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SUSTAINABLE ENVIRONMENTAL MANAGEMENT: AN ETHNO-BASED APPROACH: THE CASE OF TOTEMS, SPIROSTACHYS AFRICANA AND ACACIA NIGRESCENS IN CONSERVING ZIMBABWEAN FAUNA AND FLORA.

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Abstract

The fight against unsustainable use of the environment calls for a multisectoral approach, ethno-based methods included. Thus ethno-based methods (traditional knowledge systems) of conserving the flora and fauna and the use of traditional herbs to fight various ailments have slowly resurfaced from the 'caves' to save those of us living in the computer world of today. Indigenous groups all over the world have developed cultural belief systems that demonstrate knowledge of and appreciation of the Earth. They embody cultural rules about how the various components of the environment should be treated for the good of current and future generations. This paper thus explored the use of Ethno-based Knowledge (Traditional Knowledge Systems) to protect the environment from degradation as expressed through totems, rituals and prohibitions regulating the use of natural resources, hence, contributed to the conservation of flora and fauna among indigenous Zimbabweans. Two similar 'technologies' were identified from two different cultures in Zimbabwe and both had some aquatic conservation systems in them. The two ethno-based technologies compared fairly well to modern technology used in the catching of Kapenta fish in Lake Kariba Zimbabwe. In a multi-dimensional qualitative approach, ethno based knowledge systems were extracted from some Shona and Ndebele communities through interviews with key stakeholders such as community elders, teachers and students from the two cultures. A case on sustainable development is then made for the need to document, publicize, teach and assess school children on issues of ethno-based wisdom for sustainable environmental management in the current and future generations the world over.

Introduction

Research on the use of Ethno-based Knowledge or cultural experiences of a people in conserving the environment, is slowly gaining momentum the world over, as it is envisaged to bring about sustainable use of the environment. It is doubtless that Ethno -based Knowledge (Traditional knowledge systems) on conservation has been amongst mankind since pre-historic times. In Zimbabwe the Ethno-based Knowledge Systems have always helped in various ways, to conserve the environment before, during and after the colonial era (Murombedzi, 1992; Mavi and Shava, 1997; Mukwada, 2000; Chigora, Masocha and Mutenheri, 2007; Maponga and Muzirambi, 2007; Svotwa, Manyanhaire and Makombe, 2007). Traditional ways of conserving the environment is therefore a mere revived technology from the archives in 'caves' to the modern day computer.

From a religious perspective sustainable use of the environment can be viewed from different angles: the Book of Genesis 2 vs. [16] "And the Lord God had commanded the man, "You are free to eat from any tree in the garden; [17] but you must not eat from the tree of the knowledge of good and evil, for when you eat of it you will surely die." In the Book of Deuteronomy 14 v [3] "Do not eat any detestable thing. [9] Of all creatures living in the water, you may eat any that has fins and scales. [11] You may eat any clean bird. [12] But these you may not eat: the eagle, the vulture, the black falcon, ---[15]the horned owl---". And from the Holy Qur'an C.1 "…He created all, including Man…and gave him spiritual insight; So that man should understand Nature." From the Shona-Ndebele traditional religions, numerous prohibitions, 'Dos and Don'ts', taboos, totems, were in place in order to protect the environment, living and non-living from

degradation. The Shona and Ndebele people of Zimbabwe believed that a strict adherence to the religious customs ensured them of good rains, absence of pests, pestilence and other mishaps such as floods, hurricanes, tsunamis, earthquakes and volcanoes and many others that affect man today. Thus apart from the religious implications, all this meant that man has the mandate to utilize the environment sustainably. Certain species of animals, fish, fruits, birds were free from exploitation by a certain group of people and not everyone, hence were always conserved (Dirwai and Ngwazikazana, 2004).

This paper argues for sustainable development in that some of the Ethno-based Knowledge systems or traditional approaches are today being recycled as new inventions. Thus for instance the use of pepper to drive away elephants in the Tonga people of Binga in North West Zimbabwe (Williams, 2005) has been in existence since time immemorial amongst the Shona and Ndebele people of Zimbabwe where they used pepper *(mhiripiri/toronga/ubilebile*) to drive away snakes from homesteads through either burning or spreading pepper in powder form around the affected areas. Such and ethno-based knowledge system was never documented but was orally passed on from one generation to another. An attempt to document some of the traditional ways of protecting the environment in some African communities has therefore remained a mammoth task and yet what is needed in Africa is to improve on such traditional ways so as to come up with environmentally friendly and less expensive ways of keeping a sustainable environment. So far literature from Zimbabwe has documented the traditional methods of conservation focusing on medicinal trees (Mavi and Shava (1997); Chigora, Masocha and Mutenheri (2007); sustainable use of

wetlands, Svotwa, Manyanhaire and Makombe (2007); indigenous knowledge in conservation of forestry and land resources, Maponga and Muzirambi (2007) amongst others. This paper looks at totems as a means of conservation animal species; trees that are used during burials; three similar technologies used in fishing by three different communities of Zimbabwe and their implication in conserving the environment. The paper also highlights environmental issues focusing on ethno-based teaching, learning and assessment of candidates in an effort to envisage the goal of sustainable development in the developing world.

Objectives

The study sought to achieve the following specific objectives;

- Identify different totems and their implication to conservation of animals and subsequent sustainable development.
- Demonstrate on the use of indigenous trees for burial purposes and the subsequent implication to sustainable development in conservation.
- Compare two ethno-based 'technologies' used by two communities in Zimbabwe and a modern technology in fishing and their implications to aquatic conservation and sustainable development.

Importance of the Study

The study aims at contributing to existing sharing of knowledge on sustainable development mainly on environmental issues. Africa and other developing countries, which are normally facing heavy environmental degradation, might benefit in coming up with homegrown acceptable ways of sustainable development in the area of environmental management. A leaf from an Ethno-based technology or the traditional

way of conservation is envisaged to augment the modern ways of conservation once a smooth integration is done. Various NGOs dealing with environmental issues and sustainable development in particular might also take a leaf from the traditional ways of conservation, which are acceptable to the indigenous population in a quest to conserve the environment. Closing identified gaps in the area of sustainable development is envisaged to benefit scholars and other researchers.

