

**ASSESSMENT OF SOCIO-ECONOMIC FACTORS INFLUENCING WOMEN  
PARTICIPATION IN ENVIRONMENTAL MANAGEMENT IN DAR ES SALAAM  
CITY, TANZANIA**

**BY**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN  
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## ABSTRACT

This study was undertaken to assess the socio-economic factors influencing women participation in environmental management. Tree planting and solid waste management were taken as indicators of environmental management. The specific objectives were to; document on how urban women contribute to disposal of solid domestic waste and tree planting as indicators of environmental conservation, identify socio-economic factors influencing women participation in domestic waste management and tree planting and assess women's knowledge and perception on environmental conservation issues. A survey was done in 12 wards of Dar es Salaam City where women from randomly selected households were interviewed using a structured questionnaire. Focus group discussions done with government officials from solid waste management and forestry departments in all municipals, and women from private solid waste management associations in order to get the opinions and suggestions regarding tree planting and solid waste management in their localities. The data were analysed using Statistical Package for Social Sciences Programme (SPSS), Chi-square tests, regression analysis and descriptive statistics. The study revealed that 97 percent of women in the city were involved in domestic solid waste management through collection, storage and disposal of solid waste, while 38 percent were involved in tree planting activities. Participation of women in tree nursery production was mainly motivated by economic gains though it contributes to environmental management through provision of tree seedlings to the community. Generally, household solid waste management was done exclusively by women. Poor storage facilities, poor collection and poor disposal methods were the major problems hampering the efficiency of women

participation in domestic solid waste management. On the other hand small plot areas and land ownership were the factors that hinder women contribution to tree planting in the city. Education, land ownership, marital status and income were the most important socio-economic factors influencing women participation in environmental management especially tree planting. Participation in environmental management activities will likely depend on how aware the community is on environmental management issues. Education on the different facets of environmental management will boost women participation in environmental management.

**DECLARATION**

**I, Margaret Mtemi Natai, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work and that it has not been submitted for a degree award at any other University.**

**Signature.....** *M. Natai*

**Date and Place:.....** *7/2/2009 Mtwara*

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To my parents David W. Natai and Mrs. Eunice D. Natai

Who brought me up and for the good work they started in me.

To our daughter Lantana, and our son Jeff who was born while undertaking the course.

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## LIST OF ACRONYMS

<b>BUDEFU</b>	Busega Development Fund
<b>CBOs</b>	Community Based Organizations
<b>FGD</b>	Focus Group Discussion
<b>HESAWA</b>	Health Sanitation and Water
<b>IUNC</b>	International conservation of nature combination
<b>JICA</b>	Japanese International Cooperation Agency
<b>NCS</b>	National Conservation Strategy
<b>NCSSD</b>	National Conservation Strategy for Sustainable Development
<b>NEMC</b>	National Environmental Council
<b>NGO</b>	Non Governmental organization
<b>SAP</b>	Structural Adjustment Program
<b>SNAL</b>	Sokoine University of Agriculture National Library
<b>SPSS</b>	Statistical Package for Social Sciences Programme
<b>SUA</b>	Sokoine University of Agriculture
<b>SW</b>	Solid Waste
<b>SWM</b>	Solid Waste Management
<b>TASO</b>	Tanzania Agricultural Society
<b>TAWLAE</b>	Tanzania Women Leaders in Agriculture and Environment
<b>TECA</b>	Tanzania Environmental Cleanliness Association
<b>UCLAS</b>	University College of Lands and Actectural Studies
<b>UDSM</b>	University of Dar es Salaam
<b>UNCED</b>	United Nations Conference on Environment Development
<b>UNDP</b>	United Nation Development Programs
<b>URT</b>	United Republic of Tanzania
<b>WCED</b>	World Commission on Environment and Development
<b>WHO</b>	World Health Organization

## **CHAPTER ONE**

### **1.0 INTRODUCTION**

#### **1.1 Background Information**

In its broadest sense, the word environment embraces the conditions or influences, under which any individual or things exist, live or develop. The environment of the human being includes the abiotic (devoid of life) factors of land, water, climate, atmosphere and biotic factors fauna, flora, ecology and all those social factors, which make up the quality of life (IUCN, 1980).

Environmental management in general refers to the rational control over all aspects of abiotic and biotic factors in order to achieve sustainable development. These include land, water bodies, atmosphere, climate and biodiversity, which together make the quality of life. These have to be well utilized to achieve sustainability. In assessing environmental management, human activities that have both positive and negative impacts on the environment are looked upon. There are many examples of human activities, which have positive impact on environment. Some of these activities include tree planting, environmental sanitation, soil conservation practices and agro-forestry. On the other hand, human activities with negative impact on environment include poor agriculture practices, which lead to soil erosion, all forms of pollution, loss of wildlife habitats and biodiversity. Worldwide there is a concern on how the environment is being exploited and managed. Problems of environmental mismanagement are rampant and there is a call from many environmental activists to exploit the environment sustainably (Dankelman and Davidson, 1988). Research has shown that one of the reasons leading to environmental degradation is

deforestation, in most cases addressing women as responsible agents since women are involved in firewood collection. The fact that most women understand that the environment needs to be conserved has sometimes been forgotten.

Cities can provide healthy and stimulating environments for their inhabitants without imposing unsuitable demands on natural resources and ecosystems. A successful city is the one, which meets multiple goals. Such goals include healthy living and working environments for the inhabitants, water supply, provision for sanitation and garbage disposal drains, paved roads and other forms of infrastructure and services essential for health. Others include prosperous economic base and sustainable relationship between the demands of consumers, businesses, the resources and ecosystems on which they draw. The understanding of the links between the city's physical environment in which it is located (soil, water sources and climate) and biological environment (including local flora and fauna) and how this is changing is important if environmental hazards are to be minimized.

Tree planting and solid waste management are environmental activities, which contribute positively to the sustenance of the biological component of the city environment. In addition, these activities make city environment more pleasant, safe and valued by their inhabitants (Jorge *et al.*, 1995). Trees are planted in cities for various purposes; including ornamental, fruits, shade or fences. They are planted in homestead surroundings, along the roads, gardens or in the nearby farms. The planted trees add beauty to the city, provide shade, food, fodder, fuel, and improve the microclimate. According to Jorge *et al.*, (1995), in hot climate, open spaces with trees can give welcoming relief from the heat, especially

when combined with lakes, streams or rivers which can provide more comfortable micro-climates.

Waste management in most communities of developing countries has been a problem. This is because the waste generated is improperly managed due to lack of attention to waste management at individual level, lack of municipal waste management systems and resources for waste management (Haika, 2000). The same author further insists that various studies have indicated that women are also involved in household waste management in urban areas. According to McNely *et al.*, (1990), habitats may be well conserved with virtually no government investment by merely enabling local communities to continue to manage their resources in a sustainable way. The formation of many community-based organizations (CBOs) involved in environmental conservation like Hananasif Women Association, Kinondoni Moscow Development Association and Tanzania Environmental Cleanliness Association (TECA) has proved this.

Few studies have examined women's participation in tree planting and solid waste management in urban areas. Dankelman and Davidson (1988) have cited an example of women's Green Belt Movement in Kenya, whereby women are trained to cultivate the seedlings and care for trees with implications on environmental management. Though these activities may be carried out for the purpose of improving the condition of their families as a direct objective, there is indirectly a strong connection between women's tree seedling management and environmental conservation. Women also have been involved in solid waste management (JICA, 1998) Hananasif Women Association was one of the first community-based organizations, which was formed to abate the pathetic condition of the

Dar es salaam City. The organization was involved in household solid waste collection, street/road sweeping, open drains cleaning, public awareness creation and recycling of valuable solid wastes.

This study assessed the role of women in environmental management by exploring women's participation in tree planting and household solid waste management in Dar es Salaam City. The study further address women's perception on environmental conservation and environmental degradation aspects.

## **1.2 Problem Statement and Justification**

About ninety percent of third world women depend on land for their survival. They are the world's farmers. They grow the crops, gather the firewood, tend the animals, and fetch water. Their traditional farming methods, created the necessity to ensure future harvests, and passed down through generations, help to sustain the environment in which they live and bring up their families. The work these women do to sustain the environment is in most cases neglected. International agencies and governments have somehow ignored the vital part that women play in caring for the environment (Dankelman and Davidson, 1988).

Given disappointing results of environmental conservation policies in developing countries, a shift towards policies that address solutions at local level have been emphasised in trying to understand local knowledge systems including institutions and organized structures (Kishimba and Mkenda, 1995). The role of community based organizations and individuals at grassroots level in urban solid waste management cannot

be over emphasized. Likewise, involvement of women in particular is necessary because of the sexual division of labour prevalent in our societies.

Although it is believed that women contribute significantly in environmental conservation, little is known about women's effort in environmental management in urban Tanzania, and studies that have addressed women participation in solid waste management in urban areas are rare and inadequate. This study aimed at filling these gaps by providing empirical evidence on urban women's participation in environmental conservation activities particularly tree planting and solid waste management. The results from this study will reveal the role of women within the overall context of environmental management in countering some common misperceptions about the causes of ecological degradation, which have often pointed an accusing finger at women. The study will also reveal the extraordinary ability of women to organize themselves to carry out activities that improve their environment and their livelihood at large.

### **1.3 Objectives of the Study**

#### **1.3.1 General Objective**

The general objective of this study was to assess the participation of women in environmental management in Dar es Salaam Region so as to document their efforts as a contribution to the National Conservation Strategy for Sustainable Development (NCSSD).

### **1.3.2 Specific Objectives**

The specific objectives were to:

- Document on how urban women contribute to management of solid domestic wastes and tree planting as indicators of environmental conservation.
- Identify socio-economic factors influencing women's participation in domestic solid waste management and tree planting.
- Assess women's knowledge and perception on environmental conservation issues/programs.

The research questions in this study were as follows;

- In what ways do women participate in domestic solid waste management and tree planting?
- What are the socio-economic factors that influence women's participation in tree planting and domestic waste management?
- Are urban women conversant on issues regarding environmental conservation?
- How do women perceive environmental conservation issues/programs?

## CHAPTER TWO

### 2.0 LITERATURE REVIEW

#### 2.1 An Overview on Environmental Conservation in Tanzania

The call for environmental conservation is an outcome of the United Nations Conference on Environment Development (UNCED) held in Rio de Janeiro in 1992 whose aim was to discuss global problems of environmental conservation and development. In Tanzania environmental conservation has its roots back to the colonial era, where the societies in the then Tanganyika had a system of governance that protected community natural resources. Tribal rules and regulations foresaw allocation and utilisation of resources. Examples of such rules include those, which enhance productivity or protection of trees and shrubs against abusive harvesting and browsing (Chamberlain *et al.*, 1998).

After independence the Government has not been unconcerned with the accelerating land degradation. During that period many Institutions, by -laws and laws have been enacted to control land degradation. A number of institutions, which deal with, various aspects related to the environment management, were formed. One of them is the National Environmental Management Council (NEMC), which has been in existence since 1983. Beside NEMC, there are 10 ministries, about 24 parastatals and over 50 NGOs with an interest in the environment. In 1990 a ministry specifically for environmental matters (Ministry of Tourism, Natural Resource and Environment) was created. Although a long list of Acts geared at safeguarding the environment exists, typical of many by-laws and laws of Tanzania and in most of the developing countries for that matter is that they lack follow-up

and effectiveness. All along, there has been a problem of co-ordination of conservation and environmental issues (Bagachwa, *et al.*, 1995).

