



Sustainable use of forest resources in ward 17 of Gwanda in Zimbabwe

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Abstract

The main aim of the study was to investigate the sustainability of the use of forest resources in ward 17 of Gwanda district. A case study research design was adopted for this research because it is appropriate to the problem and the advantages it possess. The population of study comprised of 5971 villagers of ward 17, the ward councillor, the village heads, officials from the Forestry Commission and officials from the Environmental Management Agency. A random sample of 600 villagers was picked from the ward using numbered cards. Information gathered indicated that there is no sustainability in the use of forest resources. Forest management activities in the area identified by local community members included the clearing of a cactus plant which is listed as an invasive alien species, awareness campaigns run by the Forestry Commission and the Environmental Management Agency and the tree planting programme run by the same organisations. The major sources of livelihood were identified as rainfed farming, brick moulding, caterpillar harvesting, vending, wood carving, doing menial jobs for other farmers, and formal employment. Trees are mainly cut down in order to fence arable lands and homesteads, build kraals, carve different artifacts and for firewood. Poverty is one of the factors which hinder the sustainable use of forest resources in the study area.

Keywords: Sustainable use, forest resource, fencing arable lands.

Introduction

Forests are crucial in the sustenance of livelihoods and well-being of people in both developed and developing countries. Most indigenous communities depend on forests to source for natural resources, but the challenge is that a lot of the forests are destroyed every year to meet the ever-increasing demand for different forest resources. It is therefore against this background that the study intends to assess the way people at ward 17 in Gwanda District use forest resources in terms of sustainability and identify factors which hinder the achievement of the sustainable use of forest resources in the study area so that mitigation strategies can be recommended. This part of the paper gives the background to the study, puts the problem being studied into perspective, lists the objectives and research questions, discusses the significance of the study, identifies the assumptions and gives definitions of key terms which are used in the study. Delimitation of the study, limitations and the summary of the chapter will be also given.

Background to the study: Many efforts have been made globally, regionally, nationally and locally by different groups to achieve a sustainable use of forest resources. Sustainable forest management is one method which can be used to protect the planet's forests¹. Sustainable forest management advocates for the use of forests in a manner that will not diminish their productivity and will maintain their biodiversity. The forest resources should be utilised in a manner that will maintain their vitality and regeneration capacity. The Forest Principles which

were adopted at the United Nations Conference on Environment and Development (UNCED) in 1992 captured the general international understanding of sustainable forest management². In 2007 the Non-legally Binding Instrument on all types of forests was adopted by the United Nations General Assembly². The signing of the instrument was an indication the strong international commitment to promote implementation of sustainable forest management by all the stakeholders. The main aim was to have all the countries involved and committed in the sustainable use of forestry resources.

Continuous assessments are made in order to ensure that a sustainable use of forests resources is achieved. In 2012 three organisations which are namely the International Tropical Timber Organization, the Montreal Process Forest Europe, and the Food and Agricultural Organization to collaborate with each other in order to improve global forest related data collection and reporting³. This reporting makes countries aware of their current changes (both positive and negative) in the state of trees in order to respond as early as possible.

Many efforts have been made nationally in a bid to sustainably use forest resources. One of these efforts resulted in the formation of the Tetrad Tree Foundation 2011 as part of the Tetrad Holdings Corporate Social Responsibility initiatives. The aim of the foundation is to ensure that ecosystems in Zimbabwe are utilised in a sustainable manner. It is estimated that Zimbabwe is losing quite a substantial amount of trees annually due to forest destruction. This shows the need to conserve,

preserve and replace the used trees so that the future generation will also benefit from these resources. Some of the goals of the Tetrad Tree Foundation in Zimbabwe are; i. planting 5 million trees in the country by 2015, ii. restoring the country's ecosystem, iii. to encourage the use of alternative energy sources, iv. to reduce deforestation in the country, v. to reach sustainable consumption and production of trees in the country and vi. to identify alternative sources of energy to be used in the curing of tobacco.

Many groups/projects like the Bee keeping project in Wedza, Zim Conserve's tree planting project, Environmental Management Agency (EMA), the Forestry Commission and many other government and non-governmental organizations are working towards the attainment of a sustainable use of trees in Zimbabwe.