Literature review

Ethno-based Knowledge and Modern Ways of Conservation

A research, which compared two Forests within the same community of Chipinge-Manicaland Province, was carried out in Zimbabwe. One of the forests was conserved by a technocratic approach whilst the other was traditionally conserved. Chirinda Forest: Technocratic Approach to conservation on Best Management Practices (BMP) as noted in Timberlake and Shaw (1994), was brought under state control in the 1930-1940 decade, and since then the Forestry Commission's Research and Development Division have scientifically managed it. This administration is technocratic, which makes the utilization of plants, animals and soil strictly controlled. Thus firewood collection tree felling, collection of ornamental plants, as well as shooting and snaring of animals are therefore regarded as illegal. Despite all the laws in place to protect the forests, the bio-diversity of Chirinda forest has been subjected to threat over the past decades. Forest fires caused by honey collectors have caused a lot of damage to the forests, illegal wood collection, game poaching as in trapping and snaring of guinea fowls, collection of ornamental plants for some outside markets and clay extraction, are all experienced despite the various technical efforts and laws in

place. On the other hand the Chibuwe Forest Reserve: Community Initiatives and Traditional Approaches to the conservation of bio-diversity (Facts extracted from Zinhumwe and Makuku-unpublished in Mukwada, 2000) remained intact without pronounced degradation. The Chibuwe Forest Reserve, a 40 ha untouched natural riverine woodland area, found in the Save Valley South-West of Chipinge existed. Its significance as a traditional forest reserve dates back to the Mfecane wars of the 18th and 19th centuries. The local Ndau communities used the forests over the years for traditional ceremonies to appease ancestral spirits and are still used as sacred burial place for local traditional leaders, especially headmen (Mukwada, 2000). Being sacred to the local Ndau people, the forest has been spared from destruction. Traditionally tree cutting is strictly prohibited. Despite the fact that traditionally they are barred from woodcutting, locals do have respect for their dead such that no one dares move into the forests alone even during daytime, as it is strongly believed serious repercussions will befall those who defile the forests. Once if any noise of a cutting axe is heard in the forest, villagers converge and investigate and the perpetrators are apprehended, thus making the collective system of conservation effective. Consequently Chibuwe Forests have survived exploitation from villagers over the years without the aid of modern technocratic systems. This fear of the unknown has managed to reduce cases of illegal wood collection, honey collection that often causes fires, snaring of animals and collection of ornamental plants, as is the experience with Chirinda Forests, which is technocratically protected. All this is because of the utmost respect to traditional beliefs as well as respect to the dead. Thus it is envisaged that the traditional or Ethno-based

Knowledge on conservation did the job better than the modern ways of conservation in the Chirinda-Chibuwe case.

Taboos and Medicinal trees in Conservation

Both the Shona and Ndebele cultures of Zimbabwe possessed a set of taboos, Do's and Don'ts that deterred people from degrading the environment. Trees and shrubs have been used as medicines hence were spared from degradation. In the case of medicinal trees, bark was collected from either the east or west facing part of trunk hence the tree was assured of a continual survival (Mavi and Shava, 1997). Several indigenous trees as noted in existing literature have been spared from use as wood fuel hence spared from degradation as such. Today such medicinal trees are still in existence and being used as medicines as such. This is evidence of them surviving through history as they have been spared from extinction. These trees possessed a lot of significance in the livelihood of both the Shona and Ndebele people of Zimbabwe. A lot also have been covered on the issues of traditional knowledge systems, agriculture and the prediction of disasters (Svotwa, et-al, 2007). The Shonas had the capacity to predict droughts and the challenge today is to look for means to integrate such traditional experiences with modern technology so as to minimize frequent droughts of today (Ibid). In the Zambezi valley of Zimbabwe, the Tonga people have benefited much from the use of pepper to drive away elephants from their crops (Williams, 2005 web.). Use of pepper to drive away animals has traditionally been in use by most if not all Africam communities before.

Prohibitions along the Save and Odzi Rivers

Pollution is defined as the introduction by man into the environment of substances or energy liable to cause hazards to human health, harm to living resources and ecological systems, damage to structure or amenity, or interference with legitimate uses of the environment (Kirkwood and Longley, 1995). Good quality water was seen as life as it benefited fish, crocodiles roaming about and human beings and animals. Water was assumed to be pure and no one was supposed to temper around with any water source hence the, *"mvura haina n'anga"* concept, literally meaning, there was no need to consult a traditional healer on the quality of water before drinking it, hence people could drink water from any point anywhere along a river or water source. To achieve this confidence in the good quality of water, there were traditional norms, prohibitions, rules and regulations associated with all this, the Do's and Don'ts (Maponga and Muzirambi, 2007). Derogatory names such as (*nhundira matsime),* an undesirable societal member who relieves him/herself from the water well, were given so as to deter people from such bad behavior of water pollution (Chimhundu, 2004). All this was in place so as to reduce point and non-point source pollutants. Thus water quality monitoring, which is the long-term, standardized measurement, observation, and evaluation and reporting of the aquatic environment in order to define status and trends of water quality (Chapman, 1992), was the responsibility of the whole community. Most sacred dark and deep pools were spared of pollution. These were given names after clear observations of events that had taken place in such communities. Events such as the disappearance of people which was associated with the myth of mermaids hence people referred to such pools as the pool of so and so who had disappeared into

such a deep pool and never returned to the known world of ours. Such fears about the pool ensure the pool of sustainability, free from any forms of degradation.

Apart from the Zambezi and the Limpopo Rivers that marks the north and southern borders of the country Zimbabwe, the Save River is another big and wide river with its giant tributary, the Odzi River (see figure 1.2), being other important rivers in the drainage pattern of the country. Along the Save River, a deep pool called *'Ganwa'* as noted from existing literature is said to be very deep, with dark colored waters because of the depth, and is surrounded by thick riverine forests. No one dares go nearby to do any form of washing, gardening along riverbank of the pool *'Ganwa'*, a local Shona name. Cutting branches for fencing gardens and so forth along and within the riverine forest around the deep pool is traditionally strictly prohibited. Today 'Ganwa remains a leaving evidence of an untouched riverine forest in an area that has been heavily degraded. All this could be contributed to the traditional approach to conservation. The trick safeguarding *'Ganwa'* is that there is a surrounding myth of a mermaid that existed in the deep pool and consequently crocodiles, big fish, and clear unpolluted waters find safe heavens at this secluded banks of the Save river. A lot of deep pools, sacred mountains and valleys are to date still protected from any forms of pollution and over exploitation as a result of traditional beliefs and prohibitions, Do's and Don'ts (Maponga and Muzirambi, 2007).