In addition, priorities for biodiversity conservation projects in Tanzania under colonial and even after independence were characterised by marginalization of the local people who had the stake of the existing biological resources (Kikula and Mwalyosi, 1994 ). The exclusion of local communities from management of natural resources did not promote positive relations nor encouraged local support for conservation.

Due to the above-mentioned short falls, NEMC spearheaded the formation of the National Conservation Strategy for Sustainable Development (NCSSD) in 1994, which was a result of Tanzania's participation in UNCED conference. In NCSSD, National Conservation Strategy's scopes were finally widened to include a variety of sectoral specific problems and possible solutions for sustainable development.

There are many important environmental goals whose achievement would make city environment more conducive to family life, child development and social interaction. These often include a sense among the inhabitants that their culture and history are valued and reflected in the city's form and layout. It is difficult to be precise about the forms they should take since these goals vary greatly depending on culture and climate and within a city. The precise nature of the interaction between environmental factors and human well-being is also poorly understood. But all city environments need a range of public facilities such as open spaces within walking distance of residential areas where young children can

play and socialize, easily supervised by adults, and community centres which serve the particular needs of their inhabitants (for instance as meeting places, mother and child centres, places for child activities and places where social events can be organized). Tree planting in these areas will improve the microclimate and will make the areas more attractive, so community provision for their maintenance is important.

Many efforts have been made by the government in collaboration with NGOs, and the community as a whole in environmental conservation through tree planting. In the year 1980, the Forest Division (now Forestry and Beekeeping Division) in collaboration with the Institute of Adult Education, conducted the national tree planting campaign with the slogan “ *Misitu ni Mali*” (forestry is wealth). The campaign had an objective of educating the masses on the need for tree planting and forest conservation. The campaign was conducted so as to boost the national forestry programme, whose impact was declining. The campaign targeted the whole country, however more concentration was focused on regions, which had shown signs of land degradation due to deforestation.

The results of the campaign were encouraging as it was “statistically” proven that the mean area planted with trees before the campaign was significantly higher than or different from the mean area planted after the campaign (Matiko, 1987). The increase in tree planting was therefore attributed to the campaign. Matiko (1987) further observed that there is reason to believe that if the forest nurseries in each region had been able to produce and effectively distribute many more seedlings, the planting rate would have been higher and closer to the

national and regional targets, which were set. After this, many other tree-planting programmes have been implemented for the same reasons.

The tendency of growing trees in Dar es Salaam has been there since the colonial era. The area around Karimjee and state house was planted with trees during the colonial times. Today it is one of the attractive areas in Dar es Salaam as it offers adequate shade as well as conducive microclimate. In some residential areas such as Masaki, Oysterbay, Msasani, Mikocheni, Ada Estate, Kimara and Mbezi some efforts have been made to grow trees. Kigamboni area and parts of Temeke are stocked with coconut and cashew nut trees which in a way help to maintain reasonable scenery.

Institutions particularly schools have been positive towards giving their premises an aesthetic view by growing trees. For instance Jangwani Girls and Azania secondary schools have their campuses properly kept with trees providing the needed shade for off-class studies and other social functions. Muhimbili medical centre; Ardhi Institute and The University of Dar es salaam also maintain good parks with various ornamental and shade giving trees. The Dar es Salaam Gymkhana club has recently made efforts to plant various tree species in their playing grounds. Tree nurseries located at edges of Ally Hassan Mwinyi road, and other places give good scenery to the city. These are a few examples demonstrating some of the ongoing efforts to improve Dar es Salaam landscape. All in all many parts of Dar es Salaam are still naked and appear ugly to the eyes. Thus, concrete and concerted efforts are required in order to bring about the intended conditions, which are conducive for a good living.

*Miti ni Uhai* (trees are life) was one among many tree planting projects implemented in Dar es Salaam region. This project was implemented from 1992 –1997 by Dar es Salaam city council in collaboration with NEMC and Town Planning Department in the Ministry of Land, Housing and Urban development. NGOs dealing with tree planting e.g. Tanzania Agricultural Society (TASO) were also involved. The project contributed significantly in tree planting in Dar es Salaam. The main objective of this project was to improve the living conditions of the Dar es Salaam residents through tree growing and other landscape techniques. Specifically the project aimed at protecting all open areas earmarked for different public uses such as schools, children playing ground or parks against squatter occupation, and to improve and beautify the city landscape by planting trees and to provide adequate shade to the road/ avenue users particularly pedestrians, the households and parking areas. Another objective was to sensitive and educate the residents of Dar es Salaam on the need and importance of having trees within their residential and public areas. In the long run this project will enhance and sustain the availability of firewood and poles to the residents of Dar es Salaam, protect and maintain better soil condition and microclimates in fragile areas such as valleys and along the coastline, and create conducive condition in various water logged area by planting desirable tree species that could help to lower the water table. Lastly it was believed that in future there would be many trees planted in the residential areas and public utility area as a measure towards better landscaping (MNRT, 1991).

TASO also have insisted on tree planting around households/homesteads. Each household is supposed to grow at least 5 trees per year. Planting of ornamental and shade trees,

flowers and grass to keep the soil *in situ*, is highly promoted. Household in peripherals are encouraged to grow trees for fuel wood and for pole production. Various species of trees have been chosen for example; *Azadrachta indica*, *Ficus benjamina*, *Terminalia catapa* for shade; *Delonix regia*, *Saraca indica*, *Sena siamea* for ornamental; *Mangifera indica* and *Citrus spp*, for fruits (MNRT, 1991).

## 2.2 Prevalence of Environmental Problems Worldwide

By definition, environmental degradation is a phenomenon, which involves an unfavourable alteration in natural resources, that leads to loss of potential resources (McNecly, *et al.*, 1990). The following are few examples cited a decade ago on prevalence of environmental problems worldwide:

- Degradation due to deforestation has been an age-old activity and the main cause of soil erosion, soil salinity and related problems, which have faced human kind ever since land was first settled and cultivated some 7000 years ago. In countries like China, Mesopotamia, Egypt and Greece it has contributed to the decline of great civilizations (Sanders, 1990). Therefore natural resource degradation is a long time serious problem, which the world faces, and its impacts are in the form of soil erosion, loss of biological diversity, deterioration of the quality of life and reduction of the options for development.
- Each year six million hectares are degraded to desert like conditions. Over three decades this would amount to an area as large as Saudi Arabia (WCED, 1987).

- Throughout the developing world, water polluted by sewage or industrial wastes has serious consequences for human health. In India for instance 70 percent of all surface water is polluted (World Resources Institute, 1986).
- More than 11 million hectares of tropical forests are destroyed every year. Over 30 years, this would amount to an area about the size of India (WCED, 1987).
- Each day an average of one animal or plant species becomes extinct. Most of these will disappear without ever having been discovered (IUCN, 1980).

Together with acidification of the environment, the rising level of carbon dioxide and destruction of the ozone layer in the atmosphere, these developments pose a profound threat to the present and future environment.

The process of environmental degradation is complex with many causes and outcomes that vary according to socio-economic and ecological conditions. Deforestation is the most common form of land degradation and contributor to soil erosion problem. This is a result of increasing population pressure, which results to cultivation of marginal land, and livestock pressure, which leads to overgrazing (a characteristic of semi arid areas) (Sharma, 1991; Ffolliott *et al.*, 1995). Poor agricultural management practices due to technical deficiencies also contribute to environmental degradation. To check this, various conservation measures have to be taken, such as improved agriculture (crop husbandry, animal husbandry).

Another environmental problem facing most of developing countries is poor environmental sanitation. Environmental sanitation is an important area of concern in environmental

management since it has a direct relationship with the health condition of human beings. There are many health problems, which have been reported, caused by poor environmental hygiene. Studies have shown that the most immediate environmental problems in the world are the ill health and premature death caused by biological agents in the human environment such as water, food, air and soil. The problems are most acute in third world countries where:

- Four million infants or children die every year from diarrhea diseases largely as a result of contaminated food and water.
- Two million people die from malaria each year and 20 million are infected.
- Hundreds of million of people suffer from debilitating intestinal parasitic infections.

In addition, all countries have serious environmental health problems affecting hundreds of millions of people who suffer from respiratory and other diseases caused or exacerbated, both indoors and outdoors, by biological and chemical agents in the air. Hundred of millions of people are also exposed to unnecessary chemical and physical hazards in their home, workplace or wider environment. Health also depends on whether people can obtain food, water and shelter and over 1000 million people lack the income or land to meet such basic needs (WHO, 1992).

### **2.3 Major Urban Environmental Problems in Tanzania**

According to Kikula and Mwalyosi (1994), NCSSD, (1994) the major environmental problems facing Tanzania include deforestation whereby 300,000 – 400,000 ha of trees are

removed annually, soil erosion, localised overgrazing, poaching and forest encroachment, over fishing and destruction of fish habitats, household and industrial pollution, water and sanitation problems and rain water drainage and solid waste disposal problems. While the first five problems are endemic in the rural areas, the last three pose a serious threat to urban dwellers. This section discusses the major urban environmental problems in Tanzania.

### **2.3.1 Environmental Problems due to Animals.**

Most dairy cattle and chicken kept in the city contribute to human health hazards. Mvena *et al.*, (1991) stated that as a result of urban agriculture, livestock keeping, industrial and other activities, pollution has become a social and environmental issue in many urban areas in Tanzania. Cohen (1992) further noted that domesticated animals are sources of wide range of infectious agents that pollute the environment and it is believed that domestic animals are ultimate source of many modern human infections, including most of the major epidemic diseases. Run-off from livestock keeping households contributes to water pollution and long-term effects causing medial hazards to human (Archer and Nicholson, 1992).

Mlozi (1995) advocates that in Dar es Salaam, noxious odours from livestock activities are a major problem because of the types of livestock kept, the poor quality of livestock housing, the proximity of houses, and the improper disposal of animal wastes. Other problems include the inadequate or lack of knowledge about animal husbandry and its negative impact on the urban environment.

In addition, livestock keeping in most towns and cities destroy ornamental plants as animals search for food and eat grass around people's homes, along roads and in open spaces making them bare and pre-disposed to soil erosion (Mlozi, 1995). People, who gather feeds for animals also destruction of flora, especially grass and bush. Livestock also destroy the city's beauty due to dumping of excreta, obstruction of traffic movement, and haphazard erection of animal sheds.

### **2.3.2 Environmental Problem due to Plants**

Health and medical personnel claimed that watering plants creates moist conditions underneath the plants that act as suitable breeding grounds for mosquitoes (Mlozi, 1995). In Zambian cities maize growing in urban areas was forbidden and maize crops were periodically destroyed, as they were seen as a health hazard because of their potential breeding ground for mosquitoes (Dankelman and Davidson, 1988).

Ellner and Neu (1992) observed that the use of organic manure in gardens spreads harmful disease pathogens and worm cysts that cause health problems. Furthermore, spreading wastes on fields with growing crops is a risky practice due to potential spread of infectious agents. This is especially hazardous for plants intended for raw consumption. The manner in which people grow different species of crops in cities is said to destroy the city's beauty especially when different species of crops are grown haphazardly (Mlozi, 1995). Despite successful results of urban agriculture, authorities in Bamako, Mali banned the cultivation of cereals because the tall stalks provided hiding place for bandits (Diallo, 1993). In Dar es

Salaam city, crops such as bananas, maize and cassava could also hide bandits. Moreover, crops planted at decisive sharp corners can cause traffic accidents because they obscure the vision of motorists and pedestrians.

