Traditional Ecological Knowledge and Sustainable Practices among the Lozi-speaking people of Zambia

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Abstract

There is a growing international recognition that Traditional Ecological Knowledge (TEK) can be a useful source of information to complement modern scientific knowledge (MSK) in the management of natural resources. The aim of this study was to investigate the scope of TEK and their sustainable practices among the Lozi-speaking people of Zambia. Qualitative data were collected through interviews with local people in the Barotse floodplains around Mongu town and were analysed through a thematic approach. The study found that TEK among the Lozi-speaking people is very common and widely used. It includes taboos, myths and restrictions associated with the sustainable use of natural resources. From the findings of this study, we recommend that to complement modern scientific knowledge (MSK) in the realisation of sustainable natural resource management, greater attention needs to be paid to the vast amounts of TEK possessed by the Lozi-speaking communities.

Keywords: Traditional ecological knowledge; sustainable utilisation; natural resource management; Lozi-speaking people; Zambia.

1.0 Introduction

Traditional Ecological Knowledge (TEK) refers to the collective knowledge and practices of groups or individuals about their experiences and beliefs in managing their natural environment. TEK is seen as a means by which indigenous people interact sustainably

with their surrounding environment (Milupi *et al*., 2017).
TEK 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 themselves and issues relating to their environment (Olsson & Folke 2001). In many communities, TEK was disseminated orally by the older adults in the community to the younger people as they were growing up (Milupi *et al*., 2017). It was also acquired through observation (Moonga & Milupi, 2015).

Scientists and organisations are increasingly recognising that TEK offers cheap, locally adapted solutions to development problems (Mundy & Compton, 1991). This is because TEK systems can help to protect natural resources from being depleted or degraded. Several scholars (Mmassy & Roskaft 2013; Rim-Rukeh *et al.*, 2013; Sasaoka & Laumonier 2012) have recognised the relevance of TEK for the sustainable management of natural resources including tropical forests, dry land, and mountain and Arctic ecosystems. Banda *et. al*. (2015) also observed that TEK among Lozi adults can effectively help the Barotse floodplain community in Western Zambia and the world at large to mitigate climate change. TEK may also be utilised by policy-makers to enhance sustainable development and be incorporated in climate change science (Milupi *et al.*, 2017). That is because local people have substantial knowledge of resources and ecosystems available to them. Therefore, they could be good local managers of their resources if they were directly engaged as active participants in the management of local resources (Olsson & Folke, 2001).

However, some scholars, such as Raymond et al. (2010), have argued that TEK and scientific approaches to the management of natural resources may be difficult to integrate. This is because the two approaches are quite different in terms of the acquisition of knowledge. For example, TEK is acquired orally and is not systematically recorded while Modern Scientific Knowledge (MSK) encompasses systematic and recorded knowledge or practice

which focuses on agreed principles or processes of study that include reliability and validity (Barnhardt & Kawagley, 2005). The critical issues in applying TEK, according to some scholars such as Kimmerer (2002) and Maurstad *et al.* (2007) include reliability and validity. Despite these differences between TEK and MSK, there is a growing international recognition that TEK can be a useful source of information to complement MSK in the management of natural resources (Chemilinsky 1991; Berkes *et al.*, 2000; Gilchrist et al., 2005; Namafe & Chileshe, 2013). Uprety *et al.* (2012) assert that, despite a growing number of articles published on traditional knowledge, only a few have addressed its contributions to ecological restoration per se.

The aim of this paper was to explore the nature of TEK prevalent among the Lozi speaking people and to investigate the transmission mechanism of TEK. The study further investigated how TEK was being used by the ethnic group in the conservation of the diversity of natural resources in its area. We regard the use of TEK as important, not only for the reasons advanced above, but also because it involves the participation of local communities in the management of their natural resources.

