

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
REGIONAL AND LOCAL DEVELOPMENT STUDIES

**FINANCING URBAN INFRASTRUCTURE AND SERVICES IN ETHIOPIA:
THE CASE OF SOLID WASTE MANAGEMENT IN ADAMA (NAZARETH)
TOWN**

By: Dereje Tadesse



Solid waste disposal system of Adama Town

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TOWN**

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By: DEREJE TADESSE

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TOWN**

A Thesis presented to the School of Graduate Studies of Addis Ababa University in partial fulfillment for the Degree of Master of Arts in Regional and Local Development Studies.

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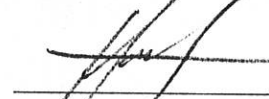
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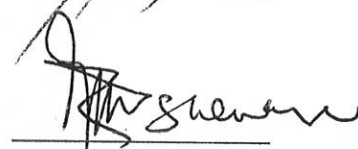
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TABLE OF CONTENTS

Acknowledgement	i
Table of contents	ii
List of tables	vi
List of pictures	vi
List of acronyms	vii
Abstract	viii
CHAPTER ONE:	
INTRODUCTION	1
1.1. General Background	1
1.2. Statement of the Problem.....	2
1.3. Objective of the Study.....	5
1.3.1. General Objective	5
1.3.1. Specific Objectives.....	6
1.4. Methodology	7
1.4.1. Sources of data	7
1.4.2. Sample size and Sampling technique.....	7
1.4.3. Data Analysis	8
1.5. Scope of the Study	8
1.6. Significance of the Study	9
1.7. Organization of the paper	9
CHAPTER TWO:	
SOCIO- ECONOMIC BACKGROUND OF ADAMA TOWN	11
2.1. Location and Physical Features.....	11

2.2.	Economy.....	11
2.3.	Population	12
2.4.	Infrastructure and Services	13
2.5.	Municipal Finance of Adama	15
2.5.1.	Sources of Locally Raised Revenues	16
2.5.2.	External Revenue Sources	17
2.5.3.	Revenue Collection Efficiency	18
2.5.4.	Expenditure	19
2.5.5.	The Financial Process	21
2.5.6.	The Accounting Systems	21

CHAPTER THREE:

LITERATURE REVIEW	23
3.1. General.....	23
3.1.1. The Role of Urban Areas in the Development Process.....	23
3.1.2. The Challenge of Urbanization.....	25
3.1.3. Infrastructure’s Role in Development	26
3.2. Financing Urban Infrastructure and Services.....	29
3.2.1. General.....	29
3.2.2. Municipal Revenue.....	30
3.3. The Management and Financing of Municipal Solid Waste	34
3.3.1. Municipal Solid Waste: Definition, Composition and Characteristics	35
3.3.2. Municipal Solid Waste Management: Definition and Components	39
3.3.3. Common Stages in Solid Waste Management	39

3.3.4. Solid Waste Recycling.....	46
3.3.5. Selection of Appropriate Technology	48
3.3.6. Modes of Institutional Arrangement	49
3.3.7. Financing Solid Waste Management	51

CHAPTER FOUR:

DESCRIPTION AND ANALYSIS OF THE EXISTING SOLID

WASTE MANAGEMENT OF ADAMA TOWN	58
4.1. Generation Rate and Composition of Solid Waste of Adama Town.....	58
4.1.1. Solid Waste Generation Rate	58
4.1.2. Composition of Wastes	61
4.1.3. Major Characteristics of the Wastes	62
4.2. Method and Coverage of Solid Waste Collection.....	63
4.3. The Situation of Uncollected Wastes.....	69
4.4. Solid Waste Disposal System of Adama Town: Methods and Performance.....	73
4.4.1. Scavenging and Reuse of Wastes.....	76
4.5. Institutional Arrangements for Solid Waste Management of Adama Town	77

CHAPTER FIVE:

EXPENDITURE AND REVENUE OF SOLID WASTE MANAGEMENT

SERVICES OF ADAMA TOWN	81
5.1. Expenditure on Solid Waste Management Services.....	81
5.2. Revenue from Solid Waste Management Services.....	83
5.3. Methods of Fee Collection	86

CHAPTER SIX:

CONCLUSION AND SUGGESTED LINES OF ACTION91

6.1. Conclusion91

6.2. Suggested Lines of action.....94

6.2.1. Improve solid waste collection.....94

6.2.2. Improve the disposal system.....97

6.2.3. Improve institutional arrangements.....98

6.2.4. Improve the financing systems.....101

6.2.5. Enhance the participation of different actors.....103

REFERENCES.....106

APPENDICES

LIST OF TABLES

Table 2.1: Population of Adama town.....	13
Table 2. 2: Revenue of Adama Town Administration (1988-1990 E.C).....	16
Table 2.3: Expenditure of Adama Town Administration (1988-1990 E.C).....	20
Table 3.1: Patterns of municipal waste quantities and characteristics for Lower-, middle-and higher income countries.....	38
Table 5.1: Expenditure on Solid Waste management by Adama Town.....	83
Table 5.2: Revenue generated from Sanitation Fee by Adama Town Administration (1988_1992 E. C.).....	85
Table 5.3: Plans and Implementation of Sanitation Fee Collection (1988 - 1992 Eth. C).....	87

List of pictures

Front page: Solid waste disposal system of Adama town	
Picture 1: Collection works using dump trucks.....	71
Picture 2: Canals are commonly used for waste disposal (Minjar road).....	72
Picture 3: Open dumping of wastes.....	77

LIST OF ACRONYMS

ASZTA	Adama Special Zone Town Administration
ATTD	Adama Town Technical Department
BWUD and EMAC	Bureau of Works and Urban Development and Excellence Management consultants
CBO	Community Based Organization
CSA	Central Statistical Authority
CSO	Central Statistical Office
E.C	Ethiopian Calendar
FMSS	Finance Management Service
GDP	Gross Domestic Product
m.a.s.l.	Meters above sea level
MWUD	Ministry of Works and Urban Development
NGO	Non-Governmental Organization
NUPI	National Urban Planning Institute
UDSS	Urban Development Support Services
UNCHS	United Nations Center for Human Settlement
UNESCO	United Nations Education, Science and Cultural Organization
ZDWUD	Zonal Department of Works and Urban Development

ABSTRACT

This study reports the situation and financing of solid waste management services in Adama town of Oromia Region (Ethiopia). The study showed that the town is currently providing inadequate solid waste management services. The town administration collects and disposes less than 15 percent of the wastes generated by the town annually. It is also found out that the solid waste collection and disposal systems are backward and are not economical as well. The institutional arrangements` for the management of both liquid and solid wastes are also very weak.

The town administration allocates a marginal budget to this service which is less than 10 percent of its total budget as opposed to towns of developing countries that commit between 20 and 40 percent of their budget for the same. Low budget and low performances are generally attributed to scarcity of resources. However, problems of insufficient mobilization of the available resources and misuses are found to be equally serious according to this study. This shows that studying the financing system of urban services is an important area to reckon since it is helpful to look for ways by which the service may be improved by using the available resources differently. It may also be of advantage to check whether the available meager resources are effectively and efficiently used for the priority and basic needs of the town. The study also suggests some lines of action that are essential to improve the current inadequate solid waste management service of Adama town.

CHAPTER ONE

INTRODUCTION

1.1. General Background

Urban areas are both the results and engines of economic and social transformation. They provide opportunities that could be appropriated through the implementation of innovative policies and programs. The situation of most present day urban areas of the developing countries however does not show this general feature. Cities/towns of the developing countries are becoming places of numerous social, economic and environmental problems though they still play decisive roles in the national economies.

Today urban areas of the world, those of developed and developing countries alike are suffering from various kinds of pollution and environmental problems. One of the factors that contribute to the depletion of the urban environment is inappropriate solid waste management. Inadequate solid waste management is the cause of a number of health and environmental problems which have a far reaching negative impacts on the living and works of the dwellers of urban areas. Despite its negative consequences solid waste management service of most cities/towns of developing countries is significantly inadequate.

The situation of solid waste management services in the towns of Ethiopia is also worse. The efforts made to change the conditions are also minimal. Although improving the quality and coverage of the solid waste management services have significant contributions to the protection and/or improvement of the environment and public health, only marginal attentions

are rendered to it. Only a small proportion of the urban households is served and a huge amount of wastes are left uncollected.

Despite these common features detailed studies on the situation and consequences of solid waste management of Ethiopian towns are not made so far. Particularly no study has ever been conducted on solid waste management services of Adama town in spite of its size and increasing seriousness of the problem. These are the major rationale of this study.

1.2. Statement of the problem

One of the most important urban infrastructure services that are inadequately provided by cities/towns of developing countries is solid waste management service. Various studies show that a huge amount of solid waste is generated in urban areas. The rate of waste generation per capita (kg per person per year) for low-income countries is estimated to be 100-220 while it is 180-330 and 300-1000 for middle-and high-income countries respectively. The amount keeps on increasing as income and population increases (Cointreau, 1982).

However it is only the smallest proportion of the generated waste that is collected and disposed of. On the other hand, most cities in the world today are using open dumping for waste disposal, a practice that has negative impacts on both the urban residents and the environment. In such system of disposal the contaminants in the wastes could find their way back to humans to affect health, working activities and quality of life. Those living on or near dumping sites are also at risk always. Also important is the problem of not serving the illegal/informal settlement

around the towns for one reason or another. Though they are not served, the effect of the improper handling of waste in such areas is not limited to the areas alone (UNCHS, 1996).

A number of health and environmental problems are associated with wastes. Firstly, most municipal wastes in developing countries contain faecal matters and faecally transmitted diseases are responsible for one quarter to one half of deaths under age five. Secondly, municipal wastes also contain industrial wastes, which cause serious hazards. Thirdly, “the decomposition by-products of materials within urban solid wastes can release chemical constituents into drainage, seepage and atmospheric emissions which has hazardous impacts. Finally, smokes from continuous burning of dumps are the cause of extensive pollution in many cities. These negative impacts of wastes can only be lessened through adequate management (Cointreau, 1982).

The waste collection and disposal service for cities of the developing countries, however is very low covering only a quarter to a half of the wastes generated and serving less than 50 percent of the households. On the contrary it consumes from 20 to 40 percent of municipal budget in many countries. Inadequacy of solid waste management service is assumed to be the result of weak management and inappropriate and insufficient financing mechanisms. Weak management eventually leads to the pollution of the environment and may also heighten the conflict between the municipalities and the surrounding areas. Therefore, solid waste needs proper planning and management. This study will attempt to deal with these aspects of the service: the overall management(planning, organizing and other functions that are related to the

handling of the service) and the financing of urban solid waste delivery services particularly of Nazareth (Adama) town (Bartone, et.al.1994).

For the purpose of this study, financing mainly refers to the mechanisms or the processes of raising or providing funds and its utilization to cover the cost of the service though it also touches upon some aspects of finance management. The study attempts to review both the initial investment and operating costs of the service under consideration.

Adama town is a dynamic town with extensive socio-economic activities. It has a projected population of about 179669 in 2000 and is experiencing a fast growth rate (about 5 percent per annum). This creates increased demand for urban services including waste management. Alike all towns of the country, Adama lacks the capacity to provide the necessary services. Nearly all urban services are not provided on adequate basis both in coverage and quality. Particularly solid waste management service is of lower standard and the coverage is also marginal. The service provided in this respect is inadequate both in collection, disposal as well as dumpsite management (NUPI, 1995).

Shortage of resources is one of the major constraints to providing efficient and quality urban services in Adama town. In Ethiopia nearly all municipal services are expected to be provided by municipalities. The municipalities however lack the financial resources, among others, to fulfil their duties. Thus a gap exists between demand and supply, a gap which kept on widening from time to time while the capacity of municipalities remained the same for the past couple of years. The same is true for Adama town. Adama, though a relatively big town, has a very low

revenue as discussed earlier. Thus it has only a limited resources to use for the expansion and operation of urban services.

The problem of solid waste management in Adama town is so serious deserving studies particularly for two main reasons. First, it has a large population, which is still growing at a faster rate. This leads to increase in waste production and thus increased need for more resources and efficient institutional arrangements to manage it. Second, its relatively hotter climate makes solid waste management more sensitive requiring a more efficient and sufficient handling. The health hazard and the negative impacts of inadequate solid waste management services on the productivity of the town under such circumstances are really enormous.

The main research questions therefore are how does Adama town manage solid waste? How is it financed? Does or can it generate revenue to cover the cost of providing the service? Are there possibilities to minimize costs without compromising quality? Can other actors other than the municipal authority finance it? Is the problem scarcity of finance or failure to mobilize from the available sources? And how efficient are the management and financing systems? These are some of the problems that this study attempts to address.

1.3. Objective of the Study

1.3.1. General Objective

Urban areas generate a lot of waste that has got serious impacts on the residents and the environment if not properly managed. It has got negative impacts on the productivity of urban residents by affecting their health and living conditions. In the towns of Ethiopia, though the

consequences of improper waste management is not severe at the moment as it is in their counter parts elsewhere, the problem is growing increasingly serious as the population of urban areas grow from time to time and as activities are enhanced. Thus it requires studies and appropriate systems to deal with.

The general objective of this study is to assess the state of waste management and its financing in Adama town and to propose possible recommendations to tackle shortcomings. It aims at assessing the role of the various actors in the delivery of the service and attempts to look for a viable alternative system of financing urban solid waste management.

1.3.2. Specific Objectives

The specific objectives of the study include:

1. To evaluate the current state of solid waste management and its impact on the residents and the environment, i.e., collection and its coverage, treatment, efforts in waste minimization, recycling and reuse, the treatment of the disposal sites- its actual and potential impacts on the residents and the environment- and related issues shall be addressed;
2. To assess the institutional arrangements established for solid waste management and its efficiency;
3. To evaluate the relationship between waste management and its financing;
4. To recommend alternative institutional set up and financing mechanisms for a better waste management in the town.

1.4. Methodology

1.4.1. Sources of Data

The study is both of qualitative and quantitative. Both secondary and primary sources are used to obtain data for the study. In the document review, books, research papers, academic journals, publications and other published and unpublished materials have been consulted to this end. The archive of the municipality has also been used as a source of data. Particularly the documents of the accounts and health section were used extensively.

To generate primary data, structured questionnaire survey and unstructured interviews with concerned professionals, municipal officials, employees and other actors have been made. Accordingly, two types of questionnaires were administered: one to survey sample households and another to gather information from the town administration. The questionnaire prepared for household survey was translated into Amaharic for the purpose of simplicity and smooth communication. This is regarded very important for the collection of reliable data for it is easy for both the data collectors and the respondents to understand the questions and express ideas comfortably. Observation by the researcher was also used as one way of data collection. Market areas, motor terminals, some of the congested areas of the town, areas traditionally used for waste disposal by households, the dumpsite and other areas and neighborhoods were visited to get the right impression.

1.4.2. Sample Size and Sampling Technique

For the purpose of describing, exploring and explaining the situation of solid waste management in the town, households are selected as the major units of analysis. The total number of households in the town was 26513 in 1994, which is taken as the universe for this

study. Of the universe, 200 households are studied (the households studied consist 1117 persons) which is assumed to be a representative and adequate sample size to reach a sound conclusion about the issue under study. On top of this different institutions were visited and consulted to obtain pertinent information.

The method of sampling applied is the probability sampling method particularly the systematic sampling technique where every household in the town had a known chance of being chosen for the study. The sampling frame used is the list of households recorded and kept by the 20 kebeles. Since the coverage and quality of providing solid waste management service is assumed to vary from one neighborhood to another, samples from the twenty kebeles were considered to understand the magnitude of the problem on a town wide scale.

1.4.3. Data Analysis

The data obtained are described, summarized and analyzed using the appropriate data analysis technique. The data are presented using tables, ratios, rates and percentages to make generalizations and valuable conclusions.

1.5. Scope of the Study

The scope of data collection was made to cover all information regarding solid waste generation, temporary storage, collection, transfer, disposal as well as the institutional and financial arrangements. The survey also covers sample households from all the twenty kebeles of the town, geographically. Efforts have been made to make the survey down to the earth as much as time and resources allowed.

1.6. Significance of the Study

The study deals with one of the major problems of Adama town, solid waste management. Therefore it is of an advantage for the municipality to use the findings to improve the current situation of solid waste management services. It is hoped that the study assists Adama municipality to mobilize the resources under the control of various actors to ameliorate the situation. So, it is of a great advantage for the municipality of Adama. Furthermore, since the problem is nearly common to all towns in the region, this study can be used by the Bureau of Works and Urban Development as a framework to study the condition in other towns of the region. By the same token it can be used as a springboard for further research interests. Last, but in no ways the least, is its importance for NGOs and private firms who intend to play parts in the management of urban solid waste. This study can at least help as a point of departure for such actors.

1.7. Organization of the Paper

In chapter one, the introduction part, we have already dealt with the statement of the problem and objectives of the study area, Adama town. In this part is also presented the methodology used to conduct the study. Chapter two presents the socio economic back ground of Adama town. It provides some information that are vital to understand and analyze the situation of solid waste management services of the town. Chapter three reviews some of the most pertinent literature. Solid waste management is discussed in this chapter to a certain depth and a brief account of systems of financing urban services is made. Chapter four deals with the description and analysis of the existing solid waste management of Adama town. The rate of collection,

disposal system and institutional arrangements of waste management services of the town is discussed in this chapter. Chapter five discusses the financing system of solid waste management of Adama town. In short the findings of the study are presented in these two chapters, chapters four and five. Finally chapter six summarizes the major findings and suggests some lines of action to improve the service.

CHAPTER TWO

THE SOCIO- ECONOMIC BACKGROUND OF ADAMA TOWN

2.1. Location and Physical Features

Adama is one of the largest towns of Ethiopia next to Addis Ababa and it is the largest in Oromia both in terms of population and economic activity. Currently it is the seat of East Shewa zone, one of the 12 zones of Oromia National Regional State. It is also selected as a seat of the Regional Government of Oromia though not assumed this function yet.

The town is located in the Ethiopian rift valley, which makes it a seismically active area. It is located at about 100-km southeast of Addis Ababa on the highway to Harar. It is enclosed between 8°35'00" _ 8°36'00" north latitude and 39°11'57" _ 39°21'15" east longitude. Adama town has a total area of 9,616,399.5 M². It is subdivided into 3 higher and 20 kebeles with one central municipal authority, a body currently given the status of zone administration and thus called 'Adama town special zone'. The average altitude of the town is 1620 m.a.s.l. A chain of hills surrounds the town from all directions except the south, the only direction suitable for future expansion. It has a relatively flat topography. Adama town lies in sub-humid tropical zone with an average annual temperature of 21⁰C (Daniel 2000).

2.2. Economy

Adama town was found and subsequently grew mainly as a result of the development of commerce and communication in the area between Addis Ababa and Djibouti. It started as a

small railway station and gradually grew to its present stage. Although data on its exact structure and function is not available, the municipal office of Adama was first established during the Italian occupation. After the Italian period, the town continued to play important economic and administrative roles. NUPI report (1995) describes its economic roles as follows:

Economically, it has been serving as a major focal point for trade and small-scale industries. The town is also an important center of distribution of goods that are manufactured locally by the various industries in the town and its suburbs. Furthermore, the town has been serving as the loading center for some Ethiopian export goods" (P: 8)

A study conducted on the investment potential of Adama town disclosed that the largest proportion of the town's residents lives on commerce and transport. The same study revealed that a substantial proportion depends on manufacturing, administration, services and construction, as well (ATTD 1997).

Following the current free market policy, Adama has relatively benefited more by attracting some amount of investment particularly to the commercial sector of the economy. This further strengthened the economic role of the town. Its nearness to the famous resort area of Sodere also makes the town a more attractive place, which many people like to visit. In general, it has a very important locational advantage that contributed a lot to its growth.

2.3. Population

The relatively faster rate of the expansion of the urban economy of the town pulls quite a large number of migrants, which added to the natural increase, exhibits rapid growth of population of the town. The trend of population increase can be observed from the table below. The

population of the town is projected to be 179669 by the year 2000 and 296225 by the year 2010. The estimated average growth rate of the town's population up to the year 2010 is 5% (NUPI 1995). The share of migration in the population increase of the town is also significant. According to the 1984 population and Housing Census the rate of migration to the town was 2.22 percent per year. According to the 1994 census about 53 percent of the total population of the town were immigrants (CSO 1984; CSA 1996).

