic goods. Plastic products have increasingly entered the everyday lives of people more than any other materials. Plastic products have found a wide range of applications in various sectors such as industry, agriculture, construction, health care, packaging, and household necessities. Several factories are producing thin plastic shopping bags, and others are producing plastic shoes for local purchase as well as a variety of household products. The amount of plastic materials produced and generated in Addis Ababa is increasing dramatically compared to some years ago. Nevertheless, the amount of plastic materials per inhabitant in Addis Ababa is low compared to other cities in the world.

9.2. Organization and hierarchy within the plastic recovery system

In Addis Ababa, as in most urban areas in developing cities, thousands of people are involved in plastic recovery activities which take place within the informal sector. DiGregorio's (1994) description of the organization and hierarchy of recovery systems matches the plastic recovery system in Addis Ababa quite well, except for some limitations and variations (Figure 19).

At the bottom of the hierarchy, there are the scavengers who collect plastic materials at the municipal landfill. Almost at the same level, there are the foragers collecting plastic materials from the municipal containers and in the streets. The reason for placing the latter a little higher up in the system is based on the quality of the materials collected.

At the next level in the system are the *korales*, who buy plastic materials mainly from the households and to a limited extent from the foragers and the MSEs. The *korales* are different from the foragers and the scavengers because they buy the materials before they enter the waste cycle, therefore the quality of the materials they collect are much higher. Moreover, the *korales* are a strong upward link in the system to the small traders who operates in Menalish Terra. Their close connection with the wholesalers is mainly based on their ethnic background as members of the Gurage ethnic group.

The municipal refuse workers in Addis Ababa differ from DiGregorio's (1994) description of recovery systems, since they only participate in the transport of waste from the collection stations to the landfill, and do not taking part in the recovery system in the city. Instead, the private waste collectors operating in Addis Ababa have taken the position that the municipal refuse workers have in DiGregorio's description. The private sector in Addis Ababa participates in the collection of solid waste from households and commercial institutions and is involved in the collection of materials for recovery to some degree.

The small traders that are referred to as wholesalers in this study are placed in-between the lower and the upper circuit (Figure 19), because they constitute the link between the upper and the lower circuit. The wholesalers in Addis Ababa form the central link between all the actors within the plastic recovery system in Addis Ababa, and are therefore essential to the function of the system.

The intermediaries form the link between the informal and the formal actors, making contact with patrons. With regard to the intermediaries operating between the wholesaler and the plastics factories, I was not able to confirm how common or widespread their position is within the system. I found that there were some intermediaries operating within the system, but not how many and whether it was common to use them or more common to make an agreement with the plastics factories directly.

Some traders from the rural areas also travel to Menalish Terra to buy plastic materials at wholesale for further sale in rural areas.

At the top of the hierarchy there are the plastics factories operating in Addis Ababa. In addition, there are presumably also some small informal plastic enterprises operating in Addis Ababa, though I was not able to conduct further research on them because of problems relating to their informality and limitations on time.

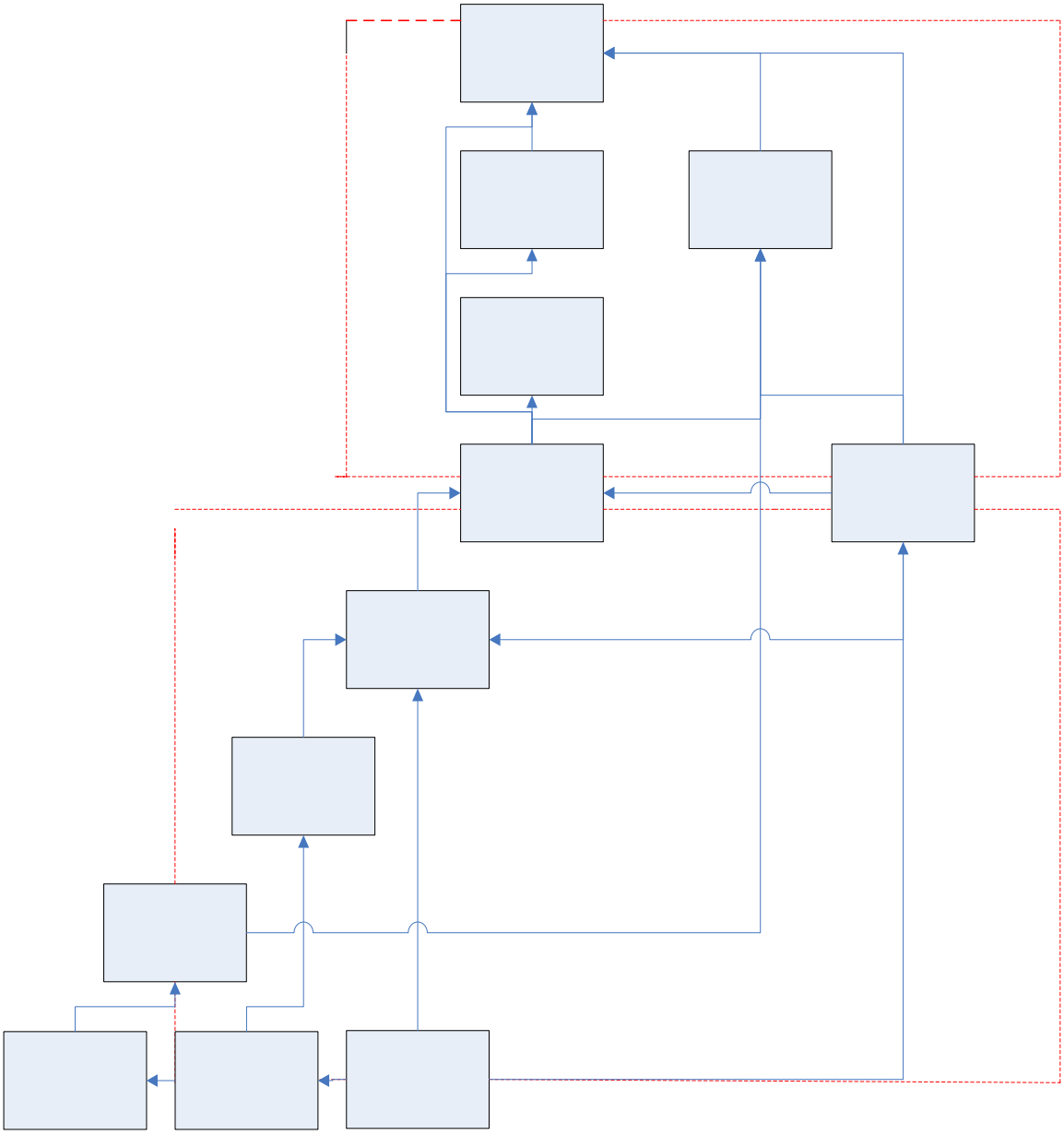

Figure 19: Organization of the plastic recovery system in Addis Ababa, 2004.

Figure 19 shows that the plastic recovery system is highly organized and consists of eight levels and a variety of actors. Like DiGregorio's (1994) description, the system in Addis Ababa can be divided into two main circuits, the lower and upper, which are linked together by the wholesalers and to some extent also by the private sector. The link that the private sector constitutes for is not as strong as the link the wholesalers constitute. The main reason is that the wholesalers have a much stronger relationship with the *korales*, which in turn has a connection with the foragers operating in the recovery system. In addition, the wholesalers are able to store a much larger quantity of materials than the private sector, which enables them to give a better offer to the plastics factories operating higher up in the system. The private sector enterprises sort out plastic materials from the mixed waste and sell them to the *korales* or to the wholesalers at the end of the day. This activity is usually carried out by the collection crew and is therefore done on an individual basis to earn some additional income. Moreover, some of the private enterprises have started to collect plastic as part of their main activity. This activity has to be distinguished from the former one, since it is done at firm level and not at an individual level. The activities also vary among the waste enterprises. Some of the enterprises store the collected plastic and then sell it to the wholesalers in Menalish Terra. Others have been able to come to an agreement with a plastic factory, which enabled them to make a higher profit by cutting out several levels within the upper circuit of the system. It should be mentioned that their capacity to store materials is very limited because they lack storage place, which means they are not competitive with the wholesalers. In addition, the private enterprises have recently started to enter this system, which may explain why many of them are selling their materials to the *korales* or to the wholesalers. It seems that they have encountered some problems in entering the system, i.e. in establishing direct contact with the plastics factories. This is mainly due to the fact that they have not been part of the system in the past. They still do not know the internal rules or norms and have not been able to build up trust with the other actors operating within the system. At least, since they operate in the formal system and receive support from the government, many actors within the system may be sceptical about their intentions, and may be afraid that the government has something to do with their attempts to get involved in plastic recovery activities. I will come back to this discussion later in this chapter.

9.3. Relationship between the actors within the plastic recovery system

The relationship between the various actors within the informal plastic recovery system in Addis Ababa can be categorized as a combination of social relationship, ethnical background and acquaintance.

Relationship among the collectors

The relationships between the different collectors, which constitutes for the lower circuit of the recovery system, such as the foragers, scavengers and the *korales*, do not seem to be strong and is not based on cultural or ethnical reasons. I will say that these relationships are mainly based on trade, where all the actors want to gain as high profit as possible for their materials. Moreover, the foragers and the *korales* may have some agreement concerning access to a container the forages has occupied. By paying them an extra amount of money, the *korales* get access to the inorganic materials within the container.

Relationship between the korales and the wholesalers

There is a strong relationship between the *korales* and the wholesalers, based on ethnical background. As the survey showed most of the *korales* were Gurage like the wholesalers operating in Menalish Terra. This leads to a further distinction between foragers, scavengers and the *korales*. It is not just their economical motives that distinguish the actors, it is also relying on ethnical background, since most of the *korales* are Gurage like the wholesalers. These vertical networks tend to be exclusive and tightly drawn and tend to frustrate the efforts of others to penetrate them. In order to enter the position the korale have in the system, it seem for me that you need to have some linkages to the wholesalers or to an korale, which in turn can introduced you to an wholesaler and serve for you. In this way, there is an invisible ethnic segmentation within the informal plastic recovery system, especially in the upper degree of the lower circuit and the lower part of the upper circuit.

Within the plastic recovery system in Addis Ababa, clients are a business secret. Which factory the wholesalers and MSE sell their plastic to and from whom the plastics factories buys their plastic waste from, is almost impossible to find out. They may be afraid for competition from other actors within the system. Moreover, they are afraid that the government are going to find out about their illegally activity, which in most cases will result in increased taxes or even a closedown of their activities.

In short, I will conclude that the social relationship between the actors within the plastic recovery system can be characterized as a patron-client relationship, which is mainly based on mutual trust, in addition for the *korales* and the wholesalers, which is based on ethnical background.