1.1 Description of the study area

This study was conducted in Mongu district (Figure 1), the capital of the Western Province of Zambia. The town lies at the end of the 610-km Great West Road from Lusaka, a distance which takes 6–8 hours to drive. Western Province is one of the 10 provinces in the country. The province has 16 districts which include Mongu, Senanga, Kaoma, Kalabo, Sesheke and Lukulu. The Lozi-speaking people are among several ethnic groups that live in the floodplain and the surrounding areas of the province, and comprise the largest ethnic group. They are traditionally cattle-keepers and have a well-established system of traditional rulers headed by the *Litunga* who is the paramount chief (Milupi, *et al.*, 2019). He is assisted by sub-chiefs in Sesheke, Senanga and Kalabo districts. The seasonal

migration of the *Litunga* and his court from the floodplain capital Lealui to the dryland capital Limulunga is an important annual cultural and tourist event called the *Kuomboka* (Baidu-Forson 2014). As observed by Moonga and Moonga (2016), the province falls in the IIb and III of Zambia's agro-ecological zones which receive between 800 and 1000 mm of rainfall. The floods that follow the rainy season necessitate the *Kuomboka* (which means coming out of water). UNESCO recognises the floodplain as a cultural landscape of Outstanding Universal Value. This means that the plain is of such exceptional cultural and natural importance that it transcends national boundaries and is of common importance for present and future generations of all humanity (von Droste, 2011).

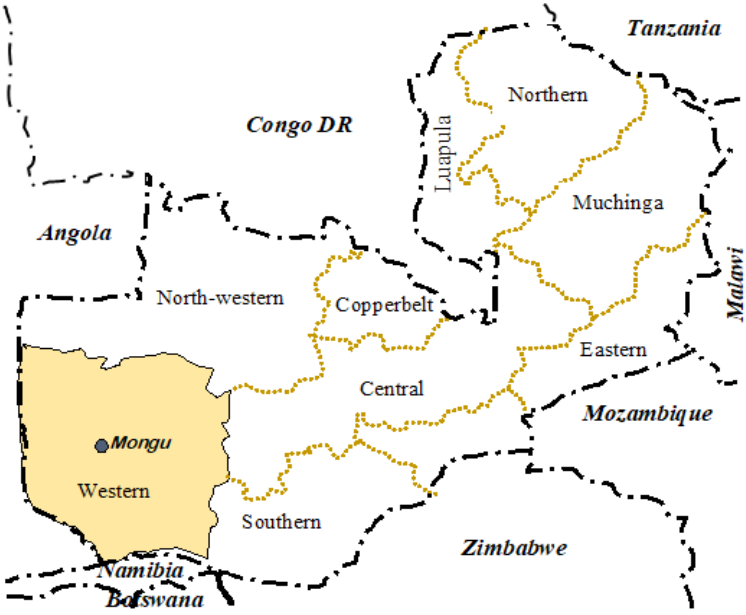

Figure 1: Map of Zambia showing the location of Mongu in Western Province

The main economic activities of Western Province are cattle rearing, fishing, and subsistence farming. Agriculture is the mainstay of most

people in the Barotse floodplain, especially in rural communities (Baidu-Forson, 2014). Turpie *et al.* (1999) and Milupi *et.al.* (2019) report that about 90 % of the population is involved in subsistence agriculture, growing crops such as maize, rice, cassava and millet. According to Simwinji (1997), the total agricultural land in Western Province is estimated at 279,000 hectares. Mongu East and the Borotse floodplains are the main agricultural production areas (Baidu-Forson, 2014). Mongu area is also known for basket and carpet weaving. It also produces some of the best mango and fish in the country, especially the tiger fish (Mwakikagile, 2010). The Barotse floodplain is a major rice growing region of Zambia (Baidu-Forson 2014).

The sandy soils of the province are good for plantations of cashew nuts, an agricultural activity which has not yet been fully exploited. The province has a large forest area that presents a high investment potential in timber logging. Presently, the local people exploit the timber at a small-scale for curio- and canoe-making. According to the 2010 Census of Population and Housing, Mongu district has a population of 191,845, of which 55,635 is urban and 136,210 is rural (CSO, 2010).

2.0 Methodology

Data for this study were collected from primary and secondary sources from July to October, 2018.

2.1 Collection of secondary data

Secondary data were derived from published materials which included journal articles and government records such as the National Environmental Policy. These documents provided background information for the study and allowed for assessment of the suitability of the project before conducting interviews (Owen, 2014). Articles published on the subject were consulted and they revealed various aspects of TEK which included transmission mechanisms and how

TEK contributes to the conservation of biodiversity. Therefore, the analysis of secondary data helped the researchers to understand better the relationship between TEK and the management of natural resources.

