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Cultural Values and African Indigenous Knowledge Systems in Climate Change Adaptation

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ABSTRACT A number of examples in this paper are used to demonstrate the efficacy of culture and indigenous knowledge systems (IKS) in climate change adaptation. The analysis is based on examination of secondary sources. The paper advances the argument that climate change impacts on cultural communities differently because they live in diverse natural environments and experience it differently. This necessitates cross-cultural communication in the search of sustainable solutions to the challenges of climate change through shared experiences. Emphasis is put on the need to document and protect IKS for sustainability and policy development. There is also the need to understand the impact of globalization on agricultural practices and the importance of interfacing indigenous and other knowledge systems to meet its challenges.

INTRODUCTION

The paper is based on the premise that the interrogation on the relationship between culture and climate change is one of the most important concern of our time which tends to be neglected in the climate change discourse (Van den Pol 2010). Studies show that climate change is a global phenomenon which affects all aspects of human life including people's relationship to the natural environment. However, the impact of climate change impacts cultural communities differently because they live in diverse natural environments and experience it differently. This necessitates the importance of cross-cultural communication in the search of sustainable solutions to the challenges of climate change. These cultural differences influence both the content of their local knowledge on climate change as well as the way this knowledge shared and articulated. The Inter-governmental Panel on Climate Change (IPCC 2001) defines climate change as a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). The causes may be due to natural internal processes or external forces or to persistent anthropogenic changes in the composition of the atmosphere or in land use (McCright 2003).

In the context of this discussion culture refers to the beliefs, behaviours, objects, and other characteristics common to the members of a particular group or society. It is through culture that people and social groups define themselves, conform to society's shared values and contribute to society. Thus, culture includes many societal aspects such as language, customs, values, norms, mores, rules, tools, technologies, products, organizations and institutions (Baldwin 2004). African indigenous communities, like other indigenous local peoples all over the world have over time developed unique and complex systems of culture and knowledge with regard to their communities and natural environments. This based on centuries of observation, innovation, experimentation, practice and monitoring (Balslev 1996; Anderson 2004).

Therefore, Indigenous Knowledge (IK) is that knowledge unique to a given culture that is acquired through accumulation of years of experiences by local people and is passed on from generation to generation (Wolff 2003).

METHODOLOGY

The study used a survey method of secondary sources on cultural values and African indigenous knowledge systems in climate change adaptation and interpretation. The relevant sources of secondary data, included books and periodicals, government and non-governmental publications, past research documents. Taking into consideration the comprehensive nature of the study, the researcher consulted secondary data sources because they were available, appropriate and adequate to draw conclusions. The time involved in searching for secondary sources was much less than that needed to complete primary data collection procedures. The following section presents and discusses the findings.

RESULTS AND DISCUSSION

African Indigenous Knowledge on Weather Predictions

Studies in various parts of Africa reveal a rich knowledge of weather predictions among local community knowledge holders and practitioners in different socio-economic sectors. This knowledge has for centuries enabled people to cope with changes in the weather patterns such as storm routes, wind patterns and to design their disaster management strategies and mechanisms long in advance by constructing types of shelter, wind break structures, walls and homestead fences appropriately. Similarly, knowledge of local rain corridors enables them to prepare for storms (McCarty 2002). For instance, among the Wasambaa in Tanzania, people used their local knowledge of cloud colours to determine those clouds which may carry hailstones. This enabled people to run for cover. The Wagogo who live in the dry areas of central Tanzania knew that prolonged drought was followed by storm and thunder during the first few rains. This was an early warning system for people to prepare or expect a disaster. The Batswana of Southern Africa knew that floods could be predicted from the height of birds' nests near rivers. Other weather indicators used by the Batswana included moth numbers to predict the coming of drought conditions; the position of the sun; and the cry of specific birds on trees near rivers assisted people to predict the onset of the rainy season (Brown 2004).

Moore (2010) provides examples of African rainmakers who are slowly gaining national and international recognition. The scientific world has begun embracing them as partners in unravelling the never-ending mysteries of Mother Nature. In fact, modern climate experts in Africa are looking up to African indigenous knowledge as a probable salvation to the current devastating effects of climate change. Mojon (2010) in the *Mail and Guardian* of 20 September 2011 provides the following information using the case of Western Kenya on the increasing importance of African rainmakers.