9.4. Evaluation of the plastic recovery system

Reuse and collection of plastic materials

The waste generation of plastic materials in Addis Ababa is low and people use the plastic materials several times before they lose their value and end up as waste products. This study shows that households are the main contributors to the plastic recovery in Addis Ababa. However, although source separation at household level is generally high it decreases when household incomes increase. This does not seems to affect the amount of plastic collected, since plastic materials are sorted out by different collectors at all stages in the solid waste management system. Plastic materials that have lost their value are sorted out and then sold or given away to a *korale*, given to old or poor people, or are disposed of in the solid waste cycle. In the latter case, they will be sorted out and picked up either by a waste enterprise collecting waste from the household, or by foragers searching for valuable items in municipal containers or in the street. If the items are still not removed from the waste cycle, they will eventually be sorted out and collected by scavengers at the municipal landfill and brought into the plastic recovery system. Therefore, source separation will most likely continue to be at a high level in the coming years in Addis Ababa.

Quality of plastic materials

The quality aspect is important at all levels in the plastic recovery system. The plastic materials are bought already at the generation level and the price of the plastic items depends on their shape and the quality, which reflects that quality is an important criterion in the system.

In general, the quality of the plastic collected for recovery is not high in comparison to the quality in European countries. The main reason for this is that the materials are reused on a large scale at the generation level, before they enters the recovery system. In addition, most of the factories use plastic waste to manufacture the same type of products as virgin materials are

used for, which results in a lower quality compared to products produced using virgin materials. Moreover, it is common to recycle mixed plastic waste, which usually results in poor quality recycled products, and a fast down-cycling of the plastic materials, which reduces the life cycle of the materials, which will eventually require disposal.

Demand and supply of plastic materials

Because of the increasing oil prices, the price of the raw materials has increased considerably during the last few years. This has resulted in relatively expensive production costs and high prices for the final plastic products. One of the informants told me that the price of PP had increased from 500 birr/57.7 USD/metric ton to 1250 birr/144.2 USD/metric ton during the previous year.

In order to reduce their production costs many plastics factories in Addis Ababa have started to use plastic waste in the manufacture of new products. Because of the large number of poor consumers, the demand for cheaper recycled plastic products is much higher than for products made of virgin materials. The products made by recycled plastic materials can meet the quality standard and the price required by this group of consumers.

Because of a growing demand for plastic waste as a raw material, most of the plastic waste does not end up in the waste cycle, but goes directly into the plastic recovery system. Since there are no formal systems for collecting plastic waste, the demand is met by the informal sector who act as suppliers of plastic waste to the plastics factories in the city. Moreover, my impression is that the demand is higher than the supply, as some of the plastics factories mentioned that they had considered importing plastic waste materials from Italy since there are not enough materials in Addis Ababa to meet the growing demand for plastic waste.

However, it is important to bear in mind that the current situation may change when Addis Ababa becomes more industrialized and people's incomes rise. Then, the degree of reuse at generation site will most likely decrease, people will probably generate more plastic per person, and the amount of plastic in the waste cycle will increase. Further, the availability of mass-produced items may reduce markets for used materials and goods. However, this will most likely not affect the plastic recovery system in Addis Ababa. There will always be some who regard waste as a resource and will continue to maintain the existing system.

9.5. Actors within the plastic recovery system and why do they act the way they do

To explain the organization of the plastic recovery system in Addis Ababa, several factors need to be considered. Several actors take decisions and act based on the current structures within the system, which in turn have an influence on the structures and the efficiency of the system. The structures that exist in the society today are a result of decisions and actions taken by actors previously. Through physical, political, economic, and cultural structures, forces arise and determine the actions taken by the actors, which in turn affect the plastic recovery system either directly or indirectly. The way the plastic recovery system is organized can either act as a barrier or lead to the possibility for action in the recovery of plastic materials. The plastic recovery system has been described in Chapter 7 and Section 8.2. I consider that the most essential parts in the existing system are the actors who are involved, because they are the one who constitutes the system. As mentioned in Section 2.1 and 2.1.1, actor's actions form the structures in the system at the same time as the structures form the actions of the actors. Giddens called these kinds of interactions 'structures durability' (1984).

In this chapter, I review of the various actors involved directly or indirectly within the plastic recovery system in Addis Ababa. I discuss why they act the way they do, based on the various structures within the society today, which are both the condition for and production of human actions. Thereafter, I discuss the barriers to change and the potential for change within the plastic recovery system.

9.5.1. Households

The action taken by the consumers is determined by tradition and level of income. It is on this basis that the consumers decide whether they are going to separate the waste or not and whether they are going to reuse items. The household sector in Addis Ababa produces the largest amount of waste in the city. This makes the consumers important actors within the system. The ways in which the consumers handle their plastic waste are therefore very essential for the system as a whole to function efficiently.

In Addis Ababa there are economic structures affecting the plastic recovery system at the household level. As mention earlier in this report, the majority of the population in Addis Ababa can be considered as poor. Consequently, reuse of plastic materials at household level is a very common practice in most households. The survey conducted on the households

shows that the extent of reuse and source separation decreases significantly when the incomes of the households increase. These structures are invisible but determine the decisions taken by the actors at household level. Hence, it can be said that the level of wealth in the society can be both a driving force and a barrier for action and in shaping the plastic recovery system and its development.

However, it is not only poverty that influences the common practice of source separation and reuse at household level. The households in Addis Ababa have a long tradition of reusing different types of materials and trading those that they do not have any use for anymore. This will most likely continue to be the pattern in Addis Ababa in the coming years and will contribute to maintaining a high degree of waste recovery within the system.

9.5.2. Collectors

The activities carried out by the collectors, such as the foragers, scavengers, the private sector, and the *korales*, are driven by economic reasons and poverty structures in the society. The main reason these actors choose to involve in such an activity is based on income generation, and not because they care about the environment. The structural force that determines the activity of the *korales* and the other collectors is the level of unemployment in Addis Ababa today. As mentioned earlier, the *korales* choose to involve in such activities because there are no other job opportunities for them, and because it is a way of making a living. This again, is also due to the high population growth and urbanization that are taking place in the city.

As mentioned earlier, the informal sector has limited access to the formal structures in the society, and thus has developed its own structures. These structures are often based on traditional structures. In Addis Ababa, the informal plastic recovery system is based on ethnic background and acquaintance. Collection of plastic materials is based on an old tradition, whereby the *korales* buy materials directly from the source. This tradition started with the collection of metals. Over the years, it has changed with the introduction of plastic materials in the market and the increasing demand for these kinds of materials. Moreover, the economic aspect has developed with the connection between the wholesaler and the *korales* based on ethnic background, trust and acquaintance between these two actors.

9.5.3. Wholesalers

The wholesaler's action is based on traditional and economic structures within the system. Most of the enterprises are family based and have been in the family for some time. This kind of activity generates high profits for the wholesalers because they are in a position to buy materials on a small scale at a low price and sell them wholesale at a much higher price. Therefore, the economy of their activity acts a strong driving force for the action taken by the wholesalers. This is also reflected in what kind of materials the wholesalers specialize in. Because of the increasing demand for plastic waste materials, more and more wholesalers have started to trade plastic materials (in addition to other materials) because of the economic profits.

The interaction and the relationship the wholesalers have with other actors within the system also influence their actions, especially their relationship with local authorities, which is characterized as antagonistic. I will return to this issue in Section 9.9, where I will discuss the government as an actor within the plastic recovery system and the relationship between the actors within the informal plastic recovery system and the local government.

9.5.4. Plastic factories

The practices of the plastics factories within the city are influenced by several structures. Because of increased price of imported raw materials, some of the actors are forced to use plastic waste in their production, in order to ensure profits. In addition, since more and more actors have started to use waste materials in their production, other actors on the market are forced to do the same in order to remain competitive. Further, because the majority of the inhabitants in Addis Ababa are poor, the demand for cheap products is high and items made of plastic waste are much cheaper than products made solely out of virgin materials. The price of raw materials, competition between plastic producers concerning price, and low-income consumers result in an extended market for low quality and low price products. In addition, there is no regulation concerning the quality of plastic products in the city, which makes it convenient for production costs to be minimized by using plastic waste. Further, because of increased taxes posed by the local authority, many of the actors try to avoid paying tax. By using plastic waste collected by the informal sector they can manufacture more products at a lower price and avoid some of the taxes, which in turn increases their economic profit.

9.5.5. Government

The government has the main responsibility for the solid waste management system in Addis Ababa and its main task is to manage the development of the system in a sustainable and suitable way. Nevertheless, the government is not involved in the recovery of plastic materials in any way.

Urban problems such as those existing in SWM in Addis Ababa are mainly a result of inadequate organization within the government and of poor urban management. The local government in Addis Ababa is not able to perform good urban management with regard to their inhabitants and the environment. This also includes the informal plastic recovery system. I believe that some of the barriers to performing good management on urban issues in Addis Ababa today are mainly the result of four main reasons.

A politicized government

As mentioned in Section 4.6, the current management structure of the city is highly politicized. Most of the people in positions of authority within the administration in the city, gained their positions as a result of their political alliance to the ruling party and not because of their professional competence. Consequently, there is a lack of professional urban management and leadership. Further, these officials have a tendency to use much of their time trying to please people at the higher levels of the government. This kind of leadership has favoured an upward accountability rather than meeting the needs of the people living in Addis Ababa. In other words, there has been a greater interest in the upward accountability to the politics than in the constituency needs and interests of the urban population. This has resulted in a deterioration of the urban environment in Addis Ababa with little accountability to its residents.

However, this situation has improved since the central government appointed Arkebe Oqubay as the new Mayor of the city in 2003. Since then, the mayor has introduced a number of changes in order to reconstruct the administration to serve the city in a much better way than before. Some of these changes have involved over a 1000 corrupted civil servants being dismissed and replaced with more qualified personnel. Moreover, there has been a stronger focus on government decentralization in favour of the sub-cities and *kebeles*, which has given the lower administrative units more power. Nevertheless, this administrative reorganization does not mean that urban management will be improved in the following years. The former

norms and rules within the administration may still be present. Illiterate political cadres are still are in a position to formulate strategies and policy, and many of them have a high position within the government. In the past, newly employed people have been relegated to the position of messenger boys. If this is the case today, the employment of professionals will not have a strong impact on the way the administration manages the city. This will most likely lead to the professional workers also struggling to favour those who are in higher position in order to attain upward mobility. There is a need to give professionals freedom and power in order to improve the management of urban services. In addition, it is important to make people responsible for their own actions, and they should be evaluated based on their performance, and not because they mingle with those people who have a higher position within the system (*Addis Tribune* 2003).[16]

Frequent shifts within the government

There is also a question about whether the frequent shifts within the government have had an affect on the management of the city. In recent years, there have been several Labour turnovers within the government, which might have led to half-finished plans and changes in plans and urban management. A lack of continuity may therefore be one of the reasons for the inadequate urban management in Addis Ababa.

