

## IMPROVING URBAN LIVELIHOODS AT HOUSEHOLD LEVEL THROUGH SUSTAINABLE UTILISATION OF PERI- URBAN FORESTS IN MASVINGO CITY

Talent Murwendo

Geography and Environmental Science, Great Zimbabwe University

### ABSTRACT

Research has focused on the threats an urban environment poses to the survival of peri-urban forests rather than on how urban residents can benefit from the existence of peri-urban forests. The purpose of the present study was therefore to highlight how urban livelihoods at household level can be improved through sustainable utilisation of peri-urban forests in Masvingo City. The objectives were to delineate the spatial extent of peri-urban forests area in the City of Masvingo and establish the present use of peri-urban forests by the low-income residents of Masvingo City. The period when demand for peri-urban forests products would be at its peak would also be assessed. Data collection was through household questionnaires, key informant interviews and direct observations. The areal extent of peri-urban forests was obtained from O/S 1: 50 000 maps of Masvingo. Other information on Masvingo City was obtained from the municipal offices. Major findings reveal that residents of Masvingo City use the peri-urban forests dominantly for the cultivation of crops to supplement their nutritional intake. The majority of the respondents also used the peri-urban forests for the collection of products like woodfuel, bark, poles, pit sand, medicine and food like honey and termites. However the residents of Masvingo City face problems in securing peri-urban products as the forests are disappearing fast and are sometimes harassed by the authorities. The paper presents pointers on the extensive use of peri-urban forests during the dry season but more importantly is the variability of peri-urban forests usage depending on the product in demand at given periods. Another important practical implication is the involvement of women and the youth in securing peri-urban products. The case study gives an insight on how urban residents can benefit and improve their livelihoods from well managed urban forests. There is need for stakeholders to educate residents on sustainable utilisation of the peri-urban forests.

**Key words:** Peri-urban, sustainable utilisation, benefits, Masvingo City, Urban residents

### INTRODUCTION

Peri-urban forests are simply defined as forestry on the fringe of urban settlements where tree species become the dominant type of vegetation, (Kuchelmeister, 2000; Mutanga, 1999). A flexible understanding of the concepts of peri-urban areas provides possibilities for comprehensive actions by local authorities and partnerships with other concerned entities. Forests and trees in and around urban areas contribute to the improvement of livelihoods and the alleviation of poverty hence these forests and trees should be guarded jealously against overexploitation. Peri-urban forests have been important to low income residents of urban areas but this importance has become more recognisable in recent years due to the needs and the nature of urban resident's invariably diverse living conditions in the developing world. According to Lanly (2002) most cities of the developing world are characterised by poor living standards, poor sanitation and service

provision as well as congestion, overcrowding unemployment among numerous other problems. The forests around urban areas are important especially for their ecological, social and economic uses, (Kuchelmeister, 2000; Lanly, 2002,). Leppard, (2010) contends that some urban residents regardless of status and wealth see trees from a utilitarian point of view and as dispensable, yet others on the contrary see trees in a very different light, more from an amenity and other values that rely on keeping people alive and healthy. The major problem is the widespread loss of trees due to development and mistreatment of trees from streets and almost total loss in outlying areas around high density populations. The trees provide primary and secondary benefits including beneficial impacts on human health, functional uses, aesthetic impacts, climatic improvements and manipulation, structural, architectural and engineering uses, economic savings and wildlife enrichment, Godefroid and Koedam, 2003).

Peri-urban forests are important ecologically, as they stabilise the climate by sequestering carbon in biomass. They act as carbon sinks through photosynthesis, exuding oxygen and helping to preserve the balance of gases in the atmosphere upon which people and animals depend for life, ( Lanly, 2002; Murwendo, 2006). Carbon sequestration is based on active absorption of carbon dioxide by vegetation. Therefore trees and plants are the sole creators of oxygen without which the human race and most of the animal life could not survive. Carbon dioxide is a greenhouse gas, which result in global warming. Peri-urban forests have been observed to mitigate pollution, carbon dioxide emissions, and ground level ozone, as well as by purifying the air. Peri-urban forests are responsible for reducing climatic extremes (Kuchelmeister, 2000; Carter, 1994) Trees provide shade as their presence provides meaningful temperature reduction on a hot day. Trees also have the ability to retain heat. Trees regulate temperature extremes hence cutting costs by about 10%. The savings reflect the reduced need for electrical power generation resulting in less pollution, fewer power stations,( Godefroid and Koedam, 2003).