Table 2.1: **Population of Adama town**

Year	Population size	Percentage increase
1964*	27812	
1970*	39221	41.0
1977*	61510	56.8
1984*	77237	25.6
1989*	94184	21.9
1994**	148940	58.1
2000*	179669†	20.6
2010*	296225	64.9

Sources: *NUPI, 1995

**CSA, 1994

† 163533 according to Adama Special Zone Town Administration

The distribution of the total population according to age shows that from 0 to 14 years constitute 43 percent, 15 to 64 years 53.1 percent and 65 and above constitute 4.6 percent. This shows that the majority of the population are economically active (Daniel, 2000).

2.4. Infrastructure and services

Similar to the cities of developing countries, the state of service delivery in Adama town is inadequate. The town has a serious problem of water supply. Out of the 25016 housing units that are in the town only 21.9 percent have private taps inside house and compound. Regarding

lighting facility only 37.5 percent have got private electricity meter and 6.2 percent have no such facility at all. Only about 7.8 percent of the households use electricity and electricity and other fuels for cooking while the majority use firewood, charcoal, dung, leaves, etc (CSA, 1996).

Social services are also inadequate. There are 28 educational institutions in the town out of which 9 are kindergartens, 6 elementary schools, 7 Junior Secondary schools, 4 high schools, one Teachers' Training Institute and 1 Technical College. The schools in the town are highly overcrowded leading to limited teacher-student contacts which in turn affects the learning-teaching process. The number of students per school in 1995 was 1309, 1917 and 3166 for primary, junior secondary and senior high school respectively as opposed to UNESCO recommendation for Ethiopia, which is 900, 480 and 960 respectively. The number of students per class room is also different from, which is 50, 40 and 40 respectively while the actual is 108, 120 and 74 respectively (NUPI, 1995).

The situation of health is also not better of. There are one hospital, one health center, 1 malaria control center, 19 clinics, 11 pharmacies, and 13 drug shops in the town. The ratio of professionals to the population in 1995 was 1:9086; 1:90861; 1: 2113; 1:30287; and 1: 1211 for doctors, health officers, nurses, pharmacists and health assistants respectively (NUPI, 1995; ASZTA, 2001).

Municipal services are also insufficient. Though the town administration is striving much to provide better services, the condition of roads, markets and recreation centers, abattoirs, liquid

waste management and other municipal services is mostly below standard and demand. One of the services that are inadequately and improperly provided is solid waste management. Presently there is no adequate collection and safe disposal of refuse. On top of the inadequate collection and disposal, the site used for disposal is also not suitable and has a serious polluting effect on the surrounding.

In general, urban services that are basic for the overall economic activities are not sufficiently provided in the town. The problem could further be exacerbated by the increase in population and activities when the town assumes its role as a seat of the regional government. Following this change of status many government offices will move to the town, which further attracts other additional activities. These put additional pressure on the existing infrastructure and services. The reason is mainly resource constraint. What resources are available and how are urban services financed in Adama town? What is the role of various actors in providing and financing urban services? A short review of the financial situation and the financing mechanisms of services of Adama town administration will be made in the following paragraphs to give a background for the analysis that follows.

2.5. Municipal Finance of Adama Town

Almost all urban services are financed from the general municipal budget. This sub section discusses the revenue sources and general expenditure patterns and related issues of the town.

2.5.1. Sources of Locally Raised Revenues

The major sources of revenue of Adama municipality may be categorized as taxes, user charges and fees, sales or hiring of municipal property and others (accidentals, and other unclassified sources). The income of the municipality from each category is presented in table 2 for the years 1988-1990 E.C (FMSS 1990-EC).

Table 2.2: Revenue of Adama Town Administration (1988-1990 E.C)

		In '000 Birr					
S.No	Revenue Item	1988		1989		1990	
		Total	% of revenue	Total	% of revenue	Total	% of revenue
1	Taxes	2493	44.25	2655	43.46	3140	59.10
2	User charge & fees	1269	22.52	1439	23.56	1405	26.44
3	Sales & hiring of property	346	6.14	320	5.23	350	6.59
4	Others	1527	27.09	1695	27.75	418	7.87
	Total	5635	100	6109	100	5313	100

Source: FMSS (1990 E.C)

As can be seen from the above table, the largest share of revenue is generated from taxes. The tax headings include business taxes, taxes on the use of market places, urban land rent, building taxes and road use taxes. Although taxes contribute the largest proportion it is indeed the property tax, which is very important in the income of the town. Property tax _ land rent and building tax _ contribute 48.50, 50.05 and 52.83 percent of the tax revenue for the years 1988, 1989 and 1990 (E.C) respectively. Property tax further contributes 21.46, 21.75 and 31.23 percent of the total revenue for the 1988, 1989 and 1990 fiscal years respectively. This situation has significant implications on the revenue of the town in a number of ways (FMSS 1991 E.C).

The fact that the revenue regulations are outdated, as discussed elsewhere in this paper, demonstrates that the municipality has difficulties to raise adequate amount of revenue that is sufficient to provide services to the ever-increasing population. The per capita revenue for 1990 E.C, for example, is Birr 35.67, which is insignificant especially when seen against the per capita cost of providing the most basic services. Many developments have taken place in Adama town since the issuance of the regulation, which could have necessitated the revision of the tax bases and rates. Businesses have expanded; technology has changed; population has increased; demands for services has grown; and so on but the capacity of the municipality has not shown significant change which ultimately led to greater gap between demand and supply for municipal services. So, the lack of buoyant and adequate revenue is one of the major problems of the town.

2.5.2. External revenue sources

External revenue sources refer to transfers, borrowings and any other form by which externally raised revenue is put under the command of the town. Borrowing from financial institutions is not possible for the town due to the absence of a legal framework for the use of such means to finance urban development. Although the municipality is needy and wants to borrow money particularly for investment purposes, this opportunity is not available so far. Regarding transfers there are some practices though the amount is not significant. The federal government transfers about Birr 1.3million, each year to the municipality from its road fund, which is a part of a tax sharing arrangement. The transfer is close-ended in that it is used only for the construction and maintenance of roads and bridges and for the purchase of equipment for the same.

In general locally raised revenue is almost the sole source to finance urban development and services in Adama, save the very recently started small transfer in the form of tax sharing. The transfer is provided only for few towns in the region - Adama, Jimma and Shashemene. Although it is difficult to show the trend due to the outdated tariff structures which does not comply with economic changes, the data available show that property tax is the most popular and may remain to be so for some times in the future.

2.5.3. Revenue collection efficiency

In addition to the impacts of the outdated tariff regulations, the efficiency of the municipality in collecting income from the available sources is also very important. Efficiency in revenue collection may be achieved if the municipality has efficient staff and system among others. Both of these however are lacking in this case. By looking at the data for 1990/E.C/ a clear observation about the manpower of the municipality can attest to this fact. In 1990 /E.C/ the municipality had 322 employees of which 130 were permanent, 73 contract and 119 temporary. Although the municipality is required to have permanent employees for permanent positions this is not possible in most of the cases due to low pay levels. The low levels of pay /salary /is the effect of the existing outdated organizational structure which was implemented in 1980 /E.C/ and in use with no modification since then. Though such changes as devaluation, transition to free market and others have taken place since then, the structure however has not changed. Due to this the municipality tries to narrow the gaps by recruiting employee on contract and temporary basis

According to an FMSS report (1990), about 84.6 percent of the employees have an educational standard of up to 12 grade only. They lack any kind of specialized training. This has a clear negative impact on the performance of the municipality. To be efficient it has to have qualified and well motivated staff. Over 90 % of the employees earn salaries less than 500, at present. It is obvious that such low paid employee can hardly be efficient performer. This of course can be explained more by the existence of considerable amount of tax arrears. In 1990 E.C, for instance there was an arrears of Birr 3,906,230, which of course was accumulated over years. The wide gaps between revenue plans and actual collections also demonstrate such inefficiencies. The performance was 43,34 and 10 percent more than the plan for the years 1988, 1989 and 1990 respectively. This partly shows that no sufficient study is made for the planning which again is the result of low quality of manpower (FMSS, 1990 E.C: 14).

Failure to undertake timely assessment is the other reason for inefficiency in tax collection. This is further compounded by absence of appropriate records and registers. The municipality had no an up to date list of taxpayers until 1990 when FMSS assisted it to establish in a better way.

2.5.4. Expenditure

The municipality spends on the expansion of infrastructure and provision of various services to its residents at least in principle. As the total revenue is very low, investment on big development projects is difficult or made only once over a longer period of time after accumulating revenue for the planned purpose. Apart from capital investment salary and recurrent budget constitute the major expenditure item of the municipality. Table 3 below

shows the share of three types of expenditure items __ capital, salary and recurrent. The trend can also be observed from the same table.

As shown in table 1:3, the share of capital expenditure, i.e. new investment declined from 40% of the expenditure in 1988 to 15.59% in 1990 while the other two headings rose slightly. Recurrent expenditures include operation costs and the provision of some of the services that have the nature of public good, like street lighting, street cleaning, etc. The recurrent expenditures are often over emphasized due to both planning problems and the apparently higher demand for the services under this heading. This decline may be explained in terms of shortage of revenue on the one hand and rise in the cost of construction of infrastructure on the other. Unless the revenue of municipality rises it is difficult to allocate a substantial amount for new investment each year.

Table 2.3: **Expenditure of Adama Town Administration (1988-1990 E.C)**

(In '000 Birr)

SN	expenditure Heading	1988			1989			1990		
		Amount	% of revenue	% of expenditure	Amount	% of revenue	% of expenditure	Amount	% of revenue	% of expenditure
1	Salary	825	14.64	18.84	856	14.01	17.80	877	16.50	26.64
2	Recurrent	1776	31.34	40.37	2073	33.93	43.12	1901.5	35.79	57.77
3	Capital	1788	31.73	40.83	1879	30.76	39.08	513	9.66	15.59
	Total	4379		100	4808		100	3291.5		100

Source: *Compiled from FMSS, 1991 E.C*

2.5.5. The financial process

The municipality prepares its annual budget and submits to the Adama wereda council for approval. The wereda council, by consulting, at least in principle, the Zonal Department of Works and Urban Development (ZDWUD), approves the budget and returns it to the municipality. One critical problem in this process, however, is that the wereda officials have less awareness about city management and lack overall qualifications, which leads to misunderstandings between municipal officials and wereda officials. This major source of the misunderstanding is lack of technical knowledge about urban management, as a matter of fact. It is clear that the activities that take place in the town are more complex and need professional approaches. The current process, however, lacks such features, which ultimately leads to the neglect of important municipal duties. This is assumed to be one of the reasons why solid waste management received less attention so far.

2.5.6. Accounting systems

Until 1990(E.C) the accounting system of the municipality was archaic, which exposed its resources to abuses and corruption. It is archaic in that it lacks flexibility, transparency, efficiency, in-built control mechanisms and systems for costing services. On the top of these, the system does not have costing mechanisms for the various services it provides. Since 1990(E.C) however, a modern (improved) municipal financial management system developed by UDSS/FMSS was applied. The system developed by FMSS is proved to be of practical significance for municipal accounting system. The system included the development and application of various manuals like:

- Tax accounting manual

- Cashier's manual
- Payroll functions manual
- Bank reconciliation manual
- Purchase, storage and issue of receipts manual
- Revenue collectors procedure manual
- Chief accountant's manual

FMSS has conducted a series of on the job training to the relevant employees and makes periodic follow-ups as well. Thus, though Adama municipality had one of the most problematic accounting systems in the past, the situation is changing through the application of a new system, which is much better. The new system has its own in built control mechanism as well. This development has got a significant impact on the efficient provision of urban services in many ways. It is a base for efficient collection and expenditure and responsive planning of services.

In this part attempt is made to describe the overall situation of the town though briefly. The economy, the condition of infrastructure and service provision, and the financial capacity of the town are discussed. These general information are deemed necessary to understand and analyze the management and financing of any particular service delivered by the town administration. Based on this general information, the description and analysis of solid waste management in Adama town is made in the chapters four and five of this study.

CHAPTER THREE

LITERATURE REVIEW

In this chapter a review of the literature on the management and financing of urban services and particularly of solid waste in developing countries is made. The major objective of the review is to lay an analytical ground for the study of solid waste management in Adama town. It is also hoped that it helps to learn from the experiences of different countries in handling urban solid wastes. It is divided into three parts. The first part deals with such general issues as the role of urban areas in the development process, the urban challenges and the role of infrastructure in development. The second part deals with the general discussion of the financing of urban infrastructure and services which is intended to provide a frame work for the discussions in the third part. The theme of the third part is the management and financing of urban solid waste. It tries to touch upon the main issues in the provision of the service with particular interest on its financing.

3.1. GENERAL

3.1.1. The Role of Urban Areas in the Development Process

Urbanization has been an important part of the progress of most countries towards a stronger and more stable economy and it also has contributed to the betterment of the living condition of a substantial proportion of the world's population. Cities and towns have crucial roles in economic development. In many countries, cities account for about two-thirds of the national out-put. According to the World Bank, "more than 80 per cent of the GDP of low-and middle

income countries was produced in the non-agricultural sectors-largely in manufacturing and services in 1990"(World Bank, 1995:11; Cheema,, 1987).

The role of cities as stimulators of development is well recorded. Mattingly rightly says that, the vast majority of manufacturing and service industries are based in urban areas, providing jobs, incomes and the national product on which a country's economy and social development is based. For instance, in Madagascar about 45 percent of the value added were produced in urban areas in 1988 though only 25.6 percent of the national population resided in urban areas. In Ethiopia also, urban based industrial and services activities contribute about 45 percent of the GDP despite the fact that it is only about 15 percent of the national population that lives in the urban areas of the country. And nowadays-national economies are becoming increasingly urban and thus, urban areas are becoming critically important to national economic development.

Urban areas are centers of innovations. Cities and towns are centers of artistic, scientific and technological innovations, of culture and education which renders them significant roles in social transformation. Urban areas also provide greater potential for human resources development, which is the result of their cosmopolitan population, and better education systems. They also provide agglomeration and scale economies (Becker, 1994; Shewaye, 1999; Mattingly, 1995; Tegegne, 1996; UNCHS, 1996; Bahl and J.Linn, 1992).

3.1.2. THE CHALLENGES OF URBANIZATION

While the urban sector is widely recognized as a "principal engine of development", the rapid growth of urban population poses a serious challenge particularly to the developing countries. World urban population more than trebled between the years 1950 and 1990 (increased from 730 million to 2.3 billion). It is expected that this would double by 2020 to 4.6 billion. Of this increase, 93 per cent is expected to occur in the developing countries. The share of world's urban population living in developing countries has grown from 49 per cent in 1970 to 58 per cent in 1985 and expected to grow to 67 per cent in 2000 and 79 per cent in 2025 (Devas and C.Rakodi, 1993).

The major implications of rapid urbanization are increased demand for urban infrastructure and services; the urbanization of poverty; and environmental problems, among others. The extent of urban poverty and environmental degradation is so alarming that it requires special attention. But since the main concern of this research is urban services we will concentrate on the same. In developing countries, there is a wide gap between the demand and supply of urban services. For instance, 30 per cent of the population of developing countries (40 per cent for Africa) have no access to safe water supplies and the water that is supplied is polluted in many cases. As well about 40 per cent of the population lack access to proper sanitation. For most large cities in the developing world, municipal authorities collect only a quarter to a half of solid waste. The inadequacy of road networks and social services such as health and education are also quite evident (Devas and C.Rakodi, 1993).

Furthermore, while some countries are making progress to deliver satisfactory urban services for all, the situation in many developing countries appear to be deteriorating. According to

UNCHS, for instance, 26 of the 58 developing countries surveyed showed "lower proportion of the urban population being served with clean water in 1980 than in 1970). The situation in Africa is particularly worse for the capacities of governments in this continent are greatly reduced by the serious economic problems they are experiencing. Thus, although cities are said to be important centers of growth, they are not delivering a better quality of life to the extent they could because lack of adequate infrastructure and services severely affected their productivity (cited in Devas and C. Rakodi, 1993:11; World Bank, 1995 vii; Dillinger, 1994).

The cost of providing urban services is enormous and it is becoming difficult for developing countries to keep pace with the rapidly increasing population. According to Prakash, "a per capita cost of US\$350-500 at 1977 prices" is required to provide the 'most basic urban infrastructure'. Devas and C. Rakodi updated the figures to 1992 prices, which gave a range of US\$1400-2000 per capita. This shows that a huge amount of resource is required (\$80-120 billion per year for the years between 1990 and 2000 for the additional urban population alone according to Devas and C. Rakodi) which is hardly affordable by the governments of the developing countries. Therefore they usually fail to expand basic services, which leads to much misery in the urban areas of the developing countries (Devas and C. Rakodi ,1993).

3.1.3. INFRASTRUCTURE'S ROLE IN URBAN DEVELOPMENT

The role of infrastructure in growth is substantial and significant. Infrastructure may include public utilities (such as, power, piped water supply, solid waste collection and disposal, and piped gas); public works (such as, roads and drainage); and, other transport sectors (such as, urban and interurban railways, urban transport,). Certain types of infrastructure are used in the

production process of almost all sectors. Users also require infrastructure not only for consumption but for raising their productivity as well. Infrastructure, if it responds to effective demand efficiently, can play a decisive role in a country's success in diversifying production, expanding trade, coping with population growth, reducing poverty, and improving environmental conditions. Adequate or good infrastructure raises productivity and lowers production costs (World Bank, 1994).

Infrastructure deficiencies, however, seriously constrain the productivity of investment. Where such deficiencies exist, firms must invest significant shares of their capital in infrastructure to provide them on their own. This increases their total investment needs and affects the productivity of that investment leading to " the reduction of the growth of profits, incomes and employment and raising prices". This deficiency has got multiple implications on the environment, poverty, and productivity of the urban residents and the countries' economies by and large (World Bank, 1991:7).

Solid waste management service is one of the major infrastructure services that are inadequately provided, particularly in the urban areas of the developing countries. Although a considerable amount of resources is devoted to it, the present state of the service is such that only half of the urban households are served. The impact of the inadequacy of the service is significant on the health of urban residents and the environment. It has got a far-reaching impact on the productivity of urban areas, by and large. This overall situation is one of the issues that attracted the researcher to choose this topic (Bartone, et. al, 1994).

Similar to any developing country, the urban centers of Ethiopia suffer from lack of adequate services. The rapid pace of urbanization, which is estimated to be about 5.6 percent per annum, further exacerbates the problem. Furthermore, the condition of some services in the major urban areas of the country is deteriorating due to overuse and lack of maintenance (Girma, 1999).

Solid waste management service is one of the basic services that are inadequately provided by the towns of Ethiopia. Some studies indicate that only 8.7 percent of the urban households dispose their wastes into municipal garbage collection containers while the majority of the rest dispose it into open areas and roadsides. Of the urban areas of the country the capital city, Addis Ababa, is said to have a better solid waste management system. But even in Addis Ababa it is only about 50 percent of the wastes produced each day that is collected and disposed of. In general urban areas of Ethiopia lack adequate solid waste management service despite the fact that it is vital for the health and productivity of the residents and for the protection of the over all urban environment. The major causes of the inadequacy are considered to be weak economic base and mismanagement (Girma ,1999; see also Tegegne, 2001).

This study reports the situation of solid waste management services of Adama (Nazareth) town. But prior to proceeding to the discussion of the condition of this service in that specific context, giving some basic information about the town, Adama, is deemed necessary. Accordingly some information that are related to the issue under consideration are provided in the next section in a very brief manner.

3.2. FINANCING URBAN INFRASTRUCTURE AND SERVICES

3.2.1. GENERAL

Due to the rapid growth of urban population and an ever-increasing demand for urban services the problems of urban areas have become crucial national issues in many developing countries. One of the most important issues is how to finance and deliver adequate urban services. The failure of cities to deliver adequate and quality services in developing countries is the result of both resource constraints and weak institutional arrangements. Though institutional arrangements are equally important and could even contribute substantially to financial problems, emphasis will be made on the financial resources, which is the subject matter of this study.