Lack of communication

There is also a lack of information and communication structures among the different institutions working on topics concerning SWM within the municipality's institutions. It seems to be a trend to work alone and not to share information with others working on the same topics. In other words, they would rather work alone than to benefit from advice or cooperate with other institutions working on the same topic. In some situations, they evidently do not share their information with others because they want to have credit for their work alone. Moreover, with regard to the relationship among the different agencies within the local government, such as, e.g. the Department of Infrastructure, EPA, and SBPDA, the tendency is even worse; they act independently regardless of the needs of other agencies. This had led to an overlap of work on many of the same topics, which again has resulted in wasted time and resources on the same job. An example of this is presented in Box 3.

[16] http://www.addistribune.com/Archives/2003/11/21-11-03/Reconstructing.htm

Box 3: Lack of communication

During my fieldwork I experienced that several actors in different agencies within the government and non-governmental organizations worked or had worked on the same topic concerning solid waste management and was in fact doing the same work. Whether this was a result of lack of communication or lack of knowledge, or whether it was simply the fact that they did not want to cooperate with others is hard to say. However, it was certainly a waste of human resources and time which could have been used on other important issues within the municipality in order to improve the current solid waste situation in the city.

Top-down hierarchy

The organization of the local government is characterized by a top-down hierarchy, where all decisions are taken at higher levels in the hierarchy. These people acquired their positions mainly because for political reasons (as mentioned earlier) and not because they are familiar with urban topics such as plastic recovery and SWM. Regardless, they make decisions concerning these topics without even consulting with the people concerned or affected. In most cases this leads to conflict between the municipality and the public, where the public do not agree with the decision taken by the municipality. Therefore these decisions often result in inadequate actions plans and solutions. This in turn has resulted in the relationship between the government and the public being weak, and there is a lack of trust and credibility. Good governance can only be achieved if relationships, interactions and feedback are established and coordinated among the actors. Without these connections, people tend to lack trust in the local government, as is the case in Addis Ababa.

The plastic recycling activities that take place in Addis Ababa are the result of a combination of all of the structures mentioned above. All of the structures affect the actions taken by the different actors within the system. For example, an increased price on raw materials forces the plastics factories to start using waste materials in their production. This again increases the demand for plastic waste, which results in wholesalers starting to specialize in trading plastic materials. This affects the structures at the collection level because there is a high demand for plastic materials, the price of such materials is higher and hence their collection is preferred in order to maximize on profit. The households will therefore be motivated to separate their plastic waste and sell it to the *korales*, because they too will get a good price for the items.

It can be seen that the economic structures are the strongest driving force for the action taken by all actors operating in the system. In addition, the effects of a rapid and disorderly process of urbanization, including an inadequate waste collection service and the absence of civic consciousness, have given the actors within the informal sector the space and possibility to carry out their activities.

The current administrative structures within the solid waste management system have a strong influence on the plastic recovery system. These structures consist primarily of laws and regulations that do not promote or address areas concerning plastic recycling. The absence of these laws and regulations may have resulted in that the informal plastic recovery system has been able to develop within the informal sector. Structures such as low capital, low quality, and labour-intensive methods have contributed to the development of a profitable activity. Nevertheless, the organization of the government and their inadequate urban management with respect to plastics recovery has resulted in people lacking trust and creditability in the government.

9.6. Lack of action towards recycling activities within the formal sector

In the course of achieving an improved SWM, the municipality in Addis Ababa has focused on expensive 'end of pipe' efforts, involving the collection, transportation and disposal of solid waste. Literature and reports on solid waste issues in Addis Ababa, such as the SBPDA publications *Solid Waste Disposal* (2004c) and *Solid Waste Collection, Transport and Transfer Station* (2004d), reflect this focus with emphasis on collection equipment and advance disposal options.

The municipality is not totally absent in the field of source separation and recycling. Several reports written by local authorities in the city have pointed out the importance of reuse and recycling activities as a response to the problem of solid waste in the city. Further the municipality has established some short-term goals, such as promoting community-based source separation, recycling, and composting in selected sub-cities and *kebeles*. They have conducted some awareness campaigns for waste reduction, recovery, reuse, recycling, and composting. However, these statements and efforts have had no effect at all on the recycling activities in the city today. Government action towards both organic and inorganic waste recycling remains non-existent.

A report carried out in 2002 by the municipality states:

'The overall objective of the Addis Ababa MSW Management Improvement Program is to contribute to an improved and sustainable environment for the long-term economic and social development of Addis Ababa. This will be achieved by reducing the rate of environmental degradation due to inappropriate dumping of MSW, reducing the share of waste ending at the landfill, promoting reduction, reuse, recycling and composting …' (ORAAMP 2002: 5).

In the master plan for Addis Ababa, reuse and recycling activities are mentioned as an option for improving the SWM problems facing the city today:

'*Decentralize waste collection to Wereda level, and encourage private sector involvement; launch a continuous awareness-raising campaign on waste management, especially on waste reduction and recycling; coordinate actions of different environmental groups through appropriate partnership models'* (ORAAMP 2002: 6).

At the local level, the SBPDA has recently published the *Solid Waste Management Collection and Disposal Regulations of the Addis Ababa City Government* (2004e), in which it is stated the decisions that all actors involved in SWM in the city are to follow the regulations contained within the legislation. It does not address mechanisms for promoting recycling or waste minimization. Waste recovery and recycling are therefore not part of the regulatory framework. This means that current activities in the sector remain outside the government purview and take place solely within the informal system.

All of the statements in several reports dealing with SWM that have been conducted by the municipality and published in recent years mention reuse and recycling as one of the priority areas in order to improve the solid waste situation. Nevertheless, there is a lack of action plans for how this is to be achieved. So far, no efforts have been made by the municipality or the government to support or recognize these kinds of activities in the city. Moreover, none of the reports mention the informal sector and those individuals that are involved in recycling activities today. The lack of overall plans for SWM in Addis Ababa at both the local and national level has resulted in efforts towards solid waste often being selected without consideration of their appropriateness in the overall solid waste management system. An example of this is briefly outlined in Box 4 below.

Box 4: An example of lack of an overall consideration of the solid waste system

The municipality in Addis Ababa are planning to create jobs for 10,000 people by organizing them as micro and small waste collection enterprises. This will result in an increased amount of waste collected from the households. However, the coverage of solid waste containers and the transportation of waste to the landfill site are already insufficient. As a result, although it might not be a bad project, expanding the collection of solid waste from the households would have little impact on the overall effectiveness of SWM. The result will be that the waste enterprises will just be helping the households to dispose of their waste in the open spaces, because the current storage and transport systems are not able to receive an increased volume of waste. In this case, the storage and transportation of solid waste is a bottleneck in the overall solid waste management system in Addis Ababa, and it would be most cost-effective to provide resources to upgrade the storage and transportation system, or alternatively reduce the amount of waste needed to be collected and disposed (Interview, 2004).

This again brings us back to the discussion about the government and its concern about the municipal solid waste management (MSWM) system in Addis Ababa. This account makes it clear that the present government is more concerned about the high unemployment in the city and not the solid waste situation. It seems as though they are making use of the solid waste system in order to be enable to reduce the high unemployment, without any regard of the overall solid waste system, or is it simple a lack of knowledge?

9.7. Contradiction in governance

It is not always easy to understand what the government is planning to do in Addis Ababa. Their plans for action and what they actually do in practice do not always comport. In this section, I discuss some of the ambiguous statements that I encountered during my fieldwork, which in turn explain why many of the actors within the plastic recovery system do not have credibility in the government in Addis Ababa.

One of the major concerns that the wholesalers operating in this area are facing today is that the government has decided to let the area available to foreign investors. One of the wholesalers had received a letter from the government in which it states that he had to remove his belongings from the area as soon as possible, or the wholesalers would have to buy the

land at a price of 4300 birr per m^2, i.e. the price paid by foreign investors. In compensation for the current area, the government has promised the wholesalers an area 20 km south of Mercato.

Another wholesaler told me that he had received a letter from the government telling him to remove his belongings from the area or the government would remove them. The reason is that the government have decided to invest in new offices in the area. He did not receive any information about the government promising the wholesalers an area 20 kilometres south from Mercato. Moreover, he told me that c.300 wholesalers had organized themselves and had put forward an offer to buy the whole area from the municipality. Nevertheless, the municipality required 50 million birr for the area, an amount that big foreign investors could pay but that the wholesalers could not afford.

According to the municipality's plan for the Mercato area, Menalish Terra is regulated into an area where the wholesale of waste materials can take place. In addition, this area falls under the land rent for business activities, and falls within the first zone under the master plan.[17] This would make the land rent that the wholesalers have to pay very expensive compared to the current land rent. The municipality has thus not considered the informal sector when they developed the plan.

The various statements mentioned above are contradictory, and have resulted in the wholesalers being uncertain about what is going to happen, and of course they are afraid that their business will become bankrupt. If Menalish Terra is going to be relocated it means that they will have to travel a longer distance to their work place, the *korales* will have to carry the collected materials from the city even further, and the customers who mainly are located near to Mercato area will have to travel a longer distances than before. If this happens, the consequences for the recovery activities operating in Menalish Terra today may be affected negatively.

Further, in a workshop held by ENDA Ethiopia (2003) several participants mentioned recycling as a sound strategy towards solving the SWM problem Addis Ababa faces today. In

[17] The master plan for Addis Ababa divides the city into 5 zones, with the last zone being located farthest away from the city centre and each zone being divided into 3 grades. The rent paid for the land use varies according to the zone and grade of the land. The maximum price is for the first grade land in the first zone, and the minimum rent is for the third grade land in the fifth zone (Girma Kebbede 2004).

the workshop report, the environmental protection authority (EPA) had two papers, one of which announced plastic recovery as a sound and environmentally sustainable practice towards a better solid waste management system, while the other was based on a study of plastic waste recycling in the year 2000, which concluded that recycling of plastic waste is technically possible but not economically viable. These two papers contradict each other, and the real situation as observed in the field. This makes it confusing for the reader to understand what they actually mean. Recycling of plastic may not be economically viable if the aim is to introduce a new and modern system for recycling. None of the studies have considered the informal sector, which is a sector that is currently earning valuable income from collecting and recycling plastic materials.

In a report from SBPDA in July 2004 (SBPDA 2004 f: 5), it is stated that there will be given priority to waste reduction and recycling. In the same report (p. 8), they say that rewards will be given to individuals, private organizations, and government and non-governmental organizations that involve in activities concerning recycling and waste reduction. Moreover, the municipality will create enabling conditions for those involved in SWM to receive financial loans. Nevertheless, in none of these documents developed by the government are the existing actors operating in the system mentioned. This leads further to a discussion on the government and its ignorance of current plastic recovery activities within the city.

9.8. Ignorance of the plastic recovery activities

Despite the valuable work that the informal sector is carrying out, planners and policymakers ignore this sector. The current master plan for the city of Addis Ababa does not mention the informal sector in SWM. During the previous year this situation has worsened since the municipality is planning to reconstruct the commercial areas of Mercato, and considering relocating Menalish Terra 20 kilometres south of its current location. They have been offered the option to stay but the land rent is quite high because the area lies within the commercial area Number One according to the city master plan.