Peri-urban forests also have important watershed protection services. They regulate the hydrology of urban areas by extracting moisture from the air as well as allowing water to reach ground levels, (Kariaga, 1999).The forests also regulate water flow especially during the dry season flows and flood control as the peri-urban forests act as sponges which soak up water and release it gradually thereby enhancing water supply during the dry season. Water quality is maintained through the minimisation of sediment load, nutrient load, chemical load and salinity, (Bishop and Landell Mills, 2002). Soil erosion and siltation can be reduced by peri-urban forests through the binding effect of the root network of trees which cause high infiltration which reduces surface runoff and soil erosion, (Mukwada, 2000; Kariaga, 1999). The binding of soils by tree roots is thought to reduce the susceptibility of soils to erosion especially on steep slopes. Trees reduce the impact of rain on soils and thus the level of particle dislodgement is reduced. Peri-urban forests ensure the sustenance of aquatic habitats through the provision of shading in rivers, ensuring adequate woody debris and habitat for aquatic species. The peri-urban forests are home to various mammalian species such as rodents, antelopes, lizards and monkeys as well as micro-organisms, (Mukwada, 2000). Mature trees are the ones that offer the greatest ecological benefits. It is necessary to protect, maintain and prolong the effectiveness of older trees, (Leppard, 2010).

Socially, peri-urban forests have been observed, to provide non-consumptive uses such as recreation and research opportunities, and scenic beauty for ecotourism, (Mukwada, 2000; Murwendo, 2006). Recreational activities like photography, sport hunting, animal viewing and bird watching can be done on peri-urban forests. Peri-urban forests provide privacy, aesthetic value and traditional medicines, (Tuckler, 1995). They can also be used for picnics and provide

educational opportunities for urban residents. Studies have shown that the physical and mental well being of urban dwellers is improved where trees are incorporated into the environment. The green colour of trees is claimed to have calming effect psychologically on the brain leading to people living and working in an urban environment to cope better with life under stressful conditions, (Leppard, 2010). The benefits can translate into a number of advantages such as improved mental and physical health, fewer family problems, greater happiness and enhanced employee output. Research has also shown that hospitalised patients with a view of outdoor greenery get well quicker than those without and are able to withstand pain better, (Kuchelmeister, 2000; Leppard 2010).WHO purports that people living in green neighbourhoods are three times more likely to be physically active as well as 40% less prone to obesity than people living in areas devoid of vegetation,(Leppard 2010, Lanly 2002).

In developed countries dwellings near or overlooking parks and public spaces improve the quality of life and 83% of people agreed that the appearance of an area is an important factor in deciding where to live (Lanly 2002). In developing countries appreciation of the importance of the environment and amenity values is less recognisable as street trees, wooded area, vleis and open spaces are fast disappearing. Indirect health advantages that mature trees provide result in widespread savings, for instance. healthy populations resulting in lower health care costs to local authorities and governments. Other economic benefits indicate that the presence of sizeable trees on a property can add up to 20 % to real estate values, (Leppard, 2010).As previously alluded to,trees provide shade as their presence provides meaningful temperature reduction on a hot day. Trees also have the ability to retain heat. Trees regulate temperature extremes hence cutting costs by about 10%. The savings reflect the reduced need for electrical power generation resulting in less pollution, fewer power stations.

Economically, peri-urban forests are important agricultural areas for urban agriculture as people look for supplementary food. Large areas of peri-urban forests are brought under cultivation, (Rogerson, 1996). Residents of urban areas also obtain firewood from the peri-urban forests. Woodfuel remains the source of fuel available to urban residents in the era of paraffin shortage and power outages. It accounts for nearly 31% of Zimbabwe's total energy consumption and about 80% of the energy demand for communal areas, IUCN (1988). The selling of peri-urban forest products becomes an important issue particularly for crafts like basket making and the commercial use of indigenous trees for construction, furniture, medicine and flooring industries. The indigenous craft industry thrives on products provided by the surrounding peri-urban forests. This may include collection of stones, wood and weaving grass. Peri-urban zones are sources of non- timber products such as edible tubers, roots and bark, edible insects like caterpillars, vegetation oil and fruits. Peri-urban forests can be used therefore to address the problem of insufficient intake of protein food in urban areas. The peri-urban forests' food products have been found to be nutritious and this would reduce the high incidences of deficiency diseases, (Kuchelmeister, 2000). Peri-urban forests, therefore improve the nutrition and the quality of life of the urban poor. In most cases the collections of these commodities generate both employment and income. Peri-urban forests' products, if sold, provide direct cash benefits and if used within the household they provide indirect cash benefits by freeing cash income for other uses.

The importance of peri-urban forests far outweighs some problems that can exist as a result of the existence of peri-urban forests. The residents will be worried more about the benefits they can derive from the peri-urban forests. Some of these

problems include sheltering of thieves, robbers, murderers and rapists. Peri-urban forests are also being used as dumping grounds for domestic waste particularly, (Carter, 1994; Lanly, 2002).