### **2.3.3 Environmental Problem Resulting from use of Chemicals.**

Chemical contamination is another serious health problem. Human beings use chemicals such as insecticides, acaricides and herbicides either alone or in combination, which contribute to the contamination of the environment (Mlozi, 1995). The fact that crop growers use pesticide is also a serious problem. Perfecto (1992) observed that most developing countries did not have the infrastructure to adequately regulate the use and availability of pesticides, nor to monitor pesticides in food or in the environment. Health problems also arise from the use of pesticides and polluted water for irrigating vegetables (Ferreira, 1981).

Another form of environmental problem is due to uncontrolled development and growing urban population. These problems have been exacerbated by high rate of urbanisation and the poor provision of urban infrastructure. The situation is worse in Dar es Salaam city whereby 50 percent of urban dwellers live in squatter settlement with very little basic amenities such as proper sanitation facilities, access to roads and solid waste disposal facilities (Mato, 2002).

#### **2.3.4 Environmental Problems due to Air Pollution.**

Bad air quality in towns is not yet recognized generally as a significant pollution problem in developing countries. It is not as damaging as water pollution in these parts of the world. The major sources of air pollution are emissions from vehicles exhausts, and indoor combustion, industrial emissions and dust from roads and construction sites (Kishimba and Mkenda, 1995). Owing to the conditions of the roads and of cars and few parking places within the city, motor traffic may be contributing significantly to the problem of air quality. Another noticeable air pollution problem in the towns of Tanzania is smoke and smell from garbage in the streets and at dumpsites.

Few people in urban areas have large and well-ventilated living space. Very often either the bedroom or the sitting room is also used as a kitchen. To make matters worse, most of the city's inhabitants use charcoal, kerosene and wood fuel for cooking and lighting purpose. Thus exposed to the products of combustion throughout the night in their congested space. At time people also use either liquid or solid pesticides to expel mosquitoes from their houses. Considering the size and the ventilation of the rooms and the humidity in Dar es Salaam, these people are breathing in the pesticides throughout the night. High exposures to the products of indoor combustion of either solid or liquid fuels have been associated with several health problems such as respiratory infections, lung diseases (Cooper, 1980) and cancer (Smith, 1988).

### 2.3.5 Solid Waste Management

Wastes are unwanted or discarded materials that arise from human activities. As applied to this study, domestic solid waste will be unwanted solid material that arises from human activities originating from domestic consumption and production activities. This includes food preparations, sweeping, cleaning, and disposal of old cloth, just to mention a few. Over many years, Tanzania urban areas have suffered a low standard of service concerning collection and disposal of solid wastes. This low level of service is a potential threat to community health and the environment. The most serious of these are urban pollution and sanitation. Problems in these fields manifest themselves in the form of water and air pollution and the unhygienic disposal of solid waste emanating from densely populated and mostly unplanned areas with poor, if any, waste-water and solid waste management systems (Kishimba and Mkenda, 1995). The health and environmental aspects, which are associated with solid waste, give rise to the importance of solid waste management. In studying solid waste management the following elements have to be considered: solid waste composition, generation, storage, collection and disposal.

Knowledge of the source and types of solid wastes, along with data on composition and rates of generation, is basic to the design and operation of the functional elements associated with management of solid wastes. All decisions on solid waste collection, transportation and disposal cannot be made without knowledge of generation, density and composition. According to Mato, (2002) compositions of typical domestic waste in Tanzania were as follow; vegetable wastes (62.5 percent), papers (6.2 percent), glass (0.3

percent), metal (1.2 percent), textiles (1.2 percent), plastic and rubber (1.8 percent), bones (0.3 percent) and inert matter (27.3 percent).

Waste generation rates per person depend upon the socio-economic condition of the particular urban society, its cultural background, climatic condition and seasonal variations. People in rich countries consume greater quantities of goods and hence higher rate of waste generation. Culture, history and climate influence types and consumption habits. Seasonal variations may increase fresh vegetables and fruits availability, thereby giving rise to varying rates of waste generation. According to Baruti *et al* (1992) , quantities of domestic solid waste in Dar es Salaam are 870 tons per day. This figure rank higher than other sources like market sites, which generate 200 tons per day, industries 100 tons per day, and street cleaning, which generate 40 tons per day. According to Mato, (2002) only 35 percent of generated wastes were collected in Dar es Salaam City. This collection level rose after privatisation of SWM activities in 1994, before the collection was estimated to be 10 percent. Uncollected waste are said to be disposed haphazardly on the streets, roadsides and in open spaces.

Concerning storage of solid waste at household level, most cities and towns in Tanzania are facing problems of similar nature. The equipments used for solid waste storage are of poor quality. In most cases plastic bags and plastic buckets are used. These containers are not properly covered as a result they act as a good breeding sites for microorganisms and insects. Also they are characterised by bad smell.

The waste disposal sites have become a problem in many towns in the country. Waste is dumped in a haphazard manner rather than been disposed of. Few of disposal sites are organized and even those, still there are considerable limitations. For health environment, there is a great need of separating and treating different types of waste differently at disposal sites to avoid dangerous environmental disasters that may be relegated.

Solid waste disposal in Dar es Salaam city is a very big problem. Due to lack of sufficient vehicles and other resources, not even 50 percent of the refuse is collected. According to Mato, (2002), only 35 percent of generated waste were collected. The City Council projection shows that only 47 percent of the refuse will adequately be collected by the year 2009 and obviously this leaves much to be desired (Baruti et al., 1992). The remaining 53 percent will just be left to rot alongside roads and in market places. In residential areas a significant portion of the waste is burnt causing considerable air pollution. In 1992 a campaign was started led by the Minister for Home Affairs to dispose off the uncollected domestic refuse by small landfills in these areas. Apart from sanitary landfill and burning /incineration, other methods of solid waste disposal in Dar es Salaam city includes composting, open dumping and disposal pits (Masota, 1998). In developed countries available options for treatment of solid domestic wastes include mass incineration and landfill practices.

There is perhaps one major approach to solving the problem of municipal solid waste in Tanzania, which has not been considered so far, waste recycling. This approach has greatly helped ease the problems of urban solid waste management in Uganda (Baruti et al., 1992).

Apart from partial recycling of metallic wastes, there is hardly any recycling of solid waste in Tanzania. It is high time recycling could be studied and subsequently institutionalised in the waste management strategy of Dar es Salaam and other urban centres in Tanzania.

### **2.3.6 Other Factors Causing Environmental Degradation**

According to Kishimba and Mkenda, (1995) the effects of Structural Adjustment Programs (SAPs) can further lead to environmental degradation. For instance, public expenditure reductions include cuts in public sector wages and budgetary allocations for food subsidies. These austerity measures could result in increased poverty and the associated increase in environmental degradation. They may also result in falling expenditure on natural resource programmes such as agricultural extension and reforestation. It is worth noting here that with the current policy reforms of which retrenchment and massive lay off are common phenomena, urban agricultural activities are likely to increase as those now unemployed strive to make ends meet (Mashauri and Mayo, 1992). This will further lead to environmental degradation in urban ecosystems as explained above.

## **2.4 Environmental Conservation**

Conservation, like sustainable development aims to achieve human goals largely through use of the biosphere. Conservation aims to achieve them by ensuring that such use can continue. Natural resource conservation has three specific objectives: to maintain essential ecological processes and life support systems on which human survival and development depend, to preserve biological diversity and to ensure the sustainable utilization of species and ecosystems. Conservation and sustainable development are thus mutually dependent

(McNeely *et al.*, 1995). The reliance of communities on living resources is direct and immediate. Unless those resources are conserved, there is no prospect of improving living standards. It would be wrong, however to conclude that conservation is a sufficient response to the problems of the rural and urban poor. People whose very survival is precarious and whose prospects of even temporary prosperity are bleak cannot be expected to respond sympathetically to calls to subordinate their acute short-term needs to the possibility of longer-term returns. Conservation must therefore be combined with measures to meet short-term economic needs (McNeely *et al.*, 1990).

According to NEMC (1994) conservation has been an issue of concern since 1920's. Action began with the organization of a conference on soil erosion in Dodoma in 1929. From there many other related conferences were followed. Various efforts made include tree planting for fuel wood and poles, control of bush fires and adoption of contour ridging.

In addition, there are also tradition conservation methods in which wildlife, forests and fishing stocks were protected. In several parts of the country for instance, villagers on their own initiative identify certain forests as sacred areas and forbid tree cutting, grazing and even bush-fires in these areas. Likewise it is common to hear that there are some areas in which it is forbidden to fish or to hunt. These beliefs, passed on from one generation to another, help to conserve the environment in the locality for many years, often until someone comes in with modern ideas. Creation of forest reserves, are also done purposively in order to protect trees and other woody vegetation. Also farmers retain various tree species when they clear land for agriculture. The reason for retaining the tree

species depends on the value of the tree to the farmer. Another practice is maintenance of sacred groves. Although they are one way of bio-diversity conservation, in some areas they are used as centre for cultural and religious life (Kitula, 2002). Another common conservation practice is domestication of tree species and animals.

After independence many efforts to conserve environment were also made. These include Village settlement schemes (1966), Decentralisation (1972) and Ujamaa villages programme (1974-76). Also the government has been passing legislation for many years prohibiting people from degrading the environment, especially in protected areas such as national parks, game reserves, forest reserves and by-laws like the Dar es Salaam city council by-laws 1990 regarding regulation of planting, maintenance and protection of trees. In spite of all these efforts the results were not very much encouraging. This is because most of the laws and regulations were not fully enforced, because of institutional weaknesses; lack of support and some are outdated. Policies are useless unless there is strong commitment to ensure implementation (Kikula and Mwalyosi, 1994).

National Conservation Strategy was initiated, and recognised by the Act of Parliament, No.19 of 1983 in which an approach towards sustainable conservation of environment was adopted. This is approach whose nature is multisectoral, highlights multidisciplinary cooperation, coordination and collaboration in addressing environmental problems. Examples of conservation practices of this nature are: Health, Sanitation and Water (HESAWA). This is a zonal project covering the lake Victoria regions of Mara, Mwanza, and Kagera. It incorporates programmes on health, sanitation and water supply. Another example is Soil Erosion Control Program (SECAP) in Lushoto. This is a Lushoto district

based soil and water conservation programme. Another way, which is also practiced, is through forest reserves. There are many forest reserves in Tanzania such as Usambara, Uluguru, and Kilimanjaro forest reserve just to mention a few.

Trees as mentioned earlier are the oldest and largest living things on the earth, and they are a good measure of the health and quality of our environment. Tree planting is a practice, which has been used for many years as a measure to conserve environment. There are tree species, which have the characteristic of protecting the land against soil erosion, some species are used to protect water sources and some are used to drain water in swampy areas and many other advantages.

Tree planting in urban areas has many advantages, which have been categorised as environmental, economical and social advantages (MNRT, 1991). As our cities expand and our population moves to increasingly urbanized areas the ecological value of urban trees has become an important conservation issue. Though it is inherently understood that trees improve our environment, until recently it was difficult to quantify these effects. An American forester has conducted urban ecosystem analyses in nearly 20 cities around the country documenting the loss of tree cover in their cities. These analyses report the value of trees not only in terms of their ecological benefits, but also in monetary bases (American forests, 2002). Trees are originally multi-taskers that is, they provide social, environmental and economic benefits.

Environmentally, tree planting can help to improve climate, this is very important especially in big cities where due to high population, and activities which are carried out in the city, temperatures tend to be high most of the time. Having trees around help to lower temperatures and improve air circulation. Trees also improve soil fertility, reduce soil erosion and reduce wind speed. Planting ornamental trees along avenues, open spaces, parks and around households add beauty to the city.