There are various financing mechanisms of urban services such as public, private and public-private partnerships. Although the public sector is the most common financing agent under the present situations, there is much desire to increase the involvement of the private sector mainly because of two reasons. Firstly, the private sector is deemed to be more efficient than the public. Secondly, to use the resources at the command of the private sector to improve urban infrastructure and services. Increased private sector involvement in service delivery has got advantages. But it needs to be in a right balance with the public sector. To find the right balance such issues as the current performance of public sector, the capacity of the relevant local government to regulate private suppliers, "the interest and capacity of the private sector, and the political consensus for private provision" require due attention (World Bank, 1995; UNCHS, 1996; World Bank, 1994).

Despite the availability of various options, most urban services in developing countries are provided and financed by the public sector, specifically by the local governments/municipalities/ in most developing countries. However, scarcities of resources and poor performance severely constrain the efficient supply of sufficient and quality services by this sector. This, at least partly, is responsible for the current worsening situation of urban services in the cities of developing countries (World Bank, 1994).

Since municipal governments play central roles in this respect it would be relevant to pose such questions as how do municipalities finance local services and what are their sources of revenue? What are the roles of other levels of government in this respect? In the following lines we shall try to throw light on some of the essential issues in this regard.

3.2.2. Municipal Revenue

Municipalities need finance to properly carry out the functions of services delivery and development activities that they are established for. The services may be provided on the basis of charges for which the user is expected to pay. Or charges may not be levied or may fail to meet the cost of the services in which case it is financed from the general local government revenues either wholly or partly. Local governments raise revenues from source they are authorized to use. Some of the most common types of municipal revenue sources are: a) Local taxation; b) Charges for services; c) Transfer from other levels of government; d) Borrowing/ deficit financing/ and, e) 'exaction' or 'development' charges (Davey, 1996).

Local taxation includes property tax, which is the major item of local taxation. Property tax contributes the largest proportion of municipal finance in most cities. Other taxes that are included in local taxation are: taxation of the local economy, local income taxes and personal taxes, motor vehicles and fuel taxes, etc. User charges are levied on some municipal services due to the need to ration limited resources and prevent waste, as well as the need to generate both the resources and the market signals for the providing agency. It is also used to effectuate the benefit principle of equality, which suggests that where benefits are predominantly private, beneficiaries should pay. Despite the existence of some strong counter arguments, charging for the services provided by the municipalities is one of the major sources of municipal revenues. The current trend particularly as part of structural adjustment, is that services need to be delivered on a cost recovery basis, which justifies charges (Davey, 1996; Zimmermann, 1998).

Grants are typical means of Transfer from other levels of government. Grants can be unconditional (such as interregional equalization) or conditional (such as investment grants). There are some arguments that cities of developing countries should not receive much transfers due to the fact that they are not playing their central-place roles as their counterparts in the industrialized countries. This view however, seems to be biased and underestimates the role of cities in the development process of developing countries. On the contrary, cities in developing nations need increasing assistance from the higher levels of government to address their current chronic problems without which it is difficult for them to address the problems given the meager revenue they can raise from local sources. Borrowing (deficit financing) may be opted for to cover the current and/ or the capital budgets or for specific project(s). Although borrowing is very useful when used wisely, the system is absent in some countries like

Ethiopia. Borrowing has also got danger if it lacks regulations and controls for it can be abused and may lead to crisis. (Bahl and Linn ,1992: 41)

The other way by which urban governments raise revenue to finance infrastructure development and service provision is contribution by the beneficiaries also called '*Exaction*' or '*development charges*' in some countries. Under this mechanism the government imposes levies on the would-be property developers in proportion to the cost the development will impose on urban infrastructure. For instance, if new residences are to be constructed and the average cost of adding them to the urban water and sewerage system is \$100, the development charge to be levied before the project is authorized would be \$100. In Latin America, a system of taxation known as '*valorization*' is used in "which the cost of the public work is allocated to affected properties in proportion to the benefits estimated to be conferred by the work in question". These ways of financing urban infrastructure development may be used by urban governments that have financial pressure (UNCHS, 1996).

Although such varying sources of revenue are existing, at least theoretically, almost all towns/cities of developing countries suffer from lack of resources to carry out the functions assigned to them. As a result of this "matters are getting worse rather than better because local revenues are not adequately responsive to changing needs". Municipal revenues are not adequate and buoyant to meet the increased demand caused by population and economic growth. Equally important is poor collection and unwise expenditure (Davey, 1996).

The extent of local control over revenue sources- whether they can adjust tax rates, impose new taxes, borrow to finance deficits, adjust charges to schedules and others are also important. In most of the cases, however, the setting of most tax rates and adjustments are done by higher level governments and therefore local governments have no such revenue authority which makes them weaker institutions. Thus, though municipalities are expected to deliver services efficiently, they lack, in most cases, the resources necessary to do so. This led not only to failure to expand infrastructure and services but also to the deterioration in the condition of the existing ones (UNCHS, 1996: 174; Harris, 1992).

To be more productive in trying to address the ever-increasing needs, municipalities need to pay attention to some basic issues that are overlooked in many cases. These include a) the use of lower cost technologies, which means doing things in a cheaper way without compromising quality. b) Searching for greater productivity and the elimination of wastes. c) Making the best use of economies of scale by merging or cooperating in the provision of services. In general, expenditures have to be systematically managed for municipalities to be efficient and effective as well as responsive to the choices of their residents (Davey, 1996).

The situation of municipalities of Ethiopia is basically similar to what is discussed in the foregoing pages. Although they are expected to provide and manage all municipal services, the amount of resources at their disposal is so meager that they hardly meet the demands. Only very few municipalities have an annual revenue of above a million Birr while the highest is not much more than six million Birr per year, except Addis Ababa, of course (Wondimagenyehu, 1999).

On the top of weak economic bases, the efficient operation of the Ethiopian municipalities is hampered by various institutional and administrative bottlenecks. Among the major problems are lack of suitable legal and institutional framework for operation; outdated tariff regulations; poor collection; lost revenue sources; absence of transfer and borrowing facilities; inefficient expenditure management and unsuitable accounting systems. The most obvious consequence of these situations is failure to deliver adequate urban services, which is easily observable in any town in the country. Furthermore, these problems have made Ethiopian municipalities the weakest and most unpopular institutions (BWUD &EMAC, 1997; Minas et al, 1999; Oromia Project Study Office, 1999; Worku, 1997).

So far attempt is made to review the overall financing of urban infrastructure and services and the problems attached to it. In the pages that follow, a review of literature on the management and financing of solid waste (also called municipal waste) will be made which will be used as a framework of analysis for the situation in Adama town.

3.3. THE MANAGEMENT AND FINANCING OF MUNICIPAL SOLID WASTE

All human activities – domestic, commercial, industrial, agricultural and so on – give rise to the generation of solid wastes. As urban population grows, the quantity of waste generated in urban areas also increases. According to Sanio, M, urban wastes will quadruple by 2025. In addition to population growth, rise in the income of the urban population is the other factor that contributes to the increase of wastes generated in urban areas. Thus, urban areas face an immense task of removing huge amounts of residential garbage and industrial wastes. These

and the expansion of cities in area make the efficient collection and disposal of urban solid wastes a difficult task (Sanio, 1998, Shannon, 1983).

Almost all city governments, in developed and developing nations alike, are faced with mounting problems of collection and disposal of solid wastes. In developed countries, the problem is the difficulty and high costs of disposing the large quantity of wastes while in developing countries the problem centers on the inability to collect. In developing countries, the largest proportion of solid waste is not collected and such wastes commonly accumulate on 'open spaces, wasteland and streets and bring with them serious health and environmental problems'. This makes waste management one of the major urban infrastructure services, which needs sufficient attention (UNCHS, 1996:269).

Solid waste management is one of the "absolutely necessary but consistently under invested services". Failure in the proper management of urban waste has serious impacts on the health and productivity of the society on the one hand and the environment on the other. "Hazardous and noxious wastes pose a particular threat to the environment. Furthermore, manufacturing processes and even solid-waste disposal by combustion produce fumes and gasses which irritate or harm. An uncollected waste block drains and is also the breeding medium for disease vectors (Davey, 1996:30).

3.3.1. MUNICIPAL SOLID WASTE: DEFINITION, COMPOSITION AND CHARACTERISTICS

Solid wastes are materials and by-products that have potential negative values for which the possessor requires no compensation upon abandonment. Gourlay defines 'waste' as what we

do not want or what we fail to use with the provision that 'failure to use includes failure to use for its proper purpose'. Waste can be produced as an unwanted by-product of a process or when something is no longer useful to the owner or it fails to fulfil its purpose (Gourlay, 1992).

Wastes may be classified depending on their sources, forms, inherent properties, etc. For the purpose of this discussion municipal solid wastes may include:

- 1) **Domestic wastes:** Wastes from household activities, such as food preparation, cleaning, fuel burning, old clothes and furniture, obsolete utensils and equipment, packaging, news print and garden wastes. In developing countries, food waste and ashes dominate solid wastes.
- 2) **Commercial waste:** Wastes from shops, offices, hotels, restaurants, typically consisting packaging materials, office supplies and food wastes. In low-income countries food markets contribute the largest proportion of commercial waste.
- 3) **Institutional waste:** Wastes from schools, hospitals, clinics, government offices, military bases, et cetera. Hospital and clinical wastes include potentially infectious and hazardous materials. Thus the hazardous and non-hazardous components must be separated to minimize health risks.
- 4) **Industrial wastes:** The composition of industrial waste depends on the kind of industries involved. It may also consist food waste from kitchens, and canteens, packaging materials, plastics, papers and metal items.
- 5) **Street sweepings:** dust and soil and varying amount of paper, metals, and other litter from the streets dominate street sweeping. In developing countries, street sweeping may include

drain cleanings, household wastes dumped along the roads, animal manure and plant remains.

- 6) **Construction and demolition wastes:** Its composition depends on the type of construction materials used though it typically includes soil, brick, stone, concrete, ceramic materials, wood, packaging materials and the like (Rand, et al, 2000).
- 7) **Sanitation wastes:** In the towns of many developing countries there are no sewerage systems for the removal of faeces and similar solid sanitation wastes. Since such materials can contaminate watercourses, if indiscriminately dumped, specialized collectors collect night soils separately from individual houses (Rushbrook and Pugh, 1999).

The knowledge of the composition of the waste stream and quantities is important to plan the waste management facilities and decide on the suitable disposal mechanism. This knowledge is also important when considering waste treatment processes, recycling initiatives and changes of collection equipment. The important characteristics of solid waste that need to be known in order to develop a suitable management system are the moisture content, the biodegradability, the calorific value, the density and generation per person of wastes. The pattern of municipal waste quantities and characteristics for lower-, middle- and higher -income countries is shown in table below (Rushbrook and Pugh, 1999).

In general, the composition of municipal solid waste varies by climate and seasonal variations as well as the socio - economy of the waste collection areas. Such variations may exist even with in the same metropolis. Moreover, waste collected in affluent areas is less dense, for it contains more packaging and other lighter materials and less food wastes and ash. This is mainly because more readymade products are used in such areas. The moisture of wastes

generated in low-income areas is greater due to the fact that the water content of food waste, which dominates the waste generated in these areas (Rushbrook and Pugh 1999, Rand et al, 2000).

Table 3.1: Patterns of municipal waste quantities and characteristics for Lower-, middle-and higher income countries

	Lower-income countries*	Middle-income countries**	Higher-income countries
Waste generation (kg/cap/day)	0.4 - 0.6	0.5 - 0.9	0.7 - 1.8
Waste densities(wet weight basis -kg/m ³)	250 - 500	170 - 330	100 - 170
Moisture content(% wet weight at point of generation)	40 - 80	40 - 60	20 - 30
Ranges of compositions(%by wet weight)			
Paper	1 - 10	15 - 40	15 - 40
Glass, ceramics	1 - 10	1 - 10	4 - 10
Metals	1 - 5	1 - 5	3 - 13
Plastics	1 - 5	2 - 6	2 - 10
Leather, rubber	1 - 5	-	-
Wood, bones, straw	1 - 5	-	-
Textiles	1 - 5	2 - 10	2 - 10
Vegetable	40 - 85	20 - 65	20 - 50
Miscellaneous inert	1 - 40	1 - 30	1 - 20
Particle size = 10mm	5 - 35	-	10 - 85

*Includes countries having a per capita income of less than US\$360 in 1978.

**Includes countries having a per capita income of greater than US\$360 and less than 3500 in 1978.

Source: Rushbrook and Pugh, 1999

3.3.2. MUNICIPAL SOLID WASTE MANAGEMENT: DEFINITION AND COMPONENTS

Municipal solid waste management refers to the collection, transfer, recycling, resource recovery and disposal of municipal wastes. As already said earlier, solid wastes are generated pursuant to human activities. If these wastes are not handled and treated, they will have serious negative impacts on the hygiene of urban areas and cause the pollution of air, surface and ground water, soil and crops. Therefore, a hygienic and efficient collection and disposal of solid wastes is indispensable for any society.

Waste left uncollected has serious health and environmental impacts. Some arboviral infections as well as habitat formation for breeding insects and mosquitoes are associated with uncollected wastes. Uncollected waste also blocks drainage channels and increases the health problems related to the ponding of stagnant water. Accumulated wastes may also cause physical hazards to people coming to its close proximity, especially children. As clearly put by Rushbrook and Pugh, clean and healthy living conditions in cities, towns and villages can not be achieved without a regular and reliable waste management, i.e., collection and disposal (Rushbrook and Pugh, 1999).

3.3.3. Common stages in solid waste management

There are various stages in the handling of municipal solid waste operation from its point of generation to ultimate disposal. Although the tasks undertaken at each stage are distinct, all of the activities are very much related and any change at any one point has impacts on the situation at other stages. The major common stages are:

- a) **Temporary storage at the source:** This is done at the household level as a part of the household hygiene. The type of storage at this point may be either separate unit storage (household storage) or communal storage (which could be stationary or portable). Separate unit storage is generally the household bin. Of the communal storage systems, portable units are preferred and regarded as appropriate for large buildings in the center of the city, as well as for densely populated single family houses in areas that are difficult to access.
- b) **Discharge to a collection point:** This refers to the transportation of the waste up to the point where it can be offered to the citywide solid waste collection system. Where portable communal storage containers are used, an empty one can be placed when the one placed becomes full and residents can bring their solid waste to the containers placed at fixed locations. There may be different ways of collection from separate unit containers – such as, collection by collection workers walking to the permanent container locations, such as back yard or an alley, or placing the container by the households at curbside for certain hours of the day according to a given schedule. In the latter case, the community has important role in the process. In block collection, a system where non-standardized containers such as baskets are used, the collection vehicle is obliged to follow a schedule and a route, and appear at a specified time in a given area. A bell may be rung to alert residents in such a system. And the residents are expected to discharge their refuse into the collection vehicles.

In other cases, intermediate storage materials are prepared to form the interface between neighborhood collection and the overall city/town collection and transportation system.

Such storage may include masonry structures or steel containers or others. In many cases, containers are not well designed and often they are just roadside open dumps without having separate compartments for the recyclable and organic wastes. The location of such containers is also not based on any rational considerations. As a result of all these, most of the waste is dumped around the containers rather than in them. Also night soils and hazardous wastes are dumped in such containers, which complicates the handling operation.

- c) **Collection:** The frequency of collection is determined by the total amount of waste generated and the rate of putrefaction. In general, a greater frequency is recommended in hot climates and for fruit and vegetable markets.

There are different types of collection technologies the major ones being those that rely on humans, those that rely on animals and those that rely on engines. Human powered collection technologies include pushcarts, pedal tricycles, wheelbarrows, and the like. Such equipment is useful particularly in the areas that are not accessible for collection vehicles. The animal powered collection equipment may take the form of drawn carts or animals may be directly saddled with containers like baskets. Animal drawn carts are advantageous for the fact that they do not consume fossil fuels and they are quiet. The motorized collection vehicles include tricycles with hydraulic tipping containers, tractors that pull wheeled containers and trucks with portable containers (Cointreau, 1982).

Many cities in developing countries employ manual loading of motorized haul vehicles. This, however, lowers the productivity of the vehicles. Thus payloads can be used where

collection points are larger and accessible to optimize vehicle productivity. Most of the motorized collection equipment is appropriate for cities where labor is expensive while for the cities of developing countries where labor is cheaper, labor intensive technologies can be employed without compromising the quality of the operation.

Solid wastes can be collected from door to door or by using communal containers. Collection in many developing countries is done by using communal containers in which containers are placed at a place where the residents of the area are required to bring their refuse and dump in. In some towns of the developing countries, however, collection in communal containers has not proved to be productive. In Jimma (Ethiopia) for instance, the municipality has put containers at selected locations where large amount of waste is assumed to be generated. The container latter were collected and put in municipal compound because they created public nuisance instead of serving the intended purpose. Some laborers who did not want to lose their incomes from transporting wastes from some households and commercial establishments were the major agents who abused the containers. According to the personal observation of this researcher the same problem was encountered in Woliso town (Ethiopia) where liquid wastes and night soils were disposed in the containers making its handling difficult. This town also collected the containers and put them in municipal compound. This shows that the creation of public awareness about the use of containers is vital prior or along with making them ready for use (Borgstaedt-Schmitz, et. al, 1998).

As already mentioned elsewhere in this paper, however, the collection of solid waste in most cities/towns of developing countries is inadequate even where communal containers are used leading to the existence of much uncollected waste. The poorest parts of the cities and the so called illegal or informal settlements are usually not served at all though the consequences of uncollected waste in such areas are usually not limited to the areas alone. In fact residents of such areas suffer much from the effects of inadequate waste management, as uncollected waste is the major contributor to the high morbidity and mortality among the urban poor (Bartone et al, 1994).

The role of the community is significant and essential at this stage. The community can be appointed as paid contractor particularly for the primary stage of collection. In the Recife (Brazil) for instance, the residents in some of the highly dense areas where vehicle access is impossible are relied up on to bring their refuse to collection points. The sub-municipal councils in Uganda also involve the community in collecting wastes (Davey, 1996).

- d) **Transfer and haul:** Waste collected from an area may be directly transported to the disposal site or it may be transferred to another type or size of equipment for hauling. Transfer takes place from relatively small pieces of equipment to large pieces of equipment. For instance, refuse may be collected by pushcarts and brought to a neighborhood transfer depot, where the waste is then dumped into a tipping truck, then the tipping truck brings the waste to an area-wide transfer station, where it is dumped into a container which is finally transported by large trailer trucks. The designing of transfer stations may be based on the economically viable radius of transport for each collection equipment (Cointreau, 1982).

It must be noted that the optimization of transport can save large resources for the city/town. The determinant factors for transport optimization includes better routing; Trip timing during less congested hours; Reduction in loading/unloading time; Reduction of 'down time'; and, Location of disposal sites (Sarma, 2000).

- e) **Disposal:** The final destination of wastes is the disposal site. Wastes must be efficiently collected and disposed of in an environmentally sound manner. In developing countries, an estimated 30 to 50 percent of urban waste is left uncollected. The uncollected parts are disposed on open fields, roadsides, river banks and drainage canals which facilitate the coming back of the chemical and biological contaminants to humans to affect health, quality of life and working activities (Rushbrook and M. Pugh, 1999).

There are various disposal options, which include Composting, incineration, sanitary landfill, and other sophisticated methods, some of which are too expensive for cities/towns of developing countries. Due to cost problems, open dumping remains the most common disposal method in the world, particularly in the low-and middle-income countries. Uncontrolled/open dumping of solid waste however has hazardous impacts on the health of the residents and the environment, which makes developing disposal methods other than open dumping a necessity. Open dumping is neither safe nor hygienic (Rushbrook and M. Pugh, 1999).

Sanitary land filling is currently the commonest method of disposal, especially in the economically strong cities. Sanitary landfilling demands for the isolation of the wastes from

the environment until rendered innocuous through biological, chemical and physical degradation process in the landfill according to Rushbrook and Pugh. Essentially it consists of filling of old valleys and quarries with compacted waste layers which are covered with the topsoil. Thus sanitary landfills should be considered as an eventual goal for which low-income and middle-income countries must plan during a course of years. Rushbrook and Pugh (1999) suggest the following pathways to achieve a full flagged sanitary landfill.

Stage 1: From open dumping to “**controlled dumping**”__ which involves reducing the working area of the site to a more manageable size, covering any exposed waste on unneeded areas of the site with soil, sand or any other convenient material, stopping fires, and agreeing on the conditions with which to work on the site with scavengers, if they cannot be removed.