Simultaneously the municipality is encouraging reuse and recycling activities as a positive practice among citizens, commercial and industrial activities. Notably, this seems not to include the informal sector such as the *korales*, the wholesalers, or the plastics factories which

are operating in the system today. An example of the municipality's ignorance of the informal plastic recovery system in Addis Ababa is given in Box 5.

Box 5: An example of ignorance in the informal sector

The local authorities in the city have planned to introduce source separation at household level. Their aim is to provide 3200 segregations bins, where each household has four containers; one for compostable materials, one for recyclable materials, one for non-recyclable materials, and one for special waste. Further, they have planned to encourage the private sector to start collecting materials for recovery from the households, which in turn they will sell directly to various plastics factories (SBPDA 2004 a).

If this is the case, the municipality would be replacing the *korales* and the wholesalers with newly established enterprises that have no experience on the field. What would happen to the individuals operating within the system today then? Moreover, where would the newly established enterprises store the materials collected? Already today, the micro and small waste enterprises are complaining about the lack of somewhere to store collected materials. In addition, the current recovery system is based on trade; the households take part in this system because the *korales* pay for their plastic materials. Moreover, most likely the households will not give away their plastic waste as well as other inorganic waste materials freely to waste enterprises.

When I asked someone working for the municipality whether it was possible to use the existing system operating within the informal sector, I received a negative response. It was not possible because the informal characteristics of the current system make it impossible to estimate how much plastic materials are collected within the system. The person also told me that there was an Ethiopian man from abroad who came to the office one day and asked how much plastic waste material there is in the city. He wanted to start a plastic recycling factory. So, in order to be able to estimate the amount of plastic waste in the city, it was necessary to establish a new formal system for collection. From this account, it is clear that the municipality regards the informal sector as undesirable and does not include consideration of the existing recovery system (Interview 2004).

It can be questioned whether this is due to total ignorance or whether it is due to denial of the informal plastic recovery system. Moreover, it could also be because governmental authorities have some difficulties in finding the actors operating within the system, or it could be the result of difficulties in gaining trust and access regarding the actors in the informal sector. On the other hand, it may be because the government lack knowledge about the informal plastic recovery system. Nevertheless, it is most likely that it is a combination of these factors. From my personal experiences, it is difficult to enter this system and to get in contact with the actors involved. Moreover, as a foreigner it might have been for me easier to get in contact with the various actors since they might have been less suspicious than if they had thought that I worked for the government.

It is important that the government understands the whole recovery system and makes use of the actors already involved in the system today. These actors are individuals who know the system best, and have the necessary experience. They have already established the structures and the links between all levels of the plastic recovery hierarchy and they can easily adapt to changes in the market in response to the demand for plastic materials.

9.9. Lack of trust between the informal sector and the government

The relationships between the formal, the informal sector, and the local authorities are not good and are insufficiently managed. The actors operating within the plastic recovery system and the growing number of the urban people in Addis Ababa do not have confidence in the local government. This is mainly a result of the way local authorities consider and treat the informal sector. In a report written by the Ministry of Economic Development, the authors' state: '… these groups of people are not only the poorest group of the people in the city, but are also frustrated and angry people' (MEDAC 2000: 30). This statement is a good example of how the actors in the informal sector are regarded by the government. It can be said that the informal sector is treated as undesirable while the formal sector is treated as a partner.

Moreover, the current practice of governance in Addis Ababa is a top-down model, where the local government makes decisions without regard to local interests and local practices. None of the latter have been consulted in any decisions that have affected them, and they have no say in the decisions. The municipality presents them with ready-made decisions, which are not subject to any further discussion or negotiation. In other words, it can be said that the

public are decision takers rather than decision makers. According to them, nothing in the municipal method of decision making is transparent, accountable, participatory, or democratic. The decision then usually becomes a source of conflict between the local system and the municipal system. Further, political highhandedness has generated high levels of corruption and also abuse of authority that has further eroded public trust in the municipal governance (Meheret 1999). The mixing of politics and administration has not promoted good governance with respect to the plastic recycling system in Addis Ababa.

Among the actors within the recovery system, the municipal authority is seen as responsible for the shortages in employment and basic needs such as access to capital, technology and land within the plastic recovery system. Moreover, they feel that the local government's attitude towards the increasing informal economy is negative. They do not receive any support from the government and the government is regarded as not caring about the actors within the informal sector and trying to make their life miserable. The *korales*, the wholesalers and the plastics factories complain about the oppressiveness of the municipal agents as well as their lack of accountability.

Many of the actors within the plastic recovery system were genuinely afraid of the government and the local authorities. Firstly, as a result of this fear, the municipality is able find out whether the actors' activities or some of their activities are carried out in an informal way and force them to pay increased taxes. Secondly, the actors do not feel that the government care about them. They do not receive any support from the government and they are not involved in any decisions, so many of them feel that they are better off without the government. Further, they are afraid that the government will make decisions that will result in that them going out of business.

The main problem within the plastic recovery system is the frightened attitude held among the actors towards the government and the municipality. This attitude exists mainly among the wholesalers and the plastic industries, which are located in the upper levels of the recovery hierarchy. A good example of the frightened attitude within the plastic recovery system towards actors outside the system can be illustrated by my own experience as presented in Box 6.

Box 6: Examples of informal actor's attitude towards actors outside the recovery system

When I entered Menalish Terra for the first time, everybody noticed me and started asking me what I was doing there. They told me I had no reason for being there and people shouted at me and made it clear that I was not welcome in this area.

On another occasion I went to Menalish Terra with a man working within Addis Ketema sub-city because he was helping me to locate the containers in the sub-city. When I entered the area with him, again everybody noticed me but this time they just looked at me. However, I had planned to go back to the area later the same day to decide where people should stand in order to count the *korales* entering Menalish Terra. When I entered Menalish Terra in the afternoon on the same day, several people recognized me as having been with the man from the municipality. Again, they asked me what I was doing in the area and most of them adopted a hostile attitude towards me, which culminated in one of the boys hitting me, so I decided it was best to leave the area.

My first thought was 'What are they afraid of?' After some time, I found out it was a combination of several things. They were ashamed because of their low status work. Some might have thought I was a tourist walking in the area to look at the poor people and their bad working conditions just for entertainment. Others were afraid because I was a foreigner who was interested in making an investment and was going to take their business away. Also, they were afraid that I could have been sent by the government, and that would have meant trouble for them in some way.

I was also encountered this attitude when I tried to get in contact with the various plastics factories operating in the city. Consequently, I only succeeded in having an interview with three plastics factories, and in all cases I was not allowed to go into the factory and was not allowed to take any pictures. Like the wholesalers, all of them were honest and told me that they were afraid that the government was going to find out that they were using plastic waste in their production, which would result in increased taxes. At the end of my fieldwork, I drew the conclusion that people outside the system are not trusted; one has to be inside the system or have some social relation to the system, and one has to know the rules and the norms operating within the system in order to be trusted.

9.10. Why firms choose to operate in an informal way

There are several reasons why the actors or firms choose to operate informally. Common to all of them is avoiding costs related to licensing and taxes. During recent years all forms of taxes have increased dramatically in Addis Ababa. In the period 1994–1996, the direct taxes[18] increased from 83.6 to 297.5 millions birr, which is triple the direct taxes in two years (Meheret 1999). Even though taxes have increased people have not seen any improvements in the urban environment and public services. As a result of the increasing taxes and bureaucratic hassles, many producers and individuals have chosen to take part in the informal sector. In addition, increased competition and difficult market conditions within the plastic recovery system have resulted in nearly all actors within the system trying to do what they can to reduce the amount of tax they have to pay to the government in order to protect their businesses and their profit.

The actors involved in the plastic recovery system respond to governmental regulations by not paying tax, and hence they do not benefit from public service because they have not registered their activities. Taxes may reduce the profitability of the activities and therefore adversely influence their activities and economical growth. When profits or potential of profits are taken away from the actors through regulations and taxation, they choose not to start firms or expand less rapidly than they might otherwise have done or they choose to operate informally.

Informal practices are not possible for firms whose size makes them visible to state officials. This does not means that the large 'formal' companies do not operate in an informal way, but that they are unable to avoid state-imposed costs as effectively as the myriad of small and micro enterprises that make up the informal sector. While this is true in many cases, the situation in Addis Ababa is different. Plastics factories do not have a full overview of how much raw materials they import from abroad or about the total use of materials in production. Therefore, the municipality does not have a full overview of the imported virgin materials or the production of plastic in Addis Ababa. This, of course, makes it easier for the industries not to register their production of plastic materials made from recycled materials.

[18] A tax imposed on a taxpayer or on their property (http://www.firstcommand.com/home/tax_command/tax_glossary/#d)

9.11. Forced into comfortable informality

Today, there is neither a policy nor a regulation that encourages recycling activities such as plastic recycling, which include the separation, collection, sorting, and transformation of plastic materials. In addition, no formal system exists for these kinds of activities. All of these activities are carried out in the informal sector, in a grey zone between the formal and the informal sector. Due to the lack of a policy that promotes recycling incentives all of the actors perform their activities informally, which means that they are not paying taxes for their activities. This also includes the formal plastic industries in Addis Ababa. As a result of the market situation the price of virgin materials imported from abroad has increased dramatically during recent years, and consequently some of the factories have started to use plastic waste in their production of new materials in order to reduce their production costs and to increase their profits. This, in order for other plastics factories to be competitive on the market they have been forced to start using plastic waste too. Moreover, they buy their plastic waste from wholesalers in Menalish Terra, though because of the informal aspect of the activity they are not given any receipts for the materials they buy and cannot document their manufacture of products made of plastic waste to the government. In this respect, they are forced to operate informally. In addition, like the *korales* and the wholesalers, they are afraid that the municipality will demand high taxes on these activities, which will reduce their profits. The various requirements imposed by the government in order to operate formally, such as applying for licence, reporting activities and paying taxes, many of the actors operating in the informal sector feel that the government are discriminating against them, and that they will not be able to survive if they have to operate in a formal way, yet owing to the high unemployment in Addis Ababa people are forced to find some value added activities in order to be able to make a living.

9.12. Benefits of the informal plastic recovery system

Thus far, most of the discussion has focused on the barriers and the problems facing the plastic recovery system operating in Addis Ababa. This may have presented a negative image of the activities. Even though there are negative aspects to the current system, the system is also beneficial to the urban society.

The purpose of this section of the thesis is to explore the benefits the plastic recovery system has for the society as a whole. Solid waste recycling and recovery can be a sustainable and

effective waste management in developing cities such as Addis Ababa. The recycling activities carried out by the informal sector in Addis Ababa generate income, create employment and reduce the quantities of waste. Maximum benefits will be gained when the municipality recognizes its SWM responsibilities and can make use of the strengths of other various actors involved in plastic recovery activities in the city. The role of the *korales* and the other actors is essential for both environmental and economic reasons. However, it is difficult to quantify their contribution due to the informal nature of this sector. Still, there are environmental, social and economic benefits associated with these kinds of activities.