Long vilified as sorcerers, Kenya's Nganyi rainmakers, with their meteorological equipment consisting of trees, pots and herbs were being enlisted to mitigate the effects of climate change. He reports the case of Alexander Okonda, an African rainmaker in western Kenya, near Maseno, kneeling in the dark shade of a small coppice, blows through a reed into a pot embedded in a tree hollow and containing a secret mixture of sacred water and herbs. He is a member of the Nganyi community, a clan of traditional rainmakers that for centuries has made its living disseminating precious forecasts to local farmers. Alexander says and explains, after completing his ritual:

This contains so much information. It is something I feel from my head right down to my toes...This skill is in the family, it runs in our blood. When I was a six-year-old boy, I could already feel so many things.

Interviews with these indigenous knowledge holders and practitioners revealed that the croak of the frog, the movement of the termites, the leafing of certain trees all carry information, the interpretation of which the Nganyi have transformed into a ritual art hovering between legend and science. The Nganyi's fame was sealed when his great-grandfather 'the greatest rainmaker in the family' was detained in the 1910s by the British colonial authorities who believed he was responsible for poor rainfall.

The great grandfather had 30 wives and was buried in a sitting position with a rainmaker's pot on his head in a site near the western town of Kisumu which is now one of the main natural 'shrines' used by his descendants to concoct their forecasts. Modernization slowly eroded the community's aura but the Nganyi have recently been offered a way of reviving their traditions through a project aimed at using indigenous knowledge in disaster prevention. This programme is funded by Britain and Canada. It brings the Kenya Meteorology Department (KMD) and traditional rainmakers together to produce more accurate forecasts and disseminate them to a wider number.

In her discussion of rainmaking and climate change in Tanzania, Oestigaard (2010) states that in Tanzania rainmaking has been an intrinsic part of culture and religion. The rainmaker is responsible for the wealth and health of his/her people by controlling and providing the life-giving waters. Thus, the rainmaker tried to control and manipulate nature by rituals where the forefathers and the deceased provided rain through the chieftain or the king as a medium. The chieftain or king's divinity is defined by his power to

control disasters, which included the fertility of the fields, the health and wealth of humans and animals, epidemics, plagues, and safety from attacks by wild beasts, to name a few. If the chieftain or king failed to provide the life-giving waters, wealth and health to his people, he could be killed because he threatened the safety of the society. Agricultural practices were thus deeply rooted in culture and religion thereby linking the ancestors to the structure and governance of society. These beliefs co-exist in Christianity where droughts or failure of the annual rains are seen as a penalty by God due to people's disobedience and sinful behaviour. These traditional belief systems are under pressure due to modernity and globalization.

Therefore, in order to understand changing agricultural practices the project studied the relation between traditional rainmaking and agricultural practices in the face of modernity and globalization. To this end, a dual approach was adopted. The first approach explored how changes in the traditional culture and religion with regard to rainmaking affects the actual agricultural practices. On the other hand, the study examined how the introduction of new agricultural practices and crops and associated pressures on land and water resources influenced the cultural practices and religious beliefs of the society.

The area of investigation was in the Mwanza region in northern Tanzania on the shores of Lake Victoria. Mwanza is the second largest town in Tanzania. 85 percent of the population in the Mwanza region practice smallholder agriculture. In this region, rivers flow into Lake Victoria which also enabled a comparison of how traditions and rituals with regard to different bodies of water such as rain, rivers and lakes enabled changing strategies and agricultural practices in relation to globalization and climate change (Oestigaard 2010).

The Use of African Indigenous Knowledge Systems as Climate Change Adaptation Strategies

The long experience of the interaction between human being and their natural environment has enabled them to develop various strategies of coping with the environment including climate change. Some of these strategies still have relevance to date (Bews 2002).

For instance, the Rufiji river valley area in Tanzania has been for many years prone to frequent floods (Muya 2006). Example is given of the life along the Rufiji river valley in Tanzania which is prone to frequent floods (Muya 2006). Local people in the area depend on agriculture and the waters of the Rufiji river. They build their houses on stilts, so that the floodwater passes underneath the floor of the house. Brush (1997) elaborates that stilt houses are built primarily as a protection against flooding but also serve to keep out vermin. The shady space under the house can be used for work or storage.