Economically, tree-planting activities could create employment to some people. If it were a project, labour force would be required for nursery preparations, tree planting and management practices of the planted trees. On the other hand trees could be a source of income to some people, for instance those engaged in tree nurseries business. Others could get money through selling of tree products for instance, fruits, fuel wood and poles. Further more the municipals can revive the existing parks and gardens by planting shade and ornamental trees, then the areas could be charged a nominal fee for those who use them.

Socially, factors such as recreational facilities are important for the city residents. Usually during the weekends or after a day's hard work one needs a cool, nice place where he/she can sit and relax. Parks and gardens, which have been well maintained, can offer a lot in this regard.

## **2.5 Women Participation in Environmental Conservation**

Participation is understood as a process whereby individuals and families assume responsibility for their own health and welfare and for those of the community and develop

the capacity to contribute to their own and the community's development. They come to know their own situation better and are motivated to solve their common problems. This enables them to become agent of their own development instead of passive beneficiaries of development aid.

There is clear evidence that women play a critical role in the management of biological resources. Women are recognized as managers of the environment, beginning with their role in traditional hunter-gatherer societies, credited with collecting food for the family. For example in traditional hunter-gatherer societies like that of Ikung Bushmen of Kalahari desert, women are major food providers through gathering in the woodlands. Commenting on this, Dankelman and Davidson (1988) had this to say "the concepts of man the hunter as the only provider of family food is quite inadequate. Of equal or even greater importance for family well-being is the role of women, the gatherer."

Agarwal and Anand, (1982) further argue that women, particularly those living in rural areas of third world countries, play a major role in managing natural resources – soil, water, forests and energy. Their tasks in agriculture and animal husbandry as well as in the household make them the daily managers of the environment. They have a profound knowledge of the plants, animals and ecological processes around them. Women are also good and active in tree planting and conservation activities. Kenya Green Belt Movement is a good example of women participation in tree planting as a means to conserve the environment (Dankelman and Davidson, 1988). The Green Belt is focused on local participation of women in the establishment of 'Green Belt Communities' and small tree

nurseries. By 1982 there were 50 nurseries producing 2,000 – 10,000 seedlings per year, and 239 'Green Belts' (Dankelman and Davidson, 1988). The action by Indian women movement protest against forest destruction and acts to rehabilitate the environment by planting trees is a positive action towards environmental conservation (Agarwal & Anand, 1982).

A research on gender and biodiversity management in India reported that women play a central role in the conservation, management and use of biodiversity, rich animal and plant resources on which the earth of life depends, yet their contribution is often overlooked. They are relatively 'invisible' partners from the grassroots to the policy level. If biodiversity is to survive, both women and men must play an equal part in its management. There is therefore an urgent need to consider gender, who does or uses what, how and why, in development efforts, to promote true partnership and ensure the sustainable conservation and use of biodiversity now and in the future (WRI, 1986). In order to correct this missing link in environmental conservation we should make biodiversity management gender responsive. This requires 'listening' to women, and not just 'hearing them out.' It means recognition of and building upon women's knowledge base, their skills and ensuring that women have control over the process of change.

In Tanzania, many efforts have been made to conserve the environment. Most of these efforts have been directed towards combating deforestation, which was found to be alarming in many places of the country. Many NGOs, and Community Based Projects have been introduced. Among these are women groups, which have been joined together to fight against this problem. Kwimba Reforestation Project, which is located near Lake Victoria, is

one example. This project has been started in 1991 as a result of serious deforestation problems, which endangered the life of the people and their animals. It is a community-based project involving both men and women. The people in this place are agriculturist and livestock keepers. There are many reasons for the disappearance of trees in the district over the past century which have been identified by the project:

- Much of the timber has been cut for fuel wood, for cooking and heating. Women and children are the traditional collectors of wood. As the population has grown, women and children needed to cut more wood and walk longer distances to find it
- Some people believe that evil spirits live in birds, such as owls, or in the trees themselves. Therefore, the people believe that removing trees keeps the evil spirits away. The people of Kwimba do not plant a tree that has a nutritious fruit because of the belief that the tree's evil spirits cause children picking the fruit to fall and hurt themselves
- Landowners cut trees to create more space for agriculture (food and cash crops)
- Native trees attract birds that eat food and cash crops. Some farmers cut trees so as to deter birds
- The tsetse fly used to be common and cause 'sleeping sickness' in the area. Many trees were cut to distract the breeding ground for tsetse flies
- In the past, vegetation was cleared so that surprise attacks by other cattle herding people could be spotted before the enemies reached the area.

Since 1991, more than 6.4 million trees, including fast-growing Australian eucalypts, have been planted in forty villages through the Kwimba Reforestation Project funded by the

Australian Government's Overseas Aid Program. The project has helped the people of Kwimba in many ways: Men and women have learned forestry through workshops and reading and picture materials. They have planted and cared for the trees and seen their work as important for their survival today and for their children's future. Different community groups, such as church and youth groups, and primary schools now operate tree nurseries; also wells have been built near schools to supply water for the nurseries.

Another example is BUDEFU (Busega Development Fund) a women group formed with an aim of combating deforestation in Shinyanga region. The group started in 1997. Shinyanga region is found in the central part of Tanzania. According to this group the causes of deforestation in their area were overgrazing and long draught periods which stricken the region in the past. The group started with only one acre planted with 300 plants, their target is to buy a bigger area to plant 3000 fast growing trees, which have been proved by agriculturist experts that it helps to restore the land quickly. These women believe that trees are life. It is their expectation that in the future the problem of fuel wood will be minimized, they will get more crops from the field as the soil fertility will be improved, the weather condition will be improved and also their animals will get feed more easily.

Women also have participated in other activities like solid waste collection e.g. Hananasif Women group in Dar es Salaam mentioned earlier. Other activities done by this women group include: open drains cleaning, road/street sweeping, street grass cutting, road sand removing, public awareness creations on environmental management issues and recycling of valuable solid waste as environmental conservation activities.

## **2.6 Socio-economic Factors Affecting Environmental Conservation**

Social factors are those factors which relate to the human life, for instance, educational level, culture, marital status, age and gender to mention just a few, while economic factors are those related to the financial status, which include purchasing power and labour cost (Katani, 1999.)

Humans depend on natural resources for food, fodder, energy, construction, medicines and related products. However these resources on which humans depend on have a critical character of being renewable if well managed or otherwise they will become extinct (McNeely *et al.*, 1995). Management or extinction of natural resources is influenced by socio-economic factors. Some of these factors include human population, gender, income, and land tenure systems among others.

### **2.6.1 Population Size**

Human uses of earth's resources have increased with population growth. As human population grows, need for resources increases, and it is well known that present rates of resource use are unsustainable (World Resource Institute, 1992). It is important to note that population growth affect biodiversity directly through increased resources consumption and indirectly through fueling the process of poverty and migration, and causing a breakdown in social institutions determining the management of natural resources (McNeely *et al.*, 1995). Other population effects on environment are due to clearing of land for new settlements, expansion of urban/city areas and clearing of land for agriculture.

Fragmentation of land as the case in Kilimanjaro region is also the effect of increased population size, which has effect on natural resources.

### **2.6.2 Income**

Income has a profound effect on the dependency of people on natural resources. Katani, (1999) argues that, people with higher income usually have more of the available resources including land and may consequently plant more trees to help secure biodiversity than people with low income. Moncla and Kihyo (1999) further argue that as people's income improves they shift from fuel wood to other forms of fuel like kerosene and electricity. This is obviously relieving the resource base from exploitation and hence maintenance.

### **2.6.3 Gender**

Gender is not a synonym for women, but considers both men and women and their interrelations. Thus, gender as a social relation has a profound influence in the role men and women play in the management and conservation of environment. For women, trees and the forests are multifunctional. Whereas men tend to concentrate on their commercial potential for timber and other goods, women think of them as providing fuel, fodder, and food. It is for this reason that women have developed a greater depth of knowledge and significant management skills than men.

Moreover, Van den Oever, (1993) identifies women as primary educators of various roles of the young especially girls who have traditionally been helping their mothers with the daily chores associated with subsistence farming, fuel wood gathering and fresh water

collection. Women are also knowledgeable about forest products. Studies show that rural women knew more about tree species than men, because they are in direct contact with the environment and the management of forest resources. In Sierra Leone for example, women were reported to know 31 uses of trees on fallow land and in the forest and the availability of forest products, men knew only 8 (FAO, 1989). In addition, women's role in seed selection and vegetative propagation has been and is still crucial in many parts of the world, not only in the conservation and enhancement of genetic resources but also in agricultural production in general (Katani, 1999).

It is important to note that in some areas, strict customary tenure codes prohibit women from planting trees. A study in Dodoma, Tanzania revealed that women, especially the married ones, were not ready to plant trees because they did not own land and they did not benefit from the income obtained from trees (Mhaviile, 1996). When women do not control land, they lack the confidence to plant trees even though tree planting in many cases combated soil erosion, improved soil fertility and enhanced biodiversity potential.

#### **2.6.4 Land**

Land is one of the important determinant factors in effective intervention for sustainable conservation of environment. Important issue to be considered among others is the issue of land holding and uses. Where a piece of land is held permanently, the potential for growing trees is greater than where shifting cultivation is practiced. Consequently, there are questions about maintenance of trees and who will finally obtain benefit from them (Kajembe, 1994). Blosch (1993) insist that land tenure security also provide incentives for

long term planning and management. This helps farmers to sedentize and incites them to invest in medium term soil conservation, agroforestry and reforestation. Fedel *et al.*, 1988 argue that increased security of tenure tends to increase incentive for increasing land productivity via the long planning horizon that land ownership permits, better access to credit and other inputs. This tendency reduces the pressure on land and hence on environment.

In Tanzania, the issue of women and land ownership touches traditions and customary law. These are shaped by tribal customs and traditions, which often create barriers for women to equal rights of ownership to land, property ownership and inheritance. History shows that Tanzanian women have been deprived of their rights to acquire, hold and own land the same as women in most other African societies. Constitutionally, the land is owned by the state. Individuals can only acquire rights of occupancy. However, the right of occupancies is acquired mainly through family transfer or through direct allocation from a state agency or by monetary transaction. In practice land ownership through family transfer is the major known way used by the Tanzanian rural people. About 90 percent of land acquisition in rural areas takes place under customary law or through inheritance. Most rural women settle on and use land, which they get through family ties. Under customary laws women and girls are never beneficiaries of this type of acquisition. The acquisition and ownership of land is a monopoly of male members of a family.

### **2.6.5 Conclusion**

This section has reviewed literature on various environmental management efforts, which have been done with the aim of identifying gaps to be filled with the current study. The literature review revealed that although many studies on solid waste management have already been done in Dar es Salaam City and other regions in Tanzania, there is inadequate information on contribution of women at household level. Also few studies have been done to identify socio-economical factors, which influence women participation in solid waste management and tree planting as indicators of environmental management. Thus, a justification for the current study.

## **CHAPTER THREE**

### **3.0 METHODOLOGY**

#### **3.1 Description of the Study Area**

The study was conducted in Dar es Salaam city and concentrated more on urban wards. Dar es Salaam city is the capital of the nation. The region lies between 6° 48' South and 39° 17' East. The region is bordered by the coast region on the north, west and south and the Indian ocean on the east. The region encompasses an area of 1393 square kilometers or 0.2 percent of the whole Tanzania area, whereby 448 square kilometers is occupied by the urban Dar es Salaam and 945 square kilometers is occupied by rural Dar es Salaam. The Region has three administrative districts named Kinondoni, Ilala, and Temeke. The region has coastal humid climate, with rains almost throughout the year and distinct peaks in November and April. The annual rainfall ranges from 700 mm on the west to 1000 mm on the east. The temperatures are high averaging 29° C. The soil types are mixed and are dominated by sandy soils.

