



Wolkite University

College Of Social Science and Humanity

Department of Governance and development study

Title: - khat and plastic waste challenge hygiene in urban environment

Advisor Mr. Abebe Amare

Done by;

1. Tigist Ewente
2. Emewa Shetunh
3. Mesetawt Terefe

Senior essay

January 2021

Wolkite Ethiopia

Abstract

The general objective of the senior research is to analysis solid waste management especially khat and plastic waste. Its scope is emphasizing solid waste in khat and plastic impact in urban hygiene environment.

The significance of the paper is to aware more about impact and mechanisms of plastic and khat waste recycling concern. This research used secondary data and only qualitative data. Finally, the funding's or results will discuss and completed.

Acknowledgment

First we would like to thank our God for giving us spiritual support and strength to resist challenges when we prepared this research proposal. We have a deepest gratitude for a great pleasure having Mr Abebe Amare as our advisor. He gave us advice, comment and suggestion throughout the research writing and encouragement. He rendered to accomplish this work.

Table of Contents

Abstract.....	I
Acknowledgment.....	II
List of tables and figure.....	V
List of symbols and Abbreviations	VI
Chapter One	1
1. Introduction.....	1
1.1 Background Of The Study	1
1.2 Statement Of The Problem	2
1.3 Research Question	3
1.4 Research Objectives.....	3
1.4.1 General Objective	3
1.4.2 Specific Objectives	3
1.5 Significance Of The Study.....	3
1.7 Limitation Of The Study	4
1.8 Organization Of The Paper.....	4
1.9 The Research Methodology.....	4
1.9.1 Sources of data	4
Chapter Two.....	5
Related Literature Review	5
Theoretical And Conceptual Framework.....	5
2.1 Solid Wastes.....	5
2.2 Classification Of Solid Wastes	5
2.3 Sources And Components Of Solid Waste.....	5
2.4 Plastic Material Consumptions.....	5
2.5 Solid Waste Management.....	6
2.6 Solid Waste Collection.....	6
2.7 Risks And Problems Associated With Solid Waste.....	7
2.8 Recycling.....	7
2.9 Effects And Impacts Of Solid Wastes	9
2.9.1 Environmental impact of solid waste disposal.....	9
2.9.2 Public health concerns.....	10

2.9.3 Aesthetic concerns.....	10
2.9.4 Ecological Concerns.....	10
2.10 Collection Of Solid Waste.....	10
2.11 Empirical Research Funding's Of Previous On Solid Waste In Ethiopia	11
2.11.1 Khat: The Ethiopian Context.....	11
2.11.2 Plastics.....	12
Chapter Three	15
Conclusion	15
3.1 Conclusion And Summary	15
References.....	16

List of tables and figure

Figure 1 Benefits of recycling..... 8

Table 1 Percentage of Khat generation..... 11

List of symbols and Abbreviations

SWM.....	Solid Waste Management
MSWM.....	Municipal Solid Waste Management
RSW.....	Residential Solid Waste
SWMS.....	Solid Waste Management System
ISWM.....	Integrated Solid Waste Management

Chapter One

1. Introduction

1.1 Background of The Study

Solid waste management (SWM) is one of the critical concerns facing the developing countries because of the social, economic and environmental implications once not properly managed. Studies show that only 30-50% of the waste generated in developing countries is collected and managed properly (Dawit and Alebel, 2003).

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

The most common disposal method for solid waste in Africa is open landfills, with no environmental control. Many of these landfills are almost full and in most cases the environmental conditions are very poor (Yirgalem Mahiteme 2001). The insufficient handling of solid waste represents a source of water, land and air pollution affecting the urban environment and the health of the people living in the cities, and is one of the most critical environmental problems that cities in Africa are facing today. The current capacity of most solid waste management systems in Africa is inadequate and too slow to meet the increasing demand of the solid waste generated (Tadesse Kuma 2004).