Employment

The economic benefit of the system is that the high degree of labour intensity of certain reclamation processes enables numerous people to earn some kind of income. Therefore, the informal plastic recovery system provides significant employment opportunities for a large number of individuals such as the collectors and wholesalers who would otherwise be jobless. As a result of the limited job opportunities in the formal sector, the informal waste sector generates employment for several thousands of people. As mentioned in Section 8.2.5, many foragers and scavengers, and c.5000 *korales*, and c.300 wholesalers are dependent on the recovery system of plastics and other materials, including collecting, sorting, cleaning, and reusing, in their struggle to earn a daily income.

Collection of materials

An important characteristic of the recovery system is that unlike standard recycling activities, with the exception of the *korales*, the collectors recover materials from refuse that has already been disposed of and incorporate into the municipal waste cycle. The collection, transportation and transformation of these materials by the collectors contribute to the creation of materials of value that otherwise would have been lost. Furthermore, the informal recovery system leads to a reduction in the quantity of solid waste needing to be collected, transported and disposed by the municipality, which results in savings for the municipality in terms of expenses relating to collection, transport and final disposal of the materials at the landfill 'Repi'.

Supplies of cheaper raw materials

The formal plastic industries in Addis Ababa benefit from the informal plastic recovery activities by obtaining raw materials at low cost. Plastic recovery reduces the demand of raw

materials needed to be imported from abroad. The reuse and recycling of plastic therefore reduces the dependence on imported raw materials. In addition, the informal sector benefits from an expanded market and an increased demand for recovered plastic materials. Since the production costs of plastic materials are lowered in the formal sector, the final products can be sold on the market at lower prices, and they can reach a larger consumer group, which is significant considering that the majority of the population in Ethiopia are classified as poor.

Environment and economy

As for environmental effects, the use of plastic waste in the production instead of virgin materials saves the environment from the extraction of raw materials, conserves natural resources such as oil, and requires less energy than virgin materials, reducing emissions of substances such as carbon dioxide (CO^2) into the atmosphere. In addition, if these materials were not collected they would end up as landfill. Leaking chemical substances would then pollute the underlying soil, the groundwater and the air. All of these potential effects are avoided because almost all of the plastic materials are collected for reuse and recycling.

Benefits of the informal plastic recovery recycling activity in the city can be summarized as follows:

- Employment of c.6000 (Section 8.2.5.) people who would otherwise be unemployed.
- Saves the city expenses as a result of waste collection, transport and disposal.
- Reduces the amount of waste materials requiring collection and transport
- Supplies/substitutes raw materials for the industry
- Reduces the production costs of plastic products would otherwise have been lost
- Environmentally beneficial in the form of reducing the amount of extracted raw materials, reducing the amount of waste in the landfill, and extending the life span of materials.
- Improves the health and safety conditions in the city

10. Conclusion

This study aimed at describing the informal plastic recovery system in Addis Ababa and the actors involved. Moreover, the study aimed to evaluate the performance of the system based on the strengths and barriers facing the system today. In order to do this, it was essential to include this system in the formal solid waste management system of the city as well as the private sector involvement in solid waste management.

Accordingly, I have made use of structuration theory and adopted an actor-oriented approach. These theories have enabled me to explore different cultural, economical, political, and traditional structures within the society and their interactions with the actors which have resulted in the complex system for the recovery of plastic materials.

Fieldwork was carried out using a combination of qualitative and quantitative methodology. This has proved essential for the study since there is a lack of research concerning the informal plastic recovery system in Addis Ababa. As a result, it was impossible to find secondary data, so triangulation has made it possible for me to gain a broader understanding of the topic. Quantitative methodology has made it possible for me to make some estimations, including sizes of labour forces, amount of materials collected, and source of collection, while qualitative methodology has enabled me to obtain data about the actors' opinions on various aspects of the system. Moreover, by using both approaches I have been able to double-check my own findings in order to ensure the reliability of the data.

A review of the literature on scavenging and the informal sector has been very helpful, and has given me a broader understanding of recovery activities in developing countries, as well making it possible for me to compare my own findings with those of other similar studies carried out in other cities in developing countries.

Actors involved in plastic recycling in Addis Ababa and the relationship between them

The households constitute the largest source of plastic waste in Addis Ababa, and therefore the households are important actors within the recovery system. Further, the recycling activities in Addis Ababa depend on thousands of people who collect plastic materials all over the city. The study has identified that there are four different groups of collectors operating within the recovery system: the scavengers collecting plastic materials at the municipal

landfill site, foragers collecting valuable materials from municipal containers and in the street, the private sector involved in solid waste collection, and the *korales* that constitute the largest group of collectors in Addis Ababa. Further up in the system there are the wholesalers that constitute the central link between those actors operating at lower levels in the system and those operating at higher levels within the system. At the highest levels within the system are the formal plastics factories using plastic waste in the manufacture of new plastic products.

This study has identified that the majority of the *korales* and the wholesalers are Gurage, and that the relationship between them is therefore much closer than with the other actors within the system. Moreover, the wholesalers' relationships with the plastics factories seem to be characterized as a patron-client relationship, where the wholesalers operate as suppliers of plastic materials. This relationship seems to characterize the relationship between all actors within the informal system.

Informal plastic recycling as a profitable activity

The municipality is responsible for the solid waste management in the city, but is currently not able to manage all the aspects concerning solid waste management. Consequently, the informal sector has recognized that there is a market for such activities and especially for plastic materials, and has filled the gap left unfilled by the municipality. This has resulted in the development of a highly organized system for source separation, collection, trade, and transformation of plastic waste materials.

The degree of reuse at household level is high. However, the survey showed that this practice decreases when the income of the household increase, though this most likely does not affect the high degree of plastic recycling taking place in the city today. The plastic is collected at various stages in the solid waste system, such as directly from the household by the *korales* or the private enterprises, from municipal containers, from the streets, and from the municipal landfill, and is brought into the plastic recovery system. It is most likely that this activity will continue to exist in Addis Ababa for a long time, since there always will be someone who will regard plastic waste as a resource.

The recovery of plastic materials in Addis Ababa is mainly driven to satisfy a huge domestic market. The growing demand for plastic waste materials is mainly a result of the majority of people in Addis Ababa being poor and plastic products made of plastic waste can meet their

requirement in terms of both quality and price. This has further been strengthened since the price of raw materials has increased dramatically during the last years. As a result of the high demand for plastic products almost all plastic generated is collected and brought back into the plastic recovery system. This high demand is also reflected by the economic income generated by the various actors within the recovery system. The study has shown that the income generation differs sharply among the various actors operating in the system. Foragers collect and trade materials at survival level, while the *korales* are able to benefit from much higher incomes. This supports Medina's (1997) statement that the collectors are not always the poorest of the poor, but that some can earn as much as an average salary. In this respect, the *korales*' income can be compared with the average salary in Ethiopia, which is c.300 ETB, though in some cases their income may be far lower or higher. Regardless, this level of income is low compared to that generated by the wholesalers. This study has shown that in some cases wholesalers can earn c.500 birr a day. This shows that the wholesalers operate in a monopolistic market, where they are in a position to exploit the collectors, who work for a low profit. At the same time, they have access to large formal industries who buy waste materials wholesale. Further, an increased demand for such materials enables them to increase the price of the materials. In addition, this activity takes place outside the formal sector, which means that they do not comply with governmental regulations such as tax payment.

Quality aspects

The quality requirement of plastic materials has been shown to be important at all levels within the system because it determines the value of the materials. However, an important aspect and possible problem of the current recovery practice today concerns the quality of the recycled materials. Today, recycling of plastic products is done without any regard to quality standards. Mixed plastic products are graded and used to produce new plastic products. As a consequence, the quality of the plastic products produced is of low quality. This contributes to a shorter lifetime for the plastic products. In addition, during the recycling process, the release of toxic materials such as benzene and vinyl chloride can occur. Moreover, when plastic is used to package food, toxins and carcinogens can migrate from the plastic containers into the food and beverages, especially if the plastic is heated. Further, since the plastics are washed with ordinary soap at the factories prior to being recycled it may not be sufficient to remove some of the hazardous substances that cover the plastic (Lardinois & Klundert 1995). In order to improve the quality of the recycled materials, further research and basic skills concerning the transformation process are considered necessary.

Benefits of the recovery system

The research has shown that the informal plastic recovery system in Addis Ababa brings several benefits to the society, such as employment opportunities to several thousands of unemployed people, which in turn reduces poverty. Moreover, it reduces the amount of waste needed to be collected, transported and disposed at the landfill. It supplies low cost raw materials to industries, which makes the plastics factories more competitive on the market and it also saves the environment from the extraction of natural resources. The informal plastic recovery system in Addis Ababa has an important role in solid waste management because it is able to undertake collection and recycling of most of the recyclable plastic materials generated in the city, which is especially important considering that the municipality is not taking any action in recovery activities.

A need to be recognized and considered by the government

Despite the benefits the informal plastic recovery system provides for the society, the government ignores the actors operating in the system. Thus, it is time that the government recognized the importance of the recovery activities carried out in the informal sector. Increased efforts to improve the collection of solid waste for disposal will only exacerbate the disposal problems. By contrast, a focus on waste recovery and plastic recycling could contribute substantially to reducing the amount of waste needing to be disposed of. A framework for improved urban solid waste management should therefore focus on both collection and disposal in a more cost-efficient way, in combination with efforts to try to minimize the production of waste and to promote recycling and reuse of solid waste. In order to achieve this, it is essential that the municipality recognizes the informal recovery sector and develops a better understanding of their activities in the city today.

Lack of trust and credibility between the formal and the informal sector

An important issue that has arisen during this research and that is evidently one of the main problems facing the plastic recovery system today is the relationship between the actors within the recovery system and governmental authorities. The efforts by the government within solid waste management, such as planning to relocate Menalish Terra and to implement a new system for source separation and recovery through MSE, have resulted in actors within the plastic recovery system not trusting the local government and being afraid of its intentions. This is mainly due to the informal aspect of their activities and because the government have not yet recognized their important contributions towards the society, but

instead regards them in a rather negative way. There is a need for the government to recognize and try to gain the trust and credibility of the actors operating in the plastic recovery system. In order to improve the situation within the current plastic recovery system, I believe that the government should not become involved in this kind of activity or affect the current practice by radical regulations. However, it is essential that the government recognizes the activities carried out and considers them when it comes to decisions that will affect the actors in some way, e.g. the proposed relocation of Menalish Terra. Moreover, an introduction of economic subsidies, tax reductions, favourable loans, and promotion of policies that provide an advantage for recycled products may be favourable. Such policies could ensure that resources produced at the local market are not lost, and based on imported products. However, in order for this to happen the government has to reconsider its relationship with the actors operating within the informal sector. Actors who are affected by decisions taken by the government should be brought into any consultancy. The chances for success are higher when people agree and are willing to participate in the decision making and are not forced to change through imposition. In most cases the ones who know the situation best are the ones who should be involved in these kinds of decisions. This is also essential if the government is to be able to support those actors operating in the system. Moreover, there is a need to start cooperating and sharing information on the different topics concerning solid waste and recycling within the municipality. Those institutions involved in solid waste and plastic recycling have to cease the practice of keeping information to themselves and instead start to recognize the benefits and strengths of an more open and transparent practice, in order to improve the current situation. At least, there is a need for a structural change within the government. People in the government should be employed based on their educational background and experience in the field, and should be evaluated for their work based on their performance and not because their relationships with those in higher positions within the government.

