Transmission mechanisms of Traditional Ecological Knowledge and sustainable management of natural resources among the Lozi-speaking people in Barotse floodplain of Zambia

by

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Abstract

The last periods have witnessed a growing research interest of Traditional Ecological knowledge (TEK), with some research focusing on its role in natural resource management. Here, we contribute to this body of knowledge by focusing on the transmission mechanisms of TEK and sustainable management of natural resources among the Lozi-speaking people of Western Province in Zambia. Although TEK plays a role in the sustainable management of natural resources, its transmission between or among generations, remains a neglected field. Using primary and secondary data sources, we found that TEK in the study area included taboos associated with the sustainable use of natural resources and traditional teachings that guided the local people as to the correct time to harvest their natural resourcesas there was evidence of plant and animal species in the study area. The study further showed various ways in which TEK is transmitted from one generation to another in the Barotse floodplain. The most prevalent mode of TEK transmission shown in the study area was found to be through informal transmission. This is because the transmission of TEK was characterised by cultural, rituals and other cultural practices such as kuloba sitaka and kufuluhela. It is through these rituals and ceremonies that TEK is transmitted. (from one generation to another in the Barotse floodplain –can be deleted). Horizontal and vertical mode of TEK transmission was also evident in the study area. This is because the most common actors in the transmission were parents who were imparting the knowledge to their children.The study, therefore, recommends more studies to be undertaken on transmission mechanisms of TEK in other tribal groupings. This is in order to help preserve

the knowledge which is currently receiving little attention. There is also need for natural resource managers to seriously consider the significance of TEK and consider its application in natural resource conservation and management. Finally, we recommend that, in order for local communities to use natural resources in a sustainable way, greater attention should be paid to the TEK possessed by communities.

Keywords: Traditional ecological knowledge; natural resource management; sustainable utilization, transmission; Lozi people; Zambia

1.0 Introduction

Traditional Ecological Knowledge (TEK) has been of interest to environmental policy makers (Haruyama 2003). As mentioned in the preamble of the Convention on Biological Diversity (CBD) agreed at the United Nations Conference on Environment and Development (UNCED, 1992), TEK is viewed as the means that enabled indigenous peoples to interact with the natural environment surrounding them in a sustainable manner. The use of TEK therefore has been advocated for the sustainable management of natural resources (Milupi et. 2019). This is because TEK systems have helped to protect natural resources from being depleted or degraded (Ohmagari and Berkes, 1997; Gadhil *et al*., folks 1993). Several scholars (Barkes*et al*. 2000; Gilchrist *et al.,* 2005;Milupi *et al* 2017; Chileshe, 2020) have recognised TEK as being useful source of information that can complement western scientific methods to resource management. This is because TEK acts as an alternative source of data especially in remote places (Gilchrist *et al.* 2005). TEK has also been found to add to the extensive information on the natural history and demography of wildlife species that have contributed to the sound management of wildlife resources (Milupi *et al*. 2017; Gilchrist *et al.,* 2005). TEK is defined differently by different scholars. Mmassy and Røskaft (2014) defined TEK as 'the cumulative body of knowledge and cultural continuity of resource use held by specific groups of people and their relationship with the environment', while Berkes*et*

al., (1995) defined TEK as a cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment. In this study, TEK is used as a broader term, covering not only ecological knowledge but other knowledge and skills related to making a livelihood. Scholars such as Olsson and Folke (2001) noted that local resource users had substantial knowledge of the resources and ecosystems as such they could be good local managers of their resources if they were directly engaged as active participants in their management.

TEK,according to Olsson and Folke (2001), evolved through adaptive processes and has been handed down through generations. This took place by cultural transmission about the relationship of living beings that included humans exchanging information between them and issues relating to their environment (Olsson and Folke 2001); Ohmagari and Berkes, 1997; Haruyama, 2003). In any society, the transmission of traditional knowledge among generations is a complex and fundamental process embedded within the deep socio-cultural structure (Inglis, 1993).TEK transmission however differed from culture to culture. For example, among the aboriginal culture, children were "learning by doing". Verbal instructions were not usually given to children (Berkes, 1997). The children were encouraged to learn skills by playing and imitating adults through participation in subsistence production activities (Berkes, 1997).