The presence of a formal recovery system in urban areas of Africa is hard to find, nevertheless such systems usually exist in highly organized waste recovery systems within the informal sectors in most cities. These activities have the potential to contribute to the solution of solid waste management problems if the governmental authorities start to recognize the potential of the recovery activities carried out by the informal sector. In order to improved urban solid waste management in African cities, the municipalities should therefore focus more on the informal waste recovery activities, in combination with efforts to minimize waste generation. Reuse and

recycling of solid waste are effective ways of reducing the amount of waste needed to be collected, transported and disposed by municipalities (Zerbock 2003).

Ethiopia is facing rapid urbanization per annum, leading to overcrowding and the development of slums and informal settlements with poor waste management practices. Urban dwellers generally consume more resources than rural dwellers. And so generate large quantities of solid waste and sewage (Tewdros ferede, 2011).

1.2 Statement of the Problem

Consumption of the plant khat (scientific name: *Catha edulis* Forsk) in Ethiopia has long since become one of the hallmarks of urban centers—old and new alike. A good portion of the population, especially among the youth, has taken up the habit of chewing it (despite the escalating price) so much so that trade in khat and delivery of associated services are growing fast and spreading far and wide. The ever widening use of the stimulant is obviously generating a huge amount of waste making the already-bad situation of solid waste management in Addis Ababa worse.

The lesser combustibility of khat waste has largely rendered it less preferable among low income groups to be included as a fire wood. This may explain why khat waste ends up in many street corners of Addis Ababa and in almost all the other urban centers to be swept into sewerage lines.

On the other hand, plastics have become so omnipresent and their use so varied that it may be hard to imagine how life was, and will be, managed without them. The use of plastic materials permeates industrial products in auto mechanics, electronics, construction, fabrics, household utensils and cutleries, and innumerable varieties of packages, containers and wrappers. The popularity and indeed indispensability of plastics in household and industrial uses emanates from their lightness, simplicity, ease to utilize, affordability etc.

These amenities of plastic are, however, overshadowed by the problems associated with the large amount of waste they leave in their wake. The problem of plastic waste disposal is even more compounded by its non-biodegradability. The threat to environment posed by the absence and/or lack of proper plastic waste management has already become widely manifest to need any elaboration. Plastic waste clogs sewerage lines and is unable to decompose for hundreds of years and some forever affect perviousness which impacts drainage and soil fertility.

The use of plastics, as much as it has eased life in rural communities, is in no less a degree negatively affecting livestock that inadvertently feed on plastic material that litter grazing grounds.

The current problem in the management of plastic and khat waste is already posing a serious threat to the environment. With the expected increase in the consumption of both items, the

problem will certainly grow correspondingly. Needless to say that this problem has to be somehow addressed; and addressed fast, before the damage on the environment gets irreversible. It would so be agreeable that recovering energy from these wastes is a very good way of managing them.

The present research aims at studying the possibility of recovering energy from khat, and plastic (HDPE) waste by using their mixture in a pyrolysis process.

In developed or not so much developed cities perhaps the most prominent shortcoming is the threat posed by solid waste on the environment and public health. The health of the population in Ethiopia urban centers is endangered due to improper and uncontrolled disposal of solid waste especially khat and plastic hence dumping along roadsides and in open area solid waste that are seen among respective municipalities and concerned in the country are, unfortunately, very low or poor (tewodros, arjan, and fitsum, 2008).

1.3 Research Question

1. How plastic materials and khat are being collected?
2. What are the major problems are available in towns?
3. What type of waste disposal contaminates the town?

1.4 Research Objectives

1.4.1 General Objective

To enhance solid waste management by generating information about khat and plastic to recommend feasible solid waste management options.

1.4.2 Specific Objectives

- Identify the source of plastic and khat wastes in the town.
- Investigate the environmental impacts of plastic and khat waste.
- Examine the attitude of residents towards plastic and khat waste.

1.5 Significance of the Study

The study would have the following significance role: - rise awareness about khat and plastic waste; it may use as input for who interested to carry out similar study in the area of khat and plastic waste; another researcher may take this research as reference to conduct further research in similar area; the researchers was get knowledge and experience to conduct such assessment and also one of the beneficiary of the study may be the Ethiopian town in which theses study

undertaken. After conduct of the study; Ethiopian urban town can use recommended solution and take corrective way to transform its own situation.