A consideration of the relationship between the informal sector and the government is missing in most of the studies that I have read about concerning informal recovery systems in developing countries. As this study has shown, the main obstacle for the informal sector is their relationship with the government. The studies I have been reading, such as *Scavengers Cooperatives in Asia and Latin America* (Medina 2000), *Improving municipal solid waste management in third world countries* (Bartone & Bernstein 1993) and *Urban Solid Waste Management: Waste Reduction in Developing Nations* (Zerbock 2003), discuss organizing the

informal sector into cooperatives. However, none of these studies mentions the relationship between the formal and the informal sector. This study has showed that even though it may be favourable to organize the informal sector into cooperatives, it may not be successful if the relationship between the actors and the state is not positive. Actors within the informal sector will most likely not be willing to take part in such action. In other words, such strategies are not appropriate in all cities. It depends on the political situation and the relation between the civil society and the state. Whatever the choice of approach to support the informal sector, it is essential that the relationship between the government and the informal sector is positive. If the informal sector lacks confidence in the government they will most likely not be willing to cooperate with them.

The current plastic recovery system in Addis Ababa may not be a perfect example of how to manage the recovery of plastic materials, but my conclusion is that the plastic recovery system functions well at all levels within the system, from the households at the lowest level to the plastics factories operating at the highest level of the system. Even though the wholesalers are the winners in terms of economic profit, the role they have within the system is crucial to the functioning of the system. The consequences of relocating them from the Mercato area are unknown and it may not be worth taking the risk. Moreover, to determine the extent of the informal sector within plastic recovery, the local authorities should abandon their plan to develop a formal and parallel recovery system through the MSEs. The introduction of such a system will most likely compete with the existing informal recovery system and fail in the actual context or be counterproductive, since the existing system and actors involved have not been taken into consideration. The best way of improving the recovery of plastic materials in Addis Ababa seems for be to build on the existing system. This study has shown that the problem facing the plastic recovery system is neither a question of technology nor the lack of plans that have resulted in the poor governmental management of plastic recycling in Addis Ababa. Rather, this study has shown that there is a need for good governance to solve the problem. In other words, there is a need for a municipality that has knowledge and experience on the topic. Further, there is a need for a city administration that involves all actors in decision making, and that considers their opinions. The political contest is therefore of far stronger importance than lack of technology or lack of plans.

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12. Appendices

12.1. Interview guide

12.1.1 Wholesalers in Menalish Terra

Male Female

Age

- How long have you been involved in this activity?

- Why did you start this activity?

- What kind of materials do you buy?
  Metal
  Glass
  Plastic
  Wood
  Paper

- How much material do you buy during a day/week/month?

- From who do you buy the materials from?
  Micro and small enterprises
  Collectors
  Industries
  Household
  Other_____

- What do you do with the materials you buy?

- Who do you sell the materials to?

- How many employees do you have?

- How much do you pay for one kg?
  Plastic
  Metal
  Glass
  Wood
  Paper
  Aluminium

- What is the price per kg of material that you sell?
  Plastic
  Metal
  Glass
  Wood
  Paper

- Are there any problems concerning this kind of activity?

- Do you like this kind of activity?

12.1.2. Micro and small enterprises participating in solid waste management in Addis Ketema

Sex: Male

Female

- When did you start this business?

- Why did you start this business?

- What kind of solid waste activities do you carry out?
  Waste collection
  Recycling
  Composting
  Waste disposal
  Other

- Who are your clients?
  Households
  Industry
  Institutions
  Restaurants

- How many clients do you have?

- What kind of material does your firm collect?
  Mixed waste
  Plastic
  Paper
  Glass

- What are you doing with the waste you collect?

- What kind of technology does your firm use to collect the waste?
- Are you satisfied with the technology you are using at the time?

- What do you think about the income of this sort of activity?
  Low
  Good
  Average

- Would you like to expand your activities in solid waste management?

- If yes, to include other activities or to expand the activity you are performing today?

- What do you think are the main problems concerning solid waste management in the city?

- What do you think the government should do to make the solid waste situation in the city better?

- What do you think are the major problems concerning this activity?

12.2. Surveys

12.2.1. Collectors in the informal sector of solid waste management in Addis Ababa

These questionnaires were developed as part of my master's degree on solid waste management and recycling activities in Addis Ababa. The purpose of these questionnaires is to gain information on the current practice concerning collection of different inorganic materials for recovering, who collects the materials, and what type and amount of materials are collected by different individuals. The answers to these questions are central to my master's project, where the aim is to identify the current waste collection system and the strength and weakness concerning the current solid waste management and recycling system in Addis Ababa.

Sex: Female □ Male □

Age: _____

1. Where do you come from?

_____

2. Education background

Illiterate

Literate

Secondary school

Above

3. How long have you been in this kind of activity?

1-2 years

2-4 years

4-6 years

6-8 years

Other_____

4. How and why do you choose to involve in such an activity?

_____

_____

5. What kind of materials are you collecting?

Glass

Plastic

Leftover food

Metals

Paper

Other_____

6. In which area of the city do you collect the materials?

_____

7. Where do you collect the materials?

Household

Streets

Waste bins

Landfill

Other

8. How many hours do you work during a day?

1 2 3 4 5 6 7 8 9 10

9. How much do you earn during a day?

On a god day

On a bad day

10. What do you do with the money you earn?

11. Are there seasonal variations in the quantity of waste collected?

Yes Some No

12. To whom and where do you sell the collected materials?

_____

_____

_____

13. If selling them to wholesale buyers, do you have specific buyers you sell the materials to?

Yes No

15. If yes, how many and why?

_____

16. How do you relate to an increase in the price of the materials?

Collect more

Collect the same amount as usual

Collect less

17. How do you relate to a decrease in the price of the materials?

Collect more

Collect the same amount as usual

Collect less

18. Do you face any problems doing this activity? If yes, what kind of problems?

_____

_____

_____

19. What is your plan for the future**?**

12.2.2. Survey of collectors translated into Amharic

በአዲስ አበባ የደረቅ ቆሻሻ በመሰብሰብ ላይ ለተሰማሩ ግለሰቦች የቀረበ ቃለ መጠይቅI

ይህ ቃለ መጠይቅ ለድህረ ምረቃ ትምህርት የማሟያ ፅሁፍ ለማዘጋጀት ሲሆን ጉዳዩም በአዲስ አበባ የደረቅ ቆሻሻ ማስወገድና መልሶ ጥቅም ላይ ማዋልን (Solid Waste Management and Recycling Activities) ይመለከታል።

የዚህ ቃለ መጠይቅ ዋናው ዓላማ ደረቅ ቆሻሻው በማን እንደሚሰበሰብና ዓይነቱና መጠኑ ምን ያህል እንደሆነ ለይቶ ለማወቅ ነው። የነዚህ ጥያቄዎች መልሶች የጥናቱ ዋና ክፍሎች ሲሆኑ ዋና ዓላማዎቹም በአሁኑ ጊዜ ያለውን የደረቅ ቆሻሻ አሰባሰብ አይነቶችን መለየትና ጥንካሬና ድክመቶቻቸውን በመለየት መፍትሔ መጠቆም ነው።

ጾታI ሴት ☐ ወንድ ☑

ዕድሜ 23

1. ከየት አካባቢ ነው የመጣህው/ሽው? [illegible]
2. የትምህርት ደረጃ
   - ያልተማረ (ማንበብና መፃፍ የማይችል)
   - የተማረ
     - ማንበብና መፃፍ
     - ከ1-4 ያጠናቀቀ
     - ከ4-5 ያጠናቀቀ
     - ከ6-8 ያጠናቀቀ
   - ሁለተኛ ደረጃ
   - ከሁለተኛ ደረጃ በላይ
3. በዚህ ስራ ለምን ያህል ጊዜ ሰርተሃል/ሻል?
   1-2 ዓመት
   2-4 ዓመት
   4-6 ዓመት
   6-8 ዓመት
   ሌላ__________
4. እንዴትና ለምን ይህን ስራ መረጥህ/ሺ?
   [illegible]
5. ምን ምን ዓይነት የደረቅ ቆሻሻዎች ትሰበስባለህ/ሽ
   - ጠርሙስ
   - ፕላስቲክ ጎማ /ጎማዎች/
   - የምግብ ትርፍራፊ
   - ብረታ ብረት
   - ወረቀት
   - ሌላ__________
6. በየትኛው የከተማዋ አካባቢ (ክፍል) የደረቅ ቆሻሻ ትሰበስባለህ/ሺ?
   [illegible]
7. ከየት ቦታ ነው ደረቅ ቆሻሻዎች የምትሰበስበው/ቢው?
   - ከቤት
   - ከመንገድ
   - ከቆሻሻ መጣያዎች /ገንዳዎች/
   - ከቆሻሻ መጣያ ቦታዎች (Landfill)
   - ሌሎች__________

8. በቀን ለስንት ሰዓት ቆሻሻ ትሰበስባለህ/ሺ?
1 2 3 4 5 6 (7) 8 9 10

9. በቀን ምን ያህል ታገኛለህ/ሺ (በገንዘብ)?
- ደህና በሰራህ ቀን 8
- ደህና ባልሰራ/ሺ ቀን 3

10.ባገኘህው /ሽው ገንዘብ ምን ታደርግበታለህ/ሺ?
ቆጠባለሁ

11. የምትሰበስበው/ቢው የደረቅ ቆሻሻ ከወቅት ወቅት ይለያያል?
ይለያያል _____
በጥቂቱ ✓
አይለያይም_____

12. ለማንና የት ነው የሰበሰብከውን/ሺውን ደረቅ ቆሻሻ የምትሸጠው/ጪው?
መንገድ ላይ

13.የምታስረክበው ከሆነ ቋሚ የሆነ ተረካቢ አለህ/ሺ ወይ?
አዎ ✓
የለኝም_____

14. አዎ ከሆነ መልስህ/ሺ ስንትና ለምን ? (1) ገንዘብ ስለሚከፍሉኝ

15. የሰበሰብከው/ሺው የደረቅ ቆሻሻ ዋጋ ከጨመረ ምን ታደርጋለህ/ሺ?
ብዙ እሰባስባለሁ
የመጠን ለውጥ አላደርግም ✓
መጠኑን እቀንሳለሁ

16. የሰበሰብከው የሰበሰብሺው የደረቅ ቆሻሻ ዋጋ ከቀነሰ ምን ታደርጋለህ/ሺ?
ብዙ እሰበስባለሁ
የመጠን ለውጥ አላደርግም ✓
መጠኑን እቀንሳለሁ

17. ይህን ስራ በምትሰራበት ወቅት/ጊዜ ችግሮች ገጥመውህ ያውቃሉ። አዎ ከሆነ መልስህ /ሺ ችግሮችን ብትዘረዝር።
የሌለኝ

18. የወደፊቱ ዕቅድህ ምንድን ነው?
ተመንጋ

12.2.3. Households' handling and opinions about solid waste management in Addis Ketema

These questionnaires were developed as part of my master's degree on solid waste management and plastic recycling in Addis Ababa. The purpose of these questionnaires was to find out if waste is a problem for people in Addis Ketema, their opinion of the current waste collection systems in the area, and their practises concerning the handling of solid waste.

