Factors for Loss of Biodiversity in Great Ruaha Catchment Area (GRCA): A Case of Ruaha Ward in Iringa Municipality

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ABSTRACT

The study was conducted in Iringa municipality based on the factors influencing loss of biodiversity in Iringa municipality, A case of Ruaha ward. The study focused on exploring activities practiced in Ruaha Catchment Area which related loss of biodiversity. Both primary and secondary data were used. The methods of data collection were observations, interview and documentary review methods. Qualitative data were analyzed using statistical package for services solution (SPSS 20) which descriptive statistics including percentages was used. The results show that major factors lead to loss of biodiversity are agriculture, brick making, charcoal burning and livestock keeping. The most effects of these factors are drought, decline of water and loss of soil fertility. This is due to deforestation and use of artificial fertilizers. It is recommended that government should have information of regulation (increase fines to law breakers). Local communities should be actively involved in the decision-making and planning for conservation of biodiversity, enforcement of laws and establishment of by-laws so as to combat loss of biodiversity. Education and awareness about biodiversity conservation should be provided to the community members.

Keywords: Catchment, Biodiversity, Ruaha

1.0 INTRODUCTION

Biodiversity is the variation of living organisms from all sources, terrestrial, marine and other aquatic ecosystems and all the habitats of which they are part; this includes diversity within species, between species and of ecosystems (Stein, 2000). In the present era, human beings are considered as the most dangerous

cause of destruction of the earth's biodiversity. However, there is five factors identified which lead to biodiversity loss almost all over the world; those are habitat destruction, invasive species, pollution, human overpopulation and over-harvesting. In different parts of the world, species face different levels and types of threats. But overall patterns show that the most causes is human being factors (Wilson, 2006).

Secretariat of the Conservation on Biological Diversity (SCBD) (2010) explained the rate of biodiversity loss has not been reduced because the five principle pressures on biodiversity are persistent, even intensifying habitat loss and degradation, climate change (including global warming), excessive nutrient load and other forms of pollution, over-exploitation and unsustainable use, and Invasive alien species (Boris, 2006).

Increasing demands of globalization and consumption have made a significant impact on biodiversity loss. Areas of high resource extraction are often the regions with the highest species density. India is home to around 46,000 different species of plants alone, and has as many as 81,000 different species of animals, which accounts for approximately 8% of the world's biodiversity. Brazil, whose Amazon region is subject to extreme deforestation, is home to 55,000 species of flora, accounting for 22% of the earth's total. This destructive activity in such high density areas plays a large role in our current rate of extinction (Kerry, 2001).

In Tanzania the loss of biodiversity also is the problem especially around Ruaha Catchment Areas (RCA) (Sosovele, 2001) . The RCA is important for agriculture, livestock keeping, forestry, fishing, mining and tourism/wildlife, and timber plantation activities that are important for the welfare of the people in the region and in Tanzania in general. The Great Ruaha River, which for a long time has been a perennial river, since the mid-90s become seasonal. The amount of water has been declining increasingly during the dry season leading to low or no flows at all during the dry season. The declining and drying of water during the dry season has had major impacts on the biodiversity. The continued growth of human populations and of per capita consumption have resulted in unsustainable exploitation of Earth's biological diversity, exacerbated by climate change, ocean acidification, and other anthropogenic environmental impacts (Clements, 2010). Report from Iringa Municipal (Ecosystem and biodiversity for National, 2011) showed that biodiversity keeps on decreasing at high rate (70%). Scarse

information exist observed trend in biodiversity in the area.. Adequate information on causes of loss of biodiversity in the area is pre requisite for developing effective management of biodiversity. Therefore, this study sought to reveal the information.

2.0 METHODOLOGY

The study was conducted in Iringa region specifically in Ruaha Catchment Area in the year 2015. The study was carried in Iringa Municipal at Ruaha ward. Iringa Municipal lies between Latitude 7° South of Equator and Longitude 35° East of the Greenwich Meridian. The Altitude is between 1560 and 2000 meters above sea-level. The Municipality covers an area of 176.987 Square Kilometers. The temperatures are relatively cool all the year round. The mean annual temperature is about 19^0C, June and July are the coolest months of the year with temperatures between 11^oC and 22^oC while December is the warmest month of the year with temperatures ranging from $15 – 28^o$C. Iringa Municipality has only one rainy season, which is from December to May. Annual average rainfall is about 600mm. The Municipality falls in the Agro Ecological Zone three (AEZ III) (Mugerezi 2002*).* Administratively Iringa municipal council is divided into 16 wards including Ruaha ward as the area for study.