People in the study area, (that is, ward 17 of Gwanda district) are aware of the need to sustainably use forest resources through the role played by environmental agencies in educating people and prohibiting some destructive practices. However, there are some factors which make people fail to conserve and preserve these resources. Deepening poverty has led to people seeking desperate means of living like selling firewood and timber. Poverty has also made it difficult for people in communal areas to acquire some alternatives like using electricity, solar power system, using gas stoves, and accessing metal materials for fencing and building shelter. They have been left with very little options other than using forest resources since they are locally available and for free. Firewood constitutes 49% of the domestic use of energy in Zimbabwe³. This shows that forest resources (especially trees) are used at an alarming rate.

Much has been said about the use of forest resources in different places, but nothing has been said about the use of these resources in ward 17 of Gwanda district. The information about the use of forest resources has been generalized and is outdated because of economic changes which are being experienced over time. Although deforestation is perceived to be one of the top environmental issues in Zimbabwe, little satisfactory data is available to estimate the nature and extent of the processes involved in it and the other forms of misusing trees⁴. The information on the regions' remaining forests and woodlands is often outdated, incomplete, fragmented or misleading⁴. This study, therefore, intends to assess the extent to which the sustainable use of forest resources is pursued in ward 17 of Gwanda district and the factors which hinder the achievement of a sustainable use of forest resources in order to bridge the gap in research.

Statement of the problem: The researcher has observed that people in ward 17 in Gwanda district use forestry resources to get food, shelter, medicines, furniture, fencing material and some other industrial purposes to satisfy their needs. Many people make money through the use of forest resources, for example, selling mushrooms, selling harvested caterpillars, by

selling fruits, doing carpentry, brick moldings (which needs firewood), selling firewood, and using trees to fence their fields. These forest resources are under a threat of the fast growing population, which means an increase on the demand for more trees, whilst the quantity of these resources is decreasing. Financial constraints make people in the study area fail to use other alternatives like electricity, metal poles, wire fences and some other ways of getting money which do not need the use of forest resources.

However, no data is available on the changes caused by people on the forest resources, and as a result the researcher decided to carry this research.

Purpose of the study: The main aim of the study is to investigate the sustainability of the use of forest resources in ward 17 of Gwanda district

Objectives of the Study: i. To determine whether there is a sustainable use of forestry resources in ward 17 of Gwanda district. ii. To identify factors which hinder the attainment of a sustainable use of forestry resources in the study area. iii. To devise mitigation measures which can promote a sustainable use of forestry resources in the study area.

Assumptions of the Study: The researchers assumed that the stakeholders in ward 17 of Gwanda would cooperate whenever their input is needed and that problems highlighted are general across the area under study. It was also assumed that the respondents would give correct and accurate information. The researchers also assumed that the recommendations of the study would help in improving sustainable use of forest resources.

Significance (or importance) of the study: The study can be useful to the various stakeholders interested in the sustainable use of forest resources. It can also guide Government Departments in the formulation of policies for the sustainable use of forest resources. The study will benefit different groups/organizations which are concerned with forestry resources as well as individuals who need the information about the use of forestry resources. Major stakeholders like the Forestry Commission, Environmental Management Agency (EMA) and the Ministry of Environment and Tourism will benefit from the information gathered in this study. The study will give an accurate information about how forestry resources are used in ward 17 of Gwanda district and the causes of an unsustainable use of these resource.

Scope (delimitation) of the study: The research focused on how community members in ward 17 of Gwanda use forest resources. Only community members and local authorities and organisations working in the area were part of the research.

Limitations of the study: This was a case study and one of the major limitations of case studies is that they only look at a specific case which might not be representative of all cases and

as such conclusions drawn from such studies may not be generalised to other cases. The case study design like most qualitative research methods lack experimental and statistical controls which makes it hard to establish internal validity⁵. Use of qualitative data in case studies brings with it an inherent limitation of observer bias in the interpretation of the data⁶. It is generally difficult to generalise findings from case studies. However it can also be argued that even though it is also difficult to generalize findings of case studies to other cases such findings can be generalized to similar situations^{5,7}. The conditions in the ward 17 of Gwanda are similar to conditions in other communal areas in Zimbabwe therefore the findings can be generalised to those settings. The local leadership was skeptical of the motives of the researchers and most of the locals were illiterate. The researchers managed to create good rapport with respondents and provided user friendly questionnaires which were unambiguous and easy to understand. The researcher also sought written permission from the responsible authority to carry out the research in order to get rid of any suspicions about the motives of the research.