Another deep pool called (*Dziva ra Tsunai)* literally meaning a pool that belongs to one called Tsunai is found along the Odzi River, a tributary to the giant Save River. This is another deep pool without any stream-bank cultivation nearby. Mermaids, crocodiles and big fish are believed to coexist. All forms of soap are prohibited; hence,

no washing and bathing is done anywhere nearby *Dziva ra Tsunai.* It is believed that people who go fishing at *Dziva ra Tsunai* only use fishing hooks and not any other devices and if one gets a big catch but continues to exploit the pool then at last the 'owners' of the pool give a warning by offering a 'dry fish'. Such myths deter fisherman from exploitation of the deep pool. As if that is enough, fishing times are restricted towards midday and not early in the morning, as mermaids would be bathing and not at sunset, as mermaids would be back with the coming of cool breezes.

Winds blow from a region of high pressure to a zone of low pressure (Waugh, 2000). It is therefore a true geographic fact that during sunset water loses heat slowly. Hence, due to the convectional currents concept, warm water rises to the top as cold water descends. Thus big fish come to the upper surface of water in search of warmth towards sunset hence if people continue fishing the big fish would be depleted. Thus the prohibition from fishing in the evenings or at sunset conserves the fish population. The cool breeze associated with the coming of mermaids is in fact the effect of difference in local pressure where the river environment develops a lower pressure zone than the surrounding landscape which automatically assumes a higher pressure with the abrupt lose of heat at sunset hence, the cool air blows towards the river. Observing the cool breeze blowing towards the river at sunset is envisaged as warning from mermaids to fishermen who have to leave the deep pool or else they would permanently stay in the waters of *'Tsunai'* pool. Fear of the unknown with a lot of respect of the myth of mermaids have saved most pools, dams, rivers and the surrounding forests from all forms of exploitation and over exploitation. All these issues have been studied and documented in one way or another. This paper looks at totems, burial rituals and use of

two trees, the *Mutovhoti* or *Spirostactiys Africana in Latin* (along the Save River) and the *Chinanga/knob-thorn or Acacia Nigrescens* (along the Zambezi River) and how these have been used a technology to catch fish the traditional way and the two are compared with the use of a Fish Finder and electricity from generators as modern way of catching and conserving fish in Lake Kariba.

Data collection methodology and process

In a multisectoral qualitative approach, the study was carried out in two provinces of Zimbabwe, Masvingo (Shona and Shangani languages) in the South East of Zimbabwe and the Matabeleland North (Ndebele and Tonga languages). A total of 120 students were purposefully sampled from schools in the two provinces and these were doing Forms 3 and 5 in the year 2004. The students were given homework tasks on how their own people at home viewed the various environmental aspects of conservation especially on issues of burial rituals, totems and fishing amongst many others. Each respondent displayed how her/his people viewed these environmental aspects and many more not covered in this paper. These were aggregated to reflect the general view of the particular community and subsequently province and then the general country's view. Apart from the written homework, which was collected as raw data and detailed interviews, focus group discussions were done with both the students and their teachers at the respective schools. For triangulation purposes on the issue of sustainable environmental management, key informants such as headmen, chiefs, educationists and specialists in school examinations were also interviewed in this study. Two technologies were thus studied during this period, fresh water fishing along the Zambezi River, the Tonga experience; fresh water fishing along the Save River, the

Shangani-Shona experience and the two were compared with modern fresh water fishing in Lake Kariba, a man made lake in northern Zimbabwe.

Detailed participatory observation was also used to triangulate on the data collected during interviews and essays from students. To this effect, the researcher embarked on a participatory research observation on Lake Kariba. This overnight expedition was done on a cold Saturday evening in the month of July 2005. Apart from providing their tribal views on environmental conservation, the method used also showed that the use of traditional methods on conservation might continue to be passed from generation to generation with some form of a common accuracy from one community of the country to the other, hence infusing it with modern technology is envisaged to help mankind in the near and far future.

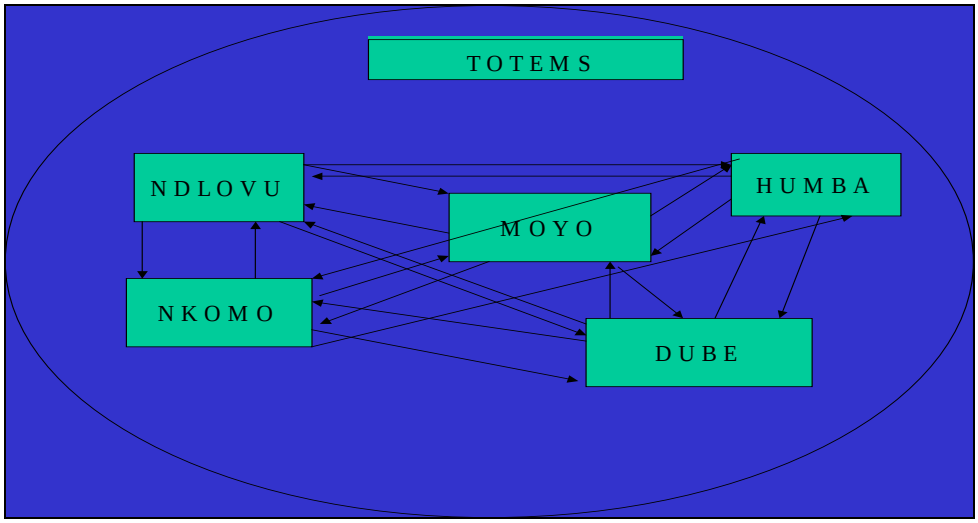
Research Findings

Totems and Taboos (Prohibitions)