The following are some of the reasons, which make Dar es Salaam a suitable area for the current study;

- There are serious environmental degradation problems in Dar es Salaam City caused by unplanned settings (Armstrong, 1987; Sawio, 1993).
- Many institutions and NGO's such as National Environmental Management Council (NEMC), Tanzania Women Leaders in Agriculture and Environment (TAWLAE), and Ministry dealing with environmental conservation are located in Dar es Salaam.

- The Region has higher population growth rate and it is known that rapid population growth has a negative effect on the environment (McNeely *et al.*, 1995).
- Poor planning of Dar es Salaam city has rendered some areas impassable and hence solid waste collection not possible.

### 3.2 Socio economic Profile of the Study Area

Dar-es salaam region is the biggest and highly populated region in Tanzania, which forms the centre of many political, social and economic activities in the country. According to 2002 Census, Dar es Salaam Region has a population of 2,497,940 people, of which 1,236,863 are females (URT 2003). The city is the biggest in Tanzania and most dynamic socio-economically, culturally and geopolitically. The city like many African cities is not planned and many people live in squatters. This has caused many problems especially when it comes to the provision of social services. Majority of people in the city are either engaged in business or are employed in various sectors. In the rural Dar es Salaam people are engaged in agriculture where cassava, sweet potatoes, maize, rice, vegetables and fruits are grown as food crops. Cashew nuts and coconuts are grown as cash crops. There are good numbers of unemployed people (majority being youths) who survive by doing small business such as petty trade (*Machinga*). Urban farming is also practiced as a means of improving people's income and food production. Livestock (dairy cows, layers and broilers) and crops like vegetables, bananas and cassava are also grown.

### **3.3 Research Design and Sampling Procedure**

A cross-sectional research design was employed in this study whereby data were collected at a single point in time. This design was selected because of its broad scope and can incorporate many variables of interest to the researcher (Babbie, 1990). The data collected were used both for descriptive analysis and for determination of relationship between and among variables.

Before the actual process of sampling, the researcher carried site visits. Prospective areas for the study were visited in order to select the best study areas. It was also through site visit that the boundaries of the study area were decided and demarcated. The sampling procedure used was the multistage sampling. All three districts of Dar es Salaam region were involved in this study. Twelve wards among the urban wards were purposely selected from the three districts. Then, ten households from each ward were randomly selected. Women (married or female headed) from the selected household were interviewed. A total of 120 women from selected households were interviewed in this study.

### **3.4 Instrumentation**

A structured questionnaire with closed and open-ended questions was used for data collection. The questionnaire was prepared in English and later translated in Swahili for easy communication with respondents. To establish validity, the questionnaire was pre-tested in one ward of Kinondoni district, in which 30 women were purposively selected. Thereafter necessary changes were incorporated accordingly. Respondents for pre-testing exercise were not included in the study sample. The questionnaires solicited the following

information; first section solicited data about household socio-economic characteristics, second section collected information on socioeconomic factors that influence women's participation in tree planting and domestic solid waste management, and the last section collected data on women's perception of environmental management issues.

In addition, Focus Group Discussions (FGD) were also conducted in all three municipals in which a checklist of questions was used as a guide during the discussions to collect different opinions and suggestions from individuals concerning the topic under study. A focus group is a session in which participants representing the target population discuss the various aspects of specific topics or subject matter (Morgan, 1988). It involved group interviews of about 4 to 10 people who are preferably unfamiliar to each other to minimize each other's influence but have similar background. In this study, participants in the FGDs were purposely selected, involving 2 municipal officers from solid waste section, 2 women from the study area, 1 officer from forestry department and 1 person working as a private solid waste collector. The information collected includes; the problems of solid waste management in the 3 municipals and how to mitigate the problems, the importance of tree planting in urban areas, problems facing the practice and the concept of community participation in environmental management in general. Also a checklist of questions was used to gather information from tree nursery owners regarding tree-raising business in urban areas. These tree nursery owners were purposely selected in the selected wards.

### **3.5 Data Collection**

#### **3.5.1 Primary Data**

The researcher assisted by trained enumerator gathered information from the respondents using the questionnaire. Respondents were adult women in the selected households. The information collected includes socio-economic characteristics; socio-economic factors influencing women participation in solid waste management and tree planting and perception of women on environmental management. Another method of obtaining primary data was through focus group discussions (FGDs) and participant observations. Comments, views, and suggestions given out during the discussion regarding solid waste management and tree planting were taken and incorporated in the study.

In the process of data collection, participant observations were also done with the aim of establishing the baseline data concerning generation, storage, collection and deposition of solid waste. Also the method provides clues on tree planting exercise at household level.

#### **3.5.2 Secondary Data**

Secondary data included information from previous studies on solid waste management and tree planting such as figures on quantities of solid waste generated per day per household and population data, women and environment, women and/in development, domestic solid waste management and urban tree planting. The information was collected from Sokoine University of Agriculture National Library (SNAL), National Environmental Council (NEMC), Ministry of Natural Resource and Tourism, University of Dar es salaam (UDSM), University College of Land Actectural Studies (UCLAS), and from Departments

of solid waste management in all municipals of Dar es Salaam City. The source of data/information included both published and unpublished documents.

### 3.6 Data Analysis

Quantitative data were analysed using Statistical Package for Social Sciences (SPSS) programme, whereby responses from the questionnaire were coded, summarized and then entered into a computer for analysis. Descriptive statistics were used which include cross tabulation, calculations of frequencies, and Chi-square. Further, logistic regressions were used to establish the relationship between tree planting and some socio-economic characteristics of women in order to determine the direction of the relationship. Tree planting was taken in this case as dependent variable because few women participated in the activity as compared to domestic solid waste management, where majority of women (97 percent) participated. Logistic Regression is a type of regression whereby the dependent variable is a dummy (Yes/No) variable. These regressions are sometimes called limited dependent variables regressions. Several individual women's characteristics that were assumed to influence tree planting such as education, marital status, income and employment were used. Participation in tree planting was specified as a logistic model as follows:

$$PT = X\beta + \delta \dots\dots\dots (1.0)$$

Tree planting (PT) is the dependent variable and it takes a value of 1 if a woman participates in tree planting and  $PT = 0$  if otherwise.  $X$  is the vector of explanatory

variables such as employment status, education, income and marital status.  $\beta$  is a vector of unknown coefficients, and  $\delta$  is the error term. The estimated betas are converted to odds ratio, which shows the changes in the probability of participating in tree planting by women due to changes in the specified variables.

In this case tree planting was taken as an indicator of environmental management. Then the independent variables were tested at 95% confidence level to determine the significance of each variable on tree planting. The effects of the women characteristics were estimated using the following models:

$$TP = \beta_0 + \beta_1 F_{\text{headedD}} + \beta_2 L_{\text{downD}} + \beta_3 \text{employD} + \beta_4 \text{educD} + \delta \dots \dots \dots (1.1)$$

$$TP = \beta_0 + \beta_1 F_{\text{headcdD}} + \beta_2 L_{\text{downD}} + \beta_3 \text{employD} + \beta_4 \text{highedD} + \beta_5 \text{priedu D} + \delta \dots \dots (1.2)$$

$$TP = \beta_0 + \beta_1 F_{\text{headedD}} + \beta_2 L_{\text{downD}} + \beta_3 \text{employD} + \beta_4 \text{IncomeD} + \delta \dots \dots \dots (1.3)$$

Whereby, TP is the current participation in tree planting, F<sub>headedD</sub> is the dummy variable for marital status, L<sub>downD</sub> is dummy variable for land ownership, Employ<sub>D</sub> is dummy variable for employment, Educ<sub>D</sub> is a continuous variable for number of schooling years and High<sub>edD</sub> and Prieduc<sub>D</sub> are dummy variables for higher education and primary education respectively (Table 1) and  $\beta_i$  ( $i = 1, 2, 3, 4, 5$ ) are coefficients and  $\delta$  is the error term.

**Table 1: Descriptions of women's characteristics and some socio-economic variables**

<b>Dependent variables</b>	<b>Definition of the variables</b>
Tree Planting	=1 if a woman participates in tree planting; else = 0
<b>Independent variables</b>	
Fhcaded	= 1 if a woman is head of household; else = 0
Landown	= 1 if a woman own land privately; else = 0
Employment	= 1 if a woman employed; else = 0
Highedu	= 1 if a woman has secondary education and above; else = 0
Pricedu	= 1 if a woman has primary education; else = 0
Income	= 1 if a woman has income < 500,000; else = 0

From this regression, we expect education level and income variables to have positive and significant coefficients, on tree planting meaning that those women with higher education and income are more likely to participate in tree planting than women with low education and low income. The reason for that is for example, educated women are more likely to read and understand environment brochures/issues compared to uneducated women. Also land ownership is expected to have a positive and significant coefficient meaning that those who own land have higher possibility of participating in tree planting. It is assumed that since trees are long term investment those who own land are more likely to plant trees than those who do not own land. I have no *a priori* expectation about the relationship between tree planting and marital status, if a woman is head or not head of the household and employment variables.

## CHAPTER FOUR

### 4.0 RESULTS AND DISCUSSION

#### 4.1 Characteristics of Respondents

The age of respondents ranged from 19 to 65 years, with majority being in age group 30-34 (22 percent), followed by age group 35-39, (21 percent). Educational background of the respondents ranged from informal education (e.g. *madras*) to higher education (tertiary education). Majority of the women interviewed had secondary education (48 percent) followed by those with primary education (34 percent). Fifteen percent of the women had tertiary education, which include certificates, diplomas and degrees in various professions. Eighty two percent of the respondents were married, nine percent were single, three percent were divorced and seven percent were widowed. About 20 percent of the households had an average of four household members, followed by households with six members (18 percent) and five members (14 percent). The average household size was 6 members.

Information on residence history revealed that, majority of the respondents were migrants (81 percent) from various parts of Tanzania. Only 12 percent were born in Dar es Salaam. This is characteristic of many big cities of developing countries where most people tend to migrate to the big cities in search for employment, business and good social-services, which in most cases are inadequate in rural areas. It was also found that 55 percent of these residents rented houses from government institutions and private owners. The remaining 45 percent lived in private houses.

With regard to the economic activities small business (petty) was found to be the main economic activity of the respondents in the study area involving about 59 percent of all the women interviewed. About 38 percent of the respondents were employed and 3 percent were peasant farmers. Annual income obtained from those activities was not easily obtained, because majority of respondents do not keep accounts of their daily transactions. Despite this short fall, household incomes were estimated through salary slips and indirect assessment of sells, and they were categorised as follow; low income<sup>1</sup>, medium income<sup>2</sup> and high income<sup>3</sup>. Majority of households had medium income (52 percent), followed by high income (45 percent). The rest of the respondents were categorised as low-income earners.

Based on household expenditure it was observed that solid waste disposal bills constitute part of household expenditure costs though most of household's income is used for food, followed by school fees. Travel costs and house rent were also found to consume substantial amount of the household income.

