STAKEHOLDER INTERACTIONS IN WETLANDS: IMPLICATIONS FOR SOCIAL ECOLOGICAL SYSTEM SUSTAINABILITY

A CASE OF LUKANGA SWAMPS, ZAMBIA

Bags of charcoal along the Ndola- Kapiri Road: Picture courtesy of Bwalya 2007

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ACRONYMS

CLD	Causal Loop diagram
CRB	Community Resource Boards
CPR	Common Pool Resources
DACO	District Agricultural officer
DAPP	Develop Aid From People to People
DFO	District Forestry Officer
ECZ	Environmental Council of Zambia
FSP	Fertilizer Support programme
GMA	Game Management Area
INGO	International Non Governmental Organization
IMWI	International Water Management Institute
IWRM	Integrated Wetland Resource Management
MTENR	Ministry of Natural Resources and Tourism
MACO	Ministry of Agriculture and Cooperatives
NWS	National Wetlands Strategy
NGO	Non Governmental Organization
NRM	Natural Resource Management
PAM	Programme Against Malnutrition
SA	Stakeholder Analysis
SES	Social Ecological System
SPSS	Statistical Package for Social Scientists
WWF	World Wide Fund for Nature
ZAWA	Zambia Wildlife Authority

ABSTRACT

The Lukanga swamp is a wetland in Central Zambia which for hundreds of years has supported indigenous people. These people have built their livelihood and cultural identities based the ecosystem services it provides. An important part of understanding the ecosystem's dynamics and its ability to generate services is taking into account the human aspect that influences and is influenced by nature. This paper discusses Lukanga Swamps as a Social–ecological system with linkages across time and space, with levels of organization and decisions made in one place affecting people and ecosystem functions in another place. The paper aims to investigate relationships among stakeholders and interactions between stakeholders and the Lukanga ecosystem. It was found that there were tensions and negative perceptions between stakeholders which prevented effective participation for NRM. Other factors affecting the status of the Lukanga Swamps were the increased value of common pool resources due to demand from surrounding urban areas, weakening of traditional institutions for natural resource management and ineffective governance and monitoring from various government ministries and departments. The paper argues that an important part of achieving Socio - ecological sustainability is building trust and through the creation of stakeholder platforms.

Key words: *Lukanga Swamps, Socio-Ecological Systems, Stakeholders, sustainable livelihoods, Institutions*

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1.0 INTRODUCTION

Historically wetlands and wetland resources have been perceived as waste lands (Chabwera, 1998) and the land and water of wetlands particularly in Europe have been converted to other uses such as agriculture and infrastructure. Further, since the 1900s, more than half of the world's wetlands have been lost through conversion (Schuyt, 2005). Although alterations have often been thought to be in the best interest of society the environmental costs of wetland loss have been high and benefits such as hydro electric power (especially in Africa) have been only been for the few. However, an important event in sustainable management of wetlands was the coming into force of the Ramsar convention on wetlands of international importance in 1975. (Schuyt 2005). The Ramsar convention seeks to promote the wise use of wetlands for the benefit of the environment as well as sustainable livelihoods of the people directly dependent on them (Ramsar 2006).

The Ramsar convention signaled a paradigm shift toward wetland conservation and brought issues of wetland degradation to the forefront of the international arena. It led to many studies on wetlands. These studies were however focused mainly on developed countries and Africa was underrepresented (Schuyt 2005:178). Hence, due to lack of scientific investigation and inconsistent mapping policies in Africa, an exact and estimate of the total extent of wetlands is still unknown and wetland loss continues (ibid). Further, wetland loss in Africa is connected to policy intervention breakdowns due to inconsistency among government policies in diverse areas, "including economics, environment, nature protection and physical planning". Such failures come about because of the insufficient understanding of functions and values of wetlands and thus the consequences of wetland loss (Schuyt 2005:180). Nevertheless, "wetlands in Africa are an important source of water and nutrients necessary for biological productivity and often sheer survival of people" (ibid) and so sustainable management of wetlands is vital to the long-term health, wellbeing and safety of many African communities.