Cultural and Spiritual Interpretation of Climate Change

Folke (1998) argues that while scientific explanations of climatic changes have mainly concentrated on anthropogenic, greenhouse gas emissions, indigenous knowledge-based interpretations of observed climate changes in Africa and elsewhere are often much more varied and encompassing. He elaborates that whether or not scientific models are incorporated into local community-based interpretations and explanations depend on the status and accessibility of science within a culture and on the influence of media. In some places, media and its coverage of climate change issues dominate local people's understanding of climate change. Nonetheless, local people's own observations are local and relevant. For example, Henderson-Sellers (2002) observed the marginalization of community experiences in a Tswana village, South Africa.

These local personal observations and experiences evoke deeply felt emotions, as familiar signs of seasonal changes become invalidated. For example, in November of 2009, a very special meeting took place within the Tshidzivhe community of Venda, in the Limpopo province of South Africa. The meeting was to carry out an exercise in community participatory mapping, and it was to mark a turning point for the community and all those involved.

Chambers (2006) defines participatory mapping as a group-based qualitative research method that gives participants freedom to shape discussion on a given topic with minimal intervention from researchers. It generates a rich understanding of the connections between people, places and organisations over space and/or time.

For participants it can lead to new understandings of an issue, of a locality and the influences of wider social, political and economic forces. It may also increase the relevance of a study as the questions being asked are the important ones for those taking part. For the researcher it can often provide a surprising and rich set of data which can be both visual (the maps produced) and auditory (the conversations). For example, the Chief of Vhutanda said: *our countryside is being destroyed, and our forests have disappeared…for me the forests are my life. If you cut them down, you wound my own heart.*

Venda is home to the traditional indigenous vhaVenda, known as the 'Rainmakers'. It is one of the regions of South Africa where such communities practice their traditional ways of life. The vhaVenda people are a matriarchal society, where the ecological knowledge which guides the governance of the community is held by women, known as *makhadzis*. Many of the *makhadzis* are also custodians of sacred natural sites and are responsible for the associated community practices and rituals to keep order in the community and the ecosystem.

Furthermore, the impact of colonization and industrialization has fragmented local communities, changed power relations and destroyed the rich biodiversity and forests of the extraordinary Soutpansberg Mountains, in which their territory is located, in the northeastern part of South Africa. Industrial plantations, mining and tourism are some of the major forces of environmental degradation in the area.

The *makhadzis* are deeply pained by the destruction of their traditional territory especially the sacred sites. The *makhadzis* began to sketch the relationship between the sacred sites, showing how these sites are critical places within the ecosystem - natural springs, forest, wetlands, river basins and waterfalls - which maintain the health and resilience of their ancestral territory (Shai 2006). With support from the African Biodiversity Network and *Gaia*, a community exercise in eco- cultural mapping was then carried out in November 2009. In the context of the study eco- cultural mapping refers to a collective process where communities themselves create a network of relations within their area. More than 70 of vhaVenda people took part, mostly from Tshidzivhe community, guided by trainers in eco-cultural mapping from Colombia and accompanied by indigenous leaders from the Colombian Amazon and the Russian Republic of Altai. Joyce, a Makhadzhi elder had this to say:

When I look at the map we are drawing I feel I could cry. Our territory has been badly hurt...I cry for the coming generations. How are they going to live when this country is destroyed?

Women, men and youth in the community spent six days mapping. It was a time for deep reflection as the elders shared their knowledge of the territory, the sacred sites, the traditional practices and rituals, many of which are on the verge of being lost due to climate change. As part of the mapping process the community knowledge holders were involved in remembering the territory, the sites of ecological and cultural importance, and the role of rituality. According to them the first map of the ancestral order of the territory, reflected how things were when the community was living traditionally. This was still in the living memory of the elders - when the territory was teaming with wild animals, forests and had abundant rain. The second map was of the present. This, they said, is the map of disorder - where the forests are destroyed, there are no more wild animals, rivers and lakes are drying, the rainfall has radically fallen and the traditional crops have almost disappeared.

The final map is of the future - the vision of how the communities wish to regenerate the territory and rebuild their communities. They have already begun to build their future now - such as elders teaching in schools to revive traditional seed diversity, and working with Mupo Foundation to restore and strengthen their bio-cultural knowledge and practices.