From the essays handed in by the 120 students studied and interviews with key informants it was derived that totems were as good as other prohibitions noted in existing literature in conserving the environment. A totem is taken here as a tribal badge or emblem. Totems are very popular amongst most Africans and the Shona and Ndebeles of Zimbabwe are not spared. Each clan is associated with a totem that cements the people together and an animal usually symbolizes this totem. Oral tradition teaches that one was/is not supposed to eat meat associated with her/his own totem. To show the gravity imposed on totems, one was not even supposed to court or marry from a family of his/her own totem as this was regarded as taboo. Thus amongst the Shona and Ndebeles of Zimbabwe the issue of totems was one of the most common examples

of resource conservation cited by the students, teachers and elders interviewed in this study. Eating meat from one's totem was said to result in one losing teeth or other mishaps that were associated with such clan's spiritual way of life. People, because of the fear of such mishaps like uncontrollable deaths and diseases in the family, avoided eating from their totems hence such animals were spared from extinction. Thus in an area dominated by the *Ndlovus* elephants could thrive without extinction, the same as impalas in an area dominated by the *Shavas* and zebras in an area of the *Mbizi* clan, Birds in area of the *Nyoni* and so forth. Figure 1.1 shows this inter- relationship amongst the Shona and Ndebele cultures as reflected in the use of totems and how this complex relationship could be used to interpret conservation of fauna.

Figure 1.1 Model to illustrate the interconnectivity of Totems amongst the Shonas and Ndebeles of Zimbabwe.



- Those who measure Ndlovu (elephant) were barred from eating elephant meat, whilst those who measure Nkomo (cattle) were spared from eating beef.
- Those who measure Shava (Impala) were not supposed eat Impala meat.
- Whilst the *Ndlovus (e*lephant) were not supposed to eat elephant meat they were at liberty to eat from any other game hunted.

- The *Nkomos* whilst they were spared from eating cattle they could eat from any other animal such as Pigs, Hares, Hippos, Impalas and Water Bucks.
- The *Humbas (Pig)* were prohibited from eating pork but were at liberty to eat meat from any other animals.
- The *Dubes (Zebra)* were not supposed to eat zebra meat whilst the *Moyos* were spared from eating the heart of any animal.
- Totems could also resemble a place such as a pool and the people associated with that measured *Dziva* (Pool) and these were spared from eating fish, as the fish were pool dwellers. The Dzivas were free to eat any other meat except fishes.
- The *Moyos* (heart) could eat from any animal in the game but were spared from eating the heart of any animal and this was the same to the *Gumbos* (leg) who could only avoid trotters and hooves of any animal.

Rituals pertaining to deaths and conservation of Flora

Death used to be a rare occasion as it was restricted mainly to chronic diseases of old age or unfortunate years of pestilence. Gravesites were restricted from children. They were such sacred places that people could not even dare point to the site with a forefinger, but rather a fist, only to show respect. There were different trees and shrubs associated with burial ceremonies:

- *Ziziphus mucronota (muchecheni/ umphafa/umlahlabantu)* in the Shonas and Ndebeles of Zimbabwe, this tree with its thorny branches and leaves was believed to drive away witches on a fresh grave hence was cut and left on top of a fresh grave to guard the buried against those who tempered with graves.

- Early in the morning when relatives revisit the grave, they check on the positions of such branches of the *Ziziphus mucronota* indicating whether the grave was still intact or not.
- If the positions of the trees and shrubs left on the top of the grave were shifted then that automatically indicated that witches, people in general and animals such as dogs and hyenas had tempered with the grave hence traditional healers had to be consulted for a cleansing ceremony.
- Because of the cultural significance associated with *Ziziphus mucronota* the specie is well conserved and not used as wood fuel, which is a major cause for deforestation in most parts of rural Zimbabwe. *Ziziphus mucronota* is also significant as it is used as a healing medicine (Mavi and Shava, 1999).

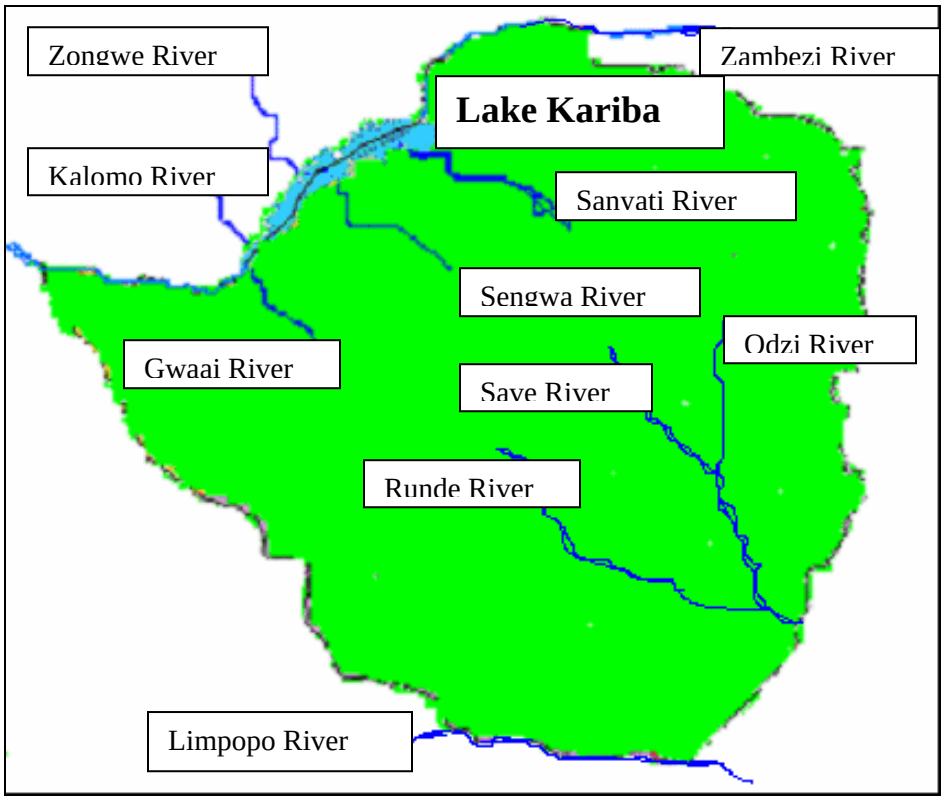
From interviews with key informants, it was also observed that a shrub with a pungent smell (*Zumbani* in Shona or *'Umsuzwane'* in Ndebele or *Lippia javanica* is a shrub with a variety of medicinal purposes. It is also used to wash hands when people are immediately from the gravesite after burial. This is done so as to cleanse people of evil spirits from graves. The same shrub because of its scent is also used to sweep the fresh grave and the shrubs are left ontop of the grave until the following day. This was and is done to make sure clear-cut observations are made on the possibility of any tempering of the grave overnight. The smells from the shrubs from a scientific point of view removes the smell of human beings and that of the buried corpse hence leaving the shrubs protects the buried corpse from scavenging animals such as dogs and hyenas. Shrubs such as *Zumbani* in Shona or *'Umsuzwane'* in Ndebele are found in their abundance in almost all parts of Zimbabwe. Different cultures in Zimbabwe have