Ethical and legal considerations: Participants were reassured that they could withdraw at any time from the study if they so wished. They were informed of the purposes of the research and potential reparations to them as individuals and as a group. It was also explained to them that their identity would not be revealed. Anonymity, confidentiality and right to withdraw from the study were spelt out.

Organisation of the Study: The first part of the paper outlined the background of the study, described the problem, then outlined the objectives of the study, generated the questions and outlined the limitations of the study. This is followed by the research methodology which discusses the research design, the population and sample of the study, the instruments used, and finally data presentation and analysis procedures. Results and discussion then follow which covers data presentation, interpretation, analysis and discussion. The paper ends with a conclusion.

Methodology

In this part of the paper, the researchers will focus on research design and the instruments and techniques that will be used in capturing the information on the sustainability of the use of forest resources in ward 17 of Gwanda District in Matabeleland South. It will discuss the research instruments, data collection procedures and analysis procedures that will be used in the study. The section on data collection focuses on methods and instruments to be employed in collection of data. The last section on data analysis will describe how data will be captured, analysed and presented.

Research design/plan: The study adopted a case study research design because of its appropriateness to the problem and its merits. A case study can be described as a strategy of doing

research which involves the use of different data sources to study a specific case within its real life context². It shows that there is proof that issues discussed are real and it can easily influence decisions on environmental activities. Case studies are based on an in-depth investigation of a single individual, group or event. A case study research can be single or multiple case studies, includes both qualitative and quantitative evidence, relying on multiple sources of evidence and benefits from the prior development of theoretical propositions. The researchers deployed different research instruments which include questionnaires, field observation and interviews.

Population and sample for the study: The population of study comprised of 5 971 villagers of ward 17, the ward councillor, the village heads, officials from the Forestry Commission and officials from the Environmental Management Agency. A random sample of 600 villagers was picked from ward using numbered cards.

Research instruments: The researchers chose the most appropriate instruments that provide for collection and analysis of data which were secondary data sources, interviews, questionnaires and observations.

The researchers conducted interviews with the officials from the Forestry Commission and the Environmental Management Agency (EMA), the ward councillor and village heads so as to obtain information on what is being done by different individuals and groups towards the attainment of a sustainable use of forest resources in the study area. The interview schedule was both structured and unstructured. This enabled the interviewer to gather information that has a direct bearing on the aims of the study. The interview also allowed the researcher to modify one's line of inquiry follow up interesting responses and further probe for more useful information.

Interviews were used because they provide a high level of flexibility and give a chance for further probing into interesting issues. The interviews also gave the researchers a chance to explain unclear questions and observe hidden and non-verbal cues⁸.

Questionnaires were used to obtain data from local community members with 600 of them being given to the villagers. Questionnaires were used because of they give interviewees independence and freedom of response as they can be completed in the absence of the interviewer. They can also reduce travel costs since they can be transported in bulk and also reduce chances of subjectivity and bias since respondents have more time to respond.

The researchers made use of field observation in order to observe signs of uses and damage/destruction which was in the forest and to observe efforts which were being made to increase and/or protect forest resources in the study area. Observations were used because they are a direct technique which depend on

seen events and also lack the artificiality found in other techniques. They were used to validate the data obtained in the interviews.

Data presentation and analysis procedures: Data obtained from the study will be presented in tables and graphs in order to give an overview of findings to identify trends and to establish relationships between parts of the findings. Tables conserve space and present data in such a way that the narrative may be reduced, and can also be self explanatory⁹. Relationship among data in a table may be visualized and this process facilitates the process of data comparison. Tables make it easy to summarize data by putting it into individual cells. Comprehension of tabulated data is enhanced as it is easier to understand and remember such data. Graphs will also be used to offer good visual presentation of the results.

Results and discussion

This part of the paper focuses on the presentation, discussion and analysis of the results. Pie charts and tables will be used to present the results followed by an analysis and discussion of these results.

Responses on the issue of sustainability: Information gathered indicated that 90% of the respondents think there is no

sustainability, 6% think there is sustainability, and 4% was not sure as to whether there is sustainability or not as shown in Figure-1.