Stage 2: From controlled dumping to “**engineered landfill**” which gradually adopts the technique by which the entering of surface water into the wastes is controlled and avoided, soil is excavated and spread to cover wastes, spread and compact waste into smaller layers, and improve the isolation of wastes from the surrounding geology.

Stage 3: From engineered landfill to “**sanitary landfill**”__ This involves a continuing refinement and increasing complexity in the engineering design and construction techniques begun at the engineered landfill stage (Rushbrook and Pugh, 1999).

Poorly designed and operated waste disposal sites have a number of health effects. These include: direct physical harm arising from collapse of unstable slopes of wastes; explosions; fires and similar accidents; bacteriological and protozoal pathogens and similar infective agents arising from the biological contamination of wastes and their subsequent infective transmission to a host; chemical contamination; and the effects of chemical and microbiological

contaminants on reproductive activities, such as low birth weights, still birth or specific birth defects. In 1993, for instance, a solid waste dumpsite collapsed in Istanbul and about 39 died whose homes were buried in garbage. In the same year, 22 died due to garbage slide in San Salvador (Rushbrook and M.Pugh, 1999; Bartone et al, 1994).

Solid waste incineration is the other method of waste disposal. Incineration is a “thermal process for burning the waste at a very high temperature to generate electricity. It requires high calorific value of waste to burn without any external fuels. It is found at the highest level of the waste disposal or treatment hierarchy. It is high-tech and expensive mostly used in rich nations that have the problems of finding new sites for sanitary landfill (Sarma, 2000).

In other instances, citizens of the cities of developing countries try to reduce their garbage problems through different other mechanisms one of which is burning. Though this may contribute to the reduction of the amount of waste of households, it causes environmental problems and health hazards such as respiratory diseases. Thus it is not advisable under normal conditions.

3.3.4. SOLID WASTE RECYCLING

In the process of solid waste management, resources may be recovered and reused which considerably contributes to efficient use of resources and to the reduction of the costs of solid waste management. However, in developing countries, it is only about 3 to 5 percent of solid waste that is currently being recycled which is mainly done by scavengers. Small scale scavenging is an important option, which may be studied and used by cities of developing countries to minimize the amount of waste that needs to be disposed of. According to a study

conducted in 1982, of all the solid waste put outside by households in Khartoum, 35% was removed by municipal garbage vehicles, 21% eaten by domestic animals (especially goats and cattle), 20% was removed by people (pickers or scavengers), 17% was eaten by wild animals (including dogs), and 8% remained accumulated. Governments can encourage and support recycling through “imposing user fees for waste disposal, encouraging composting and formalizing the functions of waste scavengers....” Recycling may help to save foreign exchange, conserve natural resources, promote industrialization and to minimize waste and costs of disposal (Fox, 1994; Stren and R.R. White, 1989; Cointreau-Levine, 1994).

Many towns of the developing countries usually miss the advantage of 'waste economy' by which materials may be intensively reclaimed and reused and only a small proportion of the solid waste generated may need to be disposed of. In Bangalore (one of the largest cities of India with about 4million inhabitants), for instance, the amount of solid waste generated per person per year is around 270kg, but the amount that is unused and has to be disposed of is only around 30kg. The rest is reused or recycled. Particularly recycling scarce materials such as metal has much economic advantages. This presupposes an extensive change in the way in which solid wastes are handled and processed up to now. The 'waste economy' also provides a livelihood for thousands of people in large cities (UNCHS, 1996).

Using the organic matters of solid waste to enrich or fertilize soil through composting is another important aspect of reusing (and disposing) wastes. In developing countries, organic matter constitutes 50 to 75 per cent of the total waste stream. This organic waste can be treated and used to promote agriculture by improving the fertility of soil. It is estimated that soil

degradation has already significantly reduced the fertility of over a quarter of the world's agricultural land a problem that requires extensive interventions. On the other hand a huge amount of resources that can improve the quality of soils is left unused and simply disposed (Sanio, 1998).

As already mentioned, the initial interest in waste management is the collection and disposal of the same in a better way. However, there is a growing interest nowadays in what is referred to as 'waste minimization', which is concerned with the reduction of wastes at all points. This implies that households and businesses can strive to reduce the amount of waste they generate so that the amount to be disposed of and the cost of disposal could be reduced. Municipalities may encourage waste minimization by using various means, which may include:

"...Providing recycling credits which the local authority pays to households or business for paper, glass, metal or other materials they separate and make available for collection or lower charges for households or enterprises who generate very little waste for collection...(UNCHS, 1996:405, see also Netzer, 1974).

3.3.5. SELECTION OF APPROPRIATE TECHNOLOGY

Also important in the management of municipal solid waste is the type of technology employed. The choice of appropriate technology should be made with the intention of choosing techniques that provide the desired services at the least cost possible. Appropriate technologies can also help to achieve sustainable results. Furthermore, it must give an advantage to tap community resources by requiring local participation. On top of these, it requires less input

from outside since it makes the use of locally available construction materials and labor (Menendez, 1991; Fox, 1994).

Adoption of suitable techniques is also important to collect wastes from the densely settled low-income areas that are difficult for the vehicles commonly used. In general, the use of an appropriate technology is vital both for affordability and responsiveness. However, many cities in the developing countries use imported equipment, which are difficult to maintain due to the shortage of spare parts or foreign currency to buy them.

Vehicle maintenance is one of the common problems in most cities. This is further exacerbated by shortage of vehicles, which leads to overuses and absence or reduced time for servicing. Thus, sufficient maintenance facilities need to be in place (adequate number and qualified mechanics and well-facilitated workshops). Also important is the mechanism used to ensure staff productivity and the development of appropriate indicators of performance for the collection and disposal of solid wastes.

3.3.6. MODES OF INSTITUTIONAL ARRANGEMENT

Although there are slight variations in the mode of institutional arrangement among developing countries, in many cities municipal authorities manage solid waste (both collection and disposal). In some cities, however, the private sector has expressed increasing interests in its management under contract arrangements. The public entities that are responsible for the management of solid waste could be semi-autonomous departments where a considerable part of the service is contracted out or direct departments (or sections within departments) providing

the whole service themselves. In Africa, while most Anglophone countries rely on a public cleansing service, which is integrated with regular departments of the local authority, sub contracting is used as an alternative approach. Sub contracting is made to local entrepreneurs for specific areas or specific aspects, as in the case of large cities of Nigeria, or contracting the whole work to a single private company as in the case of Abidjan. In Ibadan, the private contractors are permitted to operate in the field since 1980s and they can contract with the government for removal in certain areas, or with individuals and institutions or business establishments (Davey, 1996; Stren and R.R. White, 1989).

In other cases, community involvement is recognized as an important input. Usually the community is involved at the initial stage of collection particularly in the densely settled areas where access for vehicles is difficult or impossible. The community can be organized into associations to make a substantial contribution to the management of urban solid wastes.

Although much of the work is being done by the public sector, it has proved to be less efficient in a number of instances. One of the major problems of public sector management is absence of management flexibility. Municipalities are obliged to follow government working hours. Appropriate span of management between supervisors and workers and staff ratio is missing in most cases. Bureaucratic procurement procedure bog down maintenance operations, which lead to, increased downtime of solid waste collection equipment. Most solid waste collection vehicles are down for 3 to 6 days for minor repairs and for 3 to 6 months if the parts are to be ordered from foreign suppliers (Cointreau-Levine, 1994).

Absence of management flexibility is the major reason for desiring the participation of the private sector in the delivery of services including solid waste management. But the experience of some cities has shown that the participation of the private sector is not the only way to introduce flexibility to the sector. In such cities as Lagos (Nigeria), Bandung (Indonesia) and Ho Chi Minh city (Viet Nam), management flexibility is obtained through the commercialization of the solid waste management entities. Commercialization in these cities involved: the restructuring of the solid waste service entity into semi-private enterprise; granting authority to the new enterprises to hire and fire personnel freely and to collect appropriate tariffs to cover costs; and, payment by government of costs related to services of public properties and the removal of subsidies (Cointreau_Levine, 1994).

The privatization of some aspects of solid waste management is also regarded as an alternative in the institutionalization of the service delivery. Privatization however, does not rule out the strengthening of municipal governments for they need to be strong enough to monitor and regulate the delivery of the service. The private sector participation may be effected through one or more of the following systems: Contracting, concession and franchise.

3.3.7. FINANCING SOLID WASTE MANAGEMENT

In many countries, the collection and disposal of solid wastes is financed from the general municipal revenues. Solid waste collection and disposal often consumes as much as 20-40 percent of municipal revenues and it often suffers more than other municipal services when budget allocation and cuts are made. In the past costs were kept low by unplanned and careless dumping or incineration. These systems, however, have got serious negative impacts on the

environment and the health of urban residents. This compelled urban governments to create 'sanitary landfills'- careful burial of wastes. This system also encountered the problems of the exhaustion of close-in land for landfills and hence additional cost of transportation to new sites (UNCHS, 1996).

One of the reasons why solid waste management is financed from the general municipal revenues is due to the nature of the service. Some regard solid waste management as a public good for which the local governments are responsible. According to Cointreau-Levine, it is "non exclusive, meaning that once it is provided to some portion of a community it benefits the overall public welfare, not only the resident that specifically receives the service". Davey also says that solid waste management is a "mixed good"- there are private benefits to having one's refuse removed, but there are obvious public disbenefits if rubbish is not removed or if it is deposited in public places (Cointreau-Levine, 1994; Davey, 1996).

In addition to these general practices, user charge is also used as one way of financing urban services. Generally, user charges are easily applicable to those services that are largely confined to individual consumers, where there are no major adverse distributional effects and where it is convenient to administer. User charge is a means to ration consumption according to the willingness to pay. Where the consumer is willing to pay the service will be provided and where there is no such willingness it will not be provided. Solid waste management service, however, is difficult to provide on this basis mainly because it has some aspects of public good. This implies that it is difficult to exclude those who are not willing to pay on the one hand and on the other hand the impact of not providing the service is not limited to those who are not

willing to pay. User charges also imply that the standard of the service provided is contingent on the capacity and taste of the consumer, which requires setting various standards. Setting such varying standards, nevertheless, is not acceptable due to the nature of the service. Attempts to enforce charges through the withdrawal of the service also proved to be counter productive (Dillinger, 1994).

Despite these general features, there are some experiences where solid waste management service is provided on the basis of user charges. One of the good examples is Seoul where the charges are billed together with water, gas and TV. Failure to pay results in the disconnection of all services. In Nairobi also, residents that have water connection are invoiced on their monthly water bills for refuse collection. In some other cases (in Ahmedabad and Calcutta of India and Recife of Brazil), for instance, city cleansing is financed from a sur-charge on the property tax. This shows that there are still possibilities by which user charges can be enforced by tying it to another service, which can be stopped (Davey ,1996; Stren and R.R.White, 1989).

In most cases user charges are calculated to cover total expenditures and do not reflect the social cost of environmental effects. In spite of this some municipalities have instituted solid waste pricing system that provide incentives for households to reduce waste generation. Variable charges depending on the amount of waste generated is also regarded as an important tool to minimize waste at its point of generation. User charge may also render the solid waste authority directly accountable to residents for cost and value of the services that it provides (Netzer, 1974; Cointreau-Levine, 1994).

Other mechanisms of financing solid waste management service are disposal charges; product charge; deposit refund systems and subsidies. Disposal charges (also called “tipping fees”) are applied to waste disposal such as the dumping of industrial and troublesome wastes (like tires and used oils). “Tipping fees (user charges on a per ton basis) can be collected from private refuse haulers and from individual industrial and commercial establishments that bring their solid waste to the landfill”. This however requires comprehensive laws and sanctions and strong inspection and enforcement. Product charges are mostly applied to non-returnable containers, lubricant oils, plastic bags, fertilizers, pesticides, and feedstock, tires and car fuels. In the deposit refund system, special taxes, charges or fees are imposed on consumers to encourage recycling and prevent pollution. They are also applied to automobiles and automobile batteries. Subsidies are most often given to waste authorities or the private sector for such activities as research, development and installation of new technology and the like. Some of these can be applied in cities of developing countries depending on their peculiar situations, which of course requires the development of an efficient system for their management (Cointreau-Levine, 1994:5; Bernstein, 1993).

Private sector provision of solid waste services on contractual basis is desired by many cities in developing countries as a solution for shortage of resources. The private sector however is reluctant by questioning the capacity of local governments to reliably pay to contractors. The private sector is rather willing, some times, to work independently- “through zonal monopoly or open competition”- and to collect user charges of its own. The problems that obviously arise in such cases are as to how the government can regulate the tariffs, what to do with those

individuals who are not willing to enter into agreement with the private sector, and how to handle collusion.

Although the role of the private sector is largely constrained by such situations in most cases, there are instances where it is playing significant roles. According to a study conducted by Davey , out of the eight towns studied, three of them have contracted out the solid waste management service to private contractors. It is reported that after having seen the benefits of the practice they have widened the area covered by the private firms to “85 percent of the population in Penang, 88 percent in Porto Algre and 60 percent in Recife”(Davey, 1996:31).

Even though there are clear benefits from contracting out solid waste management services there are some issues that need due attention in this regard. These include:

1. **Problem of regulation:** There are frequent breaches of contracts (for instance in Penang). There are the problems of failure to collect and act of artificially increasing the weight of paid-for loads.
2. **Selection of areas:** The private sector, when involved, is allocated the areas with predominantly upper-income households and large industrial and commercial establishments with easy access. If private service costs are covered and matched to user charges within the service area the opportunity is lost for the government to use the revenue generated from the wealthier areas to cross-subsidize the poorer areas. As well it leaves the public sector with poor areas where collection is difficult to undertake.
3. **Costs:** New costs of supervision are incurred by the public sector, while the private sector may be efficient for itself. Due to political reasons and problems of job security,

municipalities may not be able to dispense with staffs. This also increases the labor costs.

4. Risks and Uncertainties: The involvement of the private sector in urban service production and supply has got benefits undoubtedly. It has got risks as well. Among the risks are:

The possible unwillingness of contractors to deal with less profitable areas and with poorer customers, pressures to raise prices in monopoly situations, inattention to positive and negative externalities, bankruptcy, and the collapse of essential services, and difficulties of coordination between multiple producers (Davey, 1996:38).

The major reasons for the introduction of the private sector in to urban service delivery are shortage of resources and efficiency, as already mentioned. Although the participation of the private sector may contribute to the solution of these problems, it has got risks and therefore care must be made in choosing to opt for it. It may not work in all circumstances and times and in the same way for all cities. In the cases where this may not seem feasible other alternatives such as importing competition into the public service management, enhancing consumer choice and control and increasing bureaucratic responsiveness to civil demands may be used to gain the advantages of some of the important features of the private sector.

The case of solid waste management in Ethiopian towns is worse of. In almost all towns of the country, no adequate solid waste management service is provided. Though some level of services are provided in some medium towns it is not well organized and thus fail to meet the needs to expectations. In the small towns municipal solid waste management service is totally lacking. Consequently, urban areas of the country are threatened by environmental and sanitation problems, which have negative impacts on the productivity of the towns. To the

extent they are provided the services are financed by municipal authorities (MWUD, 1996; Oromia Project Study Office, 1999).

To sum up, urban areas generate huge amount of solid waste, which needs safe disposal. In this part a brief discussion of the major components of solid waste management and experiences of cities/towns of developing countries is made. Various alternatives are used by cities/towns of developing countries to collect, reuse and dispose solid wastes. Also different institutional, financing and technological options are used by these cities. This review will be used as an analytical basis and tool in describing and explaining the situation of Adama town in this regard. It is also a major point of departure in developing recommendations at the latter stage. The following chapter gives a brief description of the socio-economic background of Adama town. It is intended to provide a general understanding of the study area prior to going in to more detail analysis.

CHAPTER FOUR

DESCRIPTION AND ANALYSIS OF THE EXISTING

SOLID WASTE MANAGEMENT SERVICES OF ADAMA TOWN

Adama is a medium town with a sizable population that is growing at the rate of 5 percent per year. This indicates that the town generates a relatively huge amount of waste that needs handling. However, the town provides an inadequate waste handling service __both solid and liquid. The town administration devotes some amount of resources to solid waste management each year though the service provided is not satisfactory. Solid waste management is regarded as a priority for the town by 94.5 percent of the households studied. Notwithstanding the need of the residents, the service provided is unsatisfactory (84.5 percent responded so). Why does such a wide gap exist between the service provided and the demand for it? What are the core problems and how is the town administration tackling them? These and other relevant issues will be dealt with in this chapter. The chapter describes and analyses the generation rate, collection, disposal, financing, institutional arrangement and the technology used to manage solid waste in Adama town.

4.1. GENERATION RATE, COMPOSITION AND CHARACTERISTICS OF SOLID WASTE OF ADAMA TOWN

4.1.1. SOLID WASTE GENERATION RATE

It is a truism that all human activities lead to the generation of wastes. Solid waste is the result of such human activities. In a study undertaken by the Health and Social Services division of

Adama Special Zone Town Administration, the amount of solid waste generated per day per person in the town is estimated to be 0.267 kg or 0.0007216m³ by using the rate estimate by WHO for towns of low-income countries. Accordingly the amount of waste generated by the town per day is estimated to be 43663.3 kg or 118m³ which is obtained by multiplying the rate by the total population, which is 163533 according to the data of the town administration.

According to information obtained from the town administration and personal observation of the researcher, the amount of waste generated is assumed to be more because of many reasons some of which include:

1. Institutions and industries obviously generate more waste than individuals or households;
2. Adama town is a marketing place for large volume of agricultural and manufactured goods, which generate much waste. The contribution of the leftovers of Chat is quite significant in this respect;
3. Due to lack of adequate latrines a number of households, especially those in the congested areas, dispose their night soils into the streets in plastic bags during night times which further increases the amount of waste collected as solid. Such practices widely prevail in Kebeles 07, 19 and 20.
4. Adama town is located close to the Sodere resort center and other recreation areas which pulls many people to the town particularly on weekends. This also leads to the generation of a considerable amount of wastes.

5. The relatively extensive construction works, which produces a considerable amount of debris also, contributed to the increase in the amount of wastes that need to be disposed of (ASZTA, 2001).

During this study, households were requested to estimate the amount of solid waste they produce per day. According to the responses 65(32.5%), 45(22.5%), 41(20.5%), 39(19.5%), of the households generate up to 0.250 kg, 0.250 to 0.500kg, 0.500 to 1kg and above 1kg respectively. Accordingly the average amount of waste generated per person per day in a household is calculated to be 0.199 kg. On this basis the amount of waste generated per day by the town is 32543.1 kg, which is less than the amount estimated by the town administration. It is also much less than the amount estimated by Cointreau, which is between 0.4 and 0.6 kg per capita for low-income countries.

Two problems are discernable in this regard, which could have led to these variations: Firstly, there is a problem of estimating the amounts of waste in kg by the households surveyed for the lack of such experiences. Secondly it seems reasonable that since many of the households use firewood and charcoal for cooking, the amount could be much more because much ash is produced by most of them. It is also true that people generate waste not only in their houses but also on streets and elsewhere in the town too. This added to what is produced inside their houses or residential compounds may be equal to the amount estimated by the town administration, i.e. 0.267 kg or 0.0007216 m³ per capita per day. So the same rate will be used for the analysis in this paper (Cointreau 1982, ASZTA, 2001).

4.1.2. COMPOSITION OF WASTES

Food preparation waste is the major component of wastes generated by households. The most obvious reason for this is that the residents of the town prepare their food from raw items that contain much waste as compared to ready-made foods. The second most important waste item is ash and dust. This is so mainly because 66.5 percent according to this survey and about 77 percent according to CSA (1994), of the households of the town use firewood and/ or leaves and charcoal to cook their food which produces much ash. Also 60 percent of the housing units of the town have mud floor which leads to the generation of much dust (Field survey, 2001; CSA, 1996).

97 percent of the surveyed households clean their houses every day, which means that they discharge wastes each day. The waste generated by households is assumed to be temporarily stored in the compound of the households. As per the results of the field survey, 33(16.5%) of the households surveyed use local/traditional baskets as temporary storage materials of solid wastes while 73(36.5%), 24(12%) and 70(35%) use sacks, plastic bags, and other materials like barrels, metal containers of various sizes, etc respectively.