Research on urban-forestry has concentrated on the degradation and destruction of these areas rather than on the benefits which can be derived from these forests by the urban residents. Peri-forests are important sources of livelihood for urban residents. The urban residents depend on these forests for their livelihoods. The food economy of urban households depends on the peri-urban forests in one way or the other. Peri-urban forests have become important areas of sustenance for low-income residents. There is therefore need to sustainably utilise the peri-urban forests so that the urban residents continue to benefit from them. Peri-urban forests are also potential areas for development and town planning mostly concentrate on engineering perspectives and the forests are easily destroyed. This means that peri-urban forests are under threat from human development, though access to peri-urban forests would remain unlimited. Similarly, the degradation of the urban fringe has become a critical area of concern and has been given much attention by most research especially in recent years of electricity outage and increasing poverty, disregarding the importance of these areas to the urban residents if well managed. This study therefore seeks to highlight the extent to which peri-urban forests can be used and managed for the benefit of the residents of Masvingo City in Zimbabwe.

The major aim of this research is to highlight Masvingo City residents can derive from the existence of sound flourishing peri-urban forests near their doorstep. Specifically, the study is based on three important aspects. Firstly the study sought to delineate the spatial extent of peri-urban forests area around Masvingo City. Secondly, the study sought to establish the benefits derived from peri-urban forests by residents of Masvingo. Thirdly, the study sought to determine the temporal variations in peri-urban forests' product demand.

The benefits to the urban residents from peri-urban forests cannot be over emphasised. Many people, especially the poor benefit immensely from peri-urban forests socially and economically, during periods of stress and need. A study of this nature can lay inroads for further studies on sustainable utilisation of surrounding peri-urban forests by the urban poor. The study will provide information on how peri urban forests are used by urban residents to their benefit. The urban residents would benefit immensely by gaining knowledge and understanding on how they can utilise sustainably the surrounding peri-urban forests. Urban planners will gain an insight on how peri-urban forests could be utilised, preserved and conserved. The planners will be provided with information that will help in planning and policy formulation. The greening of urban areas is usually the work of urban planners. The generated information will help in solving problems of deforestation around the residential areas. The study has diverted from the traditional studies which stress on the degradation of the peri-urban zones as a result of the urban growth.

## **THE STUDY AREA**

The City of Masvingo is situated on the southern part of the country. It was established in 1890 and is the oldest urban centre in the country, (Masvingo City, 2001). The City has a population of 69936, (Central Statistics Office, 2002). The City covers an area of 6835 hectares. The City plays a distributive and communicative role due to its equidistant location from the country's major cities of Harare, Bulawayo, Mutare and Beitbridge. The low-income suburbs of Masvingo City are Mucheke, Runyararo, and Rujeko. The medium income suburbs are Target Kopje and Eastvale and The high-income

suburbs are Rhodene and Northlea as shown by figure 1.1. Peri-urban forests which could be more beneficial to the residents and which need to be exploited sustainably surround all these suburbs.

Masvingo City receives rainfall of between 450-700 mm per annum with average monthly temperatures of about 26°C. It is a low-lying area that has basalt and alluvial soils which support the growth of dense forests. The landscape around Masvingo is rolling terrain interspersed with ridges. The vegetation is mostly miombo woodlands dominated by woody cover. Masvingo City is found at the confluence of the Shagashe River and the Mucheke River. The two rivers provide riverine vegetation to the City. To the north of Masvingo the open spaces and the Shagashe Nature Reserve as well as the exotic trees provide a spectacular view in the City. To the east and west parts of the country vegetated open spaces comprising woody cover can be observed from the map. Open spaces on the southern portion are small although there is the Target kopje and the agricultural plots at the boundary of the City. Masvingo is surrounded by large scale commercial farms and therefore its boundaries show areas of dense vegetation which is mostly woodlands, (Masvingo City Report, 2001)

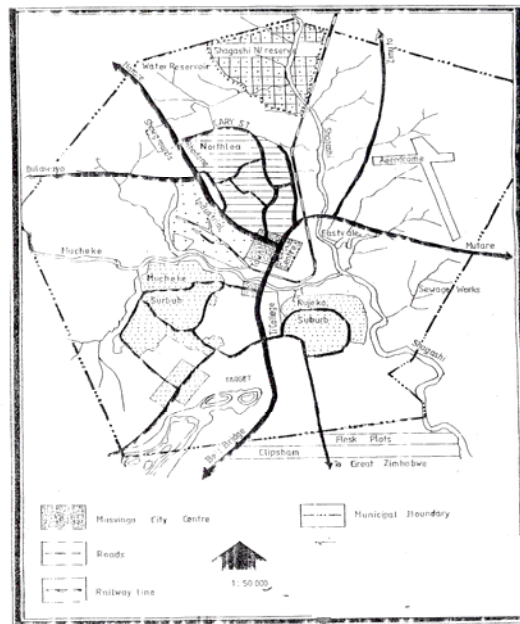


Figure 1.1: The Masvingo City. The vacant land in area indicates the peri-urban forests under study.