#### **4.2 Women Participation in Environmental Conservation Practices**

It was observed that 99 percent of respondents participated in one or more environmental conservation activities. Majority of respondents (63 percent) participated in environmental sanitation through solid waste management, 33 percent participated in tree planting and solid waste management and 5 percent participated in tree planting only (Table 2). Small

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<sup>1</sup> Low income below TZS.250, 000 per year

<sup>2</sup> Medium income TZS 250,000 to TZS 500,000 per year

<sup>3</sup> High incomes above TZS 500,000 per year.

size plots could be among the reasons for low level of involvement in tree planting. Some areas where this study was undertaken were very much congested and unplanned giving no space for tree planting.

**Table 2: Environmental Conservation Activities Practiced by Urban Women in Dar es Salaam City, Tanzania**

Activity	Frequency	Percent
SW management	75	63.0
Tree planting & SW management	39	33.0
Tree planting	6	5.0
Total	120	100

#### 4.2.1 Solid Waste Management

##### 4.2.1.1 Solid Waste Source, Storage, Collection, and Disposal

About 65 percent of the solid waste comes from the kitchen and 33 percent from the yard, large part of it being leaves. About 2 percent comes from other sources; these are like paper, textile and rubber products. This is no surprising because most of the surveyed areas are residential and large portion of solid waste would be expected to come from the kitchen. Mato (2002) observed that, large portion of domestic solid wastes in Dar es Salaam city came from the kitchen and most of it is of organic nature. One of the reasons for such observation is that majority of people in Tanzania still use fresh foodstuff and thus their solid waste is characterized by high percentage of vegetable and cereals.

The results also show that large portion of SW from the surroundings is made of plastics and tins. This is caused by changing lifestyles whereby urban residents today use more industrial products such as water, juices, butter, cooking oils and tomato paste, more frequently than years back where this condition was not very much experienced. This was also observed in a study by Mato, (2002), whose conclusion was that, the current trade liberalization policy and increase in consumerization are slightly changing the waste composition in urban areas with a result of elevated levels of plastics and cans (Table 3).

**Table 3: Household Solid Wastes Categories in Dar es Salaam City, Tanzania.**

<b>Solid waste category</b>	<b>Source</b>	<b>Percent</b>
Organic	Kitchen	60
Leaves/grass	backyard	33
Plastics	Kitchen	3
Others	Various	2

Majority of the respondents (99 percent) agreed that the overall process of SWM is a big problem in Dar es Salaam City. This is expected given the poor planning of the city, high population density, and poor infrastructure that together make the problem more complicated. Many municipalities and town councils have very low capabilities of waste collection and disposal. This is aggravated by the rapid urbanization process and declining economy. The results show that only 55 percent of the surveyed areas get SW collection service either by city council or private companies (Table 4). The rest use on site disposal methods, which include; disposal pits (40 percent) and burning (4 percent).

**Table 4: Methods of Solid Waste Disposal in Dar es Salaam City, Tanzania**

<b>Method</b>	<b>Frequency</b>	<b>Percent</b>
Collected by city council	66	55
Disposal pits	48	40
Open dumping	5	4
Composting	1	1
<b>Total</b>	<b>120</b>	<b>100</b>

Municipal officials agreed that the amount of SW collected is only half of what is really generated. These findings are supported by those of Kironde and Yhdego, (1997) which shows that huge masses of wastes are not collected. A large part of the waste is buried or burnt on site, disposed off haphazardly by roadsides on open spaces or in valleys and storm water drains. In addition Mato, (1997) showed that about 5-10 percent of the urban population receive regular solid waste collection services in most cases confined to few areas, usually the urban centres and high-income areas. According to NEMC (1997), most parts of urban areas are not easily accessed by refuse trucks, because they are unplanned and these parts carry about 60 –70 percent of the urban population in Tanzania. This means, the remaining 40 percent of solid waste has to be disposed by other means like disposal pits or burning. Doing so increases the burden to women as solid waste managers at home.

Different household members were observed to be involved in solid waste disposal at different extents. Majority of respondents accepted that SWM is the responsibility of women. About 88 percent of women did the actual practice of solid waste management in their households while 12 percent involve other family members such as children and

house girls at the household level. This is because of sexual division of labour, which exists in a household whereby women are supposed to participate in biological, physical and social reproduction. Solid waste management is one of the physical reproduction activities in a household.

#### **4.2.1.2 Waste Recycling and Sorting**

The study revealed that only 52 percent of respondents sort their SW before disposing. Those who do not sort their waste mentioned that for them waste is waste and there is no good reason for sorting. However, some respondents (48 percent) do sort their waste and use them for various purposes (Table 5). Fifteen percent of respondents use it as source of energy for instance cooking and heating, where as 31 percent use it as compost manure. A negligible number of respondents re-use them directly for example use of plastic bottles and other container for drinking water, cooking oil and kerosene. It was argued by respondents that since most of the waste come from the kitchen and women do most of kitchen activities then majority of solid waste sorters at household level are women.

Although re-cycling is now a growing phenomenon in most developing countries, it is rarely practiced in Tanzania. Very few individuals practiced recycling. The activity was widely practiced at the main dump/landfill where various people collect various solid waste materials like paper, aluminium cans, glasses and plastic containers for sell to various industries like Sushack plastics, Tegry plastics, Metal products Ltd and Kioo Ltd. Thirty percent of these scavengers were women.

**Table 5: Recycling and Re-use of Sorted Waste in Dar es Salaam City, Tanzania**

<b>Use of sorted waste</b>	<b>Frequency</b>	<b>Percent</b>
Not applicable (do not recycle)	64	50
Soil conditioner	37	31
Source of energy	18	15
Direct re-use	1	1
<b>Total</b>	<b>120</b>	<b>100</b>

#### **4.2.1.3 General Solid Waste Management Problems and the Role of Women**

The significant role played by women in solid waste management at household level has been explained earlier. This implies that problems associated with solid waste management at household and at the community level have an impact on women participation in environmental management.

It was observed that, there are several problems, associated with various ways used, in SW disposal (Table 6). The majority of the respondents (98 percent) agreed that SW disposal methods practiced currently are not desirable and are not safe for their health. Facilities for waste storage and collection both in households and in the streets are few and are of poor quality. In such a situation it is very easy for insects such as flies from these wastes to contaminate food and water and may cause health hazard and diseases like diarrhea, cholera and other related diseases. Provision of proper facilities for solid waste storage and collection will facilitate the overall process of solid waste management and thus increase the participation of women in the activity.

Transportation of waste in Dar es Salaam City was also found to be a problem. The waste trucks are few and not all are in operation. Because of this, waste has been piling up for a long time in streets and households causing problems to nearby communities. Twenty one percent of respondents mentioned that it takes too long for solid waste to be collected at their homesteads, which expose them to the risk of getting diseases. Further 22 percent of respondents complained of high costs involved in solid waste collection by private companies. The costs of solid waste collection averaged Tshs 2,500 per household per month. This amount has to be paid regardless of the frequency of collection (usually twice a month). It was observed that this people are complaining not because the costs are too high for them to afford but because the companies responsible for SW collection are not efficient. Many households have to pay extra money to other individuals for the same purpose, and this adds the cost of SW collection per month.

Dumping of solid wastes is done in poorly located sites with inadequate facilities that are required for proper disposal of solid wastes. The disposal site accommodates all types of waste from the town irrespective of the nature of waste. It is common to find hazardous waste, such as strong chemicals and hospital wastes dumped together with normal domestic wastes. Women were among the scavengers, about 30 percent in that place collecting various materials for sell. If women could be sensitized on recycling, they could sort the materials before being taken to the dumpsite. This would increase the number of women participation in recycling business.

Twenty percent of respondents used disposal pits for SW disposal. They decided to use the method because they neither get the service from the city council nor the private SW

collectors. Although some of them mentioned that the method is not suitable for SW disposal especially because of small land they have, some agreed that they were not allowed by the authorities to use pits system since it leads to environmental pollution and they were left in a dilemma as they were not given alternative for disposal.

**Table 6: Solid Waste Management Problems in Dar es Salaam City, Tanzania**

<b>SWM problems</b>	<b>Frequency</b>	<b>Percent</b>
Too costly	26	21.7
Lack of transport and small land	26	21.7
Lack of transport and too cost	25	20.8
Small land	20	16.7
Lack of transport	19	15.8
Small land, too cost and lack of transport	4	3.3
<b>Total</b>	<b>120</b>	<b>100</b>

#### **4. 2.1.4 Proposed Solutions to SW Problems**

Some of the solutions to waste management as proposed by respondents include; promotion of environmental education/awareness to the society (17 percent) and provision of necessary facilities for SWM for example dust bins and centres for waste storage (28 percent). Respondents mentioned that facilities for SW collection are concentrated in city centers only. In other areas they are not available, one can walk very long distances without seeing a toilet or a dust been around. However, majority of respondents (55 percent) were in the opinion that both measures/solutions should be adopted.

During the interview with municipal officials, alternatives like introducing SW composting were also suggested as one among the simple, cheap and safe method for solid waste management. They argued that this method could be suitable since most domestic solid waste is of organic nature. Composting is an aerobic process that converts waste into a humus-like material through microbial action on the organic portion of the solid waste. If carried out effectively, the final product is stable, odour-free, does not attract flies and is low in pathogenic microorganisms. Compost is mainly used in soil conditioner to increase organic content and improve soil structure, make it more resistant to wind and water erosion, retain more water, and easy to till. An other solution to solid waste management suggested by the municipal officials was recycling. Although it is practiced in some areas, recycling is still a new idea in Tanzania. The responsible authorities should promote sorting and recycling of valuable solid wastes like bottles, papers, metals, plastics and textiles in the places of collection. These could be easy if community participation through CBOs will be emphasised. To put more emphasis on this, they suggested that the responsible authorities should introduce solid waste shops in the streets where people can sell those products easily and solve the current problem of solid waste market, or offer an incentive to street kids or other individuals who could submit a certain amount of plastics, papers or bottles to them. This is very important because apart from reducing the problem of solid waste disposal it will also provide additional source of income and employment to adjacent community.

#### 4.2.2 Women Participation in Tree Planting

About 38 percent of the respondents practiced environmental conservation through tree planting in different ways. This includes raising and selling tree seedlings of different types and planting trees around homesteads. Among these, 16 percent plant less than 5 trees per year around their houses. There are several sources of trees. The major source of tree seedlings is purchase from private nursery owners (Table 7). However own tree nurseries make a substantial proportion of the seedling. Other sources include government and non-governmental organizations. It was observed that many indigenous species are raised at home while most of exotic species are bought from various sources. The wide range of different sources of tree seedlings shows the commitment of urban women to tree planting as a conservation activity in Dar es Salaam City. Despite that the proportion of women committed to conservation through tree planting is low, it is likely to increase with increasing environmental awareness.

**Table 7: Sources of Tree Seedlings for Afforestation Activities by Women in Dar es salaam City, Tanzania.**

Source	Frequency	Percent
Not involved in tree planting	75	63
Buy from private owners	18	15
Buy from private owners and own source	11	9
Own tree nursery	9	8
Buy from private owners and from government	5	4
From government	2	2
<b>Total</b>	<b>120</b>	<b>100</b>

The planted trees served different purposes at household level (Table 8). The results show that, out of those who planted trees, 16 percent planted shade trees, 9 percent planted fruit trees, 6 percent planted ornamental trees, 6 percent planted shade and ornamental trees and 3 percent planted shade and fruit trees. It was expected that, many households would have planted more shade trees than any other types of trees because of hot/ humid and sunny weather of the study area.