referred to them by different names although they serve exactly the same purpose. Because people fear misfortune befalling them, use of such trees and shrubs for firewood purposes was and is in some cases strictly out of place. The caution lies in the fact that once one takes any of those trees and shrubs for firewood purposes the family or clan would be destroyed (*ichithamuzi/kuparadza musha)* or there would be untimely deaths that wipe out the entire family. Fear of death meant that no one dare used for wood fuel purposes trees or shrubs associated with burial ceremonies. These remained conserved hence the traditional or ethno-based methodologies have a role to play in sustainable development in the area of environmental conservation.

The major threat to the degradation of these trees is the escalating deaths due to HIV/AIDS, as more of such trees are needed for burial purposes and not wood fuel this time. Since death is eminent to every one these trees need to be protected. From this simple exercise, it was also observed that most students were happy to say out their findings during the focus group discussions. They even indicated that those at home were also eager to offer/ share such experiences with them hence education was regarded as relevant to them and their families. It was also easy for parents and guardians at home to assist in the homework, as it was in context of the ethno-based experiences hence relevant to them and their culture.

Water Bodies and two technologies in fish conservation

Figure 1.2 Zimbabwe's major Rivers



Zimbabwe is a landlocked country in Southern Africa. Its main neighbours are Botswana, South Africa, Namibia, Zambia and Mozambique. Most of its rivers run straight to the sea such as the Save and Runde in the south whilst those in those in the north runs into the Zambezi river or into Lake Kariba and then to the sea. Two technologies were noted and observed during this study. The two had some similarities in that they utilised light in the catching of fish and that each had its own forms of prohibitions that were used to protect the environment from over exploitation. Table 1.1 summarises the findings of the study with regards to the two-ethnobased technologies as they are compared with the modern day technology of Lake Kariba.

Table 1.1 Ethno-based and modern day fishing methodologies.

Save River	Zambezi River	Lake Kariba
Mutovhoti (Spirostachys africana) experience	**Chinanga (*Acacia Nigrescens or Knob thorn)* experience**	**Fish Finder and electric lights- experience**
Mutovhoti Provides Light to attract fish	Lit fires at river bank provides light to attract fish	Fish Finder details on fish availability and generator

		provides lights to attract fish
Machetes used to hit fish	Chinanga's hooked thorns to hit and drag fish	Lights and nets to attract and trap fish
Only big fish attracted	Big and small fish trapped	Only selected fish attracted
Conservation as only a sizable fish can be hit	Conservation as only a sizable catch can be dragged	Only the desired quantities are dragged as quantities are observed through the Fish Finder.
Dark nights when there is no moon	Dark nights when there is no moon	Dark nights when there is no moon
Eyesight and elders' experience used to detect catch	Eyesight and elders' experience used to detect catch	Fish Finder a computerised device used to detect catch
Prohibitions 'Do's and Don'ts', protect fish from over exploitation	Prohibitions 'Dos and Don'ts', protect fish from over exploitation	Fines protects the waters from pollution, over-exploitation and poaching

1. The Mutovhoti (Spirostactiys Africana) and Fishing

The *Mutovhoti* or *Spirostactiys Africana in Latin* is in other circles used to treating small wounds and snakebites (www.csae.ox.ac.uk/workingpapers/pdfs /9908text.PDF). This tree is prohibited from using as a fuel wood as it is believed that using it brings about snakes around the homestead. The *Spirostactiys Africana* infact produces a strong smell when burning which causes severe headache hence is a source of pollution in the huts when burnt in closed doors. On the other hand its strong pungent smell is bad for snakes, which sneak away from hibernation once they get the smell of it. This meant that whenever it is burnt snakes are likely to come out of hibernation hence are seen moving away from homesteads. This proves correct the myth that when you burn the M*utovhoti* or *Spirostactiys Africana,* you bring snakes around the home hence fear of snakes around the home, conserves the *Mutovhoti* tree

species in the Sengwe area of the Chiredzi district in the Masvingo province of Zimbabwe.

Traditionally the Shangaani people of the Sengwe area in the Masvingo province south east Zimbabwe where the *Mutovhoti* or *Spirostactiys Africana* tree is abundant have used it when catching fish. When dry, the *mutovhoti or Spirostactiys Africana* burns continuously like a candle and such a burning bundle of dry twigs is used to provide light that attracts fish during dark nights in the Save River. The Shangaani fishermen then hit the attracted big fish using machetes, as they are attracted to the big light provided by burning the *Spirostactiys Africana* or *mutovhoti* twigs. The machetes are aimed at hitting big fish and that results in a way of conservation in which only the big fish are selected in the process. The process also exposes a lot of ingenuity in the local people. The process is communally done and well monitored by elders who choose when to do the fishing. Days and times when there was any form of moonlight were avoided. Deep pools were selected where a variety of big fish were anticipated. Pools where crocodiles were frequently seen were also avoided. Stormy conditions and stormy days as such were also avoided. Experienced elders held the burning twigs from the *Spirostactiys Africana* in the middle of the pool whilst the rest of the members hit the big fish with machetes with others doing the collection in traditional open containers or baskets.

Advantages:

- Elders used an Ethno-based Knowledge/traditional knowledge and experience to select the pools where to do the selective fishing.