## RESEARCH METHODOLOGY

The major research method employed in this study was a questionnaire survey of the household of Masvingo City. The study was carried out between November 2006 and September 2010. About a total of 120 questionnaires were administered and fully answered. Systematic random sampling was used for data collection. The suburbs were used to demarcate areas where data could be collected. Masvingo City was divided into three categories based on income and status, mainly the low income suburbs, middle income suburbs and high income suburbs. The researcher and two assistants administered the questionnaires over a period of a month. The questionnaires were administered on Saturday afternoons on the assumption that people were at their homes during this period. The questionnaires were soliciting

information on the possible usage of peri-urban forests by Masvingo City residents. The questions were directed towards the household head. In the absence of the household head other members of the family who were informed would be interviewed. In cases where a property had more than two families, only one family mostly the owner would be targeted failing which a second household would be randomly selected at the same property irrespective of status.

Topographical maps, 1: 50 000 O/S were also used in this study. This involved the calculations of areas from the map's grid squares. Similarly, vegetation density was obtained from these topographical maps. These maps provided the added advantage since a lot of information could be obtained in this area including work on human activity. Interviews of key informants were conducted with the Masvingo City Council Officer on housing, Officer from Environmental Management Agency and the Councillors. In all these cases the focus was on the acquisition of different views on benefits of peri-urban forests to the low-income residents of the suburb and the justification for the sustainable utilisation of trees in the forests around Rujeko low income residential areas.

Secondary data were obtained through perusal of records and literature from the City council library. The above provided background information on the Masvingo City's development. The information on the importance of peri-urban forests was also obtained from library sources. More work on peri-urban forests could be obtained from a number of relevant journals. For purposes of time descriptive statistical analysis was used to interpret the data together with cross tabulations to show interrelationships. The raw data was converted into graphs and tables for purposes of representation.

## **RESULTS AND DISCUSSION**

More than three quarters of Masvingo City (4708.15 hectares) constitute area under peri-urban forests. The residents of Masvingo City benefit in a number of ways from this expanse forest coverage. The forest resources are important inputs into the resident's way of living. However the harvesting of the forest resources is controlled by such factors as time and distance. The temporal and physical controls can become important indicators on the sustainable utilisation of forest resources in Masvingo City.

### *Spatial Extent of Peri-Urban Forests Cover*

The peri-urban forest zones of Masvingo City can be divided into four distinct zones. Firstly, the northern zone covers the area between the road to Harare and the road to Zimuto Communal lands. This zone covers about 989 hectares of forested area. The zone incorporates the Mushagashe Nature Reserve. The area is dominated by miombo woodlands comprising mostly woody cover. The dominant trees are *Mususu*, *mnondo* and *mukarati* trees. The area is dotted with the common acacia tree species especially near the built up areas of Rhodene and Northlea. The zone also incorporates the sections of the Shagashe river valley which has lush vegetation dominated by lacustrine vegetation.

Secondly, the eastern zone forms a portion of forested area. The zone stretches from the road to Zimuto Communal Lands to the road to Mutare. The area covers about 1003 hectares. This zone has few human disturbances housing the aerodrome and the army cantonment area. The zone is a high security area and hence few disturbances to the forested areas. This is a zone of potential importance to the residents of the City as it is within the Masvingo City masterplan of 1996.

The third zone covers the southern area and is about 936 hectares in extent. The vegetation is denser on the low-lying valleys of the Mucheke River and Shagashe River. The Shagashe river valley supports many species of animals and aquatic plants like the water fowl. The zone is between the road to Mutare and the road to Beitbridge. The zone includes Clipsham and the Flesk agricultural plots. This forested zone is near the low income suburb of Rujeko and middle income suburb of Eastvale.

The fourth zone is the western zone stretching from the road to Harare up to the road to Beitbridge. The zone is about 1750 hectares in extent. This zone is truncated by Mucheke River and also comprises the Target Kopje ridge on its southern parts. This is the zone that covers the industrial area and the low income residential area of Mucheke and Runyararo and the middle income area of Target Kopje. The impact of human populations is felt on this zone. This is a zone targeted for further construction of low-income housing-the Remainder of Victoria Ranch Housing Scheme.

