

*Full Length Research Paper*

# **A Critical Investigation of Environmental Malpractices in Mozambique: A Case Study of Xai-Xai Communal Area, Gaza Province**

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**Mozambique like other countries in the sub-Saharan Africa and the world over is at high risk to the possessions of global warming and potentially facing 'catastrophic' changes in the physical environment, water sanity, agriculture, biodiversity and habitats and new pressures on human health and national economy. These problems are precipitated by a compound of malpractices such as poor farming methods and poor environmental management, lack of environmental ethics included. Drawing on several examples of Mozambique's communal areas and Xai-Xai communal area as a case study, the paper demonstrates the complexities and subtle nuances of consolidating good environmental practices in a society riddled with abject poverty, high illiteracy levels, few or no Agricultural Extension Officers, weak erratic power supply, underdeveloped industrial base and cultural barriers that undermine sound environmental management. It argues that the institution of robust environmental practices at family, community, institutional and national levels should be constructively aligned with its grassroot implementation (at institutional levels) to foster epistemological access of peasant farmers to information linked to 'sound' environmental conservation practices, the development of 'best practices' of environmental management and a culturally responsive, knowledge rich environments. The paper further argues that to confront the adverse impacts and the jeopardy caused by environmental mismanagement, there is need for the government perhaps through the Ministry of Lands and Agriculture to establish a National Climate Change Monitoring Committee consisting of scientists and experts from different ministries and relevant bodies to help manage the environment and monitor climatic changes from local to national level.**

**Keywords:** Investigation, Environment, malpractices, Xai-Xai, communal areas, Mozambique

## **INTRODUCTION**

Recent studies reveal that the world is undergoing serious climate change as global temperature is ever increasing. In particular, the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2001), reveals that the global average temperature will increase by 1.4° C to 5.8° C between 1990 and 2100 if the levels of emissions are not reduced. According to the same report the increase in temperature is largely attributed to the anthropogenic activities especially the use of fossil fuels in the developed world. On the other hand, developing countries especially in Africa are even more vulnerable due to their dependence on burning fuels. The impacts of climate change in Africa are generally manifested in human health and in the agricultural sector worsening the existing levels of

poverty and undermining all development efforts in the continent. In Mozambique, since about 80% of the population depend directly on land and natural resources, the effects of climate change and variability are likely to have a great influence on the communities and in the national economy in general. The main sectors likely to be impacted by climate change according to Mozambique's initial Communication to UNFCCC (UNFCCC, 2006; Albertina Bambaige, 2008) include: Agriculture and food security, water resources, coastal resources, biodiversity, human health and infrastructure, loss of life, erosion, land degradation, sea level rise, natural disasters, salt intrusion, crops, ecosystems, property, human and animal habitats, outbreaks of pests and diseases, displacement of people, and destruction of

infrastructure (communication network, schools, hospitals and houses).

In this light, environmental protagonists have relentlessly championed 'good' and 'sound' environmental practices as indispensable catalysts for fostering human health and fighting global warming in general. However, these protagonists have championed environmental practices yet without critically reflecting on and taking stock of the deep seated structural constraints (poverty, high levels of illiteracy, lack of environmental and agricultural expertise among the rural populace), ideological and political motivations that accompany good environmental practices adoption and use in resource constrained environments (Federal Republic of Nigeria National Policy on Environment 2004; World Bank 2004). Not surprisingly, several studies on environmental management evolve and are guided by the assumptions that increasing access to information particularly secondary sources/material like books and Information and Communication Technology (ICT) will inevitably scale up access to information and accelerate the production of knowledge (Apple Inc n.d., Licoppe and Heurtin, 2001). This understanding has been accentuated by the role of the Internet and the World Wide Web in 'democratising' the production, dissemination and access to information. The interventions at national and educational institution levels have been guided by the unsubstantiated assumption that increasing the ICT infrastructure (internet and communication networks, computers, electricity supply) and other secondary materials like books will automatically improve human knowledge on environmental management without paying sufficient attention to other structural constraints that hinder access to the information like the ICT skills gaps of academics and laypeople, poverty, high levels of illiteracy, socio-cultural barriers like negative perceptions towards new technologies such as pedagogical use of ICT and student limited communicative competencies. In this light, the argument is that the empowerment of peasant farmers (farmers at grassroots) and other rural dwellers should be in the forefront on environment issues that affect their communities – in other words rural people should be made environmental managers of their own communities.