Street sweeping is the other major component of wastes generated by the town. In Adama town sweeping of eight main asphalt streets is done daily. Street sweepers do not clean the non-asphalt roads because of their difficulty to handle. The major waste items of street sweeping are leaves, sand, dust (earth), papers, packaging materials and animal waste (manure). Plastic bags, which are becoming one of the most problematic waste items, constitute a significant proportion of the wastes generated. The windy climate of the town creates additional problems by carrying dust and other wastes like plastics and papers from one area to another. Particularly

the problem caused by the dust is serious and its possible health impact is well recorded (NUPI, 1995).

Market places and motor terminals also generate a huge amount of waste. Adama is a town that is widely used for the marketing of agricultural products. Agricultural products produce wastes that are more dense and wet. Institutions like hospitals, clinics, offices and schools produce a considerable amount of wastes. Adama also hosts some 190 medium and small scale industries that also produce wastes some of which are likely hazardous. The other important waste items are papers, plastics, wood, bones, straw, textile, and others in that order of importance. All these added together make the amount of wastes generated in the town too huge which requires a considerable amount of resources and stronger capacity to properly handle it.

4.1.3. MAJOR CHARACTERISTICS OF THE WASTES

The identification and clear understanding of the principal characteristics of solid wastes is very important for designing systems and equipment for solid waste management __collection, recycling, and disposal. This in fact demands detailed study regarding each component, which is beyond the scope of this research. However, a general assessment is made here which may help as a springboard for further study.

One of the major characteristics that are important is the biodegradability of wastes. Biodegradability is the capability of wastes to be broken down into innocuous particles by the action of living things such as microorganisms. According to the result of the field survey, the most important waste item of the town is food waste. This kind of waste is biodegradable

which makes its handling easier. It also requires less land area for disposal. The size of disposal site may therefore be decided accordingly. The knowledge of this character of wastes also helps to know the amount of gas or leachate that the waste produces after being put into landfill.

Density is the other important characteristic that needs to be known. The waste generated by the town is essentially denser because it constitutes food waste, ash and dust which have more density. This knowledge also helps to select the right type of vehicle for the collection and disposal of wastes. The moisture content of wastes is important as well. It is generally true that wastes produced in low-income areas contain greater moisture basically because they are food wastes predominantly. Accordingly, solid waste of Adama town contains greater moisture (Rushbrook and Pugh, 1999).

In general, a clear understanding of the generation rate, composition, and characteristics of wastes is vital for a systematic handling of wastes and in selecting a compatible technology to this end. In the foregoing lines attempt is made to explore the amount of waste generated in Adama town and its major compositions and characteristics. These are the basic points that any waste manager should know, in principle. Given these basic features, which in a way define the nature and magnitude of the problem, the following section will deal with the methods and coverage of solid waste collection of the town.

4.2. METHOD AND COVERAGE OF WASTE COLLECTION IN ADAMA TOWN

Most waste items, especially those from homes and offices, are not direct threats for public health and the environment by themselves, but it is how they are handled, stored, collected and

disposed that poses risks. There are in fact hazardous wastes that need special handling. To avoid or reduce risks, all waste items need safe collection and disposal. In the following paragraphs, the methods used in collecting solid wastes and the efficiency of the system will be discussed.

As demonstrated in the last section, different bodies generate solid wastes in varying amounts at different points. Thus the proper handling of wastes should begin at each point of generation. Households store their wastes on a temporary basis. Street cleaners sweep streets. Municipal workers also clean market areas and motor terminals. Institutions also generate and store solid wastes for final disposal. The duty of collecting all these wastes and disposing of is left to the town administration, which is assumed to be the sole body responsible for the task, except in the cases where the producers dispose their wastes themselves.

Although there are various methods of waste collection practices in different towns, Adama town administration currently uses the door to door collection method alone. The town administration has assigned 4 dump trucks one of which is not operational currently. Thus they are only 3 trucks that are there to collect wastes from all over the town. No human or animal powered mechanisms are in use for this purpose presently. Collection is done by going to the areas from where wastes are intended to be collected. The collectors blow trumpet (“trumba”) following which households bring and dump their refuses into the dump trucks.

As per the information provided by the health section of the town administration, the town administration gives priority to big hotels and business establishments/areas, congested areas and streets in undertaking solid waste collection. The main rationale is that a large number of

people use these areas and more wastes are generated that need to be removed timely. Accordingly business areas/establishments are served three times a week, streets once per week, and congested areas twice a week as per the schedule of the town administration. Residential areas are scheduled to be served every two or three week. Other institutions like the hospital, clinics, schools and other educational institutions, industries are not served at all or are served occasionally depending on their request. Usually they dispose wastes on their own premises.

Regarding the service provided to the residential households 84 percent of the respondents answered that the town administration is not giving a regular collection service. 66.5 percent view that it is hardly possible to say that the town administration is providing the service at all. Residents on the peripheral areas complain that the service provision is not based on the principles of equity because it is only the central part of the town, which is generally regarded as the wealthier part, that is served.

Lack of capacity is the reason for setting priority and failure to serve all neighborhoods equally or reasonably. According to data obtained from the town administration, there are only three trucks and these trucks are loaded manually which further lowers their productivity. The trucks collect waste from door to door and directly take it to the disposal site, which is about 8 km away from the center of the town. The average number of trips each vehicle makes per day is two. The loading capacity of the trucks is 5, 6 and 7m³. There are five working days per week. However one of the drivers is assigned to work on Saturdays that will rest on one of the working days. The weekly working hours is 37 hours. These are the major conditions that have

serious negative impacts on the efficiency of the workers and the trucks that ultimately affect the amount of waste that could be collected. Given these conditions, i.e., the number of trucks, system of loading, the average number of daily trips to the dumpsite, the loading capacity of the trucks and the working hours per day and per week, the average amount of waste that is collected and disposed each day is only 36m³ out of the 118m³ generated. Thus it is only 30.5 percent of the solid waste generate by the town that is collected and disposed each day by the municipality.

As per data gathered from various sections of the town administration, the main reasons for such significant discrepancy in solid waste collection include:

- The use of old and insufficient number of trucks: of the three trucks that are currently available for this purpose two of them are very old (one of them is as old as 33 years). One of the trucks is down for two months and the other two for one month each per year. Thus, by considering the number of working days in a year, the down times due to vehicle maintenance and other conditions that affect the collection capacity of the trucks and the workers, the amount of solid waste that could be collected each year does not exceed 15 percent under the present situation;
- The motorized trucks are loaded manually which reduces their efficiency. The loading of a truck takes an average of two hours;
- Slow/poor maintenance of trucks – The town administration has its own garage and mechanics. But it does not keep spare parts, which makes the time they stay in the garage longer until parts are bought from elsewhere. It usually takes about a week for minor repairs while about three to six months for major ones. According to the information

provided by the health and garage sections of the town administration, the reasons are routine procurement procedures and lack of spare parts (spare parts are usually bought from Addis Ababa because it is difficult to get genuine parts in Adama);

- Low workers' productivity - Due to absence of incentives and low salary the productivity of workers is very low. The town administration uses the civil service regulations to administer its workers. The civil service regulations do not provide for incentives like overtime and no attractive fringe benefits are contained in it that could motivate the workers to be more productive. The salary scale is also very low and no improvements were made during the past ten years or more. Consequently many employees particularly drivers have left the division in the past and it is difficult to retain the existing ones in the future unless the scale is revised.

Because of absence of incentives and low salary scale, the workers, especially the drivers tend to prefer serving areas like big hotels and business establishments from where they may get some benefits either in kind or otherwise. The fact that some of the respondents commented on the drivers' preference of the wealthier areas attests to this idea. About 38 (19%) of the respondents commented that the service is not provided for all equally and some of them asked for the replacement of the drivers by others because of corruption (preferring those who offer them special benefits). Such complaints and views show that the town administration has no standards for its performance. Without such standards and performance controls, it is difficult for the town administration to be efficient and responsive. The reactions of the respondents show that the town administration is not

responsive. Of course it has no capacity to be fully responsive but it could at least be "fair" by employing the available resources on equity basis.

- Low cooperation of the community in waste collection - One of the reasons why much time is spent on loading is that the community does not quickly bring their wastes and load onto the trucks. It is only after the "trumba" is blown that many of them start preparing the wastes for transfer. This significantly affects vehicle efficiency. The problem in fact is partly prompted by the irregular schedule of the town administration;
- Shortage of budget - The budget allocated for capital and operation cost of the service is very small which makes expanding the service difficult;
- Other assignments - though not frequent the trucks are assigned to undertake other works other than waste collection, which has a direct impact on the amount of waste that could be collected and disposed.

By and large, the capacity of the town administration is so limited that it is only a very small proportion of the solid waste generated that can be collected and disposed. This demands looking for other alternatives or complementary mechanisms and building the capacities of the town administration. Among the alternatives or complementary mechanisms suggested by respondents are using horse drawn carts, wheelbarrows human power and other low cost but efficient mechanisms. Of course the use of these alternatives could be easier if transfer stations are arranged which could contribute much to vehicle efficiency.

The town administration recently bought 10 collection containers and one multi-loader truck, which will increase its collection and disposal capacity, according to the health section of the town administration. The containers have a capacity of 7m³ each (a total of 70m³). The use of the containers may increase the coverage of the service to 60-66 percent if 5 to 6 trips are made each day by the new truck. To achieve and maintain this level of performance, however, some kinds of incentives are necessary which may even help to increase the rate further. The obvious problem that may be faced, however, is if the multi-loader truck breaks. Since it is only one the problem that emerges if it breaks will be something intolerable.

The number of containers bought is also very small that it is only few areas that can be served through this method. The criterion that is used to place the containers are the importance of the selected areas on the basis of commercial activities, density of population, the possibility of serving adjacent kebeles and areas where the community commonly dump wastes on. Although such criterion are useful to wisely use the available resources it is vivid that more containers are needed. The introduction of containers also requires the creation of community awareness regarding its use and delegation of responsibilities of controlling their proper use to neighborhood level. Without the creation of such awareness and clear definition of responsibilities (and the active role of the community) the containers could be sources of more problems than benefits.

4.3. THE SITUATION OF UNCOLLECTED WASTES

It is understandable from the discussions in the preceding part that much waste remains uncollected in Adama town. By considering the days and hours of work, number of trips and

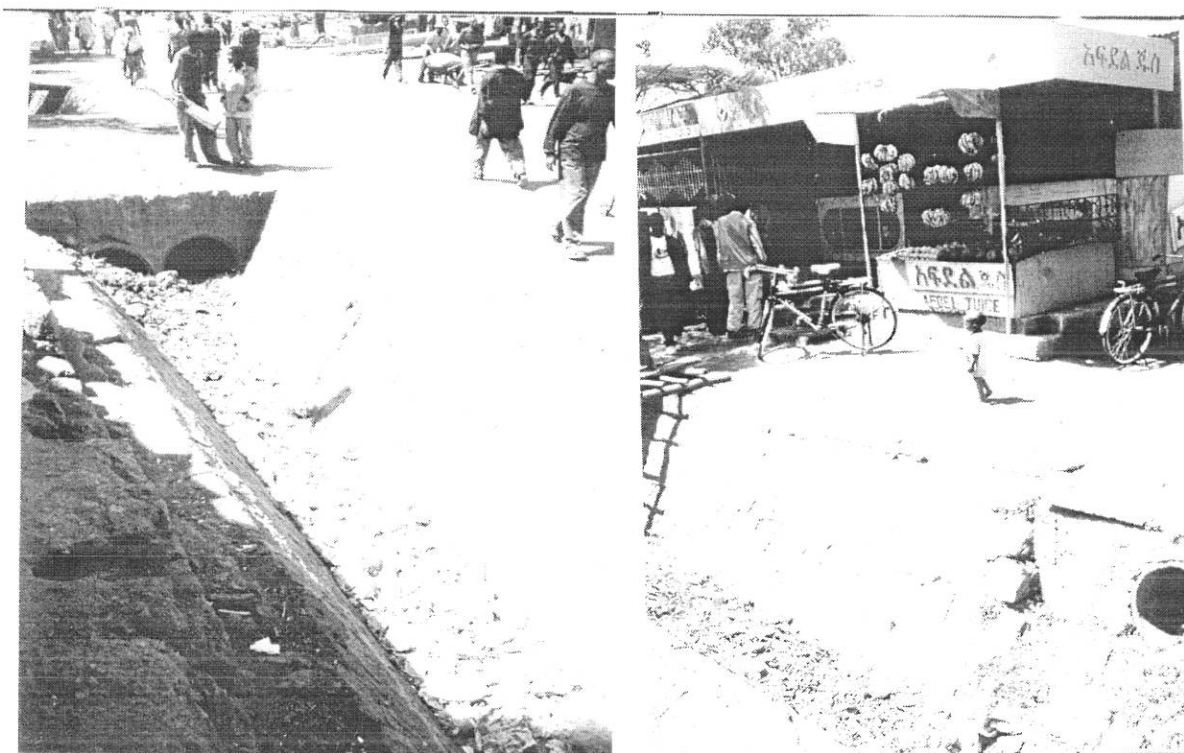
down times of vehicles in a year, it is estimated that about 85 percent of the solid wastes remain uncollected. What is happening to this part of the waste and where is it going? This is an important question to ponder.

According to the findings of this survey, the residents take some measures to get rid of the wastes that the town administration does not collect and dispose of. According to this survey, 99(49.5%) of the surveyed households burn their wastes inside compounds, 30(15%) bury inside compound, 25(12.5%) dispose on open fields and roadsides 34(17%) dispose into collection trucks and others. Even though the proportion that disposes wastes into roadsides and open spaces is so low as mentioned above, personal observations and the overall situation of the town shows that many more people dump their wastes into canals, streets, roadsides, open spaces and ditches. The piles of wastes here and there and in the canals on the right and left side of roads testify this. Both night soils and solid wastes are thrown into canals in front of some of which are found restaurants, tea rooms, shops and other establishments that give public services. Liquid wastes are also disposed into the canals, which makes them breeding grounds for flies, mosquitoes and bad smell.



Picture 1: Collection works using dump trucks

Refuse that is not properly disposed of and /or disposed into canals most likely block drains. Where there are large volumes of running water, like in the case of Adama, blocked drains will cause overflows, create new courses of escape in unpaved areas and standing pools in which insects can breed. Adama town repeatedly experienced attacks from running water the effects of which have been aggravated by the impacts of solid waste dumped in ditches or canals and open fields. Unless properly handled the impact will increase as the amount of wastes increases with population growth among others. Moreover, the hot climate of the town exacerbates the negative impact of uncollected waste on the health of the public. In such circumstances, wastes decay faster than in other areas and therefore generate contaminants and bad smell (Etherton, 1980).



Picture 2: Canals are commonly used for waste disposal (Minjar road)

To sum up, the amount of waste collected by the town administration is alarmingly very low and the impacts of uncollected waste are severe. This shows the need for more attention and commitment of more resources to the service. Still important is how and where the collected wastes are disposed. Inappropriate disposal has got equally serious negative consequences on public health and the environment. The solid waste disposal systems and performance of Adama town is the subject of the next section.

4.4. SOLID WASTE DISPOSAL OF ADAMA TOWN: METHODS AND PERFORMANCE

Public health and environmental problems do not emanate from inappropriate or inadequate collection alone. Unsafe disposal is another source of risk and needs due attention. In this section attempt is made to assess the disposal system used by the town and its performance.

Disposal to land is the ultimate destination of most waste items. Of the various systems of disposal Adama town uses the open dumping method. The dumpsite is located about 8 km from the center of the town on the way to Addis Ababa about 400 meters from the high way. The driving distance from the center of the town is about 15 to 20 minutes one way or 30 to 40 minute double trip. The site is located out side of the town's boundary, in the boundary of a farmers' association. The area is secured through an agreement with the farmers' association. It is in use for the last three years now. The area used for current dumping is excavated with an intention to cover the waste when it becomes full. But the waste is not covered though it is already full. Rather the waste is simply burnt continually (Field survey, 2001).

The solid waste disposal site is located side by side with the liquid waste disposal site. The site is selected because it is relatively far away from human settlement and farmlands. However it is located on a higher elevated area which exposes it to wind. Consequently the wind carries much wastes to the surrounding areas.

No geological study is made for the site prior to use and even after. According to the town administration, this is not necessary since it is only if ten meters or more is excavated that such

a study is compulsory as per the WHO prescription. Though the town administration says that there is no ground water on the site there is no data based on technical study to support that.

The on site management of the dumpsite is also weak. The site is fenced with barbed wire and four guards are assigned to take care of it. The guards are there mainly to collect and bring back wastes that are taken away by the wind. But since effective supervision is not there, especially the plastic bags are being spread over the surrounding areas. This, unless stopped, is ugly and pollutant as well. It may also cause problems on the moisture content of the soil in the long run since it can prohibit the percolation of water into the soil. There are no such necessary facilities as water, fire fighter, and equipment used to excavate the land and cover the wastes with topsoil or other materials. The fire may spread to nearby areas and cause damages unless closely supervised and controlled, if the waste is left to burn, despite its polluting impacts (Field survey, 2001).

One of the major reasons why open dumping was preferred to sanitary land filling by the town administration is due to the more cost the latter requires. But although it seems that open dumping is less costly, its cost is probably much higher if the indirect costs such as its effects on environmental pollution, loss in land values and treatment of people who get sick by infections from wastes are taken into account. Smoke from the continuous burning of the wastes obviously is one of the hazards that the system causes (Rushbrook and Pugh, 1999).

Although the magnitude seems limited at the moment, the open dumping waste disposal system used by the town currently most likely has the following possible dangers, the seriousness of which could increase over time:

- Bad smell – The largest proportion of the wastes contain a considerable amount of moisture that makes it decay and generate bad smell. This can cause and/or activate some diseases particularly related to respiratory system. It also may lead to loss of the value of land found in the neighborhood.
- Burning of wastes has a polluting effect on the air which also, though not recognizable today, will have negative impacts on the health of the community in the long run unless tackled timely.
- It is hardly possible to think that the wastes have gone away by disposing them in such a manner since the system does not stop the contaminants from coming back to humans through various ways to affect health and their environment. Soluble contaminants can easily leak into the ground water and/or enter surface water. Waste disposal in this manner could also be a channel for the transmission of diseases via the terrestrial food chain. The effects are undoubtedly more serious on the people living down stream. Furthermore, the site is exposed to wind, which spreads some of the wastes over the surrounding area. The impact of this on the quality of the soil is easily discernible.

As already pointed out, it is only a very small part of the solid waste generated by the town that is being disposed to the site. Even though this is the case, the situation implies that the problem will be more serious in the near future even at this pace of disposal. One can imagine therefore what could happen when the amount of waste disposed to the site is doubled or tripled. This shows that open dumping is not an ideal system of waste disposal and calls for an improved system which may be undertaken with reasonable costs and by accounting its

present and future benefits. The current insufficient site management also requires some improvements.

4.4.1. Scavenging and Reuse of Wastes

The amount of waste that needs to be disposed of may be minimized through reuse of the waste materials. Reuse implies scavenging which can be done at the collection point or on the disposal sites. Although sorting and resale of garbage has developed into an important “industry”, as it is called the “ regenerated resource industry” in Japan for instance, there is no any experience of scavenging in Adama town in this regard. Even the guards assigned to the dumpsite responded that they never do such things, because it is despised. Scavenging could be a source of livelihood for many jobless people on the top of the economic benefits that can be reaped by reusing the material (Eherton, 1980).

The only use made out of wastes is that of using fruit left over as fodder for animals. Residents of the town that have animals use skins of orange, banana and other fruits to feed their animals. Of course about 9 percent of the respondents responded that they use wastes as fertilizer on their gardens. This is a good habit that should be encouraged both to minimize waste and to increase food production. But the proportion is quite insignificant particularly as compared to the greater organic matter share of the wastes. This shows that there is need for better intervention by other bodies, most likely the town administration, to make better use of the resources.



Picture 3: Open dumping of wastes

4.5. Institutional Arrangements for Solid Waste Management of Adama Town

According to an informant, solid waste management in Adama town began in 1960 E. C. Wheelbarrow, locally called “kurikur”, was used to transport the wastes to Dejzmach Amdie sefer on the way to the today’s abattoir, which was edge of the town by then. The work was done by the municipality in general and had no specific body to handle it.

Waste management is fully run by the municipality. Currently the health section under the health and social services division is responsible for the task of managing both solid and liquid wastes. Health and social services division is one of the five divisions of the town

administration. The health section is headed by a professional sanitarian. According to the organizational structure of the special zone town administration, the health and social division is responsible to the social sector, which is headed by one of the executive committee members of the town council (ASZTA, 2001).