Generally, the vegetation of Masvingo City comprise of scattered grass and woody tree species. The tree species found in the surrounding peri-urban zones include *Eichnania eassipes*, *brachystegia boehmi*, *Faidherbia albida* and *Sclerocarya binea* and numerous acacia species. The species of grass are *Heleropogan Contortus* and *Crodondactylon*. The spatial extent of peri-urban forests surrounding Masvingo City has been influenced by the terrain and human interference since residents continue to derive benefits like woodfuel and carry out agricultural activities in these forests. Forest fires, grazing, woodfuel collection and urban agriculture practised in the peri-urban forests have resulted in the dominance by secondary succession bushy vegetation immediately near the settled areas.

The study shows that Masvingo City is a well forested city whose boundaries are marked by numerous vegetation species. However, while the City boundary is indicated by a line, peri-urban forest boundaries are zones of influence that vary in vegetation densities and usually spill well beyond the City boundaries. Forest and tree cover depend on the status of the nearby residential areas. Peri-urban forests closer to low income residential areas of Rujeko and Mucheke have been influenced by human disturbance while those near high- income residential areas like Rhodene are less influenced. Cantonment areas where movement is restricted have dense vegetation cover.

#### *The Use of Peri-Urban Forests in Masvingo City*

From the study it was revealed that residents of Masvingo City acquire benefits such as energy, food, building materials, and agricultural products from the surrounding forests. The peri-urban forests also have perceived important ecological functions such as the curbing of soil erosion, fertilising the soil and protecting the watershed.

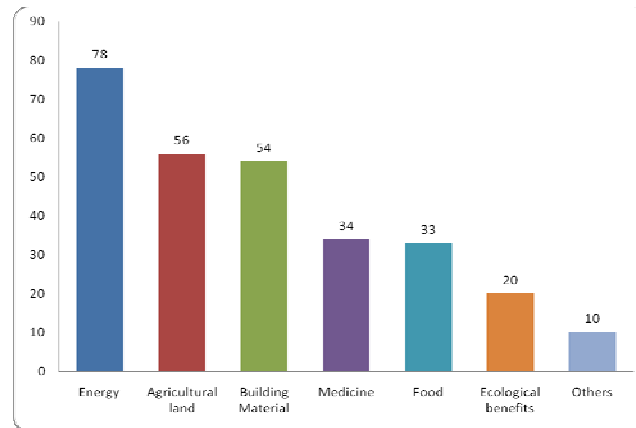


Figure 1.2 Benefits derived from the peri-urban forests by the residents.

It was revealed by about 78% of the respondents that they obtain woodfuel from the peri-urban forests. It was also revealed that woodfuel is cheaper when bought from the street vendors who obtain it from the nearby forests as compared to the market place where it is obtained elsewhere. Comparatively, woodfuel remains cheaper to other alternatives of energy such as paraffin which remains a scarce source of energy. It was also observed that some sections of Masvingo City like parts of Rujeko are not yet connected to the electricity gridlines and, residents from these sections depend on woodfuel from the peri-urban forests for warmth and domestic uses. The whole situation in the City is worsened by the intermittent supply of electricity through load shedding programmes by the Zimbabwe Electricity Supply Authority (ZESA) or when power outages are experienced. It was also established that male youths and women adults were earning income from selling woodfuel in the City especially in Rujeko C as is common in most African cities (Bishop and Landell-Mills, 2002). The demand for firewood among the Masvingo City's working residents is high, as their working schedules do not allow them to collect firewood from the peri-urban forests. Studies by Nelson, (1999) have revealed that survival strategies of different groups of people may range from diversification from or intensification of farming to wood vending among others. Woodfuel vending in residential areas of Masvingo City has become more common in recent years. Woodfuel collection has a number of impacts on the species diversity since it is selective. The harvesting of woodfuel has led to the removal of the *brachystegia* species from the peri-urban zones the low income suburbs of Mucheke and Rujeko. This has in turn resulted in the dominance of the acacia tree species and grass species in these peri-urban zones.

Agricultural land is in high demand from Masvingo City residents. About 56% of the respondents revealed that they use the peri-urban forests for crop cultivation. Urban agriculture enables households to fend for their families and is proving to be a great activity among households in the suburb. This activity is common in all residential suburbs. Residents supplement their food since the prices of basic commodities are now beyond the reach of many in Masvingo City. Mukwada (2000) and Bowyer (1999) assert that the practice of urban agriculture has been on the increase in the major African cities and has expanded over the years as economic hardships force urban population to turn to urban agriculture to supplement its livelihood. The major crops grown Masvingo City peri-urban zones include maize, pumpkins, roundnuts, sweet cane, groundnuts, vegetables, sweet potatoes sugar cane among other numerous crops like sorghum. The Peri-urban forests of Masvingo City also provide fodder for animals like horses, cattle, goats, and sheep not



necessarily to the Masvingo City residents but also to the families outside the City boundary. Peri-urban zones are therefore the producers of horses, dairy cattle, rabbits, pigs, poultry and other animals like goats and sheep. However there is always a shortage of suitable land to carry out urban agriculture and many people migrate to their rural homes during the rainy season to till the land. Most of the fields are often small in extent with some fields as small as the floor space of an ordinary room in the City. Favoured lands for agricultural activities are the peripheral areas and the open spaces within the urban zones. The valleys along Muccheke and Shagashe Rivers are also lucrative areas for urban agriculture.