While the aforementioned points are general to Africa, most are particular to Mozambique, hence the research adopts Mozambique, and in particular Xai-Xai communal area as a case study. Mozambique is among the most disaster prone countries in the world - combined with high levels of abject poverty, high levels of illiteracy and weak national institutions. The occurrence of natural disasters such as floods, cyclones, drought and earthquakes has consistently had a significant impact on people and the economy- they have created a life-threatening situation for the Mozambican people. According to United Nations (UN, 1999) report, humans were the most endangered species in Mozambique. Other threatening environmental

problems include the loss of the nation's forests through deforestation and human induced veld fires. The nation lost 7.7% of its forest and woodland between 1983 and 1993 alone (UN report, 1993). In 2008, "veld fires in the central provinces of Mozambique allegedly started by local farmers extending their fields destroyed 16,000 hectares of arable land" (Africa News Network, 18/09/08; Mawere, 2010). The purity of the nation's water supply is also a significant issue. Surface and coastal waters have been affected by pollution. Mozambique has 100 cu km of renewable water resources. About 89% is used in farming and 2% for industrial purposes. Only 81% of the nation's city dwellers and 41% of the rural population have access to pure drinking water. As of 2001, 13 of the nation's mammal species and 14 bird species were endangered and about 57 plant species were threatened with extinction. Endangered species in Mozambique include the green sea, hawkbill, olive ridley, and leatherback turtles (UN report, 2002).

The abovementioned factors make Mozambique susceptible to negative environmental consequences and human-induced climate change that could even worsen the gravity of the prevalent problems. Projected consequences consist of sea level rise (SLR), water scarcity, floods, agriculture and food insufficiency, increased soil erosion, increased wind speed, loss of biodiversity and habitats and new pressures on human health and national economy. It is estimated that as much as 25 percent of the population faces a high mortality risk from such events, and the country ranks as the second most geographically exposed country in Africa (UNDP, Mozambique, 2009). Climate change effects have the potential to increase this risk in the future, and can easily undermine development efforts and increase vulnerability of poor people who depend disproportionately on the environment for their livelihood- which may lead to socio-economic, political unrest in the country. This dependency also highlights the necessity for consideration of sustainable resource use and environmental conservation in poverty alleviation interventions, irrespective of climate change concerns.

These are all issues that demand careful and immediate attention (from both the government and non-governmental organizations), if a safe environment for sustainable development is to be guaranteed in Mozambique and of course beyond its borders-hence the present research is timely and relevant.

## **Background to the Problem**

While the discourse on environmental management has, to a larger extent, gathered momentum in Southern Africa, Mozambique included, in the last couple of years, most of the issues raised have centered on solving the problem at national and global levels without seriously considering the contribution(s) of the 'grassroots

communities'. Issues of global warming, depletion of the ozone layer, acid rains, famine and other such natural and human induced disasters have dominated most academic discourses and researches and very little has been written about the rural dwellers' place and relevance in natural resources and environmental management. In Mozambique, and in particular Xai-xai communal area, what is even more worrying is the fact that it is still the outsiders who are driving the environmental management initiatives (though only does this occasionally) and the community dwellers/peasant farmers are passive recipients. It is this kind of background which prompted the researcher to come up with the research question: 'Could discourses on environmental management at national level alone impact a positive change of behavior on the rural population and improve the future of Mozambique's environmental managing strategies?'

Despite the lack of specific studies carried out in Xai-Xai communal area on prevailing environmental problems, it has been asserted that the prevalence of natural disasters and other such environmental problems tend to be worsened by environmental malpractices. Recent study on Mozambique's climate in general shows that if no action is taken as a matter of urgency the effects of climate change in the near future will be as follows:

- Increase of the mean air temperature by between 1.8 and 3.2 °C;
- Reduction of annual rainfall by 2 to 9%;
- Increase of the solar radiation from 2 to 3%; and
- Increase of the evapo-transpiration by between 9 to 13% (Mozambican Initial Communication to the UNFCCC, 2006).

The above is a clear testimony that measures should be put in place to curb environmental problems and lessens the gravity of natural disasters in the area. The researcher was therefore motivated to carry out research on natural resources and environmental management in Xai-Xai communal area so as to shed more light on this rather neglected area of study. Environmental malpractice is considered to be universal in Mozambique and hence this research describes how it is manifested and examines environmental problems ensuing from poor environmental management in the area.