2.2 Collection of primary data

Qualitative data were collected from July through October 2015. Data collection was done using semi-structured interviews with both male and female indigenous Lozi-speaking people in Mongu area. The sampling unit was the household head. Participants were selected based on their knowledge of local ethno-ecology. In total 25, household heads, 15 females and 10 males, were interviewed. Five villages namely, Imbowa, Laelui, Liyolelo, Mabuto, and Siyubo were covered by the survey. To ensure that the interview questions were suited to the context, a pre-test was conducted at Mongu harbour in Mongu town.

The heads of households were interviewed in order to learn about the type of TEK which is prevalent among the Lozi-speaking people, the mechanisms used to transmit TEK, and how TEK is used in natural resource conservation. All participants were requested to give verbal informed consent to participate in the research. During the qualitative content analysis, information on local values and useful concepts related to TEK was extracted and synthesised into three themes, namely the nature of TEK prevalent among the Lozi-speaking people, ways in which TEK is transmitted among the Lozi-speaking people, and the ways in which TEK contributes to conservation of natural resources in Western Province.

3.0 Results

This section presents the three predominant themes that arose during data analysis.

3.1 Nature of TEK prevalent among the Lozi-speaking people

One major global concern today is to develop actions toward resource conservation (Hanazaki *et al.*, 2018). In this study, many interviewees indicated that the Lozi-speaking people have a rich culture with a lot of TEK that contributes to the conservation of natural resources in the province. These practices include taboos and restrictions that forbid cutting down of trees on shrines and river catchment areas. Plant species which have utilitarian value, such as *mukwa (Pterocurpus angolensis),* Zambian teak (*mukwa* or *Baikiaea plurijuga*) or fruit-bearing trees, such as *masuku* (*Uapaca kirkiana*) and *mubula* (*Parinari curatellifolia*) are not allowed to be cut without permission from the *Litunga*. There are also taboos, myths and restrictions related to the killing of animals, especially those which are considered endangered. The interviews revealed that Lozi society does not allow certain animal species to be killed without permission from the chief. These animals include the eland (*pofu* or *Taurotragus Oryx*), the lion (*Panthera leo*) and the leopard (*Panthera pardus*). Killing creatures like spiders (*Achaearanea tepidariorus*), lizards (*Hemiductylus fluviviridis*), pythons (*mboma* or *Pythonidae sebae*) and some fish species, such as perch (*Mbundu* or *Ctenopoma multispine*), silver catfish (*lubango* or *Schilbe intermedius*) and squeaker *(singongi* or *Synodontis species),* is also restricted. Also, eggs of birds and animals like geese (*Anserinae species*), chicken (*Gallus gallus*) and crocodile (*Crocodylus Acutus)* are not eaten without permission. According to the participants, the local belief is that if pregnant women ate eggs, their children would be born with bald heads.

It is also taboo for a bride to eat eggs because it may affect her fertility. These findings demonstrate that TEK can play a vital role in the conservation of resources within local communities.

Another useful method of resource conservation practised among the Lozi-speaking people is putting restrictions on the time and area of harvesting natural resources. According to Hall (2002),

this approach can help in several ways, including limiting harvest of specific life stages and protecting depleted stocks and their habitats during the rebuilding phase of a resource. In this study, interviewing the local people revealed that harvesting of resources such as birds and fish waits until it could be done collectively and at an appropriate time. The bird cropping exercise, referred to as *kuloba sitaka* (Moonga & Milupi, 2015; Sumbwa, 2011*),* is mainly performed along banks of water bodies such as the Zambezi River, and it ensures that birds are only harvested once in a year. This once-a-year controlled cropping means that there is no overexploitation of birds, many of which nest on reeds along river banks. *Kuloba sitaka* is, therefore, a local expression of a resource management technique gained through TEK by which birds are conserved.

Another resource conservation practice common among the Lozi-speaking people is the *kutulisa* or rotational grazing. This is a practice where cattle are moved from one place to another for purposes of grazing, so that they do not graze in the same area for an extended period of time (Milupi, *et al.*, 2019; Moonga & Milupi, 2015). The basic premise with rotational grazing is that it will allow the pasture plants a rest period to regrow before being grazed again. The phenomenon is common in the Barotse floodplain where there is plenty of pasture for animals. This way, the Lozi-speaking people prevent overgrazing which is a requisite condition for land degradation. Without doubt, the Lozi farmers practice controlled grazing, a phenomenon which is also practised by modern cattle-ranchers (Smith *et al*., 2011).