**Table 8 : Major Reasons for Tree Planting by Women in Dar es Salaam City**

<b>Reasons</b>	<b>Frequency</b>	<b>Percent</b>
Shade	17	14
Fruits	11	9
Shade & ornamental	7	6
Ornamental	5	4
Shade & fruit	3	3
Medicine	2	2
<b>Total</b>	<b>45</b>	<b>38</b>

In general participation of women in tree planting in Dar es Salaam region is not adequate. Less than fifty percent of respondents were involved. This has been contributed by a number of factors. One of the major factor-affecting trees planting was unavailability of planting space. Women would like to plant trees in their settlements but they are limited by the sizes of the plots they own. It was generally observed that many people were interested in tree planting, and in some instances attempted to plant trees in front of their houses, in pavements and backyards, although those places are not very suitable for trees given the small distances from the buildings and only flowers would be suitable for those areas. This

shows how eager the people are, but also indicates that they lack tree raising fundamentals such as what type of trees to be planted in what environment.

#### **4.2.2.1 Role of Women in Tree Nursery Management and Tree Seedling Supply**

A number of tree nurseries were observed in different parts of the region. Both men and women run these nurseries as a business venture though majority (63 percent) were male youths and women represented only 32 percent.

None of the respondents had background in agriculture or forestry and thus were faced with technical constraints regarding management practices of different tree species. The knowledge is very important because there are so many plant species in these nurseries with different growth characteristics/habits that need some technical knowledge in the nursery management not available in the practitioners. The availability of water is another constraint. These nurseries are usually located on roadsides where it is not allowed to install water tapes, thus in many cases wastewater is used for watering the seedlings. Markets for the products are among the major problems facing tree nursery management. Most of the products are sold on site. If they could devise some marketing strategies, they could get a bigger margin than what they are getting now.

The Ministry of Natural Resource and Tourism knows the existence of these people, but they are not officially recognised, though they agree that they contribute to environmental management/conservation through provision of tree and flower seedlings. This has been proven by the fact that about 15 percent of the respondents agreed that they get the tree seedlings from private owners. It has been observed that awareness on the importance of

tree planting, has increased recently and this has increased the demand for tree seedlings. At the same time tree seedlings supplied by government institutions are not enough to meet the demand of the people and thus the community is urged to participate in the production of these seedlings.

#### **4.3 Socio-economic Factors Influencing Women Participation in Environmental Management**

The relationship between women participation in environmental management and some socio-economic factors is shown in table 9. Marital status, education level, residence history, land/house ownership and economic activities showed a significant influence in women participation in environmental management in Dar es salaam City. Married women are more responsible in family matters than single women especially in issues related to household activities including environmental management like domestic solid waste management and tree planting. Married women spend more time at home thus more likely to contribute to environmental management activities at household level. Female-headed households have fewer children or no children at all, making them not to be bound with domestic activities as compared to married women.

**Table 9: Chi-square Test Results for Socio-economic Factors Influencing Women Participation in Environmental Management in Dar es Salaam City, Tanzania**

<b>Variable Tested</b>	<b>Chi-square value</b>	<b>Significance</b>
Marital status of respondents	123.559	.000***
Age of respondents	33.362	.499
Education level	123.168	.000***
Houschold size	11.01	.357
Residence history	122.556	.000***
Land/house ownership	122.540	.000***
Women's economic activities	124.548	.000***
Estimated household annual income	0.163	.922

\*\*\* Significant at 0.001

Education level increases the ability of an individual to understand, interpret and integrate environmental issues. Respondents with higher education level (form VI and above) were able to integrate environmental issues with other sectors of development, and forecast future impact of poor environmental management with some measures to conserve it, than those with lower education level (primary and lower). Experience from the NCSSD, (1994) shows that in primary and secondary levels the understanding of concepts of environment is very limited both amongst teachers and students. There is inadequate effort to make education something interesting and worth pursuing among the primary and secondary level student population (Munishi and Hawa, 2003). At tertiary and higher institutions, curricula are usually out of touch with current environment issues and environmental education is taught as specialization or slightly touched in specific subjects (Munishi and

Hawa, 2003). For instance livestock training institute have yet to reorient their curricular to meet the growing demand of environmental conservation among livestock officers (NCSSD, 1994). On the other hand in institutions of higher learning environmental issues are studied by students of natural sciences. Environmental issues are inadequately studied by those taking applied and social sciences. In general there is inadequate environmental education, and awareness among trained personnel in Tanzania.

Education has an impact in environmental management practices as it facilitates public understanding of the nature of Tanzania's environmental problems. This is the first step towards active participation in solving environmental management problems. If people are illiterate, it is rather difficult for them to digest some concepts, which are necessary in environmental management. The type of education provided, whether formal or non-formal should cut across all segments of the population and be part and parcel of people's daily lives.

Residence history had a bearing on participation in environment management. Various social studies have shown that indigenous residents are less innovative in environmental management activities compared to immigrants because in most cases the immigrants have to work hard in order to be able to meet the costs of living such as food and housing while the indigenous residents in most cases live in their own houses and have gardens or food crops in their localities which make their life easier. This situation makes them relax and less innovative. This means that migrants are more likely to participate in environmental issues like tree planting, soil and water conservation and pollution control than those born in the area. This is true in many urban areas of Tanzania whereby, majority of the residents

are migrants from other parts of the country and dominate most of social and economic activities. As an example about 88 percent of the respondents were migrants from outside the city.

Decision to plant trees or any other environmental management activity around settlement was very much dependent on land /house ownership. Those who are sure of staying in an area for a long time have higher probability of practicing environmental management activities like tree planting than those who rented houses as they consider their stay in those houses/plots to be temporary and environmental management activities, which have long term effect like tree planting, were not important to them. Likewise, solid waste management to them is seen as the responsibility of the landlord. Majority of people who were willing to plant trees around their homestead are those living in houses that they own. People living in rented houses lack decision on long term plans like tree planting in their surroundings as they consider it to be the responsibility of the house owner. A low proportion (45 percent) of the respondents in this study were living in their private houses and this could be one of the factors that contributed to low number of respondents involved in tree planting.

Women economic activities, which include farming and small business, show a significant relationship with participation in environmental management activities. Women who are involved in small businesses participated more than those without. This group is comprised of women who partake part time in small business, which in most cases is a hand to mouth business and the rest of the time doing other household activities. These other household activities or in other words known as unpaid domestic activities such as cleaning of the

surroundings and taking care of gardens around settlements are activities that may contribute to environment conservation such as solid waste management. On the other hand employed women, spent most of their time in work, leaving them with little time to do other activities such as environmental management activities at home. It is only during the weekends where they can participate in household activities like environmental cleaning as one of environmental management practice at household level. If the two groups of women have to be compared, the unemployed women participate more in environmental management activities at household level given the nature of their duties.

Other factors, which were found to influence women participation in environmental conservation, are as shown in Table 10, where respondent's interest in biodiversity conservation constitute the highest proportion (49 percent). Most of respondents agreed that observed changes in climatic parameters such as insufficient and irregular rains, increased hot conditions and soil erosion are the results of poor environmental practices such as deforestation and poor agricultural practices. Other factors include influence of various environmental campaigns (22 percent), influence of other people practicing environmental conservation activities (9 percent) income rising for those involved in tree nurseries (15 percent), and beautification of compounds (5 percent).

**Table 10: Factors Influencing Women Participation in Environmental Conservation in Dar es Salaam city, Tanzania**

<b>Factor</b>	<b>Frequency</b>	<b>Percent</b>
Interest in biodiversity	59	49
Environmental conservation campaigns	26	22
Raise income	18	15
Other people practicing	11	9
Beautify the compounds	6	5
<b>Total</b>	<b>120</b>	<b>100</b>

#### **4.3.1 Relationship Between Women Participation in Tree Planting and Some Selected Respondent's Characteristics**

Table 11 shows logistic regression results of some of selected variables and tree planting in Dar es Salaam City. Logistic regression models assess the effects of some respondent's characteristics on the likelihood of participating in an environmental conservation activity. The odds ratios in the logistic regression represent the factor by which the odds of participating in tree planting change when the independent variable is altered.

**Table 11: Correlation Between Women Participation in Tree Planting and Some Selected Characteristics of Respondents in Dar es salaam City, Tanzania.**

Variable	Coefficient	Odds ratio	Z- value	P> z
Individual women's characteristics	-2.566	0.077	-2.85	0.004***
Female headed	2.648	14.129	4.42	0.000***
Land ownership	0.849	2.336	1.37	0.172
Employment	0.163	1.177	2.06	0.040**
Education				

Number of observation = 120 ,      Log likelihood = -54.76,      Pseudo R<sup>2</sup> = 0.25

\*\*\* significant at 0.001

\*\* significant at 0.05

The relationship between female-headed households variable and tree planting was negative but significant, indicating that there is a negative relationship between the two variables. This suggests that women heads of households are less likely to participate in tree planting than women who are not heads of household. This could be explained by the fact that women in Tanzania are not entitled to land ownership and thus, they are not motivated to plant trees on a land, which is not theirs. In some ethnic group when the husband passes away the wife is chased out of the clan land. Another fact is that in some ethnic group like the Chaggas, trees are man's property and it is not women's duty to be involved in tree planting (Personal observation).

Land ownership variable was positive and significant indicating that private owners of land are more likely to participate in tree planting than those who do not own land privately. As

explained earlier those who own land are confident in any long term or short term environmental conservation activity such as tree planting than those who do not own land.

Total years of education showed a positive and significant relationship with participation in tree planting. This means that education has a positive influence on women participation in tree planting, meaning that those with higher education levels are likely to participate more in tree planting than those with low education. Education widens one's knowledge on various issues including environmental conservation. An educated woman can read and understand various information on environment, and sometimes less effort is needed to convince an educated woman to participate in tree planting since she might already know the benefits of tree planting.

In order to evaluate how different levels of education relate to participation in tree planting a model that included several dummies of education variables (primary, secondary and higher education) was used. The results showed non-significant positive correlation between tree planting and education (Table 12). These results are contrary to what was expected, but given that many people lived in congested and unplanned areas for instance Buguruni, Vingunguti and Tandika wards where tree planting is not possible such results are not surprising. Even if someone is educated and knows well the importance of tree planting, space for tree planting could be limiting. It can be concluded that education contributes to participation in tree planting and other environmental activities but it can be hindered by other factors like land ownership, land size, and place of residence.

**Table 12: Influence of Some Selected Variables on Women Participation in Tree Planting in Dares salaam city, Tanzania**

<b>Variable</b>	<b>Coefficient</b>	<b>Odds ratio</b>	<b>Z- value</b>	<b>P&gt; z </b>
<b>Women's characteristics</b>				
Female headed	-2.713	0.066	-2.94	0.003***
Land ownership	2.643	14.058	4.37	0.000***
Employment	0.946	2.575	1.51	0.131
Higher education	1.209	3.353	1.55	0.120
Primary education	-0.403	0.668	-0.75	0.455
Number of observation = 120			Log likelihood = -55.335	Pseudo R <sup>2</sup> = 0.25

\*\*\* significant at 0.001

A model that included a variable representing women's income instead of education variable showed that income had a negative but significant relationship on participation in tree planting (Table 13). This means that as women's income increases the probability of participating in tree planting decreases. One explanation could be that the environmental effects such as air and water pollution mostly affect low-income households. These people cannot afford artificial technologies such as air conditioners and water cleaning chemicals instead they rely on natural methods/technologies such as water boiling for water purification and fresh air from natural environment. Probably these could be the reasons for their participation in tree planting. In addition some women with higher income took tree planting as an inferior activity. In general high-income women were less concerned about the tree planting business as compared to low-income women.