- Selected fishing was done on specific times of the day; month and year hence gave the fish time to breed.
- Only machetes were used to hit big fish hence small fish were spared unlike where fishing hooks and nets were used.
- No diesel was involved hence the process did not pollute the waters and the *Spirostactiys Africana* was used for lighting purposes only.
- Elders monitored quantities hence avoided over fishing, which was believed to anger the river 'gods'.
- Depending on the size of the group a basketful or two to three of such were enough measure to dismiss the fishermen.
- Basketful as a measure was on it's own a sign of conservation as the elders sustainably used the river which then remained a sign of livelihood and food for years to come.

Disadvantages:

- As a fishing methodology the chances of risk to crocodile attacks were also high.
- In the event of a hurt fish escaping there were high chances of such a fish remaining wounded and die later without anyone noticing and collecting it, hence was cruelty to animals.
- Fishing was restricted to dark nights only and during the dry season when water levels were quite low hence the society could not sustain their lives by relying on the river.

2. The Chinanga (Gakaunga/Isinanga/Knob-thorn/ Acacia Nigrescens) and Fishing along the Zambezi River

Oral tradition states that the people who lived along the banks of the Zambezi River had their livelihoods based on the giant Zambezi River, which crosses more than six countries that includes the Democratic Republic of the Congo, Angola, Namibia, Botswana, Zimbabwe, Zambia, Mozambique and so forth. The different cultures and people along the giant Zambezi do possess different stories of how they interacted with the river. Cultural experiences from the Tonga people of Binga in Zimbabwe on how they interacted with the river were recorded during interviews. The experience was found to be similar to that of the Shangaani people in Sengwe along the Save river down south in the Masvingo province and that of modern day fishermen along the Kariba dam.

The Tonga people normally enjoyed fishing along the giant Zambezi River in the months of August and September before the rains come but the activity could be extended to December if there were no heavy rains during that season. Between February and up to June the river was flooded and difficult to do fishing. The indigenous communities along the Zambezi River enjoyed fishing during that period.

Use of Chinanga in the Zambezi

From detailed interviews with key informants and traditional leaders in the Binga area, it was noted that in chief Negande's area, fishing was either communally done between 2-3 families at a time or done per individual household. The fishing families could camp for some hours at a chosen riverbank. A big fire was lit at the bank of the river where experienced elders chose a pool as illustrated in figure 1.3. Such a pool was supposed to be a known pool, which was free from crocodiles and hippos. In

fact, the presence of a fire was said to drive away all wild animals, crocodiles included. The fire could be lit for as long as the fishermen wanted to do their extraction business. Fish big and small were attracted to the light as reflected far and wide in water. The experienced elders could observe using their naked eyes to determine the quantity of fish that were within reach. If there was plenty of fish around the lit waters near the fishing 'camp' then a thorn bush without leaves *(Chinanga/knob-thorn or Acacia Nigrescens)* was used to hit the waters. Fish were trapped in the strong knob thorns and were pulled out of water immediately as if they were trapped by present day fishing hooks. Traditional containers such as open basket (Rusero) were used to measure the day's catch as a measuring device. Two or three open-basketful of catch was enough for the day.

Advantages:

- It was communally done hence enhanced socio-economic interaction amongst the community members
- The tools were readily available that is the thorn bush (*Chinanga or Acacia Nigrescens*)
- Skilled expertise in elders was also easily available in any community hence fishing and chances of getting a good catch were also enhanced.
- Fire was the main science behind catching fish as it provided light to attract fish.
- The communities showed that they were not behind in technology as they knew that fish could be attracted by light at night hence had to look for the means to exploit the fish, an art modern day fishing is still using

- Not much fish was extracted when using the thorn bush hence the river was not degraded in terms of over exploitation of its fish resources.
- Fire lit at the banks of the river drove away wild animals including crocodiles hence the fishermen's lives were in less danger from predators.
- The lit fire at the banks of the river never polluted the river itself a thing which is happening with today's diesel run rig-boats which often have oil leakages that pollute the river and dams when fishing.

Disadvantages:

- The method could not guarantee enough catch for the families involved, as there were a lot of restrictions and prohibitions that governed fishing along the river.
- One was restrained from day dreaming or giving promises of large catches to his wife and community when leaving home for the fishing event which had to be regarded as a secret to the fishermen.
- In the event of a wounded fish escaping from the 'hook' the fish remains wounded hence was cruelty to animals.
- Unnecessary comments were not invited, that is passing comments on the size of catch and the quality or funny types of fish, was regarded as taboo.
- It was the duty of the elders to guard against people of such 'big' mouths so as to make sure they remain at home doing other chores whilst the real fishermen went out to do much productive work.
- It was regarded as a taboo to look down upon the day's catch as one could risk being taken by the gods of the river.

- People who were reckless with their type of talk especially talk that angers the river ‘gods’ risked being eaten by wild animals and crocodiles despite the big fires around.
- Because of certain events that took place in the past, pools were named. Pool of Crocodiles (*Dziva reNgwena*) was named after several crocodiles feasted on both humans and animals hence naming it after such events deterred people from visiting or even fishing at such pools hence they remained intact and undegraded.

3. The Fish Finder and modern ways of fishing in Lake Kariba

The fresh water fishing along the Save river in the interior Zimbabwe and the Zambezi River along the boarder with Zambia reflected some similarities in technology where fire in one way or another was used to attract fish. The two technologies existed almost 900 km apart and have been passed on from one generation to another. In Lake Kariba, a similar technology is still in use but in a modern way with the use of computers to improve on the efficiency on fish detection. It is illegal to do fishing near the shore or harbor as authorities try to avoid the pollution of the lakeshores through oil spills. Similarly there were a series of prohibitions in the traditional knowledge systems, which protected the waters from pollution. The computerized fish finder is a multi-purpose device with the capacity to detect catch of various quantity, size and depth where the catch is found. Similarly in the traditional knowledge base experienced elders used their knowledge and long-term interaction with the river to detect fish quantity and availability in the waters. Fish Finder is also used to detect the temperatures of the waters below, terrain below, presence of submerged mountains, trees, hills and