The section has one head, one supervisor, one foreman, 12 janitory inspectors assigned to kebeles, ten loaders and 72 street cleaners to manage solid waste. The section operates in the overall municipal framework and has no autonomy to operate on its own. It has a clearly spelt job description though lack sufficient manpower both in quality and number. Due to the low salary scale it is difficult to find and retain qualified manpower on the one hand and on the other hand the outdated organizational structure does not allow having enough number of employees to run the work. The section and/or the division have no capacity to issue regulations and directives that are necessary for the daily routine but implement those issued by higher bodies. It has a weak enforcing capacity as well. Its capacity to plan and implement is also so limited. It does not have mechanisms to control and enforce decision and/or directives passed by the municipality without going to the formal or regular courts.

Since the municipality is regarded as a sole responsible body for waste management of the town, the role of other actors is not significant in this respect which seems due to capacity problems. No private sector, NGO or CBO is playing parts in the management of wastes except the owner of Nur gebeya who takes care of wastes generated on his premises. The owner of Nur gebeya disposes about 8m^3 of solid waste each week to the municipal dumpsite by his own vehicle. Industries and institutions (including the hospital) dispose their refuse on their own

premises by burning and/or burying. Other than this no organized agency takes part in solid waste management, according to the health section of the town administration.

Failure to deliver adequate services is considered as failure to give sufficient attention, which consequently led to failure to allocate adequate resources. This is a view generally held by the respondents. As a result, different institutional alternatives are suggested particularly regarding a body that is more appropriate to manage solid wastes. Accordingly 54.5 percent of the respondents suggested that the municipality is the right body to deliver the service because of the experiences it has in this regard, its responsibility to manage the town, and the capacity it has. 28.5 percent of the respondents consider kebeles as appropriate organs because they know the problems of the community more than any body else and since they can be caught responsible for they are closer to the community. 8.5 percent of the respondents regard the health bureau as the most appropriate body because of its responsibility for public health. Only 4 percent of the respondents recognize the private sector as an appropriate institution mainly due to efficiency.

Partnership with the community and the private sector seems something not thought of by the municipality. The contribution of the community seems to be higher in such a situation where the municipality has only limited capacity. Such initiatives can increase the rate of waste collection on the one hand and the efficiency of vehicles on the other if the community is made to bring its wastes to a central place in the neighborhood. By so doing the loading time of the trucks could be reduced and more trips could be made which ultimately increase the amount of

wastes collected and disposed and the number of households served. The community could also be thought and organized so that it could be responsible for the cleanliness of its neighborhood.

The participation of the private sector is lacking presently. However it is assumed by some of the respondents that it could be one of the major actors if enabled to participate. Enabling may mean the creation of favorable environments for the operation of the sector as contractors or otherwise so that the benefits of managerial flexibility of the private sector and its resources could be made use of like in the case of some towns of the developing countries. It does not seem that there is a possibility of privatizing the service mainly because the private sector of the town is not that strong or developed.

Even though the municipality is trying to deliver the service, it is not efficient in its performance. Of the total respondents 169(84.5%) responded that the service currently provided is not satisfactory. Only 1 percent responded that it is satisfactory. The major institutional problems for its inefficiency includes outdated organizational structures, weak enforcing capacity, absence of qualified manpower, lower importance conferred to the service, etc. The other critical bottleneck is the fact that the town administration is obliged to follow civil service regulations that are rigid and not convenient for the management of service delivery responsibilities where flexibility is much desired for efficiency and responsiveness. These all indicate that there is a greater need for institutional reform.

CHAPTER FIVE

Expenditure and Revenue of Solid Waste Management Services of Adama Town

5.1. EXPENDITURE ON SOLID WASTE MANAGEMENT SERVICES

As indicated in the literature review, solid waste management consumes as much as 20 to 40 percent of municipal revenues of developing countries. Available data show that the rate is exceptionally different for Adama town. Actually it was difficult to obtain the exact amount of expenditure on solid waste management services due to problems of recording. The amount recorded as sanitation expense of the town administration includes only the salary of contractual and daily workers and other operation costs. These constitute only 4.5 percent of the municipal revenue and 1.8 of the total expenses of the town administration for 1992 E. C. budget year. Other expenses are lumped together with the general municipal expenditure in a way so difficult to sort out.

The town administration for instance uses a common garage where mechanics work in pool for all the vehicles it has. Oil and lubricants are also bought in bulk and used as need arises with no clear system of usage and recording. In some instances, the records of the garage and that of the account section do not match leading to problem of reliability. Even if all the expenses like fuel, oil and lubricants, costs of maintenance and spare parts, salary of the permanent workers and other relevant expenses are added to the aforementioned sanitation expenses, the rate does not exceed ten percent of the total revenue at most. This shows that unlike the experience of towns/cities of developing countries, Adama town spends a very low proportion of its revenue

on solid waste management. The budget allocation decisions are not made depending on the cost of the service to be provided (Accounts section of Adama town).

One of the explanations for the low level of expenditure on solid waste management service could be the low level of importance given to the service. As indicated in the preceding parts of this study, the organizational structure, manpower and salary scale, the equipment and overall budget allocated for the management of solid waste is insignificant particularly as compared to the size of the town and the amount of solid waste it generates. Consequently it is only below 15 percent of the waste that is collected and disposed of. This clearly implies that as opposed to the cities/towns of developing countries that make more efforts and devote a considerable amount of resources to address the problem though the gap persists, Adama pays less attention and makes less effort, a situation that aggravated the problem. The usual common reason for such a situation is scarcity of financial resources. Scarcity of finance, however, is not the only reason in the failure in the quality and coverage of the service. Problems of management, failure to mobilize and unwise utilization of the available resources are equally important.

This can be explained by instances where the town administration gives more attention to activities that are not its typical responsibilities instead of its direct duties, which shows that lack of resources is not the only problem. For instance data gathered from the accounts section show that sports consumed about 5.8 percent of the municipal expenses of 1992 E.C which is equal to 14 percent of its total revenue for the same year. Its expenditure on solid waste management for the same year, however, was 1.8 percent of the total expenditure and 4.5 percent of the total revenue, as already mentioned. It is not only the amount expended on it but

the quality and coverage of solid waste management service is also very low. Table 5:1 shows the amount expended on solid waste management service (1988 - 1992 E.C). Note that this is only what is recorded as sanitation expenses by the town administration. This does not include all expenses on solid waste management on the one hand and on the other hand it does not mean that all of it is expended on the same since sanitation means more than solid waste management (Accounts section of Adama town).

Table 5.1: Expenditure on Solid Waste management by Adama Town

Year	Expenditure in Birr	Percent of total expenditure	Percent of total revenue
1988	132944.35	3.0	2.4
1989	138716.67	2.9	2.3
1990	146005.57	4.4	2.7
1991	213736.15	3.0	3.4
1992	268580.14	1.8	4.5

Source: Adama Town Administration, 2000

5.2. REVENUE FROM SOLID WASTE MANAGEMENT SERVICE

The cost of solid waste management is covered from user charges and general municipal revenue. The residents and other institutions in the town pay sanitation fees, which is assumed to cover the costs of providing the service at least partly. The amount paid is generally categorized in to two: that paid by business establishments and that paid by the residents (households). Business establishments pay an amount, which ranges between 2 and 480 Birr/year depending on their capital and/or business transaction. The town administration has a

list of rates that it uses for the collection of fees from business establishments. Accordingly the biggest business establishment pays Birr 480 while the smallest ones pay Birr 2 annually.

The amount paid by the residents is fixed based on the size and grade given to the plot of land they own or use on an annual basis. It ranges between 36 and 3 Birr; the highest paid by the owners of first grade land and the lowest fee by the owners of the lowest grade. The grading of plots is normally based on their access to the main road and the quality of the house and/or structures (Accounts section of Adama town).

Although documents regarding the backgrounds of fixing such rates are not available difference in rates could imply that those who generate more waste are charged more and those who generate less pay lesser fees. In other words, big business establishments pay the highest charges because they are assumed to generate more wastes than the small ones. The residents who occupy the first grade plots also pay more because they generate more wastes than the lower income residents living on the lower grade plots. Normally higher-grade plots are expensive and thus they are the high-income groups that hold them. This goes in line with the arguments made in the literature, which says that as income increases the amount of waste generated also increases. Thus the application of differential charging seems reasonable. The amount of fee charged is fixed along with other rates by the taxes assessment committee of the town administration based on the rates and fees regulation of the town. The Rates and fees Regulation used by the town administration was issued in 1968 __Legal Notice No. 339 of 1968 (Accounts section of Adama town, Negarit Gazeta, June 1968).

The volume of revenue generated accordingly, however, is not sizable enough to cover the cost of the service, despite the fact that all business establishments and residents are required to pay the charges irrespective of whether they are served or not and the quality of service provided. It has to be noted that sanitation fee is not meant for solid waste management alone but for all activities undertaken regarding the cleanliness of the town, such as drain cleaning, hygiene control and others. The coverage and quality of solid waste management service is very limited, as already discussed in the foregoing pages, which is the cause and at the same time the effect of low amount of revenue raised from it in the form of user charges. Normally people do not comfortably pay charges for the sub-standard services they receive or for the service they do not receive at all. The revenue generated from sanitation fees is presented below for the period of the last five years.

Table 5.2: Revenue generated from Sanitation Fee by Adama Town Administration (1988_1992 E. C.)

Year	Amount of revenue generated from sanitation fee		Sanitation fee generated as %age of total revenue	Sanitation fee generated as %age of expenditure on sanitation
	Birr	c		
1988	117112	42	2.1	88.1
1989	101632	30	1.7	73.3
1990	99431	95	1.9	68.1
1991	111278	00	1.8	52.1
1992	94073	83	1.6	35.0

Source: Adama Town Administration

5.3. METHODS OF FEE COLLECTION

It is generally perceived that solid waste management is a public good the provision of which cannot be left to the wishes and tastes of individuals. The effects of providing or not providing the service is not limited to those who pay or not pay for it. Failure to properly handle wastes of a certain locality has impacts not only on the locality itself but also on others near and afar. This feature of the service is one of the factors that make providing it on absolutely user charge basis. It makes the collection of fees difficult as well. Usually it is regarded as the duty of the municipalities and many residents dare to evade paying user charges for it. The town administration's plan and implementation of revenue collection activity from this source may better explain the situation, which is presented in the table below.

Two major issues are observable from the information provided in the table: First, the plans seem to be underestimated for Adama town where many business establishments and over 25000 households exist. Second, a significant amount of revenue remains uncollected each year. This can be seen from the table below, which shows that about 30 percent of revenue that could be collected was left uncollected over the past five years. Moreover, the proportion of revenue collected during these years showed a declining trend that is mainly the result of poor collection and low workers productivity. Such an accumulation of arrears may finally lead to inability to pay.

Table 5.3: **Plans and Actual collection of Sanitation Fee (1988 - 1992 E.C)**

Year	Plan		Actual collection		Percent accomplished
	Birr	Cts	Birr	Cts	
1988	130000	00	117112	42	90.1
1989	170000	00	101632	30	59.8
1990	150000	00	99431	95	66.3
1991	150000	00	111278	00	74.2
1992	150000	00	94073	83	62.7

Source: Adama Town administration

Due to implementation problems, the collection of solid waste management fees is tied to other services that are indispensable for the user and that can be stopped upon failure to pay for in many towns/cities of the developing countries. Collection of sanitation fee is tied to other services in Adama town too. Accordingly the fee that is collected from business establishments is tied to the renewal of business licenses. By law businessmen are required to renew their licenses with the municipality each year. To get the license renewed they have to pay business taxes and fees including the sanitation fee without which undertaking any business activity is regarded as illegal and leads to legal action. Thus all businessmen who like to continue their work pay the fees before they get their licenses renewed.

Regarding households, the collection of sanitation fee is tied to property taxes. All households, particularly those who own their own houses are required to pay their property taxes and sanitation fees every year without which they would not be eligible for any service given by kebeles and/or the town administration. This method has got shortcomings however: Firstly, kebeles give only marginal (mostly administrative) services such as issuing identity cards

which many people can do without. Thus they can evade paying both the property tax and the fee. This is the reason for the prevalence of arrears on property tax. According to UDSS/FMSS there was an arrears of 1,916,900 Birr on 6790 property owners of the town. This automatically implies that these owners have also not paid sanitation fee too (UDSS/FMSS 1991 E.C).

Secondly, 30 percent of the housing units in the town is public house for which the occupiers are not required to pay property taxes except rents. Of the households surveyed 119(59.5%) live in their own houses while 77(38.5%) live in houses they rented from kebeles, government or private individuals. This shows that tying the collection of sanitation fees to property tax cannot capture a considerable proportion of the households. This unproductiveness of the system seems one of the reasons for lower revenue collection performance in this regard.

Agitation and campaigns are the other alternatives used to collect fees. These also did not prove to be productive and also face problems of sustainability. 87(43.5%) percent of the households responded that they do not regularly pay the fees. Among the non-paying respondents 32(36.8%), 19(21.8%) and 20(23.0%) percent indicated the major reasons as lack of ability, failure of collectors to go to the payers to collect the fees on time, and the service is unsatisfactory deserving no payment respectively. Respondents also indicated that fees are not commensurate with the service received and most complain that they are paying for the service they are not getting at all.

It follows from this discussion that solid waste management service coverage of Adama town is very low partly due to the limited financial resources available for its provision. Shortage of

finance emanates from inefficient fee collection more than it does from lack of sufficient sources. Inefficiency in collection is partly the result of inefficient systems. It includes poor record keeping, poor systems of collection like tying it to dispensable services, poor workers productivity, and weak control mechanisms. For collection of sanitation fee to be more productive it needs to be tied to a service that users can not dispense and could be stopped (like water supply for example).

In principle user charges should cover the cost of providing the service unless and otherwise subsidy is provided for. In cases where subsidy is considered the amount/proportion should be clearly known so that the rest could be raised from the users. In the case of solid waste management services in Adama town, however, no clear understanding is there in this respect. Should the town administration subsidize it and how much should it do is not clear even for the experts concerned. It is by simply repeating what has begun a couple of decades ago that the town administration is operating. Although it can do what it ought, it has to base itself on a reasonable solution and has to start somewhere, however.

The other most obvious reason for low revenue from the service is that the tariffs are outdated and not commensurate. One can imagine one of the big hotels, for instance, which is being served three times a week, which is about 150 times per year at that rate. If the average cost of service each time is estimated to be Birr 10, which is a very low estimate as a matter of fact, the total cost of service that this business establishment receives is Birr 1500 per year and it is expected to pay Birr 1500 annually. But it is only Birr 480 (only about 30 percent of the expenses of the service it receives) that the biggest business establishment in the town pays as

per the current rates. User charges need to be flexible to adjust them to changed cost of providing the service. Broadly viewed, charges need to include the overall environmental costs incurred. But this is not the case in Adama particularly regarding the service under study. Let alone these basic aspects, almost all charges do not capture even the direct financial costs. Thus much of the cost is covered by the general municipal budget as already said elsewhere.

Regarding the community's attitude towards charges for the service many of them are already paying the amount fixed by the town administration even now and over 50 percent of the households agree that user charge is necessary while only 21(10.5 percent) disagree. The rest are indifferent. The households however suggested that the town administration must be responsive and the service should be fair and satisfactory.

By and large, it may be possible to make some conclusions at this point: the town administration's expenditure on solid waste management service is so low because the service it provides is so low both in quality and coverage. Although the residents of the town regard solid waste management as one of their priorities, the town administration's view seems different. The revenue raised from the service is very low because the collection capacity and systems used are poor on the one hand and the tariff is outdated on the other. These and other problems mentioned in this chapter are the major constraints that entangle the service. Solid waste management is a very important service that needs sufficient understanding and resources. Unfortunately the situation in Adama town seems different. What should be done and who should do them are the major questions that need answer. This will be dealt with in the next chapter.

CHAPTER SIX

CONCLUSION AND SUGGESTED LINES OF ACTION

6.1. CONCLUSION

Neither urbanization nor rapid urban growth are crises in themselves. Rather these are opportunities that can be manipulated by implementing innovative policies and development programs. It is well recorded that urban areas are motors of economic and social transformation of nations. Despite their critical developmental roles, widespread poverty, environmental degradation and a number of other social and economic problems threaten urban areas, particularly those of developing countries. This indicates the need for promoting sustainable development programs, which aim at protecting the urban environment, reducing poverty and strengthening the urban economy. It is by doing so alone that the opportunity that urbanization offers can be reaped.

The promotion of sustainable development programs however is not an easy task since it requires resources and extensive works on the building of suitable institutional framework. The absence of such critical conditions is the reason for the present worst situations of towns/cities of developing countries. The negative consequences are so serious and will increasingly be so if not addressed somehow.

Among the problems urban environmental degradation is becoming an important issue. Today the world is experiencing a swift urban environmental depletion that is caused by the effects of

extensive and complicated human activities undertaken in the cities and towns. Industrialization and urban fashion of human settlement play major roles in this regard. One of the particular areas of concern in urban environmental issues is waste management. As discussed in this study, urban areas generate a huge amount of wastes due to their large population and extensive economic activities. These wastes require proper management without which their impacts on the health and living of the residents is far-reaching and may also be long lasting.

Urban wastes are generally categorized in to two as solid and liquid wastes. In this research solid waste management with particular reference to Adama town is dealt with to a certain depth. A special emphasis is put on the financing of the same to investigate what core issues are underlying failures to provide adequate services in this respect. It is generally assumed that scarcity of resources is the major problem of municipalities to provide adequate and quality services. Though this is one of the major reasons in generic terms, there are different specific issues that need enough attention of the managers and/or planners. This study showed that problems of financing, particularly that of lack of effectively mobilizing and inefficiency in using the available resources are equally important.

Solid waste management service of Adama town is very weak. It is less than 15 percent of the waste generated that is collected and disposed each year. The collection and disposal systems are so backward and uneconomical leading to the under utilization of the meager resources allocated to the service. Although solid waste management consumes between 20 and 40 percent of municipal budget of most developing countries, it is less than 10 percent of its budget that Adama town administration spends on solid waste management services. The

institutional arrangements for the management of the service are also weak. Currently it is the town administration alone that is taking care of the solid waste management service of the town. The body responsible for waste management (both liquid and solid) is organized at section level. The section is not equipped with sufficient manpower both in terms of quality and quantity. As already mentioned it is only a small amount of budget that is allocated for the service. This also shows the lesser degree of importance given to the service.

Weak and inadequate solid waste management in Adama town is the result of the combination of the following reasons:

- Insufficient understanding of the consequences of improper waste management that led to giving less attention to it both by the municipal officials and the community at large;
- Absence of efficient collection and disposal systems (absence of clear guidelines and procedures);
- The commitment of insignificant amount of resources to it;
- Weak resource mobilization and insufficient participation of other actors;
- Old tariffs, improper personnel management regulations, old organizational structure and low professional status of the waste management staff and the over all inefficient management and operation systems (the predominance of common practices rather than systematic approaches).

Adama town has a greater potential for various development investments for it has a sizable population, ideal location and good climate. The current change of status is also another important factor that enhances its potential though it puts additional pressures as well. These

potentials nevertheless may not be effectively utilized if they can not be complemented by adequate services. Among the necessary basic services is solid waste management. Though it is very important the current situation of the service is inadequate. Thus it needs more attention and much resources to change the situation. Some of the possible lines of action that must be pursued to change the current situations are suggested in the following section.

6.2.SUGGESTED LINES OF ACTION

In the foregoing pages various areas of bottleneck and problems of solid waste management of Adama town are identified and discussed. In this section some possible lines of action are suggested. Generally speaking, future improvements need to incorporate a comprehensive policy framework and strategic solid waste management plan that take into account all the physical, technical, legal, institutional, financial, environmental and socio-cultural aspects of solid waste management. More specifically the following may be considered to improve the situation of Adama town (Bartone et al 1994).

6.2.1. Improve solid waste collection

The present solid waste collection rate of the town is very low which shows that more efforts should be made to change the situation. To improve the collection rate the following may be considered:

- ***Increase the number of waste collection trucks.*** The assigned trucks are not sufficient and consequently a small proportion of the waste is collected currently. So, to improve the collection rate more trucks are necessary. The trucks that may be added should be compatible with the existing system and the overall health of the population as has been

said. To this end multi-loader trucks are preferred to load and transport the recently introduced collection containers easily. Furthermore, trucks that have covers are preferable to stop wastes from being spread while being transferred or transported to the dumpsite. The resources needed for this purpose may be injected by the central/regional government and/or other funding agents as a one time investment input.