**Table 13: Effects of Selected Variables on Women Participation in Tree Planting on Selected Women Characteristics Dar es Salaam City, Tanzania.**

<b>Variable</b>	<b>Coefficient</b>	<b>Odds ratio</b>	<b>Z- value</b>	<b>P&gt; z </b>
<b>Individual women's characteristics</b>				
Female headed	-2.438	0.087	-2.62	0.009 **
Land ownership	3.193	24.377	4.46	0.000***
Employment	1.013	2.752	1.58	0.114
Income	-2.354	0.095	-3.76	0.000***
Number of observation = 120      Pseudo R <sup>2</sup> = 0.35      Log likelihood = -47.627				

\*\*\* Significant at 0.001

#### **4.4 Women Perception on Environmental Conservation in Dar es Salaam City**

It was important to solicit information about the perception of respondents on environmental management issues to get an insight on how the problem is understood and solutions sought in conservation. It is this knowledge and perception that determines how easily actions are taken towards environmental conservation.

The study revealed that almost every one understood the concept of environmental management. What differed was the level of understanding and the meaning assigned to it. About 57 percent of respondents related environmental management with environmental sanitation and tree planting whereas 23 percent understand it to mean environmental sanitation (Table 14).

These results have been very much influenced by various campaigns conducted throughout the country on environmental conservation. After the Berlin meeting on environmental conservation held in 1995.

The government laid down some strategies aimed at protecting and conserving the environment. These included the formulation of environmental conservation laws and by-laws and formulation of institutions dealing with environmental issues. Tree planting have been very much publicized, for instance 1<sup>st</sup> January of every year is a tree planting day where people are encouraged to plant trees as a measure against environmental degradation. In Dar es Salaam City many trees have been planted under the supervision of the Regional Commissioner (Lt. Y. Makamba) who is very much committed to the issue. In addition, environmental sanitation for the case of Dar es Salaam has been very much insisted because of the sporadic outbreaks of cholera, and diarrhea. These diseases are waterborne, that is, people residing in areas with no safe drinking water or water contaminated by sewage drains are at risk of getting the diseases. Poor drainage system increases conducive breeding areas for all forms of mosquitoes leading to increased malaria cases.

**Table 14: Women Perception on Environmental Conservation in Dar es Salaam City, Tanzania**

<b>Environmental conservation perception</b>	<b>Frequency</b>	<b>Percent</b>
Environmental sanitation and tree planting	68	57
Environmental sanitation	28	23
Tree planting, environmental sanitation and conservation of water sources	10	8
Tree planting, conservation of water sources and soil conservation	8	7
Tree planting	3	3
<b>Total</b>	<b>117</b>	<b>98</b>

Majority of the respondents agreed that the existing dirt situation in the City is a problem and efforts should be made to reverse it. The reasons given with regard to causes of environmental pollution/degradation are summarised in (Table 15). With regard to the understanding of the key causes of environmental degradation, majority of the respondents viewed poor sanitation and ignorance to be the major contributor to environmental pollution (45 percent). On the other hand, thirty one percent of respondents said that environmental pollution was caused by both ignorance and inadequate facilities for environmental sanitation such as dust bins along streets for waste disposal and public toilets. They emphasized that, it is the responsibility of the municipals to make sure that all public areas are well equipped with facilities for solid waste disposal and make sure that they are functional at all times. At the same time, it is the responsibility of household members to make sure that they participate in making their environment clean.

Nine percent of respondents agreed that negligence was the major factor, as most people know exactly what they are supposed to do but they don't care. Many people in the study area complained that there are some people who understand the impacts of environmental pollution/degradation but they don't observe environmental cleanliness intentionally. This group is composed of individuals who purposely throw waste such as plastic bottles, papers, and food remains haphazardly even if there are appropriate means of disposal.

**Table 15: Women Perceptions on the Factors Causing Environmental Pollution/Degradation in Dar es Salaam City, Tanzania**

<b>Factors</b>	<b>Frequency</b>	<b>Percent</b>
Ignorance of some people	54	45
Ignorance and inadequate facilities	37	31
Negligence	11	9
Ignorance and low income	6	5
Inadequate facilities	5	4
Ignorance and negligence	4	3
Low income and Inadequate facilities	1	1
<b>Total</b>	<b>118</b>	<b>98</b>

#### **4.5 Sources of Information on Environmental Management**

The study revealed that 63 percent of respondents got the information related to environmental management through the mass media (radio, TV and news papers). In Dar es Salaam city there are more than 5 TV stations, more than 5 radio stations and more than 20 news papers which in one way or another educate the community on various issues including environmental issues. About 19 percent of respondents got the information

through both mass media and through various meetings and campaigns whereas 8 percent got the information through posters and various leaflets (Table 16).

**Table 16: Source of Information on Environmental Management in Dar es Salaam City, Tanzania**

<b>Source</b>	<b>Frequency</b>	<b>Percent</b>
Mass media	75	63
Mass media and sensitisation meetings	23	19
Mass media, sensitisation meeting and posters	11	9
Mass media and posters	10	8
Posters/leaflets	1	1
<b>Total</b>	<b>120</b>	<b>100</b>

Environmental education could spread faster if mass media could be efficiently used. It is through televisions various world wide environmental issues could be shown. There is a say, that “seeing is believing”. Some people do not believe that deforestation can lead to desertification. It is through televisions that trends in environmental degradation can be easily described and the community could easily believe and change their attitudes towards environmental degradation. This could be easier if the education system in the country will focus on environmental management issues.

The current education system in the country does not provide enough room for environmental issues to be tough at different levels. In some cases only specific subjects on environment are taught (Munishi and Hawa, 2003).

## **CHAPTER FIVE**

### **5.0 CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Conclusion**

This study was undertaken to assess the participation of women in household solid waste management and tree planting as indicators of environmental management in Dar es Salaam City. It was found that 99 percent of women participated in environmental management activities in one way or another. With respect to domestic solid waste management more than 97 percent of women participated in that activity. Basically, solid waste management activities were related to women's other physical reproduction roles, such as cooking and household cleaning. Women are involved in all stages of domestic solid waste management, that is, waste generation, storage, collection and disposal. It was further revealed that women's participation in solid waste management was not only at household level but also at community level.

Several problems constrained women participation in household solid waste management, including poor storage facilities and disposal methods, irregular solid waste collection, and higher user charges.

The idea of solid waste recovery was not well known by majority of women leading to accumulation of waste which otherwise could be useful if recycling was practiced. A good proportion of women (30 percent) contributed to solid waste recycling by scavenging in the main dumpsite, where various materials such as plastics, aluminum materials, papers and glasses were collected for selling to local industries in the city.

Women participation in tree planting was found to be inadequate, possibly due to lack of land/house title deed and lack of space for tree planting. Tree nurseries were among the main sources of tree seedlings in the city and a relatively high proportion of women took part in this activity.

Education level, land ownership, marital status and income were the main social economic factors influencing women participation in environment management especially tree planting. Most women understand various environmental concepts, though the levels of understanding differed depending on education level and exposure to environmental issues.

Generally, it can be said that women role in environmental management is significant; it needs to be encouraged, acknowledged and supported.

## **5.2 Recommendations**

The following are the recommendations, which the author thought would help to improve participation of women in environmental management.

- Solid waste management in the society should be a responsibility of individual efforts and environmental education can greatly promote this aspect.
- Although there are some efforts, which have been done on environmental management, communities need to be more sensitized so that they can change the old ideas that everything should be done by the Government. Instead, they can adopt the environment management activities as their own to make it sustainable.

- **Environmental management is a multi-disciplinary concern, which requires proper integration and coordination. The Government should ensure that there is adequate coordination among various institutions dealing with the environment.**
- **Involvement of both men and women in solid waste management at household level should be emphasized and assisted so as to ensure more efficient domestic solid waste management. This is important when it comes to formulating feasible waste management strategies.**
- **Generally, proper urban planning can solve many of the problems associated with urban environmental management.**
- **Different municipalities need to promote waste minimization technologies, so as to reduce the amounts of solid waste volumes reaching the disposal sites. These can be achieved through various technologies such as recycling, re-use and composting. Women can play a big role in this as the major domestic waste managers, by take this as an opportunity to invest on recycling business as their source of income.**

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## 7.0 APPENDICES

### Appendix I: A Questionnaire for Household Data

District.....

Ward.....

Questionnaire No.....

#### A: Socio-economic characteristics

##### 1. Marital Status

1. Single
2. Married
3. Divorced
4. Widowed

##### 2. Age of the respondents.....

##### 3. Education levels in years

1. No formal education
2. Adult education
3. Primary education
4. Secondary education
5. Higher education

##### 4. Household Composition (size)

##### 5. Household main economic activities

1. Farming
2. Employment
3. Small business
4. Other

##### 6. Estimated annual income

1. < 250,000/=
2. 250,000 - 500,000/=
3. >500,000/=

7. What is the order of expenditure from your income among the following?

1. Food,
2. School fees,
3. Transport (local),
4. House rent, water, electricity,
5. Solid waste collection,

8. Main source of labour for the household

1. Family/household
2. Hired labour only
3. Both

**B. Socio-economic factors influencing women participation in solid waste management**

9. Residence history

1. Born in the area
2. Migrated

10. How is the land owned?

1. Rent
2. Private owned
3. Government owned
4. Other (specify)

11. What are your main sources of solid waste in your household?

1. Kitchen wastes
2. Plants and animals
3. Papers and plastics
4. Others (specify)

12. How do you dispose waste?
  1. Collected by city council/private companies
  2. Burning
  3. Open dumping
  4. Disposal pits
  5. Other (specify)
13. Do you sort out waste generated to different constituents before disposing? Yes/No
14. If yes, what are the uses of those constituents sorted?
  1. Soil conditioner
  2. Utilised as energy source
  3. Direct re-use
  4. Other (specify)
15. How do you perceive the overall process of waste management?
  - It is a problem
  - It is not a problem
  - If it is a problem, why?
16. Whom do you think is responsible in management of waste disposal at household level?
  1. Mother
  2. Responsibility of every family member
  3. Other (specify)
17. Do you think current method of solid waste disposal, which you are practicing, are desirable and safe? Yes/No WHY?
18. What can be done to improve waste disposal practices?
  1. Promote environmental management awareness to the society
  2. City council to improve their services
  3. Other (Specify)

**C: Women perceptions on environmental issues**

19. What does the term environmental conservation means?
20. When did you first hear about it, and through what media?
21. Do you participate in environmental activities? Yes/No
22. If yes which activities?
23. What factors influenced you to participate in the activity/activities?
24. If participate in tree planting,
  - a) Where do you get tree seedlings?
  - b) How many trees are planted per year?
  - c) What are the uses of those tree species?
25. What do you think are the factors that mostly influence people to degrade the environment?
  1. Ignorance
  2. Low income (poverty)
  3. Neglegence
  4. Other (specify)
26. Do you know any institution/NGOs, which deals with environmental conservation?  
Yes/No
27. If yes, mention

**Thank you for your co-operation.**

**Appendix II: A Checklist for Focus Group Discussion****Solid waste management.**

1. What do you think influence/affect city council solid waste management system(s)?
2. What factors will lead to the success of city council solid waste management system(s)?
3. What role do you play on waste management?
4. What have to be done to improve domestic solid waste management?

**Tree planting**

5. What can you say about tree planting in urban areas?
6. What is their contribution to the environmental conservation?
7. What problems are encountered in urban tree planting?
8. What is the contribution of the Ministry /Dept. to urban tree planting?
9. What can be done to improve the situation?

**Thank you for your co-operation.**