1.6 Scope of the Study

Geographically this research covers Ethiopian urban town. Theoretically the study will focus on solid waste management especially khat and plastic waste challenge hygienic environment.

1.7 Limitation of the Study

The research have many limitation especially because of pandemic disease of covid 19 virus we had not use primary data such as; questioner , interview and quantitative data so only we use secondary data, but have problem of source related to khat and plastic waste .

1.8 Organization of the Paper

This research organize three chapter. Chapter one include introduction, significant of the study ,statement of the study problem ,scope of the study ,research question ,objectivity of the study, methodology, and organization of the paper .chapter two include theoretical and conceptual framework solid waste management especially khat and plastic waste ,empirical research in Ethiopia. Chapter three conclusion and summary, reference.

1.9 The Research Methodology

1.9.1 Sources of data

To conduct this study the researchers has employed secondary sources of data .such secondary sources of data that have direct relation with the impacts of plastic and khat west in urban hygiene .These sources are gathered from reports , researches conducted by individual or group, and the urban municipalities .These secondary sources of data are journals ,books , articles and official reports

Chapter Two

Related Literature Review

Theoretical and Conceptual Framework

2.1 Solid Wastes

Solid waste contains food waste demolition products, dead animals manure and other discarded material, should not contain night soil, output depends on the degree of urbanization dietary habits, lifestyles and living standards and between 0.25 to 2.5 Kg per capita per day.

2.2 Classification of Solid Wastes

Solid waste includes Street refuse, Market refuse (plastic), Industrial refuse, Stable litter, Rubbish, Ash and Garbage.

2.3 Sources and Components of Solid Waste

The sources of solid wastes are residential, commercial, institutional, construction and demolish, municipal services, industrial, treatment plants sites and agricultural wastes (Tchobanoglous et al., 1977).

Various industrial plants generate wastes, which are mainly hazardous wastes during their raw material preparation, production or transportation processes. The waste generated from such sources is not only hazardous but also inorganic requiring special treatment before final disposal (Bilitewski et al., 1977).

2.4 Plastic Material Consumptions

Plastic bags have been introduced in the 1970's (Williamson 2003) and gained an increasing popularity amongst consumers and retailers. They are available in huge numbers and varieties across the world. It is estimated that around 500 billion plastic bags are used every year worldwide (Bowmer and Kershaw 2010; Spokas, 2007), and then discarded as wastes usually after a single use (Adane and Muleta 2011). The shortage of safe and accessible drinking water is also becoming a major challenge in many parts of the world. In the wake of a boost in the general awareness about health and hygiene, there is growing concern for the safety and quality of drinking water. A solution to this problem has come in the shape of bottled drinking water which is widely available in both industrialized and developing countries with significant cost to the consumer, but the consumers buy it for various reasons such as taste, convenience or fashion,

emergency or necessity, but for many consumers, safety and potential health benefits are important considerations (Mahajan et al. 2006). In

2.5 Solid Waste Management

Municipal solid waste management (MSWM) is the generation, separation, collection, transfer, transportation and disposal of waste in a way that takes in to account public health, economics, conservation, aesthetics, and the environment, and is responsive to public demands (WWF, 2005).

According to the World Bank, overall goal of solid waste management should be to collect, treat and dispose of solid wastes generated by all population groups in an environmentally and socially satisfactory manner using the most economical means available.

Solid waste management is in crisis in many of the worlds largest urban areas as population attracted to cities continues to grow and this has lead to ever increasing quantity of domestic waste while space for disposal decreases (world Bank, 1999). Historically, the aim of waste management has been to prevent or to reduce the impact of waste materials on health or local amenity. Over the last 30 years, however, the focus of waste management has shifted to reducing impact of environment and to recover resources from waste materials. Waste management can involve solid, liquid or gaseous wastes, with different methods and fields of expertise for each (Lemma, 2007) There is a need for a complete rethinking of “waste” – to analyze if waste is waste. A thinking that calls for waste to become wealth, refuse to become resource, trash to become cash (Lem Ethiopia, 2006).