The study also revealed that 54% of the respondents declared that they obtain building materials from the peri-urban zones. The common building materials acquired from these zones are pit sand, river sand and stones which are used for construction of houses. In Masvingo City construction is a major activity. Unemployed youths engage in poaching pit sand from peri-urban zones for sale in the suburb. The Natural Resources Bulletin, (2004), asserts that over the years materials like pit sand collected in and around some urban areas like Chitungwiza and Masvingo are a lucrative business. Unemployed youths who engage in pit sand vending indicated that they obtain the pit sand from the peri-urban forests near the City. They also indicated that they supply pit sand to developers. River sand extraction is carried out along the Muccheke River and the Shagashe River. River sand extraction from these rivers has an environmental benefit of reducing the siltation of the two rivers. Other types of building materials found on the peri-urban zones of Masvingo City include tree branches, poles, timber, bark and grass. These products are used within the City limits and outside the City boundary

About 34% of respondents indicated that they obtain medicinal products from peri-urban forests. Within peri-urban forests, most shrubs, tree parts, grass and animals are used for medicinal purposes. The bulbs, tubers, tree barks and roots of shrubs are used to cure numerous ailments since they have strong pharmaceutical capabilities. In effect most parts of plants play pharmaceutical roles for different ailments like sexually transmitted infections to diseases like asthma and high blood pressure. This will make most plants in the peri-urban zones vulnerable to exploitation. Apart from plants, animals' portions are also used for medicinal purposes. This may include the portions from both large and smaller animals. Given the inaccessibility of medical facilities in the country due to economic hardships people would depend on peri-urban forests for their pharmaceutical needs. This would reduce the medical bills people would incur when they visit the public and private hospitals. While people use the forests for medicinal purposes there is need for people to sustainably use the forests to ensure that peri-urban forest would continue to provide the same services for longer periods to come.

It was realised from the study that peri-urban forests are a source of food. A proportion of respondents (33%) stated that they get fruits from the peri-urban forests. These include *azanza garkeana* (matohwe) *Strychnos*, (Matamba) and other fruits from herbaceous plants. Edible tubers are also collected from the peri-urban forests throughout the year. Some of these fruits find their way to the open markets which are within the City, while the larger proportion of the fruits is consumed by the gatherers. Traditional fruits play an important role in the provision of vitamins to urban residents who could not afford supplementary vitamins. Apart from fruits there are also edible plants which are obtained from the peri-urban forests of Masvingo City like the Shona traditional fruits of *Sambasi*, *shombori*, among others. The leaves of most plants play an important role in food security as these are used as relish. Honey collection from the peri-urban forests has been cited as another important hobby practised by the male members of the suburb. Insects like termites and caterpillars

are also collected for consumption. The same applies to the hunting of small animals like rabbits and mice for food. The forests along the Shagashe and Muccheke rivers are important sources of small birds which are also hunted for food. The two rivers provide fish for the residents.

Masvingo City residents also have perceived ecological benefits which are derived from the peri-urban forests. The residents were also aware that peri-urban forests helped them with fresh air to breathe since plants absorb carbon dioxide and release oxygen. The residents also were aware of the importance of peri-urban forests as carbon sinks for the sequestration of carbon dioxide. The leaves from plants fertilise the soil when they decay on the ground. Soil erosion is prevented because of the presence of vegetation cover. The falling leaves also provide watershed protection as more manure is added to the soil and splash erosion prevented.

Other benefits include educational purposes as these forests are a source of a lot of information. The peri-urban forests are also used for research purposes by ecologists and other interested researchers. Recreational activities such as picnicking and photography are also carried out in these areas. Apart from providing shade, it was revealed that peri-urban forests provide a habitat for birds, rodents, termites and small animals like rabbits. These small animals provide the residents with food. Other benefits from peri-urban forests include providing privacy and shelter to the residents of the City. Peri-urban forests are also appreciated for the scenic beauty and the green colour they provide to the urban environment in contrast to the brick and mortar surfaces common in many urban environments.