## Research Objectives

Could results from a critical examination of environmental malpractices be used to impact a positive change of behavior on the rural population and improve the future of Mozambique's environmental management strategies? Most researchers on environmental issues on Mozambique (Wisner 1977; FAO, 1997; 2002; UNFCCC, 2006; World Bank, 2009) are guilty of trying to solve environmental problems only at national level, without

directly involving the people who take part in the creation of the problems. The history of environmental management in Mozambique therefore makes a sorry reading especially with its failure to document, deliberately or otherwise, the place/role and contribution of rural communities/people in environmental management systems. As such, this study serves as a corrective to the reality in Xai-Xai and beyond that the rural dwellers are made 'back seaters' [by the government and other such organizations] in the whole attempt to redress the environmental problems of their own communities - a move that if uncorrected would result in 'environmental crises in the country' and would contribute to the global environmental crisis.

## Geographical Description of the Study Area

The study was conducted in Gaza Province of Mozambique, Xai-Xai district using Xai-Xai communal area as a case study. Xai-Xai is located close to the Indian Ocean, on the Limpopo River, which run through the district emptying into the Indian Ocean near Xai-Xai city. It is 200 kilometers (120 mi) from the capital, Maputo, and is in a wide, fertile plain where rice is grown. Xai-Xai has a population estimate of 116,343 (World Gazetteer, 2007). The beach of Praia do Xai-Xai (Xai-Xai beach) is the major tourist attraction in the district. The communal area stretches from the southern part of the city to the north and to the south eastern part Gaza province along the coast of Indian Ocean. The relief of the area is characterized with steep slopes and isolated sand dunes on the eastern side. The altitude of the area is about 500 - 1400 m above sea level but with some low-lying areas below sea level. The area has warm to hot summers and cool winters. The mean annual temperature is about 30°C. The rainfall though falls throughout the year, depending on the year and influence from the sea, is mainly conventional and occurs between November and March. The climate of the area is the tropical type as it includes one rainy season, one dry season; it is hotter during dry season and cooler during wet season. The mean annual rainfall for the area is about 500 - 750 mm per year with vegetation consisting of a Tropical dry savannah. Below is the map of Mozambique where the case study (Xai-Xai communal area) is located (Figure 1).

## METHODOLOGY

As part of research design, the researcher relied on literature studies, content analysis, observation and in-depth interviews. The study was between April and July 2010 using a selected sampled of 50 people (30 female and 20 male). The sample size of 50 was considered sufficient in providing the general environmental



Figure 1: Xai-Xai Communal area, Gaza, Mozambique

perceptions of the people of Xai-Xai communal area. The data collection procedures include: content analysis, observation and in-depth and structured interviews. The researcher observed the physical environment and the environmental malpractices in the chosen area. The field observation was used to ascertain the project location and what really happened at local level. To supplement the field observation information, interviews were conducted to get more information on the possible causes of environmental problems and how they can be dealt with at local/community level.

The people participated in the study were from different societal classes, ranging from the educated to the uneducated and the working to the non-working class. The respondents were drawn from different societal classes with the hope for obtaining a balanced research result that could be representative of the whole communal area. They ranged from 13 to 60 years. This age group was considered appropriate for the study given that most of the people involved in direct use of natural resources and environmental mismanagement in Mozambique are between the aforesaid ranges. More women than men were sampled for the mere reason that it is generally believed women are normally less represented or misrepresented in social science researches.

The researcher administered questionnaires with both open and closed items (open questionnaire and closed

questionnaire) to the participants in the different areas they were found. The open questionnaire was used as it enables the respondent to reply as s/he likes and does not confine the latter to a single alternative (Behr, 1988). In fact it evokes a fuller and richer response as it goes beyond statistical data into hidden motivations that lie behind attitudes, interests, preferences and decisions. Open questionnaire possibly probes deeper than the closed questionnaire. On the other hand, the closed form of questionnaire was used because it facilitates answering and makes it easier for the researcher to code and classify responses especially in this case where a large number of questionnaires were to be dealt with. Both questionnaires were used because in practice, a good questionnaire should contain both open and closed forms of questions so that responses from the two forms can be checked and compared (ibid). The participants responded to questionnaire items individually and participation was voluntary. Participants were assured of the confidentiality of their responses and were asked not to identify themselves by names. Collected data were tabulated to show frequencies before being subjected to evaluative analysis. The Tables 1 and 2 respectively contain details of the people participated in the study and the data that was gathered during the study:

**Table 1:** Details of the People who participated in the Study

Occupation	Gender	
	Male	Female
Cattle headsman	2	2
Village head	3	2
Fisherman	2	2
Traditional healer	1	2
Peasant Farmers	4	8
Charcoal producers	3	2
Students in public education	2	5
Agritex Officers	1	3
Firewood sellers	2	4

**Table 2:** Responses to closed questionnaire items

ITEM	RESPONSES		
	Strongly agree	Strongly disagree	Uncertain
1. There are certain species of plants that should not be cut down or burn	7	43	0
2. Each community should have a cultural village or a protected area	6	43	1
3. Fishing should be controlled ie done with licensed people and not done any time of the year	40	6	4
4. Veld fires should be discouraged and avoided at all costs	36	10	4
5. Crop rotation is better than monoculture	40	6	4
6. Charcoal production promotes deforestation and land degradation	30	15	5
7. Fire wood selling promotes deforestation	15	30	5
8. Crop residues should not be burnt but ploughed back after harvesting	26	20	4
9. Animal hunting should be controlled ie done by licensed people and not done any time of the year	40	7	3
10. Each community should have paddocks/reserved pastures for livestock	32	13	5
11. All community members should take part in the prevention of soil erosion and conservation of natural resources	38	10	2
12. Villagers should look for alternative forms of energy like gas, electricity and solar instead of relying solely on firewood and locally produced charcoal.	34	15	1
13. Villagers should find alternative building material like cement bricks instead of solely depending on the locally available ones	35	14	1
14. Each community should have Agritex officers to help farmers	46	4	0
15. There should be government and non-governmental initiatives on environmental management issues	45	4	1

## RESULTS AND DISCUSSIONS

The study showed both positive and negative perceptions on environmental management means. There were mixed feelings with regard to whether villagers should

look for alternative sources of energy to substitute firewood and locally produced charcoal. Similar results were obtained on whether villagers should look for alternative building material instead of relying solely on the locally available ones. Reasons given varied but the

major one was that alternative sources of energy and building material are more expensive than the locally available ones. This suggests the government should devise ways to ensure that prices of alternative sources of energy and building material are at par with those of the locally available ones.

On whether fishing and hunting should be controlled, an overwhelming majority (40 out of 50) of respondents agreed, thus showing support for the protection of some fish and animal species. And, on whether veld fires should be used as means of clearing and preparing farm lands, majority (36 out of 50) agreed that veld fires should be avoided at all costs. This finding concurs with results from a recent study on Mozambique's climate by Mozambican Initial Communication to the UNFCCC (2006) which notes that if no action is urgently taken to control climatic changes there will be increase in mean air temperature, reduction of annual rainfall and increase in solar radiation. It also relates to recent studies by Munyaradzi Mawere (2010) on green revolution program in Mozambique, where similar findings were reported. In Mawere's studies it is revealed that between 2008 and 2009 in Mozambique, particularly in the central provinces of Manica, Sofala and Nampula, veld fires claimed more than 20 lives, violated non-human animal rights and destroyed property as well as more than 16,000 hectares of arable land. In the light of this grave concern, Mawere calls the Mozambican government to reconsider the use of veld fires, to incorporate environmental ethics and respect animal rights in its green revolution program. It should be remarked, however, that the present study showed that there are a minority (10 out of 50) in favor of the status quo, and in favor of 'business as usual'. Their beliefs and attitudes concerning man's place in the natural world (often seen as nature's place in man's world) and the use of fire as part of land preparation (for farming) are so deeply woven into the fabric of traditional culture that they have accepted them and even unconsciously. This is contrary to the reality that our poor, battered, plundered and polluted planet can no longer endure a continuation of 'business as usual'. In this light, it is paramount to do away with the 'old' belief that the ecosystem is not understood or even recognized as a system and that the earth and its wilderness is too vast to be damaged by voluntary human choice. In our own time we need to revalidate the symbiotic relationship between us and the environment, for in our own time, with knowledge has come power, and with both knowledge and power, we have lost our innocence to the extent of damaging the environment on which our lives depend.