2.6 Solid Waste Collection

In industrialized countries, municipal solid waste is often collected from homes by curbside collection using purpose-built waste collection vehicles; however, many communities require residents, especially in rural areas, to convey their household wastes to collection sites known as transfer stations (Aly Ahmed, 2006). In some polishers of khat homes fetch wastes of khat and related material to the collecting track of the municipality. Other polishers used to take the waste to their homes for fueling purposes or dispose it in front of the Khat shops. In the early morning workers of municipality clean the street and collect the waste on the pushcart and dispose near the river which is found at the entrance of Awaday town on the way from Haramaya.

2.7 Risks and Problems Associated With Solid Waste

If solid wastes have not managed properly, many negative impacts may result. Some of the most important are;

- Disposal of the solid waste on the left and right side of the road ditches usually blocks up the municipal drainage lines and causes flooding. This commonly happens in Awaday town during rainy seasons.
- mostly in the rainy seasons the town's Khat waste together with other solid wastes serve as the breeding ground for vectors (mosquito and flies) that spread diseases.
- the solid waste of the town has been burning in open air and potentially causing air pollution.
- The uncollected khat and other solid wastes degrade the aesthetic of the urban environment, In Awaday; the now cleaned streets will soon be covered again with the waste before the cleaners finish their duties. Thus, discouraging efforts to keep the town clean and attractive.
- Waste collection workers face particular occupational hazards, including strains from lifting, injuries from sharp objects.
- Waste items that are being reused, some collectors, without effectively cleaned or sterilized can transmit infections to later users.
- Polluted water flowing from dumps and disposal sites can cause serious pollution of water supplies. The river at the entrance of Awaday is polluted by leachate from the solid waste burned above it.

2.8 Recycling

Recycling is re-processing of already thrown materials in to new products. Recycling converts materials that would otherwise become waste into valuable resources. In addition, it generates a mass of environmental, financial, and social benefits. Materials like glass, metal, plastics, and paper are collected, separated and sent to facilities that can process them into new products. Recycling is one of the best environmental success stories of the late 20th century. Recycling, including composting, and diverted million tons of material away from landfills and incinerators. By present, almost thousands of curbside collection programs served for developed country population.

programs, along with drop-off and buy-back centers, resulted in a diversion of large percent of the nation's solid waste in present (U.S. Environmental Protection Agency, 2007).

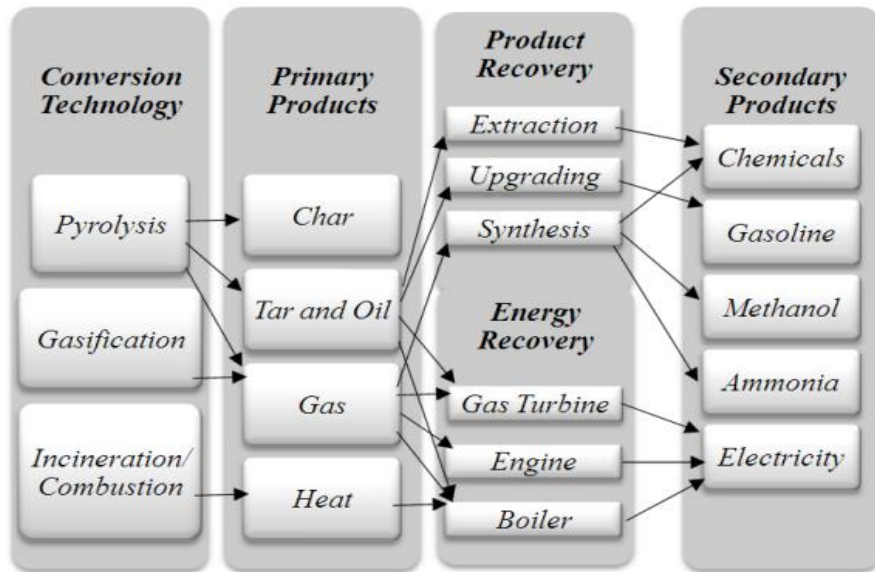


Figure 1 Benefits of recycling

Recycling Conserves resources for our children's future, Prevents emissions of many greenhouse gases and water pollutants, Saves energy, Supplies valuable raw materials to industry, Creates jobs and Stimulates the development of greener technologies. Recycling works and it does so in several ways. It reduces the monetary and environmental costs of land filling and incineration. It substitutes used materials for virgin materials, thereby reducing the demand for natural resources. It conserves energy and it creates jobs in the community. Many developed communities now actively recycle and include (Thomas E. Duston, 1993)