Peri-urban forests provide an inexhaustible array of benefits to the residents of Masvingo City which range from, food, building materials, pharmaceuticals, aesthetics and recreation to energy and ecological benefits. Residents however singled out some problems related to urban forests. These were linked to the attraction of vipers and other poisonous snakes near their homes. The forests are also related to vices like promiscuity, shelter for robbers and muggers, and dumping grounds of waste products from the suburb. Children are usually discouraged to visit these areas for fear of exposure to the above. However, the benefits outweigh the disadvantages and peri-urban forests have potential to support livelihoods of the residents of Masvingo City.

#### *Variations in Demand of Peri-Urban Forest Products*

Variations in the use of peri-urban forests were also noted in the study. The usage of peri-urban forests for sustenance was divided into three categories which are the dry period, wet period and throughout the year. The dry period was the most popular period when residents would use the peri-urban forests. This is followed by the all year round usage and lastly the wet period.

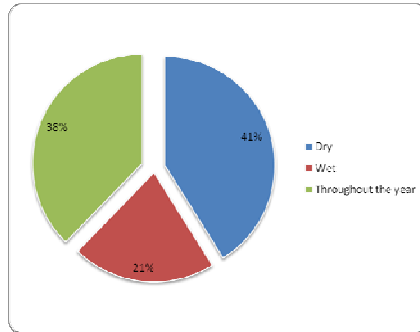


Figure 1.3: Seasonal demand for peri-urban forests usage

Figure 1.3 shows periods when demand for peri-urban forests products is at its peak. Forty one percent (41%) of the respondents pointed out that they use peri-urban forest mostly during the dry season which starts in May and end in October. It was revealed that it will be easy and less frightful to venture into the peri-urban forests during this period, as there will be less foliage. The youth and women prefer harvesting peri-urban products during this period. The hunting of mice, termites and rabbits is easiest during this period. Pit sand and soapstone extraction is easier during the dry season when the ground is conducive for excavation. Thatch grass is also collected during this period. Animal feed like silage is also done at the onset of the dry season. During the dry season woodfuel collection is also easier and this is the period when demand for woodfuel increases particularly during the cold season. Uncontrolled Animal grazing also takes place during this time especially along the Shagashe River. The animals will be feeding on the remnants of crops and grass along the river as well as on the water weeds (hyacinth).The only problem is that during this period the peri-urban forests are prone to uncontrollable fires which some times occur in these areas.

About 38 % of the respondents revealed that peri-urban forests are used most throughout the year. Therefore, residents depend on peri-urban forests throughout the year especially for activities related to food gathering. It is asserted that the hunting of small birds and animals takes place on daily basis. This is so as the peri-urban zones provide a variety of foods at different times of the year. Woodfuel collection for domestic purposes has become an activity which is carried out throughout the year as electricity outages are becoming persistent in the City. The harvesting of tree products and grass depends on daily individual needs. Similarly, the harvesting of fruits depends on the production period of the trees. The procurement of bark, poles and timber are year round activities, which take place during every part of the year. Another observation is that individuals use rocky outcrops and large trees for prayer sessions in the morning and evening also by organised churches, which use open spaces for prayer.

However, 21% of the respondents indicated that peri-urban forests are also used during the wet season. This period spans from November to April. This is when urban agriculture will be practised. Similarly, the collection of bark and medicine can be done during the same period, as the plants will have more sap in their veins. Urban agriculture provides new foliage during the wet season, as maize, groundnuts, pumpkins and sweet reeds become part of the ecosystem. Urban agriculture is done by elderly women as is common in most Cities of Africa (Rogerson, 1996). It is only after harvest that the harvested crops leave out bare ground liable to be eroded by wind and water during onset of the rainy season. Fishing and hunting as well as organised grazing takes place during this period.

### *Distance Demands for Peri-Urban Forest Products*

Masvingo City residents have certain distances they are prepared to travel to secure a particular peri-urban forest product. This would not only indicate the importance of given peri-urban forest products, but could also be indicative of the amount of demand given to particular forest products. The distances may also be indications of products that have been heavily harvested within the peri-urban zones.

Table 1.1: Distance travelled to secure peri-urban forests products

BENEFITS	AVERAGE DISTANCE (KM)	NO. OF RESPONDENTS	PERCENTAGE
Energy	6	44	49
Food	5	44	49
Building materials	2	42	47
Forest products like recreation	4	24	27
Others	5	24	27
Pharmaceuticals	7	18	20

From Table 1.1 it can be seen that peri-urban forests products have varying ranges of distance residents are prepared to travel to secure given products. Building materials such as pit sand, river sand and stones have the shortest distance since these are heavy. These products are bulky the longer the distance they are transported the more expensive they become. Since the materials are sold it becomes uneconomic to transport them for longer distances, and people are unwilling to travel long distances for these products. Pit sand is localised, as some areas do not have suitable pit sand. Mostly pit sand will be excavated near construction sites since the builders dig new sites near their workplace. However, other products like ropes, grass, poles, and bark among others may involve long distances depending on availability.