3.2 Ways in which TEK is transmitted among the Lozi-speaking people

The second aspect which this study enquired about was how TEK is transmitted in Lozi communities from one generation to another. Through the interviews, it was learnt that children learn through their constant interaction with elderly people and the biophysical environment around them. This is also the view of Bates *et al.* (2009)

who asserted that learning in indigenous societies occurs by way of learners observing their masters and also working alongside them. This study revealed that many of the elderly depend on telling and showing, while the young learner depends on listening and imitating. Knowledge is transmitted via story-telling (folk lore) and the use of songs and parables while skills are passed on through apprenticeship. Initiation ceremonies, where young people who have come of age are secluded for a period of time, are used teach different aspects of Lozi culture and adult life. Both males and females are taught about Lozi customs, sex, and the responsibilities of being an adult (which most certainly includes caring for natural resources).

TEK is also transmitted through practical experience as people engage in activities such as *kuloba sitaka* (bird harvesting) and *kutulisa* (rotational grazing). Other ways include the use of a taboo system, myths, oral literature (*atang*u) and proverbs. The origin of the Lozi tribe itself is shrouded in myths, one being that the tribe began when the sun god Nyambe descended from heaven onto Barotseland (Kapambwe, 2018). Nyambe was not pleased with Kamunu (the human being) because Kamunu used to kill animals and fish which were Nyambe's children. The lesson here is that God (who is greatly revered by the Lozis) is not pleased when humans want to kill fish, birds and animals. The significance of the finding is that the Lozi-speaking people have a way by which they transmit TEK from one generation to another, largely through the oral route and imitation.

3.3 Contribution of TEK to conservation of natural resources in Western Province

The study shows that TEK contributes abundantly to the conservation of natural resources in the study area. The participants indicated that the many restrictions that prohibit the overexploitation of natural resources have the effect on promoting the conservation of biodiversity in the Western Province. For example, traditional leaders, especially the *Litunga*, are the custodians of customary land (which

they hold in trust for the people) and the natural resources found on it. In the traditional setup, the chiefs regulate the allocation of both land and the natural resources. Therefore, people have to request for authority to use a portion of land and to harvest the resources. This arrangement contributes to the conservation of resources in the region; no resources can be used with impunity or in a raucous manner without courting the retribution of the traditional leaders. According to von Loenen (1999), western standards consider this system insecure but it works very well for the indigenous people.

As stated earlier, other practices have the effect of preventing land degradation. For example, *kutulisa* allows the soil to regenerate while *kuloba sitaka* discourages the killing of birds in large quantities along river banks. The taboo system discourages people from destroying the environment and from harvesting of food resources before maturity.

4.0 Discussion

The aim of this study was to investigate the nature of TEK that is prevalent among the Lozi-speaking people of Zambia. Previous research has indicated that, if properly used, TEK can be used to promote sustainable management of natural resources (Saylor, Alsharif & Torres, 2017). The findings of this study reveal the diversity of TEK that is common among the Lozi-speaking people. It includes taboos, myths and restrictions on the use of natural resources. Among these taboos and restrictions are *kutulisa* and *kuloba sitaka*. The study shows that these cultural restrictions promote the conservation of natural resources in Western Province in general and the Barotse floodplain in particular. While *kutulisa* ensures rotation of animal grazing activities, *Kuloba sitaka* ensures that natural resources are only harvested at an appropriate time. These traditional practices indicate that TEK could contribute to the sustainable management of natural resources as observed by some scholars such as Chemilinsky (1991) and Berkes *et al.* (2000). The

study further revealed that TEK is transmitted in different ways such as through experience where the young ones learn by imitating the elders, through storytelling, songs and by the use of proverbs.

Based on the taboos and restrictions that emerged from the study, we would argue that TEK could serve as a useful source of information to complement scientific approaches to the sustainable management of natural resources. For example, TEK exhibited in the study area could enhance conservation of biodiversity and consequently lead to the sustainable utilisation of wildlife resources particularly in remote areas where adopting standard scientific approaches may be impossible, as argued by Johannes (1998).