Transmission of knowledge systems as noted by several scholars (Laudari 2010 and Olsson and Folke 2001)helps on imparting specific knowledge on species identification, skill to use particular tools and reminding customary laws. Based on mode of transmission the exchange of TEK system can be categorized into two forms, i.e. formal and information mode (Laudari 2010). Similarly on the basis of level of transmission, it can be classified into vertical mode and horizontal mode of transmission.

Despite the recognition of TEK by several international organizations and scholars in natural resource management, its cultural transmission from generation to generation remains anneglected unkempt field. The aim of this study is, therefore, to

explore the transmission mechanisms of TEK and its significance in the sustainable management of natural resources among the Lozi speaking people in Zambia.

1.1 Description of Study Area

The study was conducted in the Barotse floodplain of Mongu District, western Zambia. The Barotse plains are found on both the eastern and western sides of the Zambezi River. The plain is located 600km west of Zambia's capital city Lusaka. It is a vast wetland along the upper Zambezi River near the border with Angola (Figure 1). The eastern part of the plains is in Mongu District while the western part is in Kalabo District. The region is one of Africa's greatest wetlands with an extent of some 230 km from north to south (GRZ, 2014). Although many ethnic groups are found in the Western Province, the area is mainly the homeland of the Lozi people or *Barotse* who were previously known as Luyi. The Lozi people are also the inhabitants of the Barotse floodplain, and derive various livelihoods from the floodplain, such as fish and farm crops. The traditional authority of the area is the "Barotse Royal Establishment" (BRE). This institution is led by a King, the Litunga (Owner of the Land) who is assisted by traditional ministers locally called *Indunas*. The Barotse is famous for its cultural heritage, and in particular the *Kuomboka* ceremony, when the Litunga leaves his flood capital, Lealuiin the plain to go to his mound palace of Limulungaon the upper land. The *Kuomboka* ceremony is an annual relocation of people, their cattle and the Litunga. It is a highly-celebrated traditional ceremony (Nkhata and Kalumiana, 1997). "*Kuomboka"*is a silozi word which means coming out of water.Agriculture is the backbone of most people in the Barotse floodplain (Baidu – Forson *et al*., 2014;Turpie *et al.,* (1999). About 90 percent of the population in Barotse floodplain is involved in agriculture, mostly for subsistence. Mongu East and the Borotse floodplains are the main agricultural production areas (Simwinji, 1997).The agricultural economy of the Borotse floodplain involves a strong interaction between herding, cropping and fishing activities (Simwinji, 1997). Crops grown in the floodplain area include rice (Oryza spp.), which is grown on lower areas of the plain

locally called *litapa*; maize (*Zea mays*), grown on raised mounds locally called *mazulu,* and cassava (*Manihote esculenta*) grown on the upland areas. Maize is the preferred crop.

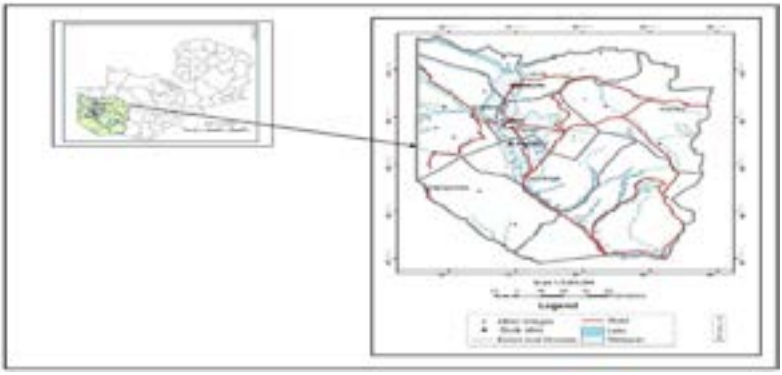

Figure 1: Map showing the location of Barotse floodplain

2. 0 Materials and Methods

The study was based on secondary and primary data collected between July and October, 2015. Secondary data were derived from published materials and policy documents whereas primary data were collected through ethnographic method namely key-informant interviews who included village headmen and elders in Lealui and surrounding areas. Literature review was conducted on various aspects of TEK which included, among others, transmission mechanisms of TEK and how TEK contributes to sustainable use of natural resources. Analysis of secondary data provided a better understanding of: the transmission mechanisms of TEK and how it promotes the management and sustainable use of natural resources. In the present study, journal papers and government records such as the national environmental policy were examined. These documents provided background information for the research and allowed for assessment of the suitability of the project before conducting interviews.