Concerning the government and other non-governmental organizations' role on environmental management, majority (45 out of 50 respondents) indicated that there was need for the government to empower people with knowledge and 'sound' ways of managing their natural environment alongside their

farming activities. This finding concurs with results from a recent study by Africa News Network (2008) which revealed that poor farming (in Majune) could wipe away the scenic beauty of the area even before it can realize its potential as a successful ecotourism product, as evidence of indiscriminate burning of the bush are common and nobody (including the government) seems to care. Thus due to lack of government initiative, many people by default or otherwise are reluctant to actively take part in good environmental management, hence making the state an "accomplice" in environmental mismanagement (Mawere, 2010). Though there are efforts by the government to electrify the Xai-Xai communal area, the pace at which the project is being implemented is too slow and the energy too expensive for the ordinary people to afford. As such, 99% of the population is still using charcoal and firewood for cooking and heating. For them charcoal and firewood are relatively cheaper to electrical energy and gas. However this has negative impact on the natural environment as it encourages deforestation, erosion, pollution (during charcoal production) and general environmental degradation. More worrisome is the realization that no efforts have been made so far to encourage people to use other forms of energy that do not harm the natural environment. This is likely to change rainfall pattern in the area. And hotter and drier conditions would widen the area prone to desertification (the arid zone of nearby districts like Massangena, Chicualacuala, Chigubo, Mabalane and Massingir) into the Xai-Xai communal area. It goes without mention that the economic and human costs of desertification would be tremendous.

Having discussed study results, environmental malpractices observed in Xai-Xai, in terms of their possible causes and impact are examined.

### **Possible Causes and Impacts of Environmental Malpractices in Xai-xai Communal Area: A Closer Look**

#### **Poor fishing habits**

As described above, Xai-Xai is along the coast of Indian Ocean. Its shores are among the most spectacular in the world with a substantial number of the currently endangered species- whale sharks. However, the shores are suffering from illegal and over- fishing (unregulated fishing like fishing out of season by both local and foreign fishermen mainly from China). As Leo Buscaglia (2010), a tourist, lamented:

*Mozambique has fallen into a common trap of many poor African nations, and has allowed China to have full rights to their waters. This allows the Chinese to fish by their own laws in Mozambique and the local government will turn a blind eye to any of their malpractices, as long as the Chinese build and fix*

*some important pot-hole strewn roads in the country. We saw various Chinese forklifts and trucks tarring the road stretching north-eastwards from Xai-Xai city whilst we were driving through the area.*

While it is a fact that there are only 1000 Whale Sharks in the world and 300 of them are in Mozambique, these allegedly fall prey from both the local and foreign poachers/unregulated fishermen (Buscaglia, 2010). This in fact is depriving the country's economy and of course future generations who are unlikely going to be privileged to have a glimpse to these rare creatures in their natural environment. This is because a substantial number of the currently endangered species (whale sharks) might be lost as coastal habitats are lost and invaded by poachers or unregulated fishermen. As Buscaglia (Ibid) noted: "we remain with little hope, that this doesn't change because of China's presence in the region and that many people in the future still get to enjoy these beautiful beasts".

### **Poor farming methods**

As reported by FAO (1997), in the productive coastal zone in Gaza province (Bilene-Macia, Xai-Xai, Manjacaze, Chokwé, Guijá and Chibuto), conditions are "relatively" favorable for agricultural production (of crops such as maize, manioc, rice, mafura/castor beans, tobacco, cotton, sugar cane, banana and fruits like mangoes, oranges and cashew). However poor methods of farming by local subsistence farmers are not only increasing food insecurity of, but are also posing serious problems to the soil and natural environment of Xai-Xai communal area. In fact soil conservation measures are important in managing and conserving water resources, "as soil erosion is causing high silt loads and turbidity in the Limpopo River and its tributaries, affecting water treatment and the storage capacity of dams" (Medicins Sans Frontiere (MSF) (1998). Xai-Xai has some tributaries that feed into the Limpopo River like the Rio Changane (Changane River) and Rio dos Elefantes (Olifants River), yet subsistence farmers in the area practice stream bank cultivation, steep slope cultivation and seem to be doing nothing to control soil erosion. One of the interviewees, a teacher, Ms Anabela of Maxelene village (in Xai-Xai communal area) affirmed this when she commented: "In this area many people do nothing to prevent soil erosion because they are not aware of the importance of doing so as most of them are uneducated".