Curbside recycling containers. The community provides containers in which individual families deposit such materials as newspapers; glass bottles and jars; tin and aluminum containers; plastic bottles and bags; mixed waste paper (cardboard, phone books, magazines, junk mail, office paper, brown bags); and used motor oil. The community arranges for curbside pickup and delivery to a recycling facility. Drop-off recycling zones. Groups of large recycling bins are installed on public property in one or more locations throughout the developed community. Recycling centers. The developed community provides the center itself and encourages residents to drop off or sell refuse materials there. Green waste diversion and composting programs.

Leaves, grass clippings, and other organic waste materials are composted and used to enrich soil or as mulch or landfill cover.

2.9 Effects and Impacts of Solid Wastes

2.9.1 Environmental impact of solid waste disposal

Contamination of ground water surface water contamination aesthetically unpleasant and generates foul odor, generation of inflammable gas such as methane and greenhouse gases inside the waste dump, fly breeding attracts rodents and pests, transmission of disease through pests, stray animals and cattle.

If solid wastes are not managed properly there are many negative impacts that may result. In order to give more emphasis for the management work, one must have a good understanding about the effects and risks that may arise from improperly managed solid wastes. The following are lists found to be the most important effects associated with uncontrolled solid wastes.

Uncollected wastes cause blockage of drains, which result in flooding and unsanitary conditions, Flies and Mosquitoes breed in some constituents of solid wastes, and flies are very effective vectors that spread disease, and Waste dumps are good shelter for rats. Rats consume and spoil food, spread disease, damage electrical cables and other materials, Uncollected wastes degrade the urban environment, discouraging efforts to keep the streets and open places in a clean and attractive conditions, Dangerous items (such as broken glass, razor blades, needles and other healthcare wastes, aerosol cans and potentially explosive containers) may pose risks of injury or poisoning, particularly to children and people who sort through waste, Waste items that are recycled without being cleaned effectively or sterilized can transmit infection to later users, Polluted water (leachate) flowing from waste dumps and disposal sites can cause serious pollution of water supplies. Waste that is treated or disposed of in unsatisfactory ways can cause a severe aesthetic nuisance in terms of smell and appearance. Fires on disposal sites can cause major air pollution, causing illness and reducing visibility, making disposal sites dangerously unstable, causing explosions of cans, and possibly spreading to adjacent property and etc. As described by Tchobanoglous et al 1977, public health, aesthetic and ecological concerns are the major impacts associated with the solid waste generation.

2.9.2 Public health concerns

The concerns of public health are related primarily to the infestation of areas used for the storage of solid wastes with vermin and insects that often serve as potential reservoirs of disease. The practice of throwing wastes into unpaved streets, road ways and vacant land led to the breeding of rats, with their attendant fleas carrying the germs of disease that result in disease outbreak. The lack of any plan for the management of solid wastes led to the epidemic of various diseases. The most effective control measure for both fleas and rats is proper sanitation. This involves the use of containers with tight lids, the periodic washing of containers, storage areas and periodic removal of biodegradable materials, which is especially important in areas with warm climates.

2.9.3 Aesthetic concerns

Aesthetic considerations are related to the production of odors and the unsightly conditions that can develop when adequate attention is not given to the maintenance of sanitary conditions. Most odors can be controlled through the use of containers with tight lids and with the maintenance of a reasonable collection frequency. If odor persists, the container can be sprayed as a temporary expedient. To maintain aesthetic conditions the container should be scrubbed and washed periodically.