As the different maps were completed the *makhadzis* sang and danced in celebration! They had unearthed a new capacity to express and interpret their traditional ecological knowledge so that the community can hold a collective vision. Based on this experience they are planning to develop more detailed maps around each sacred site. These will be used to negotiate with the government to recognize and protect each site and the connection between them. In the face of climate change, the health and vitality of ecosystems is critical. This is the basis of ecological and community resilience.

According to the community knowledge holders, the women "Rainmakers" of the Venda people in South Africa help to protect their sa-

cred forests and resist the forces which threaten their future. Venda (or Vhembe District) in Limpopo Province, South Africa is famous for its biodiversity and cultural richness. Its sacred sites are watched over by the elder women of the communities, known as *Makhadzis*. These women have come to be known as the "Rainmakers" of South Africa, due to the capacity of their cultural rituals to invite rain to the area.

Years of colonisation and the encroachment of the western world on traditional cultures have meant that the *Makhadzis* became increasingly marginalised and silenced. Also, their traditional roles as advisors to the chiefs and as keepers of the indigenous seeds were undermined. But now, with support from the Mupo Foundation, a South African NGO, the *Makhadzis* are finding their voice once again. They are rallying to protect Venda's network of sacred forests and to set an important legal precedent for South Africa's natural and cultural heritage.

In 2009, the *Makhadzis* were joined by the elderly men and chiefs of the community to form *Dzomo la Mupo* (meaning Voice of the Earth), a small community-based organisation, 'to protect nature in all her forms, and especially indigenous forests … [and] to protect and preserve sacred sites in Venda' (Ratiba 2015). The Mupo Foundation is backing them in this task. There exists a small network of bountiful forests in Venda, the source of springs that feed into the Luvuvhu river. The river catchment provides water for the surrounding land and communities, and the forests are revered as sacred; they are places where the ancestors reside and where peace must be maintained. It is the responsibility of the *Makhadzis*, as the traditional custodians of these sacred forests, to ensure that they are safeguarded and respected.

On the basis of the above practical community experiences, western scientific causal explanations of climate changes may be seen as abstract and removed from social and cultural reality. This is due to the fact that they tend to make people feel powerless and/or not responsible for combating climate changes, despite their own vivid experiences of climate change impacts in their own environment. Henderson-Sellers (2002) provides the example of farmers in western Austria, who had many detailed observations of climate changes, ranging from increased wind-felled trees, increased drought, and decreased snow cover, but whose information on climate change causes were largely based on the mass media and people did not see themselves as connected to the causes or their solutions as portrayed in the media.

In contrast, where mass media played a limited role, community interpretations were more closely dependent on people's own observations and local cultural framework. As shown by the Venda people experiences, many local interpretations contained strong ethical and spiritual elements, often framed in terms of a cosmological or spiritual balance, which has been upset. These interpretations are not created ad hoc to explain present-day climate changes, but have in many instances their roots in traditional ways and cultural experiences of interpreting climatic and weather phenomena as signs of something more than mere biophysical processes (Pendergraft 2000).

In most parts of the world and within the context of different belief systems, local people have traditionally interpreted adverse weather conditions as well as more catastrophic events as punishments for human wrongdoings. In the Congo forests of Central Africa, for example, thunder storms and hail, are viewed as expressions of the wrath of the ancestors. The adverse climatic conditions or catastrophic events are thought to be caused by the breach of taboos, such as hunting at certain times or places, picking specific plants, or eating certain foods. General moves against human cruelty, selfishness, greed or lack of spirituality, if transgressed, are also thought to precipitate catastrophe. These moral or spiritual explanations of climate change contrast with scientific explanations (Proctor 1998). However, other traditional people integrate scientific and local explanations. Among the Wasambaa and Wazigua in Tanzania for instance, the occurrence of climatic changes such as floods, drought and famine are believed to be the result of people's greed and selfishness. These lead to environmental degradation of land and water. Local views of climate changes are characteristically interwoven with other environmental and societal problems including outbreak of diseases and frequent deaths in the local and neighbouring communities (Muya 2006).