The answers to these questions are central to my master project, where the aim is to identify the current practice of waste handling at household level, and the strengths and weaknesses concerning the current solid waste management in Addis Ketema sub-city.

Sex: Female Male

Age:_____

1. **Education background**

   Literate Yes No

   If yes, please state your status_____

2. **Who is responsible for handling waste in your household?**

   Mother

   Father

   Children

   Housekeeper

   Others_____

3. **Have you been affected by the waste in the streets?**

   Very much

   Much

   Little

   Not at all

4. **Do you think the waste situation in your neighbourhood needs to be solved?**

   Very urgently

   Why?_____

   Urgently

   Why?_____

   In some cases

   Why?_____

   It does not need to be solved

   Why?_____

5. **How often does the waste collection truck come to your door?**

   Usually

   Sometimes

   Seldom

   Never

6. **How many containers are there in your neighbourhood? _____**

7. **Are the containers in your neighbourhood emptied regularly?**

   Yes

   No

8. **How far is the walking distance to the nearest container? _____**

9. **Do you use paid private waste collection enterprises?**

   Yes

   No

   If yes, how much do you pay? _____

   If no, why not?

   _____

   _____

   _____

10. **Can you point out the major merits and demerits of the current waste management?**

    _____

    _____

    _____

11. **Do you think that you have the responsibility for waste management in your neighbourhood?**

    Yes

    Some

    No

12. **When you dispose of waste, do you separate the different waste materials?**

    Yes

    Sometimes

    No

13. **If yes, what kind of materials do you separate?**

    Plastic

    Paper

    Metal

    Glass

    Rags

    Aluminium cans

    Other_____

14. **What do you do with the materials you separate?**

    Reuse them

    Sell them

    Give them away

    Other _____

15. **To whom are you selling or giving the materials to?**

16. If you sell them, please specify their price

Plastic _____

Metal _____

Glass _____

Paper _____

Aluminium _____

Other _____

17. Have you heard or received any information on how to contribute towards a cleaner and healthier environment?

Yes

No

18. Do you think the different waste campaigns have had an effect on the situation?

Yes

No

19. Do you think the waste situation in the city has improved in the last year?

Yes

No

12.2.4. Survey of the households translated into Amharic

በአዲስ ከተማ ክፍለ ከተማ ስላለው የደረቅ ቆሻሻ አወጋገድ
<u>የሕዝቡን አስተያየትና ተሞክሮን ለማወቅ የተዘጋጀ መጠይቅ</u>

ፆታ፦ ወንድ [ ] ሴት [x]

እድሜ 53

1. **የትምህርት ደረጃ**
   - 1.1 ተምረዋል — አዎ [ ] አይ [x]
   - 1.2 አዎ ከሆነ የትምህርት ደረጃዎን ይግለፁ ____________

2 **በቤትዎ ለቆሻሻ ማስወገድ ኃላፊነት ያለበት ማነው?**
   - 2.1 ልጆች [x]
   - 2.2 እናት [x]
   - 2.3 አባት [ ]
   - 2.4 የቤት ሠራተኛ [ ]
   - 2.5 ሌላ ካለ ____________

3. **በየመንገዱ ላይ ባሉ ቆሻሻዎች ችግር አጋጥሞዎት ያውቃል?**
   - እጅግ በጣም [x]
   - በጣም [ ]
   - በመጠኑ [ ]
   - በጭራሽ [ ]

4 **በአካባቢዎ ሊታረም የሚገባው የቆሻሻ አወጋገድ ሁኔታ አለ ወይ?**
   - እጅግ በጣም በአፋጣኝ [x]
     ለምን ቆሻሻው በጣም [illegible]
     [illegible]
   - በጣም በአፋጣኝ [ ]
     ለምን ____________
   - በመጠነኛ ሁኔታ [ ]
     ለምን ____________

1

የለም ☐

ለምን _____

_____

5 የቆሻ አስወጋጅ መኪና በአካባቢዎ በምን ያህል ጊዜ ይመጣል?

ቶሎ ቶሎ ☐ ከስንት ጊዜ አንዴ ☐

አልፎ አልፎ ☑ በጭራሽ ☐

6 በአካባቢዎ ስንት የቆሻሻ መጣያ ገንዳዎች አሉ? ያለም

7 በአካባቢዎ ያሉ ገንዳዎች በተገቢው መንገድ ቆሻሻቸው ይወገዳል?

ይወገዳል ☐ አይወገድም ☐

8 ገንዳዎቹ ከቤትዎ በምን ያህል ርቀት ላይ ይገኛሉ ? ያለም

9 በክፍያ የሚሠሩ የግል የቆሻሻ አስወጋጆችን አገልግሎት ይጠቀማሉ?

እጠቀማለሁ ☐ አልጠቀምም ☑

9.1 የሚጠቀሙ ከሆነ ምን ያህል ይከፍላሉ? _____

9.2 የማይጠቀሙ ከሆነ ለምን? መኖሩን አላውቅም

_____

10 አሁን ያለው የቆሻሻ አወጋገድ ዘዴ ላይ ያሉት ጠንካራና ደካማ ጐኖች ምን ምን ናቸው? ምንም የሚሠራ ነገር የለም

_____

_____

11 በቆሻሻ አወጋገድ ሂደት ላይ ሃላፊነት አለብኝ ብለው ያምናሉ?

በጣም አለብኝ ☐ በመጠኑ አለብኝ ☑ አይመለከተኝም ☐

12 በቤትዎም ሆነ በማንኛውም ቦታ ቆሻሻዎችን በዓይነት ለይተው ያስቀምጣሉ?

እለያለሁ ☑ የተወሰኑትን እለያለሁ ☐ አስቤበትም አላውቅ ☐

13 የሚለዩ ከሆነ የትኞቹን ቆሻሻ አይነቶች ይለያሉ?

ፕላስቲኮች ☑

ወረቀቶች ☑

ብረታ ብረት ☑

ጠርሙሶች ☑

ልባሽ ጨርቆች ☑

የቆርቆሮ ጣሳዎች ☑

ሌሎች ካሉ ______________________

14 የለዩዋቸውን የቆሻሻ ዓይነቶች ምን ያደርጓቸዋል?

መልሰው ይጠቀሙባቸዋል ☑

ይሸጡአቸዋል ☑

ያለክፍያ ይሰጡዋቸዋል ☐

ሌላ ካለ ______________________

15 ለማን ይሰጡአቸዋል ወይም ይሸጡአቸዋል?

[illegible]

16 የሚሸጡአቸው ከሆነ ዋጋቸውን ቢገልፁ?

ለፕላስቲኮች [illegible]

ለብረታ ብረት [illegible]

ለጠርሙሶች [illegible]

ለወረቀቶች [illegible] 1.25

ለቆርቆሮ ጣሳዎች [illegible]

ለሎች ካሉ ______________________

17 ንፁህና ጤናማ አካባቢን እንዴት መፍጠር እንደሚቻል መረጃ አለዎት?

አለኝ ☐ የለኝም ☑

18 የቆሻሻ አስወጋጅ ድርጅቶች የሚያበረክቱት አስተዋጽኦ አላቸው ብለው ያምናሉ?

አምናለሁ ☐ አላምንም ☑

19 ባለፈው ዓመት የነበረው የቆሻሻ አወጋገድ ሁኔታ ካለፉት ዓመታት የተሻለ ነበር?

አዎን ☐ አይደለም ☐ ☑ [illegible]

12.3. List of registered plastic factories operating in Addis Ababa

No	INVESTOR	PROJ_TITLE	PROJ_CONDI
1	A.B Plast PLC	Pipe Fitting and Plastic Products	Implementation
2	AA Industrial PLC	Plastic bags Mfg.	
3	AB Plast PLC/Abraham Getachew/	Plastic Pipe fittings Mfg	Operation
4	Abbay Plastic Sacks Factory PLC	Plastic sacks Mfg.	Implementation
5	Abdu Adem (Modern Multi Plast)	Plastic Sheet and Bags Mfg	
6	Abdul Wasi Adus	Plastic products mfg	
7	Abdulwasi Ahmed	Plastic Products	Implementation
8	Abdulwasis Adus Abdi	Plastic Bag Manufacturing	Operation
9	Abdurahman Bahir	Plastic Products Project	Implementation
10	Abdurahman mohammed Ahemd	Plastic Bag mfg plant	Implementation
11	Abera Kebede/Inactive1/	Plastic Products Manufacturing	
12	Addisu Yidnekachew Tesema	Vertical curtains production project	Operation
13	Adil Ebrahim	Plastic Products Mfg	Implementation
14	AFATCO P.L.C.	Plastic Manufacturing	Operation
15	Afatco Plc	Plastic materials Mfg./3rd Exp./	Implementation
16	Afric Agricultural & Industrial Development Plc	Plastic packing products	Implementation
17	Ahmed Abdulahi Salih	Plastic Sheet and Bags	
18	Ahmed Bashir Ibrahim	Polypropylene woven sack mfg plant	
19	Ahmed Bashir Ibrahim	Plastic packing material production	
20	Ahmed Bashir Ibrahim	Pvc shoes making	
21	Ahmedelhadi Kahsay	Melaminic Household Utensils Product Manufacturing	Implementation
22	AHR Steel and PVC manufacturing enterprise PLC	Manufacturing of PVC framed windows	Implementation
23	Alemayehu Amare	Household plastic products mfg	
24	Alganesh Alemayhu Zerai/W/o/	Shopping bags Manufacturing	Implementation
25	Ali Buser	Plastic bag Manufacturing	Implementation
26	Ali Buser Ahmed	Plastic shoes, soles and other plastic products	Implementation
27	Ali Ibrahim Hasen/Haji/ /Inactive1/	Plastic Products	
28	Alnub International Manufacturing and trading Plc	PP soft sultali, PP box Strapping Adhesive Tape, PP-Rope & Belt Pro	
29	Alnub International Mfg Trading PLC	Plastic mat Mfg.	
30	Amdie kebede	PP bags Manufacturing	
31	Aredo Plc	Poletlen (PE) bags Mfg	
32	Art Crafts PLC	Plastic products factory	
33	Asefa kassa	Plastic shoe and soles product plant	
34	Asegedech Fekadu	PVC tube, conduit &hose mfg	
35	Asegedech Fekadu Borshe /W/ro/	PVC compound /Pellet/mfg	Implementation
36	ASMEN PLC	Polypropylene bag mfg	
37	Asmerom Tekle	Plastic Carrier Bags/Shoping Bags Production	Operation
38	Astuti Renato (Mr.) /Inactive1/	Plastic Utencils Manufacturing	
39	Ayele Debela Hulluka	Plastic House Hold Products manufacturing	
40	Betru Wegayehu Bitew	Ploy Propylene Mfg.	
41	Bir-Wonz PLC	Plastic bag mfg	
42	Black Diamond plastic Factory Plc	Plastic Products	Operation
43	Blue Nile P.P & Craft paper bag PLC	Plastic Mat. Manufacturing	Operation
44	Bogale Shawel	Plastic shoe & sole mfg	
45	Boylo PVt Lt.Co.	Polypropylene	Implementation
46	Daniel Yohannes	Baby teats, Gloves, Ballon & catheters	