### **Veld fires**

Veld fires are "blazes that get out of control and devastate extensive tracts of forest, grassland, wildlife and other natural resources as well as injure and kill people and destroy their properties" (Natural Resources,

Agricultural Development and Food Security, 2009; Mawere, 2010:92). Human beings are responsible for 95% of forest and veld fires (Mkwanzazi, 2007), as natural fires (not influenced directly by human beings) have become rare. Xai-Xai like other Mozambican communal areas is suffering constant veld fires. This has even aggravated in the recent times due to government's campaign for the country to lead green revolution in sub-Saharan Africa. The "call for the country to lead the green revolution programme, has resulted in hasty and unplanned form of agriculture by poor peasant farmers in the countryside" (Mawere, 2010: 92). In Xai-Xai, peasant farmers who lack mechanized farm implements have resorted to veld fires as one way of clearing the land. This has had serious negative impact on the physical environment- both fauna and flora. In fact veld fires contribute to a significant proportion of land degradation and the release of green house gases to the atmosphere. Furthermore, fires destroy property and resources needed for immediate use over the dry season, crops, firewood, water sources and grazing land. Frequent veld fires may also have long-term effect on the reproductive capacity of important veld products such as vegetation and humus.

More so, biological diversity has many benefits for human beings, its different kinds and species contribute in providing agricultural, fishing and livestock services, opportunity for scientific research and symbol of cultural heritage. Some flora and fauna species with their genetic components help in developing medical, agricultural and industrial sectors. Additionally, it provides essential daily needs for the life of many local communities, biological diversity support, and ecotourism with its great economic potential.

### **Deforestation**

Besides the use of veld fires to expand farmlands, people in Xai-Xai communal area cut down trees for firewood and charcoal production. Approximately 99 % of the people in the communal area use charcoal and firewood for cooking and heating. Only about 1% uses other sources of energy such as gas and electricity for cooking and heating. The charcoal is produced locally though most of it now comes from other districts in the province such as Massingir where trees are still an abundant resource. Charcoal production and use of firewood has contributed quite substantially to the deterioration of the natural vegetation and soil erosion in Xai-Xai. A foreseeable negative consequence of this lack of concern is a further vulnerability of Xai-Xai communal area to natural disasters such as cyclones, floods, droughts as well as a change in rainfall pattern and increase in atmospheric temperature.

## Confronting the Jeopardy: The Way Forward

The conservation of natural environments and biodiversity has become a fundamental global concern and is recognized increasingly as a socio-cultural issue. The findings of this research show that Xai-Xai's environment is in jeopardy due to a number of threatening environmental malpractices like uncontrolled fishing, veld fires and deforestation among others. There is therefore need for immediate action if further damage is to be avoided.

In view of the aforementioned environmental malpractices in Xai-Xai communal area, the study advocates empowerment of the rural community and active participation of the latter in managing their own natural environment. It is essential for policy-makers to realize that environmental problems can never be solved at the national level if they are not tackled from the grassroots, that is, at community level. People-centred/farmer-centred approaches should be adopted. In this respect, it is important that the needs and aspirations of potential beneficiaries/communities be taken into consideration during the initial planning of any environmental intervention strategy. Inherent capabilities, intelligence, knowledge and responsibility of rural people will have to be taken into consideration and respected. These capabilities, intelligences, knowledges and responsibilities of the rural people can best be realized and meaningfully exploited if the people concerned are first empowered before being made to participate. The principle of empowerment states that all people participate in all activities (problems) that directly affect them because it is their democratic right to do so (Wignaraja, 1991) and participation means having power (Tasconi and Tisdell, 1993). According to this concept, participation is the natural result of empowerment. The concept of community participation is viewed as a basis for project success. The World Bank (2004) defines participation as "a process through which stakeholders' influence and share control over development initiatives, and the decisions and resources which affect them". The objectives of community participation are the following: building beneficiary capacity; increasing project effectiveness; improving project efficiency; project cost sharing and empowerment.