The majority of respondents were therefore of the opinion that forest resources are not being used in a sustainable manner, with some pointing out that the acacia trees were being cut down excessively in order to fence illegal fields around the Mnyabetsi dam. The dam is a major source of water for the community and livestock and risks being silted due to the proliferation of unprotected fields on the banks of the dam.

Forest management activities done in the study area: Forest management activities in the area identified by local community members included the clearing of a cactus plant which is listed as an invasive alien species by the Environmental Management Act and it is obligatory for the responsible authority to clear it. Other activities identified were awareness campaigns run by the Forestry Commission and the Environmental Management Agency and the tree planting programme run by the same organisations. The tree planting programme is an annual programme run by the Forestry Commission and the Environmental Management Agency where trees are planted every first Saturday of December. Table-1 summarises the activities that local communities were aware were done in the ward.

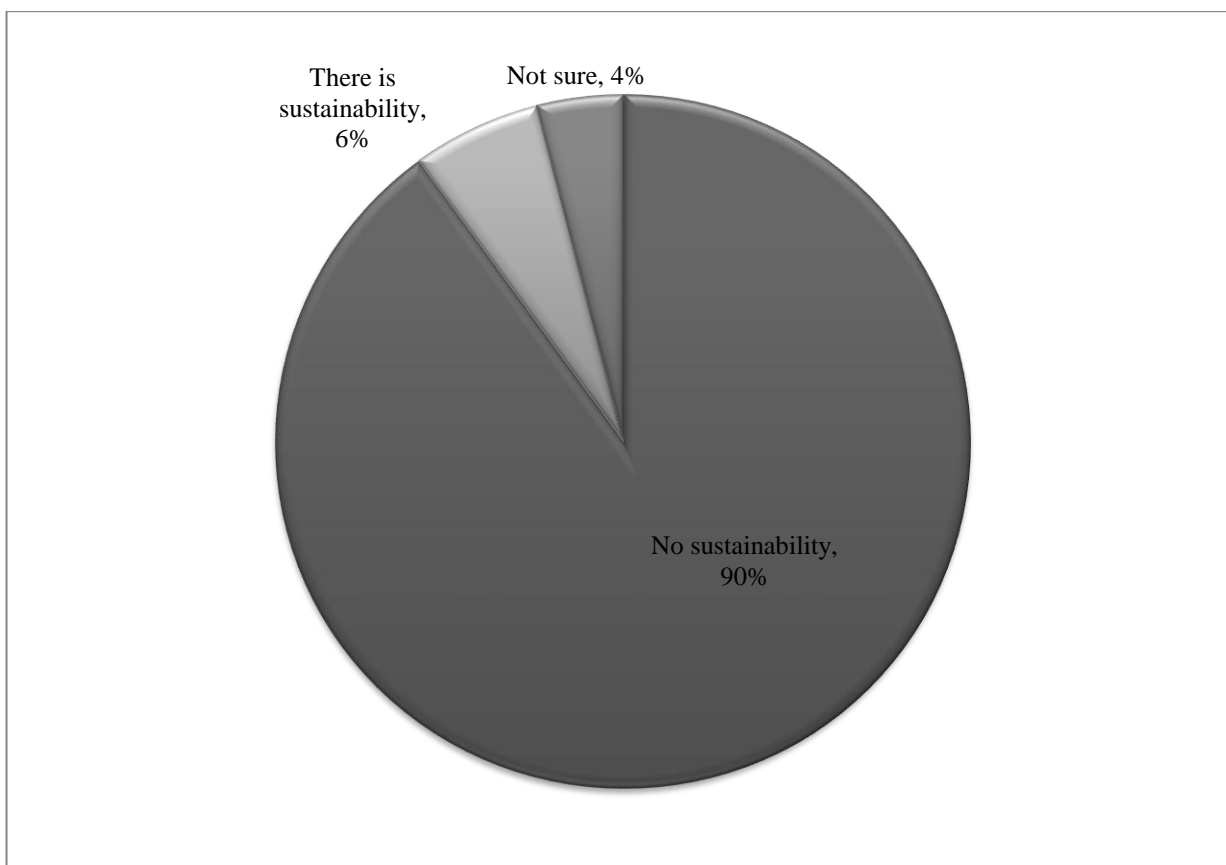


Figure-1: Responses on Sustainable use of Forest Resources.

Table-1: Activities done in the study area.