Recreation and other similar activities have an average distance of 4 km. This could be so because this can involve areas of scenic beauty which are localised. Areas like Mushagashe Nature Reserve become popular areas of choice. High land areas along the Target Kopje ridge are also popular. The same applies to the river valleys where there is less pollution. The use of peri-urban forests for recreation points to the fact that the urban poor can also benefit as they cannot afford to go to far away places for recreation.

The average distance people are prepared to secure medicine is 7 km. This is so because of a number of reasons. Medicine is not a localised commodity. Its distance varies with the species of vegetation at hand. This has tended to increase the distance for medicine. However, medicine is not needed everyday and therefore these distances are travelled once a month or a half year

Similarly food collection journeys involve somewhat long distances. Food collection takes place in areas nearest to the residential area and beyond. The distances for food are determined by the type of forest product being sought. A distance of 5 km may be a long distance to travel and hence the youth and energetic members of the residents are able to venture

into the peri-urban zones to secure the products. It was indicated that journeys for food collection start early in the morning sometimes before sunrise.

Woodfuel trips are becoming longer depending on the demand for woodfuel. In low income residential areas of Mucheke and Rujeko the distances covered to collect woodfuel have increased. This is due to deforestation closer to these areas. However the High income suburbs of Rhodene and Northlea and the middle income suburb of Eastvale are closer to wooded peri-urban forests. The demand for woodfuel is more from the low income residential areas.

While Masvingo City is surrounded by productive peri-urban forests which are playing an influential role in people's livelihoods, visits to the forests to secure commodities vary in intensity with the seasons. The variations are regulated by demands for particular products. Residents of Masvingo City are also prepared to travel shorter distance to secure given peri-urban forest products. The reluctance by residence to travel long distance to secure particular products may imply overexploitation of forest resources which are closer to the residential areas. This may also mean that less time is given to the ecosystem to regenerate. Ultimately residences will obtain substandard service from the forests because of reluctance to venture into the forest centres. This calls for effective management of peri-urban forests closer to the built up areas. The management of the forests should involve all the stakeholders (Torres, Alves and Oliveira, 2003).

## **CONCLUSION**

The economic hardships and the increasing poverty in Zimbabwe's cities have forced the urban residents to turn to the surrounding peri-urban forests for survival. The study has revealed that the peri-urban forests surrounding Masvingo City are important sources of forest resources which are harvested throughout the year by the residents of Masvingo City. The peri-urban forests are dominated by tree species of varying sizes. Apart from providing habitat for birds and other small animals, peri-urban forests are mostly used for woodfuel collection, crop cultivation, pit sand extraction, medicine, fruit collection and recreation. The use of the peri-urban forests is concentrated mostly during the dry season, but, pressing demands for peri-urban forests products has made peri-urban forests to become important throughout the year.

The residents of Masvingo City derive benefits from the surrounding peri-urban forests. The residents secure social benefits like food, bark and medicine. The residents also obtain economic benefits like agricultural land, woodfuel and pit sand. Woodfuel and building materials are the most important resources, which are obtainable during the dry season. The residents are prepared to travel short distances for pit sand but the threshold for woodfuel is more than five km. On the other hand residents of Masvingo City are aware of the ecological benefits obtainable from peri-urban forests. Peri-urban forests absorb carbon dioxide and release oxygen, which is used by animals.

Upon the above basis, to preserve and sustainably use the peri-urban forests the city fathers and the government should encourage the use of electricity, solar energy and paraffin at affordable prices. At the same vein the overexploitation of peri-urban forests in cities can be avoided if there is collective effort from different stakeholders including local government, civic organisations and individuals in educating the local residents on sustainable utilisation of resources for their well being. While urban agriculture is an important activity it should be well organised and agroforestry should be encouraged. Punitive measures should be made to work hand in hand with incentives, which will encourage local participation in peri-urban forests management.

The central messages of this research are that:

- Effective development and effective management of peri-urban forests resources are essential for sustainable growth and poverty reduction in cities of the developing world.
- Sustainable per-urban forest management must balance between the short term needs of urban residents for their social and economic development and the protection of the peri-urban forest resource base
- Strategies to reduce poverty in the cities should not lead to further degradation of peri-urban forest resources or ecological functions and services
- Sustainable per-urban forest use and improved environmental quality should contribute to reducing poverty In cities of the developing world.

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