underwater flowing rivers, amongst the multitude of other pieces of information the computerized device could avail. It also has the capacity to come up with graphs and other functions such as zoom, range, and frequency of any of the functions demanded by the captain and crew. Such documentation and skill in Fish Finder was not found in the traditional approaches. Like the traditional knowledge systems along the Save and the Zambezi Rivers, fishing in Lake Kariba is done at night during the total absence of any form of moonlight. Fishing normally starts at 1900hours when there is sufficient darkness in the fresh waters. Fishing near the harbors is strictly prohibited and attracts a fine of not less than $15 000 000 (figures in Zimbabwe Dollars valid as per year, 2005) per boat or attracts a total ban on the boat caught polluting the waters near the harbors and beaches. Fishing is done with the use of nets being immersed in the fresh waters whilst in the traditional systems hitting the fish in water was the norm. Three lights provided on the boat by giant generators act as fishing bait to attract fish towards the reach of the nets on the rig boat where as fires were lit in order to provide light that attracted fish within the traditional approach. Fish Finder improves on the accuracy of interpreting fish availability hence reduces guesswork or other forms of intelligent guesses by elders, as was the traditional case on the Zambezi and the Save Rivers. The use of generator powered lights to attract fish to within the reach of nets on rig boat facilitated easy catching of fish. In the traditional methods, elders used their experience of the rivers and pools to assess where there could be fish archives whilst in the modern technology the computerized Fish Finder does the trick. In the traditional method overexploitation was prohibited through the use of prohibitions and various warning signs by the ‘owners’ of the waters whilst in modern technology fines are used to deter

fishermen from fishing near shores or outside stipulated boundaries, as is the case in the giant manmade Kariba dam.

Advantages:

- Accurate way of looking for catches than guessing and use of experience from elders.
- Only the type of catch aimed by the fishermen can be caught.
- Use of generators means the fishermen can go further into the waters than the banks of the rivers or shallow waters where traditional fires were used.
- Electricity provided continuous energy hence fishing could be done continuously too.
- Pollution barred from within the harbors and beaches through the use of fines.

Disadvantages:

- Diesels pollute the waters whenever they leaked.
- A lot of money is needed to buy the equipment and rig boats.
- A lot is needed in terms of capital to service the boats and equipments.
- Skilled manpower to interpret the computerized devices is needed.

Implication to assessment

Both teachers and students revealed during the focus group discussions (FGD) that it was a noble idea to include the ethno-based methodologies when introducing concepts in the classroom. The Western methods that include laws and policies have been in place ever since the colonial era of 1890-1980 in the case of Zimbabwe. These have been modified here and there in postcolonial Zimbabwe with the introduction of CAMPFIRE in an effort to restore communal participation and ownership to the

existing resources, but still they have had their own limitations. So the envisaged answer is to augment the traditional methods of conserving natural resources the modern methods. But, where is the starting point? Of course it is the classroom through Ethno-based teaching/learning and School-site Based Assessment amongst many other recommended methodologies. It was reflected in this study that once education is relevant to the experiences of a community or a culture, homework becomes easy to do as elders at home could easily help. Teachers noted during interviews that by using a traditional approach in using what the students already know about conserving the environment which is the air, water, soils, flora and fauna (biotic and abiotic environments), and then moving on to more complex modern ways of sustainable environmental management systems, the classroom could benefit a lot. Each community has something unique and something common with other communities as was seen in this paper where the Shona and Ndebele communities had some common customs used to achieve environmental protection. In School Based Assessment teachers could concentrate on the various traditional methods used by the immediate communities where the students live and how conservation could help in sustainable resource conservation within such respective communities. Teachers during the focus group discussions noted that once the idea of an Ethno-based Knowledge on conservation is put across the summative exams by ZIMSEC, the local examination board, and then teachers and students were likely to appreciate and concentrate on such knowledge base during classroom lessons. It was also observed during this study that teachers and students normally appreciated learning what was frequently assessed at the end of the course. This was revealed during the interviews where both teachers and

students asked whether the issues on the traditional knowledge systems were going to have an influence in the examination process at the end or was just a mere interest in research. Once teachers notice that the issue is likely to be examined then it is seriously considered. Detailed interviews were also done with assessors from the Zimbabwe School Examinations Council (ZIMSEC) officials on how the council has gone in as far as trying to incorporate environmental issues in assessment.

Examples of resource conservation and environmental management questions that appeared from the June O' and A' level examinations of 2004 as used by ZIMSEC reads as thus:

Section A of O' level Geography Paper 2 [2248/2] number 3 [b]
[i] What are wetlands? (2)
[ii] Describe the distribution of wetlands shown on the map provided (6)
[iii]Suggest reasons why it is important to conserve wetlands and give the problems that may be faced in carrying out the exercise. (7)

Section C of A' level Geography paper 2 [9156/2] number 12
[b] Outline the impact of pollution on the environment (8)
[c] Assess the attempts made to reduce air pollution in any urban environment you have studied (9)

The initiative of incorporating environmental issues in assessment was indeed noble. However, the items remained mainly of a cognitive nature and lacked application from an ethno-based or traditional conservation systems approach, which was relevant to the candidates and their immediate communities. It is therefore envisaged that from the two sets of exams, candidates who had taken an Ethno-based approach would have benefited a lot in coming up with what wet lands are and how they could be conserved. This is so because the use of wetlands is very common a feature in rural and urban Zimbabwe as was noted by Svotwa et-al (2007).

Recommendations

- The study recommends that the on-going documentation on Ethno-based or traditional knowledge systems should get enough sponsorship so as to cover as much aspects of environmental conservation as possible.
- An infusion of Ethno-based knowledge and the modern ways of conservation could be done so as to improve on the way the environment is viewed and conserved today.
- School going children spent most of their time at school hence the education system should capitalize on the use of an Ethno-based approach in the teaching and learning process so as to instill the art of conservation from a tender age.
- Assessors in the education system could also capitalize on the 'new' inventions on the use of an Ethno-based approach to conservation is setting items that are skewed towards such an approach.
- As a researcher with special interest in environmental issues I hope others could take up from here and try to link similar technologies from different peoples and cultures to the benefit of us today and generations yet to come.