Activities done during 2005-2015	Respondents who agreed that it was/is done
Growing of trees	80%
Preserved areas in the study area	0%
Thinning	0%
Pruning	0%
Using branches not the whole tree	2%
Caterpillar farming	0%
Bee farming	0%
Removal of dangerous plants	100%

Poor methods of harvesting: The researchers observed that people are mainly cutting down and using trees which are immature for most of their domestic purposes. Immature trees, especially from the mopane tree are used for most of the domestic uses of trees as shown in Table-2.

Table-2: The Percentage of mature and immature tree used.

Purpose	Mature	Immature
Roofing	10%	90%
Building hut walls	5%	95%
Building/Making kraals	50%	50%
Fencing	20%	80%
Wood caving	40%	60%
Brick moulding	80%	20%
Firewood	35%	65%
Total	240	460

Mature trees are mainly used in the burning of moulded bricks and in making kraals. The other purposes are mainly done with immature trees which is easy to obtain and use unlike mature trees which are hard and difficult to cut down and use.

Factors hindering the attainment of the sustainable use of forest resources: Sources of livelihood: Investigations made on the sources of livelihood revealed that most people depend on farming, with some depending on brick moulding, caterpillar harvesting, vending, wood carving, doing menial jobs for other farmers, and on formal employment. However, this does not

imply that all respondents are depending only on a singular means of living. Table-3 shows sources of livelihoods and their percentage responses.

Table-3: People’s Sources of livelihood and their percentages.

Sources of Livelihood	Percentage Response
Farming	26%
Formal employment	8%
Menial jobs	14%
Brick moulding	13%
Caterpillar harvesting	17%
Vending	14%
Wood caving	8%

The largest percentage of people depends on farming, although there is very little rainfall received in the study area. Only 8% are formally employed. The other sources of livelihood are done because of poverty and most of them involve the use of forest resources, thereby leading to deforestation. One of the village heads explained that most people depend on forest resources, and these people are destructive, although it becomes difficult for him to punish or report such people since they do so because of poverty which is worsened by frequent droughts.

Methods of increasing yields: The researchers sought to get information on what villagers do in order to increase yields. Figure-2 shows the different ways in which people increase their yields.

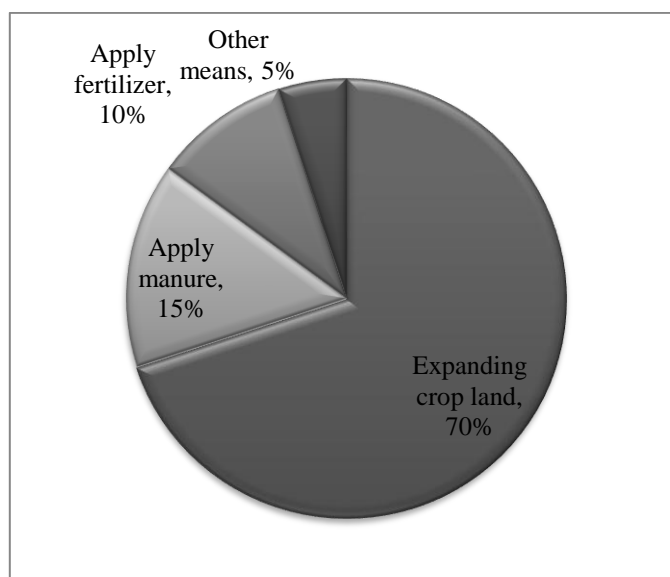


Figure-2: Methods of Increasing yield.

It was revealed that 70% would increase yield by expanding the cropland, 15% said they apply manure, 10% said they apply fertilizer, and 5% said they use other methods. This shows that most people in the study area believe that farming large areas of land will bring more harvest; hence there is need for them to clear more lands whenever they want to increase their yields. This means agriculture is causing destructions to forests when natural forests are turned into farming areas. The major reason for this might be the fact that land is readily available as compared to manure and fertilizers. For manure to be available one has to have a sizeable number of livestock which most communal farmers do not have. Credit might be the limiting factor to the acquisition of fertiliser.

Population Growth: According to data collected from the 2002 and 2012 population census, there is an increase of population in the study area^{10,11}. In 2002 there were 5 376 people in the ward, whilst there were 5 971 people in the same ward during the 2012 population census^{10,11}. There was an increase of 595 people. Table 4 shows this data.