In general, local communities' interpretations of climate change may help people better make sense of observed climate changes. In discussing the factors influencing perception, interpretation and adaptation of climate change, Mc-

Cright (2003) states those local peoples' experiences on these factors, seldom acts in isolation. Many of the climate change, environmental and social factors are interconnected. Peoples' interpretation of climate change is also affected by both media and cosmology (Klein et al. 2005). Frequent experience of natural disasters may also influence communities' development of local strategies of coping and mitigating climate changes. Van den Pol (2010) provides the example of Mozambique where local communities have developed local strategies of coping and mitigating climate changes due to frequent flood experiences.

McCarty (2002) and Muya (2006) provide the examples of small-scale rice farmers in the Mkomazi Valley in Tanzania, who with decreasing access to water; dependence on irrigated agriculture has increased the farmers' vulnerability to climate change. Whereas Samson, (2004) shows cases in Kenya where NGOs and state agencies help to disseminate information and promote crops and management methods suitable under changed climatic conditions, agricultural assistance supports communities' own efforts to climate change adaptation. One problem with such directed efforts is that some future predictions are still uncertain especially local precipitation patterns, which are of crucial importance in agricultural systems.

Social and economic ties between different groups of peoples are beneficial in times of crisis (Bates 2000). Groups hit by adverse climate conditions such as floods or drought can acquire resources from other groups not experiencing the same problems (for example, due to reliance on different agricultural techniques, use of different resources and ecosystems, or local variation in climatic conditions). Muya (2006) provides the example of the Wazigus in the Tanga region in Tanzania who are prone to drought conditions and get maize and other grain supplies from the neighbouring Wasambaa or Wabondei farmers in the same Tanga Region or from other outside regions.

However, Pendergraft (2000) using various experiences and cases from farming communities in East and Central Africa shows that with impending climate change some of these reciprocal systems may break down, as certain tribal groups may become more permanently disadvantaged. Proctor (1998) states that many climate change risk aversion strategies depend on different crop species and varieties, as well as on access to wild resources and ecosystems. Hence, agricultural policies, such as permanent settlements, can hinder indigenous coping mechanisms. In Eastern Africa, for example, various ethnic groups have traditionally tended to respond to drought by leaving their main settlements in the savannah and migrating to rain forest areas in times of drought. In most countries in the region such as in Tanzania, government settlement policies prohibited people from traditional temporary migration. So even though the government provided food aid during the drought, some of the people had no seeds to re-establish agriculture after the end of the drought (Moore 2010).

Experience in Eastern and Southern Africa have also shown that markets may undermine indigenous coping strategies if traditional crop species and varieties are replaced by high-input, high-yielding commercial seed varieties susceptible to pests, diseases and climate variation. However, in some cases, markets may also help people cope with climate change if there is food and other resources to buy in times of crisis (Samson 2004). Benefits of newly created opportunities (for example, markets) are determined, not surprisingly, by factors such as power relationships within and among groups. Powerful individuals, households and groups may appropriate new opportunities presented by climate change and monopolize resources threatened by climate change. Many indigenous African communities not only inhabit marginal areas, but also are politically and economically marginalized. They are extremely vulnerable and yet are forced into new situations, such as markets, where their indigenous knowledge and skills are not applicable (Muya 2006).

CONCLUSION

The paper was based on the argument that the relationship between culture and climate change tends to be neglected in the climate change discourses. Climate change impacts cultural communities differently because they live in diverse natural environments and experience it differently. This necessitates cross-cultural communication in the search of sustainable solutions to the challenges of climate change through shared experiences. The cultural diversity of Africa has created rich indigenous knowl-

edge systems on early warning systems for climate change adaptation. The causes and impacts of climate change had different cultural meanings and interpretations in diverse cultures. Various cultural examples from across Africa were provided to demonstrate the importance of cultural values in indigenous systems for climate change adaptation.

RECOMMENDATIONS

The paper recommends the incorporation of the role of Indigenous Knowledge systems and culture in general in the climate change discourse. Climate change is a global phenomenon but it affects cultural communities differently as live in diverse environmental settings. They need to exchange experiences in the search for sustainable solutions to the effects of climate change. These diverse cultural experiences and knowledge systems on climate change need to be documented and protected for sustainability through the use of Information and Communication Technologies (ICTs). The knowledge holders and practitioners of these cultural values need to be involved in the documentation process. Gender implications have to be considered in the documentation processes as women are the custodians of these community-based knowledge systems but they tend to be marginalized. Moreover, these indigenous knowledge systems need to be interfaced with other knowledge systems to meet the challenges of globalization.

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