2.9.4 Ecological Concerns

Ecological impacts, such as water and air pollutions, also have been attributed to improper management of solid wastes. For instance, leachate from dumps and poorly engineered landfills contaminate surface waters and ground waters as it may contain toxic elements such as copper, arsenic etc.

2.10 Collection Of Solid Waste

The term collection includes not only the gathering or picking up of solid wastes from the various sources, but also the hauling of these wastes to the location where the contents of the collection vehicles are emptied (Tchobanoglous, 1993). There are three basic types of collection equipments: Human powered, Animal powered, and Engine powered. (According to Nurconsult, 1982 and AAHB, 1997) they are described as follows.

Human-powered collection equipment: These include pushcarts, pedal tricycles, wheelbarrows, and two wheeled dollies with baskets. In general, this equipment's require some sort of smooth surface on the lanes to be effective. **Animal-powered collection equipment:** Animal powered

collection equipment either takes the form of drawn carts or the animal may be directly backed with containers such as basket. This type of collection is applicable in the cities where there is not much traffic. Engine-powered collection equipment: These includes all motorized vehicles, like tricycles with hydraulic tipping containers mounted on the back, tractors pulling wheel containers, and trucks with mobile containers. This mode of collection system is used in the cities where road accessibility is not a limiting factor.

2.11 Empirical Research Funding's Of Previous on Solid Waste in Ethiopia

2.11.1 Khat: The Ethiopian Context

A. Area and Production

Despite the official discouragement, and loud admonition of its consumers, not only is khat consumption expanding wide and fast it has long since become one of the most important cash crops in Ethiopia. There are strong domestic markets and as well in neighboring countries of Somalia, Djibouti, Yemen, and the Gulf States (Lemessa, 2001).

Greater number of farmers were and still are engaged in growing and producing stimulant crops such as khat and coffee than those growing fruits. The area and production of these crops were also larger than that of fruits since holders earned a considerable amount of money (CSA, 2006-2010). Table 2-4 below shows the amount of khat produced in Ethiopia along with respective percentage shares of the area under all crops in the country.

A 75% increase was seen in the amount of khat produced in 2010 than that of 2009. It can be inferred from this that the amount of khat waste generated – both during pre-processing for market and consumption – would also increase.

Table 1 Percentage of Khat generation

PERIOD (Ethiopian Calendar)	AMOUNT OF KHAT PRODUCED (Million Quintals)	PERCENT OF AREA UNDER ALL CROP PRODUCTION (%)
<i>SEP 2005 – DEC 2006 (1999 E.C.)</i>	<i>1.5</i>	<i>1.3</i>
<i>SEP 2006 – DEC 2007 (2000 E.C.)</i>	<i>1.3</i>	<i>1.37</i>
<i>SEP 2007 – DEC 2008 (2001 E.C.)</i>	<i>1.14</i>	<i>1.11</i>
<i>SEP 2008 – DEC 2009 (2002 E.C.)</i>	<i>1.16</i>	<i>1.08</i>
<i>SEP 2009 – DEC 2010 (2003 E.C.)</i>	<i>2.03</i>	<i>1.54</i>

The figures in the table above, the estimated percentage of khat that is marketed, and its perishable nature could altogether be used to extrapolate the enormous amount of waste generated. The spoiled aesthetics of roadsides and open spaces in Addis Ababa can be used to explain this phenomenon.

B. Waste Generation Rate

The harvester part of khat has consumable and non-consumable portions. The chew able portion is succulent and tender while leathery part is unfit for consumption. Based on the growth stage of the shoots and proportion of chew able parts, local people (farmers, traders and consumers) identify the variety of khat (types/kinds, and/or grades). In Ethiopia it is estimated that 85 to 90% of khat produce by farmers is sold while the rest is used for their own consumption in the household (Lemessa, 2001).

Khat has always been considered as a perishable commodity once it is harvested. There is no affordable means of storing it for a longer period of time other than the local and traditional way of sprinkling water and wrapping it airtight with banana leaves or transparent plastic sheets. Hence, it can be deduced that harvesting of khat certainly results in the generation of waste whether it is consumed or not.