Key Informant interview

Information on the transmission mechanism of TEK among the Lozi people of Western Province was collected from key informants who included village headmen in Lealui and surrounding areas. The key informants were interviewed in silozi. The responses of the traditional chiefs were transcribed and then later translated into English. Some of the aspects the key informants were interviewed on included:

- Natural resources predominant in Barotse Floodplain,
- Common TEK found among the Lozi-speaking people of Western Province and on
- Ways in which TEK is transmitted among the Lozi people in Barotse floodplain

3.0 RESULTS

3.1 *Results from Document analysis*

Information from policy documents that were examined such as national policy on environment clearly stipulates that the local community should be involved in natural resource conservation but does not offer insights into TEK transmission and its role in natural resource conservation. Information from journal paper further gave an overview of common TEK found among the Lozi speaking people of Western province.

3.2 Natural resources predominant in Barotse Floodplain

According to key informants interviewed, indigenous non-perennial plant species common in Barotse floodplain, include *mampana*, (edible aquatic tuberous plant).*Linjefu* (water nut of an aquatic plant)and *mashela* (edible tuberous plant of the water lily family). There is also a diversity of fish species in the Barotse floodplain such as tiger fish *(Hydrocynus vittatus)*, lungfish (*Protopterus annectens*) and rare or endemic cichlid (*tilapias)* and *cyprinid*Species. The fish species are found in different water bodies that include lakes, ponds, streams and rivers such as the Zambezi River.The floodplain also has several plant species that include many fruit-bearing plants such

as *muzauli, mumosomoso*. Different bird species such as*Nongolo* (open-bill stock), *Machikwi* (spur-winged goose), *Miombo* (*Marabou stock*), *Kanu'umbi* (*cormorantspp*), are also common in the Barotse floodplain.

3.3. Common TEK found among the Lozi-speaking people of Western Province

The Lozi-speaking people of Western Province have a rich culture with a lot of TEK that contributes to the conservation of natural resources in the province. These practices include taboos that forbid cutting down of trees on shrines and river sources. Certain plant species such as cutting *mukwa*, *mukusi* or fruit-bearing ones were not allowed to be cut without permission from the Litunga. There were also taboos related to animal killing. Certain animal species were not allowed to be killed without permission from the chief such as eland *(pofu*). Certain creatures like spiders, lizards, eland, python (*mboma)*, some fish species such as *mbundu* (*Ctenopoma multispine)*, *lubango* (*Schilbe intermedius*), *singongi (Synodontis species),* were also not allowed to be killed without permission. There were also restrictions on the time of harvesting fish and bird among the Lozi people. Harvesting was done collectively and was referred to as *kulobasitaka (Moonga and Milupi 2015)*. This cropping undertakingwas mostly done along the banks of most water bodies such as the ZambeziRiverand ensured that birds were only harvested once in a year (Milupi, Moonga and Chileshe, 2020). Another conservation practice common among the Lozi people, according to key informants, is referred to as *kutulisa*. This is the practice where cattle are not allowed to graze on the same piece of land for a long period of time. This practice is common in the Barotse floodplain where there are plenty of pastures for animals. The practice prevents soil degradation.

3.4 Ways in which TEK is transmitted among the Lozi people in Barotse floodplain

Through key respondents, the study found that several ways were used to transmit TEK from generation to generation among the Lozi people in Barotse floodplain.