- ***Improve vehicle efficiency.*** The available trucks are not being efficiently used because of many reasons discussed in this study. The efficiency of vehicles may be improved by firstly, using a loading system that can reduce the longer time spent on loading the trucks. This may be materialized by using motorized loaders than manual loading on the one hand and by collecting wastes to transfer points so that the trucks may be loaded in a lesser time than waiting until each household brings its wastes to the trucks, on the other. Still important is that the town administration should follow a regular schedule so that the households in the kebeles to be served could prepare and bring their wastes to a central place in the neighborhood. As already said, the town administration does not follow a strict schedule which forced households to prepare and dump wastes after the arrival of the trucks.

Secondly, efficient maintenance system can also improve vehicle efficiency. The town administration must keep some basic spare parts in its stock so that it can undertake maintenance works faster. The procurement procedures also need to be flexible enough to enable the institution to purchase parts in a shorter time possible to maintain the trucks. Generally speaking, maintenance works are slower when own garage is used. Thus the town

administration could also consider using private garages in order to enhance its efficiency. Stopping assignments of the trucks to other duties can also help to enhance performances.

- ***Use other alternative or complementary means of collection.*** To collect wastes, especially from the more congested and inaccessible neighborhoods for trucks, other means like animal and/or human powered mechanisms can be used. Furthermore, such mechanisms are most likely less costly and therefore can be used widely to achieve the waste management goals with less cost on top of their use as employment generation.
- ***Increase the number of containers.*** The use of collection containers is being introduced recently. Although this is an important move, the number of containers bought is so small to cover the whole town. So more containers are needed. In addition to introducing more containers, due attention must be given to the creation of awareness as to how to use the containers since they may be abused as happened in some towns (they were used for liquid waste disposal in Jimma and Woliso towns). The community can play a vital role in controlling the use of the containers.
- ***Introduce dustbins.*** Dust bins may be put on some points in the town affixed to electric or telephone poles as in some towns, Bahir Dar for instance, so that people may toss (throw) the dry wastes (like papers, small packaging materials, etc) they generate while they are on the streets.

- *Give "equal" attention to all parts of the town.* It is true that the most populated and 'active' areas generate more waste and thus need more attention. This however should not mean the less active and less populated areas and the peripheries can be neglected. Since the impact of uncollected waste is not limited to an area that is not served alone due attention has to be given to all neighborhoods proportionately.

6.2.2. Improve the disposal system

- The negative effects of open dumping, the system currently in use in Adama town is enormous. Most of the contaminants can easily go back to humans to affect their life. Thus some measures are needed to lessen the negative consequences. One of the important actions to take is changing the open dumping system to sanitary land filling system. Sanitary land filling is a more advanced system used by many cities nowadays. But it is an expensive system, which may not be implemented at once given the current degree of importance given, and budget allocated to it by Adama town administration. As discussed in the literature review part of this study, it may be accomplished on a step by step basis through phasing. Accordingly some form of controlled dumping can be implemented right away which should develop into sanitary land filling in the long run. To this end the town administration has to have some heavy-duty equipment/machines (such as bulldozers or graders, fire fighter trucks, etc) to cover the wastes with topsoil or other materials, like sand.
- Along with the proper management of the wastes that must be disposed of, the *reuse or recycling* of some of the waste items may be considered. This can help to minimize the

amount of waste that requires to be disposed of on the one hand and to use recyclable materials for economic benefits on the other. Although sophisticated recycling systems are experienced in some countries, it is either the direct use or the use of some of the materials after minor processing that is relevant to the situation of Adama, mainly due to capacity problems.

As already discussed in this study, a considerable proportion of the solid wastes of the town are organic matters. Organic matters can be composted and used to fertilize the soil. But currently it is only about 9 percent of the households that compost and uses it on their own garden as fertilizer. This is an insignificant proportion. Thus the town administration may take action to promote the composting of wastes either on its own or by encouraging private firms or individuals by giving material and financial supports. The support and cooperation of agricultural offices, NGOs and research institutions may be solicited to that effect. In fact the town administration can promote the reuse and recycling of wastes through different ways one of which of course is by giving credits and other assistance to pickers, scavengers and those who convert wastes into usable forms. As a part of this initiative households and business establishments may be instructed (informed) to separate wastes at household level and dispose them in separate containers which the town administration has to make ready.

6.2.3. Improve the institutional arrangements

- For the solid waste management of the town to be effective and responsive, the current institutional bottlenecks must be removed. One of the major actions that should be taken in this respect is *strengthening the section that is currently responsible for the service*. The

health section of the town administration must be given more importance and should be organized with the status of division or department since the activity it is responsible for is very important and sensitive needing more power and capacity. It also requires a certain degree of autonomy to make decision on the day to day activities to run the service properly. The degree of the autonomy to be given may be decided by the town administration.

- Strengthening the section may also require the *revision of the organizational structure of the municipality* as a whole, which is vital. The manpower chart of the municipality is so old that it can hardly secure and retain qualified professionals under the present situation. The pay scale is also very low and not revised for the past ten or more years. The impact of this on the productivity of the existing manpower is very clear. Thus the organizational structure and the pay scales must be revised to accommodate the new status, and function of the town and other developments.
- Adama town administration does not have *clear standards of performance and control mechanisms for its solid waste management tasks*. As a result its activities in this area lack uniformity both in quality and coverage. Lack of such instruments is one of the factors that make the service inefficient. The existence and implementation of such tools can also help the town administration to deliver the service on the principles of equity by avoiding corruption and abuse of resources. Well-scheduled programs should replace the haphazard/spontaneous operations by developing and using such tools. Furthermore, the town administration needs a clearly drawn rules and directives to guide the provision of the service (that clearly stipulates the role and responsibility of all actors - the town

administration, the kebeles, the community - and actions to be taken when either of them fail to perform their parts properly). Therefore uniform rules and directives with sufficient enforcing capacity are very important things to fulfil. The town administration has to have an adequate power to enforce respective rules and directives, to take corrective measures on those who break the rules and any measure related to the cleanliness of the town.

- As part of the institutional development measures that are essential for the *improvement of the productivity of workers* need serious attention. Under the present setting, there is no any form of incentive mechanism that motivates the workers to be more productive and innovative. Incentives are indispensable for such a service giving institution to be efficient and responsive. Therefore a package of benefits and incentive mechanisms must be developed and pursued by the town administration. This may include overtime payments, bonuses, special awards to workers with out standing performances, etc.
- *Encourage the participation of the private sector* by contracting out some aspects of the service or some areas (zones) of the town with clear and encouraging types of arrangements. Some enabling conditions may be created to this end which may include credits and the like, as already said.
- In providing solid waste management services the town administration must be able to *coordinate and lead all the efforts* that are made by different actors in this regard. It is known that kebeles do undertake some developmental activities including sanitation and other related activities. Other governmental and non-governmental organs may also take

part in this field which needs to be coordinated to marshal the available resources to achieve the goal of waste management on a sustainable and integrated manner. Some of the activities, like neighborhood sanitation control, supervision of the proper use of the containers, and participation in the collection of wastes, may also be *devolved to kebele level*.

6.2.4. Improve the financing systems

One of the major problems of solid waste management of Adama town is scarcity of finance. Scarcity of finance in turn is the result of various factors that should be addressed. Some of the improvement that need to be made in this regard are:

- *Use viable methods to improve collection efficiency.* The present sanitation of fee collection rate is so low that only a small amount is raised from this source. Some of the problems may be addressed by taking measures to improve workers' productivity suggested above. On the top of that the methods used to collect sanitation fee, especially tying it to property tax, is not a viable method as practically seen. Rather tying it to some major services like water bill, for example, can be more feasible since water is indispensable and users pay sanitation fee along with water bills for they can not afford going without water if it is stopped. Although the water delivery service in Adama is done by a different institution, it can be arranged with the same by creating a sort of net working. This is possible because any urban service is not and shouldn't be organized as an autarky and self contained.

- ***Improve rates.*** The user fee rate currently in use was issued about three decades ago and as a result very outdated and very low. This makes them irrelevant to the present situation. Such low rates are one reason for scarcity of finance for the service. Thus they need revision and adjustment to current situations and cost escalations. This of course demands for the knowledge of the unit cost of providing the service which is not known currently. Such a knowledge in turn demands for the establishment of costing system of the service which is fundamental for the establishment of a reasonable rate that is sufficient to cover costs.
- ***Link finance to service.*** An adequate and commensurate service must be provided for the charges paid by the users of the service.
- ***Increase budget.*** Solid waste management is a "mixed good" (some say it is a pure public good). This makes total dependence on user charges for the provision of the service difficult. Thus the allocation of a substantial amount of budget from the general municipal revenue is relevant and necessary in addition to the use of user charges to finance the service.
- ***Exploring and using the resources at the command of other actors.*** The town administration alone should not be the financier of the service. Alternatives must be sought for to involve the CBO and the NGO sectors as co-financiers is very essential. Ways of contracting out the service delivery may also be opted for to be able to use the expertise and the machinery at the command of the contractor(s) that may ultimately lead to efficient delivery of the service. It must be noted here however that contracting out demands a clear knowledge of what the service costs and the creation of a clear standards of performance. It

also requires enhancing the capacity of the town administration so that it can properly regulate and administer the contract. Without these conditions fulfilled, contracting out *per se* doesn't bring about the desired efficiency.

- ***Injection of resources by the Regional and /or the Central Governments.*** As plainly shown in this study the level of solid waste management service of Adama town is so poor that it needs a huge investment to improve. More trucks, containers, machinery and various studies are required to lift up it to a certain level of performance. The town administration however does not have the capacity to make such investments at once. Thus the Regional/central government must provide some amount of investment money to purchase trucks, heavy-duty machines, more containers and other institutional capacity building activities on grant and/or long term loan basis. This is also necessary to enable the town to assume and undertake its new role as a seat of the Regional government. This of course needs to be accompanied by improving the overall managerial efficiency of the town administration.

6.2.5. Enhance the participation of different actors

To increase the contribution of different actors an enabling condition must be created which may include:

- ***Creating community awareness.*** Enhancing community awareness is very important to enable them to contribute more to the cleanliness of the town. The motto " **ሁሉንም ደጃን ቢያፀዳ ከተማችን ትፀዳለች** " the equivalent of which is "if every one cleans his homestead the whole town will be clean" can be used to change the present situation on a sustainable

basis. Since the community is a very important resource particularly in this regard it has to be utilized effectively and in an institutionalized manner. Various associations and interest groups may be formed and used to this end.

- Exploring and exploiting the potential role of other actors such as the private, CBO, and NGO sectors is also important. Such individuals as the owner of "Nur gebeya" may be encouraged to expand their services to the surrounding areas on some kind of agreements. Creating various forums may also enhance the role of CBO. NGOs may also be encouraged to play their part in this very important service delivery and environmental protection issue.

Since the resource that is available is limited and major changes are attainable over time, there is a need to prioritize the suggested recommendations. Although this may require further detailed studies and inventory of the existing and potential capacities of the town administration, the following can be suggested for consideration at this point.

1. Develop/improve the collection, disposal, tariff, use and maintenance of vehicles and the related systems to improve the present worse situation by using the available resources differently;
2. Create/enhance the awareness of the municipal officials and the community;
3. Increase the number of containers, vehicles and equipment;
4. Develop standards for the proper participation of the private sector and encourage other actors to play active roles in this field.

By and large, the problem is so serious that it demands a large amount of resources to deliver an adequate and quality service. The major sources of the problem are, as already said, increased urban population, low professional status of the waste management staff and insufficient resources available for solid waste management service. To change the situation, multi-faceted measures are required which may be enforced phase by phase. Using the staff, equipment and finance currently available in different ways may lead to some significant improvements. Further, committing more resources is necessary to bring about better situations. What is important is integrated and planned action to address the problem. These suggestions are only some of the many alternatives. Those pointed above may be used to start with. As the local economy grows more sophisticated means may be pursued to further better the service. The town administration can begin here and move forward.

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APPENDICES

Appendix I-1/2

5. How many households are living in this housing unit? a) one b) two c) More than two(specify)_____
6. Condition of the house: a) Attached b) Detached
c) Others (specify)_____
7. Do you have toilet facility? a) Yes b) No
8. If your answer to question 5 is b, what do you use? a) Open field
b) Nearby river course c) Road side d) Others (specify)_____
9. What is the source of drinking water for your household? a) Piped water
b) River(s) c) Others (specify)_____
10. Do you have animals? _____ If yes, what and how many? _____
11. Do you have kitchen? a) Yes b) no
12. What do you use for cooking? (Please circle the relevant items where more than one of them are used) a) Use no fuel b) Electricity c) Gas
d) Kerosene e) Charcoal f) Firewood/leaves g) Dung/manure
13. Do you have bathing facility? a) Yes b) No
If yes, what is the type? a)Private b) Shared Others (specify)_____
14. What type of lighting do you use? a) Electricity (private meter)
b) Electricity (shared meter) c) Lantern d) Kerosene
e) Others (specify)_____

Part II

The following questions are related to solid waste storage, collection, transfer and disposal practice of your household and the town at large.

1. What is your waste storage material? a) Local basket b) Sacks
c) Plastic bags (Festal) d) Others (specify)_____
2. How often do you collect wastes from your house?
a) Daily b) Every two days c) Weekly d) Others (specify)_____
3. How much solid waste does your household generate daily (estimate in kg)? _____

4. What are the major components of the solid waste generated by your household?

(Please arrange the following in order of importance)

- a) Food (putrescible) _____
- b) Ash and dust _____
- c) Textiles _____
- d) Wood, bones, straw _____
- e) Leather, rubber _____
- f) Plastics _____
- g) Papers _____
- h) Metal _____
- i) Glass, ceramics _____
- j) Miscellaneous inert _____

5. Where do you dispose your waste currently? a) Burning in side compound

- b) Burying inside compound
- c) Spreading inside compound
- d) On open fields and road sides nearby
- e) Into river courses or canals
- f) Into municipal collection containers
- g) Others (specify) _____

6. If your answer to question 5 is f, how far is the container placed from your house (estimate in meters)? _____

7. Where have you been disposing your wastes prior to the introduction of the municipal containers? a) On road side and open fields

- b) Inside compound by burning
- c) Inside compound by burying
- d) Into river courses
- e) Others (specify) _____

8. Do you usually dispose your wastes in municipal containers? a) Yes b) No

9. If your answer to question 8 is b, why? _____

10. Where do you dispose your wastes when the containers are full?

- a) In the compound
- b) Into the road side
- c) Near the container
- d) Wait until the container is emptied
- e) Others (specify) _____

11. Do you dispose liquid waste into the municipal containers? a) Yes b) No

12. If your response to question 11 is b, where do you dispose liquid wastes? _____

13. Do you dispose dead animals into municipal containers? a) Yes b) No

Appendix I-1/4

14. If your response to question no.13 is b, where do you dispose dead animals?

15. Does the municipality provide a door to door collection services to you? a) Yes
b) No

16. If your answer to question 15 is a, at what intervals does the truck come to your place?
a) Daily b) Weekly c)Others(specify)_____

17. Does the municipality do the job regularly? a) Yes b) No

18. Do you have garden in your compound or around? a) Yes b) No

19. Do you compost solid wastes to use as fertilizer? a) Yes b) No

20. How much solid waste does your household generate daily (estimate in kg)?

21. Do you see any possibility to minimize the amount of waste your household is
generating currently? a) Yes b) No

22. If your answer to question 21 is a, what are the possible ways to do so? _____

23. How frequently do you dispose your solid waste into municipal container?

a) Everyday b) Once a week c) Twice a week

d) Three times a week e) Other (specify)_____

24. Do you agree that the containers provided by the municipality are sufficient?

a) Yes b) No

25. Do you think that the introduction of the containers has brought about change in the
waste disposal behavior of the community in favor of using the containers?

a) Yes b) No

26. At what interval garbage collecting vehicles empty the containers?

a) Daily b) Anytime when it is full c) Twice a week d) Weekly

e) Others(specify)_____

27. Do you think there are other alternative than using trucks for waste collection?

a) Yes b) No

28. If your answer to question 27 is a, what do you suggest? _____

29. Do you pay for the solid waste management services you receive?

a) Yes b) No

30. If your answer to question No. 29 is a, how much do you pay per year (in Birr)?
_____ To whom do you pay? _____

31. Do you pay the amount specified in question no. 30 regularly? a) Yes b) No

32. If your answer to question no. 31 is b, what is the reason for the failure?

a) Lack of ability to pay b) Collectors do not come regularly

c) Because the services are not satisfactory

d) Others (specify) _____

33. If your answer to question 29 is b, do you agree that some amount of charge needs to be paid? a) Strongly agree b) Agree c) Strongly disagree d) Disagree

e) No comment

34. If your answer to question 33 is a, how much do you suggest to be paid per year per household? _____

35. If your answer to question 33 is other than a and b, who do you suggest to finance the service? a) The municipality b) The zonal administration c) Kebeles

e) The regional government e) Others (specify) _____

36. Is solid waste management service your priority need (in relation to other services such as water, roads, schools...)? a) Yes b) No

37. Which level of government do you think is the most appropriate to manage solid waste of the town? a) Kebeles b) The municipality c) The zonal administration

d) The private sector e) The community f) The health Bureau

g) Others (specify) _____

38. Describe briefly the reason for your answer to question 33 _____

39. The town administration provides satisfactory waste management services. Do you agree? a) I strongly agree b) I agree c) I strongly disagree d) I disagree

e) No comment

40. If you disagree with the proposition in question 39, what would you suggest to improve the service? _____

41. State your suggestions about solid waste management services in the town (You can use the back of this page if you need additional paper) _____

Thank you very much!

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
REGIONAL AND LOCAL DEVELOPMENT STUDIES

QUESTIONNAIRE II

(To be filled by the municipality for the research on solid waste management in Nazareth (Adama) town)

Objective

The objective of this questionnaire is to gather information on the quality, coverage, mode of organization and financing of solid waste management services in Adama town and to identify major problems and suggest ways to improve the services. The information will be used to write Master's Thesis in RLDS at the AAU. Please respond to each question by selecting your answer from the choices provided or by describing your opinion. Your accurate and reliable answers are highly required for the achievement of the objective of the research. Thank you in advance for your cooperation!

1. General

- 1.1. Name of the department filling the questionnaire _____
- 1.2. When did solid waste management service begin by the municipality? _____
- 1.3. Who was doing it prior to the time the municipality begun providing the service?