Regardless of their respective amount, the management of khat and plastic wastes deserves good attention indubitably.

2.11.2 Plastics

Plastic commonly refers to materials that are made up of large and carbon-containing molecules. Numerous products can be formed from these compounds which may have several uses. These products' properties, especially the useful ones, are given to plastics from the long carbon chain molecules that compose them. "Plastics can [thus] be made hard as stone, strong as steel, transparent as glass, light as wood, and elastic as rubber. More than 50 families of plastics have been produced, and new types are currently under development" (Richardson, 2006).

Plastics are also called polymers which are long and chain like molecules. The repetition of a simple unit – the monomer – makes up the polymer molecule. Polystyrene is also known as "Styrofoam™" which is commonly found in electronic packing cartons.

There are many properties of plastics that make them and their application very useful in a wide range of varieties. It is relatively inexpensive to produce plastics which are lighter than many materials of comparable strength. Unlike the adverse effects brought about by the properties of wood and metals, plastics provide the benefit of not rusting or rotting. Any color of choice can be taken to manufacture plastics which can, moreover, be made as transparent, translucent, or opaque as needed.

Nevertheless, plastics also have some cons that can limit their selection for processing or restricts the spectrum of their application for some purposes. Some of the important properties that are offered by plastics along with some of their major disadvantages are listed below (Richardson, 2006):

- Plastics are lighter due to their lower density than that of metals;

Most plastics vary in density from 0.9 to 2.2 g/cm³,

- It is possible to reinforce plastics with glass and other fibers to form materials that are incredibly strong.

For example, nylon reinforced with glass can have a tensile strength of up to 165 MPa.

- Plastics are, in general, not the materials of choice if and when high heat resistance is needed.

This is attributed mainly because they are very thermally unstable. However, there are some plastic materials which are specifically designed to withstand temperatures as high as 288OC.

- Incineration or burning of some plastics produces poisonous fumes.
- Because of their molecular stability, plastics do not easily break down into simpler components which also means that plastics do not easily degrade or decompose on their own.

o Plastics are thus regarded among the many, if not primary, materials that are “non-biodegradable” which pose extremely high pollution threats on our environment.

This lack of biodegradability inhibits the decomposition of plastics without the need for additional processing. As a result, plastics are one of the major environmental nuisances the disposal and/or management of which involves a great complexity.

Chemical structure, synthesis process, density, and other properties of plastic can be used to classify this ubiquitous commodity per se. The categorization can have different goals which may aim at providing a sort of simplicity in one or more of the activities that are involved in the general handling of plastics – be it by consumers and/or manufacturers. For instance, Society of Plastic Industry (SPI) defined a resin identification code system to assist in their sorting and hence recycling. This system divides plastics into the following seven groups based on the chemical structure and applications (Gao, 2010):

1. Polyethylene Terephthalate (PET);
2. High Density Polyethylene (HDPE);
3. Polyvinyl Chloride (PVC);
4. Low Density Polyethylene (LDPE);
5. Polypropylene (PP);
6. Polystyrene (PS), and;
7. Others.

This classification is used to distinguish between common plastic commodities through the corresponding numbers printed or engraved on plastic materials (like water bottles and packing).

Chapter Three

Conclusion

3.1 Conclusion And Summary

The local municipal authorities should provide a means to avoid these used plastics and khat wastages by introducing biodegradable materials; and give educations on the hazardous effect of re-using plastic materials to their residents, and adapt waste management on their environments. Therefore, local governors and municipalities should become aware of risks in their community, work with community groups and policy makers to reduce exposure levels on reusing plastic and garbage materials. To raise public awareness, the regional and national different levels of educational curriculum must include the waste management systems from the grass-roots as information resources. In addition to creating public awareness on the importance of a healthy environment, mechanisms of controlling the generation of wastes at the source, alternative disposal ways, establishing additional drop-off areas (landfills) and incineration mechanisms, plastic recycling facilities and garbage's through the road are also recommended. Helping communities to reduce their exposures to health toxicants will increase the likelihood for a healthy society and clean environment for the coming generations.