Table-4: 2002 and 2012 population of Ward 17.

2002 Population	2012 Population	Percentage Increase
5 376	5 971	11.07%

The information in Table-4 shows that population in the study area increased by 11% from 2002 to 2012, which is 1.1% per annum. This population increase means an increase on land cleared for agriculture, building homes, shops and schools.

Trees which are commonly used for different purposes: The researchers interviewed some villagers about trees which they commonly use for different purposes in the study area. Table-5 shows percentage of people who use the different trees for different purposes in the study area.

Mopane (*Colophospermum mopane*) tree is the most widely used tree for different purposes. 90% of the respondents said they use the mopane tree for building their huts and 80% said they use it for building kraals. 70% of the respondents said they use it for fencing their homesteads and fields whilst 60% said they use it for firewood. However only 10% said they used the mopane tree for wood carving. The copper-stemmed cork wood (*Commiphora harveyi*) is mostly used for wood carving with 60% of the respondents saying that they were using it for that purpose. The copper-stemmed corkwood has great potential as fence poles as these can develop shoots in the rainy season and therefore become live fences. The copper stemmed corkwood is used mainly for wood carving with only 2% saying they use it as fence poles and only 1% saying they use it for fencing (brushwood). The indigenous acacia (*Acacia karoo*) is commonly used for fencing (brushwood) although it can easily rot because the local communities want to take advantage of the thorns in the tree which keep away livestock and wild animals. 55% of the respondents said they used acacia for brushwood fencing whilst 10% said they use it for firewood. The other major tree is *Combretum imberbe* which is mainly used for brushwood fencing and firewood with 17% of local community members saying they use it for brushwood fencing and 15% saying they use it as firewood. Then there is *ivimila* (*Kirkia acuminata*) which is mainly used as fence poles by 15% of the respondents and used sparingly as firewood. The use of the same kind of tree, (like the way mopane tree is used) for many various purposes can lead to deforestation and unsustainable use of forest resources, since there are some resources like caterpillars and bees which are found in or on these trees. Some people over-use the same type of trees because they would be unaware of some other tree species which are available and capable of performing the same task. One villager explained that the copper-stemmed cork wood can provide good poles for fencing if it is cut and used during the spring season so that it can develop some roots during the rainy season and develop into another tree and thus become a live fence which does not need replacing now and again.

Table-5: Percentage of respondents using trees for different purposes.

Use of Trees	Mopane <i>Colophospermum mopane</i>	Knop thorn <i>Senegalia nigrescens</i>	Ivimila <i>Kirkia acuminata</i>	Iminyela <i>Commiphora harveyi</i>	Marula <i>Sclerocarya birrea</i>	Umtswiri <i>Combretum Imberbe</i>	Isinga <i>Acacia karoo</i>	Other
Poles for fencing	70%	6%	15%	2%	0%	0%	0%	7%
Wood caving	10%	2%	3%	60%	20%	0%	0%	5%
Making kraals	80%	5%	2%	0%	0%	0%	5%	8%
Building huts	90%	3%	2%	0%	0%	0%	0%	5%
Fire wood	60%	5%	5%	0%	0%	15%	10%	5%
Fencing (Brushwood)	20%	2%	2%	1%	0%	17%	55%	5%

Education Concerning the Need for the Sustainable use of Forest Resources: Through interviews which were conducted with the EMA and Forestry Commission officials and responses from villagers, the researchers learnt that efforts have been made to educate people in the study area about the importance of sustainably using forest resources. Villagers were asked in order to get information regarding their knowledge of the sustainable use of forest resources and 90% of them revealed that they had received some education on the sustainable use of forest resources.

The gathered information shows that the majority of people in the study area know about the need for sustainably use forest resources, although they do not put it into practice. One respondent said that he is aware of the need to sustainably use forest resources, but he will not do so just because even if he tries to conserve these resources, some people will continue misusing these resources for their own benefit without any punishment which is imposed to such people. Another respondent said that people are now foreseeing the possibility of the tightening of environmental laws, especially on the use of trees; hence they are now using these resources as much as they can before stiff laws are implemented and reinforced.