A cross sectional research design was used to collect qualitative and quantitative information. This design was selected because it enables the effective collection of data from different respondents at a point**.** The sampling procedures employed both probability and non-probability sampling. Under probability, simple random sampling was used to select 95 respondents from households whereby five key informants was purposively selected under non probability sampling. Structured questionnaires were used to acquire information on factors influencing loss of biodiversity in great Ruaha catchment area. The questionnaires comprises of closed and open-ended questions, which were answered by respondents.. Pre testing of the questionnaire was done in the study area and necessary changes were incorporated before embarking on the actual study.. The collected data was coded, cleaned and analyzed by using IBM Statistical Package for Social Solution (IBM SPSS version 20). Descriptive statistics such as frequencies, percentages and mean were used for analysis.

3.0 RESULTS AND DISCUSSION

3.1 Main Activities Practised in Great Ruaha Catchment Area

There are many activities practised in GRCA which related to loss of biodiversity such as agriculture, brick making, livestock keeping, beekeeping and charcoal burning (Table 1).

Table 1: Activities Practiced in GRCA which Related to Loss of Biodiversity

Economic activities	n=95	Percent
Agriculture	62	65.2
Brick making	43	45 .3
Beekeeping	29	30.5
Livestock keeping	12	12.6
Charcoal burning	10	10.5

3.1.1 Agriculture

Agriculture is the major activity (65.21 %) practiced in the GRCA compared to other activities (Table 1). The desire to increase crop production leads to more desire of bigger land portions that also means more deforestation, hence causing loss of biodiversity in the GRCA.

Plate 1: Irrigation agriculture for water melon

Plate 2: Irrigation agriculture for onions

Most people preferred to use artificial fertilizers which help them to get more products (Table 2). The results shows that, Most of the farmers (77.9 %) use artificial fertilizers, followed by 15 % for those who use both artificial and natural fertilizers. This implies that most of people preferred to use artificial fertilizers for earning more yield, But on long run it make the land not fertile.

Table 2: Kind of Fertilizers Used in Agriculture

Types of fertilizers used	Frequency	Percent
Artificial	74	77.9
Natural	6	6.4
Both	15	15.7
Total	**95**	**100**

3.1.2 Brick making

The findings in Table 1 indicate that, 45.3% of the respondents were involved in brick making. Brick making is another factor which leads to loss of biodiversity in GRCA .Brick making lead to loss of biodiversity through land clearance, cutting logs and digging soil as shown in Table 3 and Plate 3. This activity is done in dry season where people come from different places for brick making as means to supplement their income.

Table 3: The Way Brick Making Lead to Loss of Biodiversity

The way brick making lead to loss of biodiversity	n=95	percent
Deforestation	82	86.3
Land degradation	13	13.7

Plate 3: Deforestation for brick making

3.1.3 Beekeeping

Result from the Table 1 indicates that 30.5% of the respondents involved in beekeeping. Beekeeping is seen as low factor influencing loss of biodiversity because the morden way is used to harvest honey. In many ecosystems, bees are

important pollinators ensuring the maintenance of those ecosystems. Beekeeping can be an important sustainable and alternative source of income in rural areas, benefiting communities living in and around forests. Beekeeping can also be a practical tool for raising the awareness of the communities of the importance of good management of their forests and for stimulating their conservation, thereby improving their biodiversity

3.1.4 Livestock keeping

A finding from Table 1 shows that 12.6% of the respondents were livestock keeping. This activities lead to loss of biodiversity when many people involving in open grazing and over grazing. The land to graze cattle and grow livestock feed has been a driving force behind the destruction of tropical forests, particularly in RCA. Deforestation releases billions of tonnes of carbon dioxide and other greenhouse gases into the atmosphere and causes the extinction of tens of thousands of species every year. Livestock production compounds the damage. In a few short years, overgrazing, compaction and nutrient loss turn cleared forest lands into eroded wastelands.

3.1.5 Charcoal burning

Results from the Table 1 show that 10 responses with 10.5% were charcoal burning. This activity leads to loss of biodiversity by cutting logs and burning them. .The same study was observed by Sosovele (2001). He said that the main economic activities in the Ruaha Catchment Area (RCA) are agriculture, fishing, livestock keeping, bee keeping, charcoal burning and tourism. Agriculture employs about 90% of the population in the catchment.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 CONCLUSION

There are many activities practised in GRCA which related to loss of biodiversity. Agriculture is the major activity practiced in the study area and is the almost factor which influencing loss of biodiversity in GRCA .Brick making is another factor which leads to loss of biodiversity in GRCA through land clearance, cutting logs and digging soil. This activity is practiced in dry season where people come from different places for brick making as means to supplement their income. Other activities are charcoal burning and livestock keeping. Beekeeping is seen as

a low factor influencing loss of biodiversity because the Morden way is used to harvest honey.

4.2 RECOMMENDATIONS

Government should prohibit farmers and brick makers to undertake their activities near the source of GRCA. Frequent surveying must be done for control the area. Environmental Management Act 2004 (EMA) should be used for managing biodiversity. A forestation and reforestation must be done around all sides of the catchment areas. Conducting regular meetings so as to review strategies concern biodiversity conservation if they going as well as planned. Provision of education about biodiversity conservation and environment in general is needed.

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