Cities in developing countries face many challenges in the management of solid waste. Because of increased urbanization and population growth, combined with lack of resources to provide basic infrastructure and urban service, have led to series of problems such as increased generation of waste and inadequate collection, transport and disposal of solid waste .this has become major threat to the urban environment and the health of citizens.

Nevertheless, it would not be correct to conclude the addition plastic does not bring any benefits. The application khat waste in conversation process to recover higher valued products was investigated. In this study the possibility managing this waste component which is generated locally bin significant amount for the protection the environment and recovery of valuable products was hence demonstrated. Characterization of khat waste in terms of proximate ultimate and elemental analysis result the produced in valuable information for scientific application was also substantial.

In addition, inorganic products such as plastic and khat waste are relatively new phenomena in developing countries such as Ethiopia. Several plastic manufacturing factories have started to

produce various plastic products such as water bottles, various household items, and thin plastic bags that all shops give free to their customers to carry their groceries. Most probably increasingly more consumer products made of plastic will enter the market due to the strong substitution effects plastic materials have compared to other materials, such as less energy consumption and low cost linked to the production. Today, no formal recovery system exists in the city and activities connected with plastic recovery are carried out by the informal sector. It is therefore important to explore the system, in order to be able to handle the increasing generation of plastic and khat waste and to manage it in a sustainable way which benefits society as a whole. There is also a lack of research and efforts concerning plastic recovery in Ethiopia, mainly in urban areas those mainly have several routes. To identify the recovery system and attempt to understand the organization and the different activities carried out in all levels of the plastic and khat recovery system is a good start to improve the plastic recovery system in the city.

Generally in solid waste management system of municipality khat and plastic waste management is weak. Has to increase waste storage sites or containers, initiate and motivate workers direct contact with waste and increase public awareness.

ReferencesV

Adane, L., and Muleta, D. (2011). Survey on the usage of plastic bags, their disposal and adverse impacts on environment: A case study in Jimma City, Southwestern Ethiopia. J Toxicol Environ Health Sci, v. 3, No. 8, pp. 234-248.

Ahmad, M., and Bajahlan, A.S. (2007). Leaching of styrene and other aromatic compounds in ð drinking water from PS bottles. J Environ Sci 19, pp. 421-426.

Albino, V., Balice, A., and Dangelico, R.M. (2009). *Environmental strategies and green product development: an overview on sustainability-driven companies. Bus Strat Env* 18, pp. 83-96.

Alston, S.M. and Arnold, J.C. (2011). *Environmental impact of pyrolysis of mixed WEEE plastics part 2: Life Cycle Assessment. Environ Sci Technol* 45, pp. 9386-9392.

Al-Saleh, I., Shinwari, N., and Alsabbaheen, A. (2010). *Phthalate residues in plastic bottled waters: letter. J Toxicol Sci*, v. 36, No. 4, pp. 469-478.

Andra, S.S., Makris, K.C., Shine, J.P. (2011). *Frequency of use controls chemical leaching from drinking-water containers subject to disinfection. Wat Res*, v. 45, No. 20, pp. 6677- 6687.

Dawit Waleign And Alebel Bayrasu 2003: *improvement of solid waste management in Addis Abeba participatory approach (draft) Addis Abeba Ethiopia.*

Lem Ethiopia, (2006). *Study on total waste management of Jimma southern Ethiopia.*

Lemma Asfaw, (2007). *Household generation rate and composition analyses in Adama town. A thesis submitted to the School of Graduate studies, Addis Ababa University.*

Medina Martin 2002: *globalization, development and municipal solid waste management in third world cities. El colesio de la frontora norte. Tijuana,*

Tadesse kuma. 2004: *dry waste management in addis abeba city, Ethiopia development research institute; submitted to ecological and environmental economics program 5 – 16 January 2004, addis abeba Ethiopia.*

Tehobanoglous G Theisen H., And Elson R.,1977: *solid waste engineering principles and management issue and mc graw-hill kogakush Tokyo.*

Zerbock olar 2003: *urban solid waste management reduction in developing nations, school of fast resource and environmental science: masters in international program, Michigan technological university.*