Finally, the main implication of TEK exhibited among the Lozi-speaking people is that the local communities practise sustainable utilisation of natural resources that has positive implications for the conservation of natural resources.

5.0 Challenges

The study established that there are problems associated with continued use of TEK among the Lozi-speaking people. In the first place, TEK has been adversely affected by constant climatic changes. According to Irish Aid (2016), rising temperatures and decreasing rainfall are expected to have a negative impact on agriculture and fisheries in the southern and western regions of the country. Similarly, Moonga and Moonga (2016) report that since the 1990s, the study area has experienced several drastic weather patterns which have resulted into droughts and floods. These unpredictable fluctuations in weather patterns have led to the cancellation of some traditional farming activities in the floodplains as well as the famous annual Kuomboka ceremony. Ceremonies and other traditional practises based on the weather pattern do enhance TEK among the Lozi-speaking people; therefore, the consequences of climate change have directly and indirectly negatively affected these traditional events. In addition, forests, such as miombo, which previously regenerated

quickly after deforestation or degradation have been slower to recover due to the impacts of climate change (Irish Aid, 2016). The result of these events is that TEK is at risk of being lost.

Secondly, TEK communication methods are disappearing. As indicated earlier on in this paper, TEK was passed on from old men and women to the younger generation through the oral route. The challenge today is that indigenous people, especially the young ones, are increasingly changing to modern ways of communication, such as mobile phones and television. Also, since most indigenous knowledge is not written down but held by elderly people, it risks being lost as most of the holders are dying with their knowledge. Mundy and Compton (1991) put it explicitly in the following statement:

> An old woman has just died in this village in Kenya. She was the last person to know of a forest plant that could be used to treat epilepsy attacks. She had no children and no pupils. No one wanted to learn her skills. Now her wisdom is gone forever.

Boafo *et al.* (2016) studied four rural communities practicing rain-fed agriculture in Ghana and concluded that the loss of TEK transmission through successive generations in Ghana could negatively affect ecosystem services management. To avoid this problem, they recommended that Ghana should mainstream TEK into the formal education system starting at a primary level.

Another challenge lies in attempting to integrate TEK and MSK. Scholars, such as Raymond *et al.* (2010) and Peat *et al.* (2016), have argued that TEK and the scientific approach may be difficult to integrate because the two approaches are quite different in terms of epistemological access. Whereas the scientific approach as a methodology is based on reductionism and measurement of parts, TEK is based on more relational ways of experiencing the universe. Similarly, scholars such as Atran (2001), Verran (2001), and Cruikshank (2005) argue that the conceptual models and ontologies

of traditional knowledge and modern science are sufficiently distinct to make these knowledge systems incommensurable. Bohensky and Maruhe (2011: para. 2) explain that the only way to integrate the two is through "determining how the new information and the existing knowledge interact, how existing knowledge should be modified to accommodate the new information, and how the new information should be modified in light of the existing knowledge."

Another problem facing integration, as elaborated by Nadasdy (1999), is that too often, integration is viewed mainly as a technical problem, ignoring the role of power relations between indigenous people and the state and ultimately creating products that serve scientists and the state rather than indigenous knowledge holders.

6.0 Conclusion

The study showed that the Lozi-speaking people in the Barotse floodplain have a considerable body of TEK, ranging from taboos and myths to restrictions, which can be used to conserve and manage natural resources in their locale. Furthermore, the study concludes that TEK can be conjoined with MSK to enhance resource conservation. Uprety (2012) asserts that traditional knowledge and modern science are complementary and should be used in conjunction in ecological restoration projects. This will require trade off where both TEK and MSK will have to be modified to enable accommodation to take place.

The study also concludes that ecological restoration outcomes will often be more effective and efficient if local communities are engaged in assessing problems and devising solutions related to natural resource management. Therefore, programmes aimed at management of natural resources in the Barotse floodplains should encourage greater involvement of local communities. The result of this would have positive implications for the long-term conservation of natural resources in Western Province and could be used as entry points into the sustainable use of natural resources throughout Zambia.

Recommendation

The study strongly recommended that greater attention should be paid to TEK as a useful source of information on natural resource management.

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