2. Manpower: Availability and productivity

2.1. What is the total number of employees in the Health and Social Services Division of the town administration? (Please complete the following table)

Permanent		Contractual		Temporary (daily)	
Male	Female	Male	Female	Male	Female

Appendix II-2/3

2.3.3. Year of Service

Total no. employees	Year of service						
	1-5	6-10	11-15	16-20	21-25	26-30	Above 30

2.3.4. Number of street cleaners by terms of employment: Permanent _____

Contractual _____ Temporary (daily) _____

Total _____

2.4. Do employees leave your division, frequently? _____

If so, describe the major reasons: _____

2.5. Provide the number of employees who left your division during the past three years

(Ethiopian calendar) 1990 _____

1991 _____

1992 _____

2.6. How many workers are engaged in the collection and disposal of solid waste each day

<u>Position</u>	<u>Number of employees</u>	<u>Average salary per year</u>	<u>Total</u>
-Drivers	_____	_____	_____
- Assistant drivers	_____	_____	_____
-Mechanics	_____	_____	_____
- Division head	_____	_____	_____
-Supervisors	_____	_____	_____
-Foremen	_____	_____	_____
- Inspectors	_____	_____	_____
-Mechanic aids	_____	_____	_____
Loaders/collectors	_____	_____	_____
-Sweepers	_____	_____	_____

Appendix II-2/4

-Drain cleaners	_____	_____	_____
-Landfill labor	_____	_____	_____
-Administrative	_____	_____	_____
-Others (specify)	_____	_____	_____
Total	_____	_____	_____

2.7. Are there any incentive mechanisms (such as overtime payments) for the workers if they work outside working hours? If yes, describe:

2.8. What are the problems and issues you perceive concerning the productivity of workers (i.e., union conditions, time spent on picking or scavenging, laziness, procedures are slow, lost time in travel to the disposal site, lack of supervision):

2.9. Are there other special incentives to improve productivity (such as bonuses, early release from work, recognition awards, upward mobility, training)? _____

2.10. For municipal employees: No. of sick days _____ No. of holidays _____
No. of vacation days _____

2.11. Fringe benefits: Retirement fund _____ Health insurance _____
Life insurance _____ Unemployment _____
compensation _____ Disability _____
Uniforms _____ Bonuses _____ Longevity _____ Safety _____
equipment _____

3. Institutional arrangement

3.1 With what status is solid waste managing body established in your municipality? _____

3.2. To whom is your division accountable _____

3.3 Are there other agencies involved in waste management in the town? _____ If so, give the name(s) of the agencies _____

3.4. What are the methods of coordination and communication between these agencies? _____

Appendix II-2/5

3.5. Does such an arrangement have any problem on the efficient performance of your division? _____ If Yes, please describe _____

3.6. Is there the possibility of decentralizing the services to Kebele level? _____ If so, which of the following can be decentralized:

Collection _____

Treatment _____

Transfer _____

Disposal _____

3.7. Do you involve the private sector in solid waste management? _____ If so in what form (specify) _____

3.7. What importance is given to waste management by the municipality? _____

3.8. How much budget is allocated to solid waste management per year? _____ What is the source of the budget? _____

3.9. Is the working environment conducive for the waste management workers? (explain) _____

4. Waste generation

4.1. What is the residential daily per capita waste generation rate for:

- Low-income neighborhoods _____
- Medium-income neighborhoods _____
- High-income neighborhoods _____
- Mixed residential neighborhoods _____

4.2. What is the daily commercial waste generation rate for:

- Food service establishments _____
- Grocery stores _____
- Apparel stores _____
- Office service establishments _____
- General retail stores _____
- Others _____

Appendix II-2/6

4.3. What is the daily institutional waste generation rate for:

- Hospitals _____
- Schools _____
- Government offices _____
- Others _____

4.4. What is the daily market and motor terminal waste generation rates:

- Markets _____
- Motor terminal _____

4.5. Estimate the amount of street dust, dirt, and drain cleaning on a daily basis (in kg/tonne): _____

4.6. Please provide the list of industries in your town (use a separate paper).

5. Waste Collection

5.1. How many containers are there in the town, by kebeles?

Kebeles	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	Cost of each container
Number of containers																					

5.2. What are the criteria used to place containers at each location (Kebele)? _____

5.3. What is the capacity of each container (in m³): Type 1 _____

Type 2 _____

Type 3 _____

Type 4 _____

5.4. The containers are made up of _____

5.5. What is the method of loading and unloading of the containers? _____

Appendix II-2/7

5.6. Are there large accumulation of uncollected waste in the town? If so where?

_____ Are there specific reasons for it?

5.7. Are there any particular types of wastes that are problematic to collect and/or dispose?

_____ If so, what are they? _____

5.8. Are there special systems for the collection of the following:

- Bulky or garden wastes _____
- Market or bus terminals _____
- Institutional wastes _____
- Commercial and light industrial wastes _____
- Industrial wastes _____
- Others _____

5.9. Are hazardous industrial disposed into the municipal containers? _____

5.10. Are industrial wastes disposed to the municipal dump site without any prior treatment? _____

5.10. What are your waste collection systems?

- Household or dwelling storage _____
- Collection methods _____
- Transfer points and hauling methods _____

5.11. Is each crew assigned to a specific service area, where the residents know who is responsible for the collection service in their area, and where a rapport may develop between the crew and the residents: _____

5.12. Market places:

5.12.1. Central market

- Market day(s) _____
- When are goods delivered _____
- Are there bins at each stall? _____ With lids _____
- Are there communal bins? _____ with lids? _____ Portable _____
- Methods of loading and unloading communal bins _____

Appendix II-2/8

- Describe the overall cleanliness of the sites _____

- Access and traffic conditions for collection services _____

5.12.2. Local markets

- Market day(s) _____
- When are goods delivered _____
- Are there bins at each stall? _____ With lids _____
- Are there communal bins? _____ with lids? _____ Portable _____
- Methods of loading and unloading communal bins _____
- Describe the overall cleanliness of the sites _____

- Access and traffic conditions for collection services _____

5.13. Types of bins for commercial establishments _____

5.14. What is the percentage composition of wastes collected?

- Ash _____%
- Animal manure _____%
- Earth _____%
- Night soils _____%
- Plant remains _____%
- Packaging wastes _____%
- Vegetable _____%

6. Treatment

6.1. Is there any recycling or resource recovery practice in the town? a) Yes b) No.

6.2. Do you think that resource recovery is technically or economically feasible in your town? a) Yes b) No.

6.3. Is there scavenging? _____ At what point: a) At door to door
b) At the communal bin
c) At transfer depots
d) At the disposal sites

Appendix II-2/9

6.4. How many people are engaged in scavenging (approximately): Total _____

- In direct picking and sorting _____
- As middle men organizers or buyers _____
- As users of recycled materials _____

6.5. Do municipal workers involve in the scavenging activities? a) Yes b) No.

7. Disposal

7.1. What types of disposal systems do you have? _____

7.2. How much waste is transferred to waste disposal sites each day? _____

7.3. How many disposal sites are there for the town's solid waste? _____

7.4. How far are the sites from the center of the town?

Name of disposal site	Distance in km	Driving time from the center of the town	Round trip travel time from most collection routes to disposal sites
1.			
2.			
3.			
4.			

7.5. Is there a shortfall between the amount of wastes generated and regularly disposed?

- a) Yes b) No.

7.6. If your answer to question 7.5 is a, what are the reasons (would you rank the following please)

- a) Low workers' productivity _____
- b) Shortage of equipment _____
- c) Inappropriate systems of collection and disposal _____
- d) Poor maintenance of equipment _____
- e) Inaccessibility of some neighborhoods of the town _____
- f) Absence of community cooperation in collection system _____
- g) Others (specify) _____

7.7. Are the current disposal sites according to the master plan of the town? _____ If

not, why? _____

Appendix II-2/10

7.8. Do you think that the current disposal site treatment can cause environmental problems? _____ If so, what are the prevailing and/or anticipated possible dangers? _____

7.9. Do you have the geological study of the dump site? If you don't, do you have the plan to undertake? _____

7.10. Existing waste collection and hauling capacity

Type of equipment	Number	Capacity	Number of trip per day	Number of days per week

7.11. Disposal site (particulars)

- Location _____
- Area _____
- How long has this site been used _____
- Surface area available _____
- Topographical characteristics _____
- Presence of surface water _____
- Surrounding land use _____
- Condition of access roads _____
- Length and width of access from main road _____
- Equipment available on site _____
- Facilities available on site (water, sanitation, fire-fighting) _____
- _____
- Method of landfill _____
- Hours of daily operation _____ Days of operation _____
- Estimated cost of disposal _____
- Environmental issues _____
- _____
- Existence of composting experience in the town _____

Appendix II-2/11

7.12. Based on the number and utilized capacity of vehicles employed in hauling refuse from the collection service area to the disposal area, and on the average number of trips per day, estimate the amount of refuse collected per day:

Vehicle type 1: _____ X _____ capacity X _____ %full X _____ trips = _____
 Vehicle type 2: _____ X _____ capacity X _____ %full X _____ trips = _____
 Vehicle type 3: _____ X _____ capacity X _____ %full X _____ trips = _____
 Vehicle type 4: _____ X _____ capacity X _____ %full X _____ trips = _____
 Vehicle type 5: _____ X _____ capacity X _____ %full X _____ trips = _____
 Vehicle type 6: _____ X _____ capacity X _____ %full X _____ trips = _____

Total daily haul of fleet = _____

7.13. What are the problems and issues you perceive concerning the productivity of the various types of equipment (i.e., access to the waste source, delays in traffic, long travel times off the collection route, breakdowns while on route, slow loading and unloading system): _____

7.14. Daily average trip of vehicles _____

7.15. Down time caused by vehicle problems:

Working days of the year	Down time days	%out of service	Percent of down time due to		
			Garage	Sickness	Other causes

7.16. Working hours for the vehicles:

How many days per week _____

How many hours per day _____

How many shifts per day _____

Do they work on Saturdays and Sundays? _____ What special arrangements are there when they work on these days? _____

7.17. Container emptying frequency

- Public areas _____

Appendix II-2/12

- Recreation areas _____
- Commercial areas _____
- Institutional _____
- Streets _____
- Congested areas _____

7.18. Emptying of containers by kebeles (Based on recorded data: 1992 E.C):

Kebeles	Total containers in the kebele	Emptying time					
		Daily	Once/two days	Once /3-5 days	Once/6-7 days	Once per month	No container at all
01							
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Appendix II-2/13

7.19. What are the criteria for emptying priorities? _____

7.19. How many trucks do you have to deliver the service _____

7.20. Specify the type and cost of each truck

Type of truck	Year purchased	Cost	Status		Down time day/year
			Operational	Non-operational	

7.19. Are there other means of refuse removal? If so, please specify _____

7.20. How long is a vehicle typically out of service:

- For minor repairs _____
- For major repairs _____

7.21. Is maintenance of equipment a serious problem in your town? _____

7.22. Does the town administration have its own garage? _____ If yes,

- Location _____
- Area _____
- Branches _____
- Availability of spare parts _____
- Availability and condition of maintenance equipment

8. Financial arrangements

8.1. Equipment depreciation costs

S.no.	Type of equipment	Investment cost	Life expectancy (average age)	%life used for refuse

Appendix II-2/15

8.2. Please complete the following table with accurate data about the planned and actual expenditures on solid waste services for the past five years:

8.2.1. (Expenditure of 1992 Eth. C.)

Year	Capital			Operation			Salary		
	Planned	Achieved	%	Planned	Achieved	%	Planned	Achieved	%

8.2.2.

Items	1988	1989	1990	1991	1992
Collection					
Street sweeping					
Transfer					
Open dumping					
Total					

8.3. What is the source of your budget?

- a) General municipal revenue b) User charges for the service provided
- b) Regional government d) Federal government
- c) Others (specify) _____

8.4. Do you receive any financial, material and technical assistance from other bodies for solid waste management services? _____ If so, please complete the following table:

Sources	Year(s) received	Financial assistance in Birr	Material assistance (monetary value)	Technical assistance (monetary value)
Federal Government				
Regional government				
NGO(s)				
Private investors				
Others				
Total				

Appendix II-2/16

8.5. Do users pay for the solid waste management service they receive? a) Yes b) No

8.6. If your answer to question 8.5 is a, what is the rate you charge:

Households _____

Business establishments _____

Industries _____

Other institutions _____

8.7. Does the charge cover the total cost of providing the service? a) Yes b) No

8.8. If your answer to question 8.7 is b, what is the source of budget you use to cover the costs? _____

8.9. How do you collect service charges? _____

8.10. Are there arrears and what is the reason for its prevalence?

8.11. Operation and maintenance expenses

- Tires _____
 - Fuel _____
 - Oil _____
 - Lubrication _____
 - Spare parts _____
 - Other supplies _____
 - Utilities, etc _____
 - Maintenance _____
 - Other related costs _____
- Total _____

8.12. What percentage of the municipal budget does the total cost in question 8.11 represent? _____

8.13. Are there any self-financing municipal services run by the town administration?

_____ If yes, please give the list: _____

8.14. How are charges fixed? _____

8.15. What are the factors that are considered in fixing charge (rates)? _____

8.16. Who fixes the rate? _____ At what intervals are they revised? _____

Appendix II-2/17

8.17. Over time work and payments:

Type of labor	Required weekly hours	Average weekly overtime	Regular salary	Overtime salary
Supervisor				
Foremen				
Inspectors				
Mechanics				
Mechanic-aids				
Drivers				
Vehicle crew				
Sweepers				
Drain cleaners				
Landfill labor				
Administration				
Other				

8.18. Administrative expenses (annual cost attributable to waste management):

- Telephone _____
- Office supplies _____
- Rent, utilities _____
- Radio communication _____
- Mail _____
- Public education materials _____
- Others (specify) _____

8.19. Insurance and taxes

- Vehicles _____
 - Personnel _____
 - Property _____
 - Damage, liability _____
- Total _____

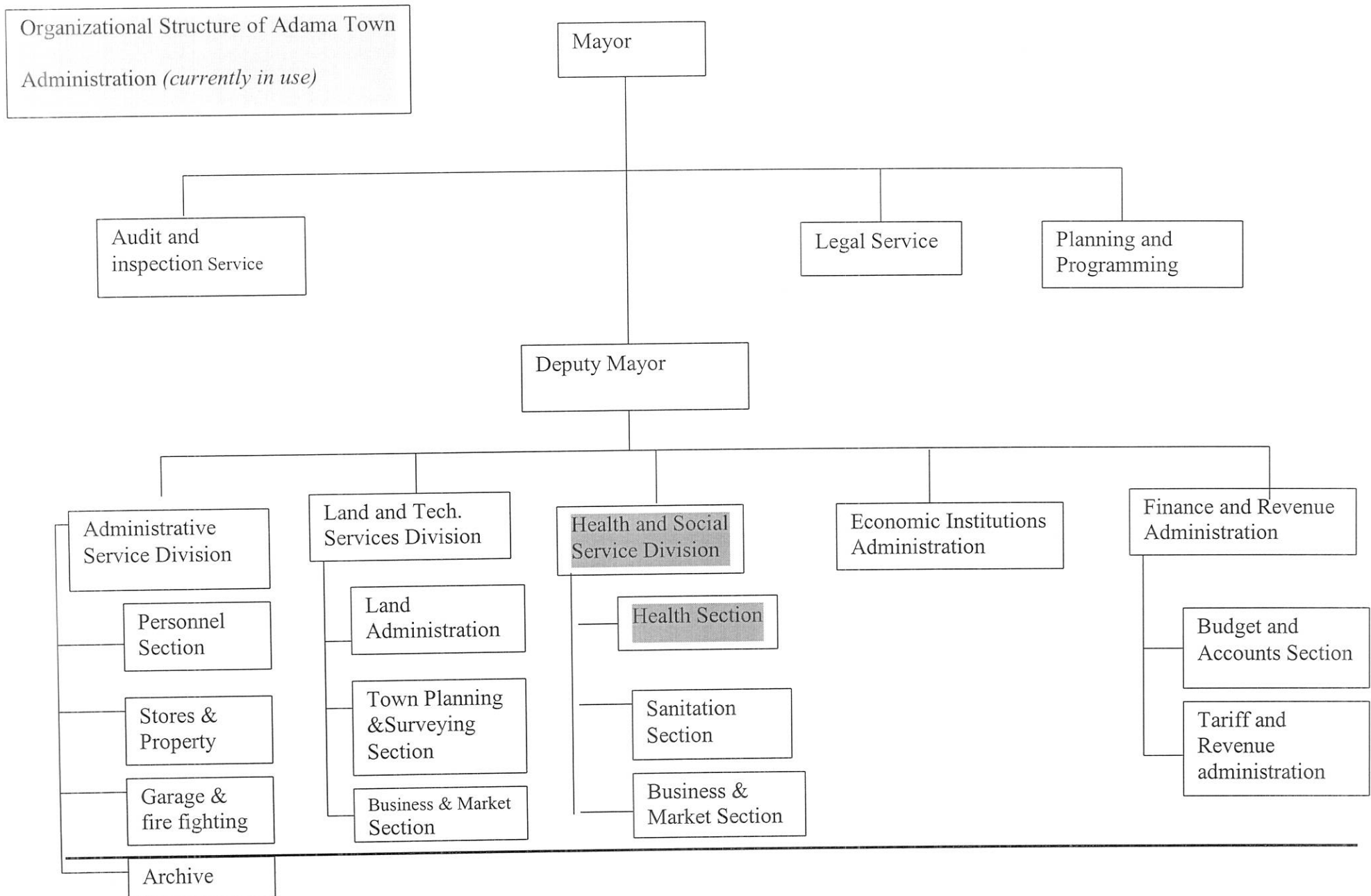
8.20. Interest

- Equipment _____ - Facilities _____

Total _____

Thank you very much!

Appendix II



Appendix III-1

Expenditure of Adama Town Administration by sources (1988-1992 E.C)

Items of expenditure	1988		1989		1990		1991		1992	
A. Salary, allowances and pension	824374	68	856400	19	880518	07	887835	38	856160	54
B. Operation Expenses										
1. Purchase of fixed assets	36699	26	30880	80	39609	40	67640	70	224300	99
2. Purchase printed stationery materials	24374	29	49212	80	48239	93	131254	39	111359	31
3. Other stationery materials	46422	81	44932	70	51647	80	61876	46	57665	85
4. Postal, telephone and services	31975	00	34754	31	44942	58	174736	78	102444	23
5. Uniforms of employees	31267	22	25537	85	34165	25	44249	49	63305	12
6. Electricity and water bills	89995	20	87398	37	122009	08	129784	78	152276	82
7. Perdiem and transportation	70346	38	81044	60	84986	40	81673	50	99207	53
8. Observance of public holy days	19599	65	25125	05	15438	60	33388	00	79325	56
9. Sanitation services	132944	35	138716	67	146005	57	213736	15	268580	74
10. To help the poor	4709	60	4564	50	7364	20	4849	00	6990	00
11. Vehicle maintenance	159551	11	216597	38	192408	86	400949	39	363719	60
12. Fuel, oil and lubricants	156365	11	147398	46	160010	28	217908	89	233289	64
13. Compensations	20327	24	38711	45	49109	95	47736	37	74640	69
14. Roads, squares and bridges	710347	15	898852	34	556392	60	969942	96	995574	89
15. Repair and maintenance	4286	15	7043	65	12658	25	3520	20	5937	90
16. Accidentals	46213	70	16112	54	34811	62	49943	97	57659	52
17. Fire fighting	6856	50	10848	12	526	00	-	-	-	-
18. Flood protection	51185	50	2283	00	-	-	-	-	47518	17
19. Sports	84712	23	137577	23	164741	75	284097	10	858960	78
20. Others	8928	60	30540	10	83940	09	4514	10	12941	48
C. Capital budget	4379763	84	4808556	09	3302975	90	7188039	09	10240634	45
Total	6941245	89	7693148	80	6032502	18	10997676	70	14922495	31

Revenue of Adama Town Administration by sources of Revenue (1988-1992 E.C.)

Sources of Revenue	1988		1989		1990		1991		1992	
A. Taxes										
Business tax and license	856584	13	857029	09	956690	48	1106047	81	1075699	57
Livestock market tax	391715	50	415226	45	493458	00	470938	75	410548	15
Land rent	514944	35	503879	61	776178	20	755196	42	906696	68
Building tax	694277	56	820782	97	883329	17	1205986	93	1192597	87
Vehicle tax	35001	10	54058	50	31094	18	28422	30	29304	24
Other taxes	1469763	95	1655049	61	272016	62	238856	99	96060	01
B. Service Charges										
Sanitation charges	117112	42	101632	30	99431	95	111278	00	94073	83
Abattoir service charge	190108	00	193549	75	196283	00	221029	00	211762	70
Technical services fee	494422	27	752075	48	904875	75	1489802	90	1063001	66
Public registration	9050	00	10140	00	11080	00	12921	00	10612	00
Public Places	2060	00	1935	00	2125	00	8810	00	9665	00
Other services	24359	49	17993	75	48742	19	33189	21	33812	79
	458558	06	380936	90	165049	88	157327	33	190072	54
Rent of immobile properties	207467	85	211569	48		95	221469	02	314509	36
C. Rent and Sales of Properties										
Sales of Property										
Rent of market stalls	33746	98	20768	00	3281	90	28251	60	5060	00
Rent of equipment	59331	88	65824	65	79202	33	11352	19	16349	00
Accidentals	43907	93	18710	00	1075	10	5390	00	3460	00
	32958	31	23348	88	96814	93	109718	84	277159	77
Total	5635369	78	6108510	42	5315160	65	6215988	29	5940445	72

DECLARATION

I declare that this thesis is my original work and has not been presented for a degree in any university and all the sources of materials used for the thesis are duly acknowledged.

Name: DERETE TADESSE

Signature: 

Date: JUNE 2001

Place: Addis Ababa University

This thesis has been submitted for examination with my approval as a university advisor.

Meheret Ayenew (Ph.D.)