Conclusion

The ethno-based or traditional ways of conservation have re-surfaced for good and it is time most communities appreciate and document them. Traditional methodologies in most cases are cleaner and less harmful to the environment such the two technologies observed when catching fish in two traditional communities of Zimbabwe. Traditional methodologies for a long time have assured a harmonized use of the environment hence was quite sustainable. Whilst it is fully appreciated that we now leave in a global village, which might demand a global approach as such, there are

certain issues, which remain part of a particular community. These have to be excavated and published for the benefit of mother earth. Thus assessment should also take a leading role in the appreciation of ethno-based methods as a panacea to environmental problems. The items set should thereby include some elements of the role an ethno-based or traditional knowledge plays in conservation. Comparing the traditional versus the modern methods of conservation could also expose the loopholes from each methodology which when closed then a better way of sustainable conservation could be achieved. Such is likely to instill not just conservational knowledge for the purpose of the exams but a long-time appreciation of environmental conservation in our various communities when pupils appreciate the methods, which they look down upon as homemade or the technology from the caves. The parents feel very relevant to school work of their children when they see that the schools are now teaching the traditional ways of doing things as they relate to the modern or computer lives of today. Parents feel comfortable to help their children in doing homework as well as in adding knowledge to the education system. It is such a coexistence, which we need for education to have meaning in our various societies. It is when the learning becomes Ethno Based and the assessment become relevant to the communities that we come from, that we can reduce the number of ‘zero marks’ that are often associated with summative exams devoid of the students’ rich experience.

References

Chimhundu, H (2004) Keynote Address on Ethnobased Knowledge and School-based Assessment. Paper presented on the 2nd sub-regional Conference on Bench-marking Ethno-based learning and School–based Assessment in a Multi-Cultural Environment, 22-27 August 2004, Victoria Falls, Zimbabwe.

Chapman, D. (Editor) (1992) *Water Quality Assessments*- A guide to the use of Biota, Sediments and Water in Environmental Monitoring, Chapman and Hall, Melbourne, Australia.

Dirwai, C. and Ngwazikazana, P. S, (2004) Ethno-Based Knowledge Systems and Conservation of the Environment. Paper presented on the 2nd sub-regional C Conference on Bench-marking Ethno-based learning and School–based Assessment in a Multi-Cultural Environment, 22-27 August 2004, Victoria Falls, Zimbabwe.

International Bible Society [1984] The Holy Bible, New International Version. Zondervan Publishing House Grand Rapids, Michigan 49530, U.S.A

Kirkwood, R.C. and Longley, A. J. (Edits.) (1995) *Clean Technology and the Environment*, Chapman and Hall, Melbourne, Australia.

Mukwada, G. (2000) Natural Resource Conservation and Management. Zimbabwe Open University, Harare.

Madzingira, N; Chizororo, M and Dirwai, C (2002) Population. ZOU, Harare.

Moyo, S; O'Keefe, P and Sill, M. (1993) The Southern African Environment. Earthscan Publications Ltd, London.

Mutangadura, A (Unpublished Thesis) (2004) The relationship between human activities and land degradation: the case of Furamera communal areas. Zimbabwe Open University, Harare.

Rukuni,. M and Eicher, C. K. (2001) Zimbabwe's Agricultural Revolution. University of Zimbabwe Publications, Harare, Zimbabwe.

Waugh, D, (2000) Geography and Integrated Approach. Thomas Nelson and Sons, U.K

Nhapi, I. (2000) Environmental Pollution and Control. Zimbabwe Open University, Harare.

Timberlake, J. and Shaw, P. (1994), *Chirinda Forest: A Visitors' Guide*, Harare, Forestry Commission.

Yusuf Ali, A. (1946) The Holy Qur'an, *Translation and commentary*, Islamic Propagation Centre International.

Journals

Chigora Percyslage, Masocha Robert and Mutenheri Feddious (2007) The Role of Indigenous Medicinal Knowledge (IMK) in the Treatment of Ailments in Rural Zimbabwe: The Case of Mutirikwi Communal Lands. **Journal of Sustainable Development in Africa** (Volume 9, No.2, 2007) Fayetteville State University, Fayetteville, North Carolina.

Mavi, S and Shava, S (1997) Traditional Methods of Conserving Medicinal Plants in Zimbabwe. Journal Archives Volume 2 Number 8-July 1997.

Murombedzi, J. (1992) "The Communal Areas Management Programme For Indigenous Resources [CAMPFIRE]: A Zimbabwean Initiative For Natural Resources Conservation." **Zimbabwe Science News**, Vol. 26. Nos. 0/12. 77-81.

Robert Maponga and Jones Muzirambi (2007) Indigenous Knowledge in Conservation of Forestry and Land Resources in Musana Communal Areas, Bindura. Journal of Sustainable Development in Africa (Volume 9, No.2, 2007). Fayetteville State University, Fayetteville, North Carolina.

Svotwa, E., I.O Manyanhaire and P. Makombe (2007) Sustainable Use of Wetlands: A Case for Mwaonazvawo Village in Mutasa District of Manicaland Province of Zimbabwe. **Journal of Sustainable Development in Africa** (Volume 9, No.1, 2007). Fayetteville State University, Fayetteville, North Carolina

Svotwa E, J, Manyanhaire I.O. and Makanyire (2007). Integrating Traditional Knowledge Systems with Agriculture and Disaster Management: A Case for Chitora Communal Lands **Journal of Sustainable Development in Africa** (Volume 9, No.3, 2007) Fayetteville State University, Fayetteville, North Carolina.

Web

Williams, R. (2005) Peppers and Elephants Don't Mix, posted Wednesday, August 17, 2005http://russlings.blogspot.com/2005/08/peppers-elephants-dont-mix.html retrieved 6/09/05)

Spirostactiys Africana (www.csae.ox.ac.uk/workingpapers/pdfs/9908text.PDF). Noble and Wright [2000] Defining rural areas (retrieved on 20/06/05) .http://www.swpho.org.uk/ruraldep/definingrural.htm

Rig Boat in Lake Kariba Craig Mac Rea http://www.safarispecial.com/gallerypics/Hkapenta1L.jpg retrieved on 13/08/05.

Fish Finder (http://www.overtons.com/cgi-bin)

Chinanga (http://www.krugerpark.co.za/africa_knob_thorn.html)

Television Program

Zimbabwe Broadcasting Holdings Television Program: Beyond our Boarders on Chief Shana stating the advantages of traditional methods of conservation. Zimbabwe Television Network (Friday, 13th August 2004 (1830-1900hrs)).

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