		mfg.	
47	Dashen Plastic Factory	Plastic Factory	Operation
48	Dashen Plastic P.L.C	Household plastic goods mfg	Operation
49	Debebe Silehi Yehualashet	PVC window & door mfg	
50	Degafe Shekutie W/Mariam	Plastic bags, plastic sheets, Laundry suit cover, Hand Gloves	Implementation
51	Demis Girma	Plastic Products Mfg	Implementation
52	E.D. Plastic Manufacturing P.L.C.	Manufacturing of Household Plastic Utensils	Operation
53	E.D. Plastic Materials Manufacturing	Plastic Products for Industrial use Construction & Electrical appliances	
54	East African Ethiopia Plc	Polypropyline bags mfg	
55	ELTRACO Trading Plc	Plastic Factory	
56	Endeshaw Molla	PP woven sacks manufacturing	
57	Ermias Habteselassie	Plastic products for construction use	Implementation
58	Ethiopia Plastic Factory	Boots, plastic bottles, jerrycans & bags Mfg	
59	Excel Plastic P.L.C.	Plastic Utencils Manufacturing Plant	Operation
60	Excel Plastic PLC	Plastic products manufacturing	Implementation
61	Excel Plastic PLC	Plastic products	Operation
62	Excel plastic plc	Plastic pipe	
63	Fethi Abdulkadir	Plastic bag Producing Plant	Operation
64	Fettiya Behar Abdela (W/t)	Plastic Products Manufacturing	Operation
65	Fetudin Omer	Polyproplene sacks and plastic bags	Operation
66	Fetudin Omer Juhar	Polypropylene sacks and bags	
67	Firew Bekele	Plastic packaging manufacturing plant	Implementation
68	Fowzy Yahya	Plastic Manufacturing Plant	
69	G/Eyesus Hidaru/Inactive1/	Plastic Household Utensils Production	
70	G/Mariam Asfha	Plastic Products Manufacturing	Implementation
71	Garad PLC	Audio cassetle mfg	
72	Getahun Wubshet/Inactive1/	Thermo Plastic Products Manufacturing Plant	
73	Ghion Industrial chemical Sector PLC	Plastic bottle & Jerrecan mfg	Implementation
74	Gidey & Hikimu General Partnership	Nylon Rope Factory	Operation
75	Gido Industrial and Trading Plc	Plastic Products mfg	
76	Gizachew Negash	Plastic Products	Implementation
77	Gizachew Negash Zeleke	PVC compound mfg	
78	Gulela Plastic Industry	Plastic Household goods & shoe Mfg	Implementation
79	Gulele Plastic Industry PLC	Plistic products Mfg	Operation
80	Gutu Ejeta	Plastic cosmetic containers mfg	
81	Hakammaz Cosmetics & Plastic production PLC	Plastic Containers for oral Pharmaceutical products	Implementation
82	Hakmmaz Cosmetics & Plastic Mfg. PLC	Plastic bag manufacturing	
83	Hashim Ahmed	Insulating Copper Wire, Plastic Hose & Conduits Mfg	Implementation
84	Henok Berhanu	Plastic products manufacturing	
85	Henok Mulugeta	Plastic Products manufacturing	
86	Heron International PLC	Plastic products mfg	
87	IMTEC Industries	Plastic Bag Manufacturing	
88	J.J. KOTHARI & CO./ETH/LTD.	Pet Bottled and Jars Manufacturing	Implementation
89	Jamaa Trade &Industry Plc	Polyproplyene Bags manifacturing	
90	Jemal Awel Juhar	Plastic goods manufacturing	
91	Jowyeid Said Salim	Manufacturing of plastic bags	
92	Kalewold Trade and Industry PLC	Plastic products Mfg.	Implementation
93	Kidist International PLC	Plastic house holds factory	

94	Lion Plastic PLC	Plastic products mfg	
95	M.A.T Plastic Products Industry P.L.C./Inactive1/	Plastic Products Production	
96	Maan Zabian	Plastic products mfg	
97	Mekonen Mikru	Plastic products mfg	
98	Merkeb International PLC	Plastic products	Implementation
99	Messud Shukrie Beshir	Plastic Bags factory	
100	METEDLI PLC	PP Woven bags factory	
101	Misgina T/ab	Plastic Bottles Production	Implementation
102	Modern Building Industries PLC	Plastic Tiles Mfg	Implementation
103	Mohammed Abdela Kassim	Plastic sacks manufacturing	
104	Mohammed Abdurahman	Plastic bags manufacturing	
105	Mohammed Ibrahim	Plastic bag manufacuring.	Implementation
106	Moplaco Packaging(Ethiopia) PLC	Plastic bags manufacturing	
107	Mulugeta Areda	Plastic household goods mfg	
108	Mulugeta Mekonen	Tana poly propylene bags manufacturing plant	
109	National Plastic Industry plc	Crates & other plastic products	Implementation
110	Natran P.L.C.	Plastic Household Goods Manufacturing	Operation
111	Natran Plastic Goods Manufacturing Plc.	Plastic products mfg.	Implementation
112	Natran Plastic Goods Mfg. Footwear	Plastic Goods Mfg.	
113	Natran Plastic Materials Manufacturing P.L.C.	Manufacturing of Construction & Household Material from Plastic	Operation
114	Need Ethiopia PLC	Integrated plastic packaging container cosmetics detergent Mfg.	Implementation
115	Nega Belihu /Inactive1/	Artificial Leather Products	
116	Nigussie Gedyelew	Polyethlene Woven bag Mfg	Operation
117	Nile Business Group PLC	PP Woren Bags Mfg	Implementation
118	Nile shoe and sole PLC	Plastic products manufacturing	Implementation
119	Northern star limited company	Plastic and shopping bag production	
120	Ome Kulsuma Ali Abdul Rahim(W/o) /Inactive1/	Poly Film Sheet Poly Bags Blow Moulding Articles Rotary	
121	Oxford Industries PLC	Plastic packaging materials MFG. (no parent company)	Operation
122	Oxford Polysacks PLC	Poly Woven Sacks Manufacturing	
123	Plastech PLC.	Production of plastic pipes	Operation
124	Plastic Tech Plc.	High pressure PVC pipe manufacturing	
125	Rabia Mohammed	Manufacture of plastic made Packages	
126	Rahel Zenebe/W/o/	Plastic Products Manufacturing Plant	Operation
127	Re'esom Fissehaye	Plastic factory	Operation
128	RGB International P.L.C.	Plastic Products	Implementation
129	RGB International P.L.C.	Manufacturing of Household Goods from Plastic	Operation
130	ROTO Plc	Plastic Products Mfg	Operation
131	Sahle Siyoum	PP woven sacks Mfg	
132	Said Ahmed	Polyproplene Woven bags factory	
133	Samuel Getachew	Artificial Leather Manufacturing	Implementation
134	Seid Muhammed	Plastic Products & Woven P.P.Bags manufacturing	Operation
135	Senay Beyene	Plastic products Mfg.	
136	Shalom Sion	Electrical Fittings & Plastic Household Products Mfg. Plant.	Operation
137	Shebel PLC	Plastic Products Mfg	
138	Shoe Wind Industries PLC	Packing materials made of plastic	Operation
139	Sima Trading	Cassette & Compact disc mfg	
140	Sirgaga Dari Bushira	Plastic Products mfg.	Implementation

141	Sisay Tefera Negash	Plastic products	
142	Summit Engineered PLC	Woven poly proylene and plastic by MFG.	Implementation
143	Tadesse Chekol	Flexbile plastic & adhesive plaster mfg	Implementation
144	Tana Plastic Work Plc	Plastic Products Mfg	Implementation
145	Tana Plastic Works PLC	Plastic products	Operation
146	Tatek Yirga	Artif icial Leather Manufacturing	
147	Taye Belay	Manufacturing of Plastic for Table Salt Packing	Implementation
148	Tehab Mfg & Trading PLC	Plastic products mfg(PP bags)	Operation
149	Teka Bedadda Oba	Plastic products Mfg.	
150	Tekle Muruta Melkamme	Poly Propylene Woven Bags	
151	Termo Plastic Industry P.L.C.	Plastic Materials Production	Operation
152	Tewodros Masresha Wakini	Thermo plastic products mfg.	
153	Thermo Plastic Industry Plc	Plastic products mfg	Operation
154	Thermoplastic industry PLC	Plastic Meterials & Bags Mfg	
155	Unity Treading PLC	Plastic product mfg	Operation
156	Univeral Plastic Factory PLC	Plastic Crate Manufacturing	Operation
157	Universal General Plastic Goods & Shoe Mfg. PLC	Various Plastic Household Utensils & Construction Usage Materials	Operation
158	Universal Plastics factories Plc	Plastic products Mfg	Operation
159	Universal Plastic Factory P.L.C.	Plastic Products	Operation
160	UPEC Plastics Engineering P.L.C.	Plastic Tiles Manufacturing	
161	Werkagegnehu Tafere Bante	Blown Plastic & Plastic Bags	Implementation
162	Workagegnehu Tefera	Plastic Sheets and Bags Mfg	Operation
163	Workineh Weinu Denboba	Thermoplastic table wares	
164	Wubtaye Belaineh	Plastic bags manufacturing	Implementation
165	Wuddish Kidane (W/o)	Electrical Insulating, Toilet Equipment and Toys Manufacturing	Implementation
166	Wulle Sirage	Woven Bag Production	
167	Wulle Siraj Amde/Inactive1/	Plastic Goods Production	
168	Yagesh International PLC	Plastic robes Mfg.	
169	Zeid Berhane /Inactive/	Plastic Shoping Bags Production	Implementation
170	Zeidy Abduramid	Plastic Materials Manufacturing	Operation

(Source: Addis Ababa, City Administration, Investment Department, November 2004).

12.4. Photographs

Waste composition.

Waste thrown into the water channels.

Waste in water channels.

Condition of one of the municipal containers in the city.

Forager looking for some items of value in a municipal container.

One of many *Korales* in Addis Ababa.

Plastic activities in Menalish Terra.

Transport of plastic waste materials from Menalish Terra.