Empowerment is not a means to an end but is the objective of development. Empowerment entails more than having the power to make decisions. It demands the knowledge and understanding to make correct decisions by those that are directly affected. Communities cannot make wise decisions if they do not have the required information/knowledge. The support organizations and government agencies are required to be sources of information and should be a channel of information to the communities so that they will be able to make right and informed decisions when they interact and exploit resources from their environment.

In view of poor farming methods, subsistent farmers can be empowered through civic education. The local government can achieve this by making use of Agriculture Extension Officers. The findings of this research have shown that there are no workshops/meetings between Agriculture Extension Officers or the local government and the rural populace on environmental issues. One of the respondents, village headman, Mr Matavel of Chongoene village (in Xai-Xai communal area) confirms that since he became a headman of the village in 1994, they have never had any meeting on environmental management with government authorities or qualified Agriculture Extension Officers. This confirms reluctance on the part of the Mozambican government and non-governmental organizations to deal with environmental issues at grass roots levels though a lot is being done at national level. In view of these findings I contend that the government should make sure that qualified Agricultural Extension Officers constantly hold environmental meetings/workshops with the rural people advising them of good environmental conservation practices (such as prevention of soil erosion and afforestation with emphasis on planting indigenous species, in particular nitrogen-fixing *Acacia* spp, and others such as *Albizia* spp, *Combretum* spp, *Zizyphus* spp, *Terminalia sericea*, and *Sclerocarya birrea*). Mozambique has the potential to develop agroforestry, and offers a wide range of applications (Lulandala, 1991; SADC 1996). This potential, however, can only be fully developed if the people at grassroots are also involved in contributing to the national development of such projects.

Good farming methods such as conservation farming could also be encouraged especially as a strategy to control erosion in Xai-Xai communal area. Conservation farming involves minimum disturbance of the soil surface by using an ox-drawn ripper tine to open the planting furrow. It has been recommended as a soil, water and draught-power conservation strategy (FAO, 2002) but perhaps due to lack of knowledge/education is not yet in use by the people of Xai-Xai and other communal areas across the country. However, because of the open grazing regime in Xai-Xai communal area, little crop residue remains in the field as cattle eat it during the dry season. Furthermore, the roaming animals compact the soil thus rendering reduced tillage unattractive owing to poor water infiltration and consequently soil erosion. This might require that the people of Xai-Xai communal area be encouraged to develop a paddock system (reserved pastures) for their livestock. Below is a diagram for conservation farming that people of Xai-Xai communal could employ to successfully control soil erosion and maintain soil fertility (Figure 2).

If conservation farming is carefully practiced especially alongside paddock system, it is likely to bring positive results on combating soil erosion in Xai-Xai communal area.





**Figure 2:** Conservation farming, Adopted from D.J. BEUKES (FAO programme in Mozambique 2002-2006)

## CONCLUSION

In this study it has been argued that the risks faced by Mozambique due to climate change and environmental mismanagement related phenomena do not differ from other countries located in the tropical region. However, the high levels of poverty, illiteracy and therefore the capacity of the country to deal with the effects of climate change and environmental malpractices make Mozambique more vulnerable. Lack of infrastructures such as roads and shortage of qualified Agriculture Extension Officers to teach/empower peasant farmers in rural areas worsen the situation leading to prolonged problems in health (spread of diseases), food insecurity, erosion and environmental degradation among other problems.

More importantly, the paper has argued that the problems and challenges encountered during the planning and implementation of environmental projects are not new or unique to Xai-Xai communal area, but are resonant of those encountered in other projects elsewhere. The slow pace of transformation and environmental management skills transfer to communities hinder project community participation. This is what scholars like Abrams (1996) protested against when he contends that in community-based projects the community should control the project and make important decisions, although professionals such as engineers may provide expertise and finance may be provided by external financial sources. In this sense, I have argued that for a community to control environmental projects, it must acquire administrative and environmental management skills. It has been made clear that although

the planners' task is a crucial one, it should take into consideration the people at grassroots- those that are directly affected by the problems.

In view of the results obtained from the study, it has been argued that although the Government of Mozambique has some national policies to enhance resilience of the poor populations in several vulnerable sectors, mainly in the area of disaster management, these policies are not tackling directly the issue of environmental problems. These are pieces of policies which are not implemented efficiently due to lack of expertise and coordination among the involved sectors. There is need therefore to harmonize theory and action- need for the harmonization of the existing policies, improving the information circulation and movement from emergency actions to preventive plans right from the grassroots levels.

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