The Sustainable Use of Forestry Resources: The study has shown that there is no sustainability in use of forestry resources in the study area. The respondents' responses and the researcher's observations revealed that there is no sustainability in the way forestry resources are used. Many activities which should be done in order to increase, preserve, conserve and protect forest resources are not being done in the study area. Tree planting as a community was done once at a local secondary school known as Bengo Secondary School on the National Tree Planting Day, but the seedlings were eaten by animals, whilst some died because of the shortage of water. The Forestry Commission Provincial Manager cited the shortage of water and insecurity as their main challenges in tree planting programmes in many rural areas.

The only community effort which was successfully done was through the assistance of the Environmental Management Agency (EMA) is the removal and destruction of a harmful plant called cactus rosea. However, open lands/spaces which remained on lands which were previously occupied by this plant were not filled by planting trees as per the EMA's plan. Failure to grow trees on these spaces and some other open and bare lands which are in the study area is a clear indication of failing to achieve a sustainable use of forestry resources. There is a need for open spaces on land to be filled by growing trees¹.

It was also noted that people in the study area are mainly using trees which are immature, instead of cutting and using mature trees which have wood which is strong and durable. The use of mature trees can help minimize the cutting down of many trees because each mature tree can produce many poles by dividing a large trunk into smaller pieces and obtaining other poles from

branches, unlike immature trees which produce one pole per tree, which can rot within a short period leading to the need to replace them with some other poles. The use of immature trees is one of the poor harvesting methods which leads to the unsustainable use of forest resources¹².

Most fields in the study area do not have metal poles, wire or wire mesh, but are fenced using trees. The indigenous acacia is the tree which is mostly used for this purpose. This tree can rot within six months, meaning that more trees would be needed for fencing every season. Therefore, the study reveals that there is no sustainability when comparing the rate at which trees are cut down with the rate at which new trees grow.

Factors Hindering the Attainment of the Sustainable use of Forest Resources: Poverty is one of the factors which hinder the sustainable use of forest resources in the study area since poor people fail to buy things like electricity, gas/paraffin stoves, metal poles, wire and other materials and equipments, but mainly rely on forest resources. The study revealed that the largest percentage of people in the study area depend on farming for their livelihood, while the place is drought prone. The other sources of livelihood like wood curving, brick moulding, selling firewood and some other activities lead to the deforestation, but people are forced to depend on them because of poverty.

Population growth and land clearance for agriculture are also responsible for the failure of attaining a sustainable use of forest resources in the study area. A population increase of 1.1% means an increase of pressure on forest resources since most people rely on these resources for their livelihoods. It also increases land clearance for croplands since most people (that is 70%) in the study area increase their yields through the expansion of croplands. There cannot be sustainability in the use of forest resources in the study area if forest resources continue to be destroyed to get land for growing crops which in turn do not produce much because of the shortage of rainfall, thereby forcing people to seek other desperate means of living which negatively affect forest resources. This is similar to Whitlow (1988)'s observation which identify the extension of cropland under the conditions of population increase as the main case of deforestation the tribal communal lands⁴. Chenje, Sola and Paleczny (1988) made a similar observation and explained that various studies have shown that the long established densely populated communal areas of Manicaland, Masvingo and Mashonaland central have lost most of their wood land resources¹³.

The study revealed that people are aware of the importance of sustainably using forest resources, but continue to mismanage these resources in the study area because there is no efficient reinforcement of environmental laws. Village leaders are reluctant to punish and report people who break environmental laws, whilst the Forest Commission and the EMA usually wait for reports from communities in most cases. There is a need to enforce regulations and avoid the lethargic approach which is prevailing at the moment in Zimbabwe¹³.

The study shows that the mopane tree is used for many purposes as compared to the other tree species. This can lead to the creation of open lands where the place would be dominated by the mopane tree. The cutting down of this tree leads to negative impacts on other forest resources which are found in the mopane forest like caterpillars, bees, and mushrooms. The study also found that the indigenous acacia is the second mostly used tree species. The chopping down of these trees can negatively affect goats and some other animals which rely on them. From the study of trees which are mainly cut down to perform various purposes, it seems trees which do not produce edible fruits are the ones which are mostly used.

Conclusion

After all these findings, the researcher concluded that there is no sustainability in the use of forest resources in the study area. It also concluded that people in the study area are aware of the need to sustainably use forest resources, but factors like poverty, population growth, land clearance for agriculture and poor enforcement of environmental laws have been found to be responsible for the unsustainable utilization of forest resources.

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