- Story telling by the elderly members of the family.
- Use of songs to transmit special information to some individuals or group of people in society; songs were also sung at different occasions, such as initiation ceremonies
- Having secluded sessions where young people were taught different aspects of their lives such as *Siyomboka* common ceremony usually done on girls when they come out of age.
- Through experience as people practiced productive work such as *kuloba sitaka (*seasonal killing of birds along the banks of the rivers and streams*), and kutulisa(*seasonal movement of animals from one place to another*).*
- Through oral literature (*matangu* and folk tales, proverbs and songs)
- Through the Lozi convention where illegal activities were forbidden such as the cutting of edible trees
- Through a taboo system such as not eating certain animal or plant species which were obeyed by the new generations by traditional concepts

4.0 Discussion

The predominant TEK exhibited in the Barotse floodplain according to the study findings contributed to the sustainable use of natural resources. For example, the traditional systems of asking traditional leaders' authority to give permission to people who would like to cut certain tree species from their gardens helps to conserve forests and special types of trees in the floodplain. Practices such as *kutulisa* (a common practice found among the Lozi people where cattle is moved from one place to another allows for regeneration of the soil. Furthermore, the various taboo systems found in the floodplain also helps in discouraging people from rescinding the environment.

Others practices that contributed to the sustainable use of natural resources in the flood plain included restrictions on natural resource harvest such as killing of bird species along river banks in a practice known as *kuloba sitaka* and restrictions on plucking of young fruits for making elicit beer such as *kachasu*. Hunting of some animals, such as *pofu,*was not allowed unless permission was granted by the chief. All these methods contributed to the sustainable management of natural resource in the area and also led to an increase in wildlife species.

In relation to transmission mechanisms of TEK in the Barotse floodplain, the study found that informal transmission of TEK was prevalent in the area. This is because TEK transmission in the area is characterised by cultural, rituals and other cultural practices such as *kuloba sitaka* and *kufululuhela*. It is through these rituals and ceremonies that TEK is transmitted from one generation to another. .In addition to cultural practices and rituals, taboos were also noticeable in TEK transmission in the area. Some of these toboos according to the study included restrictions in eating certain types offood such as some animals and plants species of ecological value. The study further found that TEK transmission in the area is also done through horizontal mode. This is because TEK transmission is naturally done by the elderly members of the family such as mothers, fathers, Uncles, aunts and grandparents. This type of TEK transmission was done within siblings and people of the same age group. For example during times of daily activities when boys were asked to herd cattle or going to harvest wild fruits and girls were asked to fetch firewood. It is through such chores that TEK would be transmitted within the family and to communities thereafter. TEK transmission in Barotse floodplain was also seen to be transmitted through vertical mode. This is because the most common actors in the transmission were parents who were imparting the knowledge to their children. The parents therefore endeavour to put the knowledge into practice by transferring it to their offspring who will thereafter put it into practice. However it is important to note that vertical transmission is only practiced by the family members of knowledge holders. In terms of the framework for the transmission of traditional

knowledge among the Lozi people of Barotse floodplain, labour is divided according to gender and age as the skills taught to a child.

5.0 Conclusion

The study findings showed diversity of natural resources found in Barotse floodplain. It also showed Common TEK prevalent among the Lozi-speaking people prevalent in the study area. The study further showed various ways in which TEK is transmitted from one generation to another in the study area. The most prevalent mode of TEK transmission shown in the study area was found to be through informal transmission. This is because the transmission of TEK was characterised by cultural, rituals and other cultural practices such as *kuloba sitaka* and *kufuluhela*. It is through these rituals and ceremonies that TEK is transmitted from one generation to another in the Barotse floodplain. Horizontal and vertical mode of TEK transmission was also evident in the study area. This is because the most common actors in the transmission were parents who were imparting the knowledge to their children. TEK transmission is crucial in ensuring continued preservation knowledge to younger generations to come and to prevent losing precious resources for sustainable utilization of natural resources. This is because there is no doubt that TEK has contributed to the maintenance of local biodiversity in the area. Furthermore, the diverse LEK systems identified in the study carry strong conservation messages and could also be used as entry points into sustainable natural resource utilisation and management.

6.0 Recommendations

Based on the findings of the study. The following are the recommendations:-

- There is a need to pay attention to the transmission mechanisms of TEK as little attention has been paid to the subject.
- There is also need for natural resource managers to seriously consider the significance of TEK and consider its application in natural resource conservation and management. This so

because little attention so far has been paid to the transmission process of TEK.

- It is further recommended that policymakers consider including the use of TEK in the management of natural resources, something that is not presently provided for.
- There is need to promote formal transmission of TEK in communities. This can be done by introducing it in learning institutions such as schools.

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