In Zambia, an awareness of the importance of wetlands to local peoples and the nation as a whole was acknowledged in the early 1980s. By 1985, Zambia had adopted and started implementing its National Conservation Strategy (ECZ, 2000). In 1991, Zambia ratified the Ramsar Wetlands Convention and designated Lochnivar and Blue Lagoon National Parks in the Kafue Flats and the Bangweulu Swamps at Chikuni as Ramsar sites (ibid). Yet a lack of political will to enhance wetland conservation can still be seen by a wetland policy which has not been completed since 1992 (ECZ, 2000). Thus, the absence of a wetlands policy coupled with conflicting sectoral policies on matters related to wetlands, poor planning concepts, insufficient information and awareness on the significance of wetlands contribute to degradation and loss of wetlands

This has been the case in Zambia as government policies on the environment and natural resources have tended to be sector driven (Phiri 2005:4). Further, land and water resources planning and management has not been adequately integrated into the overall social and economic policies and strategies for national development. Other problems include inadequate legal and institutional frameworks, limited stakeholder participation, inadequate human resource capacity, insufficient information and data, inadequate infrastructure and financial investment (Ibid).

One of the wetlands affected is the Lukanga swamps in Central Province of Zambia (see figure 1 and 4 below). Lukanga swamps came to my attention during the course of my work as a Wildlife Ecologist with ZAWA when I discovered that very little had been published on the Lukanga swamps in literature. In addition there were no management strategies in place to aid conservation in the area and anecdotal evidence indicated that wildlife resources had been decimated and the swamp area seemed to be reducing. Hence my choice to undertake my thesis studies in this area.

In addition, the Lukanga Swamps are a vital component of the Kafue Catchment. They cover an area of about 2600 Km^2(Ramsar, 2006), are the fifth largest wetlands in Zambia and support a population of 6.1 million people in Lusaka, Central and the Copperbelt provinces directly or indirectly dependent through the provision of fish, agricultural produce, livestock grazing fuel wood and charcoal (ibid). They also form an important part of cultural identities of the Lenje, the main tribe inhabiting a large area in the east of the catchment. To the Lenje the Lukanga swamps are important as a rain shrine and as a venue for traditional ceremonies such as Kulamba Kubwalo; a thanksgiving ceremony held at the end of the harvest. (Mapedza et al 2008). Other tribes include Bemba (who are mostly fishermen) and Tonga (who practice small-scale farming and agriculture) (ibid). Each group relies on the swamp for their livelihoods.

Therefore, the ecological functions of the Lukanga swamps are significant because they directly or indirectly contribute to livelihoods of all local communities through the provision of fish and dry season grazing grounds and water among other resources. Though wetlands play an important role in livelihood activities of many rural communities, these activities are not benign but have an impact on wetland ecosystems and its functions. In addition, “at the root of wetland conversion is the fact that numerous stakeholders of wetlands with different interests lay claims on the wetlands’ water and lands that do not always coincide” (Schuyt 2005, 178) For example, stakeholders include direct extensive users, who directly harvest wetland goods in an unsustainable way; agricultural producers that drain and convert wetlands to agricultural land; indirect users that benefit from indirect wetland services, such as storm abatement and flood mitigation; nature conservation and amenity groups, whose objective is to conserve nature and enjoy the presence of plant and animal species; and even nonusers that may attribute an intrinsic value to wetlands” (Schuyt 2005). In many cases, it is likely that the

different interests of these stakeholders conflict so that policy-makers are faced with complex trade-offs, a situation which is played out within the Lukanga Swamps.

Therefore, the main aim of this thesis is to explore the tensions that arise when multiple stakeholders are involved in unlimited extraction of limited wetland resources such as the land, fish and forest found in the Lukanga Swamps. Hence the specific objectives of this research are:

1. To investigate relationships between various stakeholders in the Lukanga Swamps.
2. To explore how tensions and negative perceptions between stakeholders impact resource conservation
3. To investigate the impact of resource use on the swamp ecosystem and implications for sustainability.[1]

1.1.1 Research Questions

The following research questions will meet the above stated objectives

1. What are the relationships among the stakeholders in the Lukanga Swamps?
2. What are the drivers behind the resource extraction and in what way is resource extraction generating conflict within the Lukanga Swamps?

The paper outline is as follows: Firstly it begins with the introduction on wetland issues and a brief background of the Lukanga swamps. This is followed by the conceptual framework, the theoretical framework, Materials and Methods, results, discussion, conclusion and recommendations.

The system boundary in paper includes fishers, farmers and charcoal burners extracting resources from the swamp and its catchment as well as traditional institutions. Government institutions and NGOs working within the swamp and its catchment are also dealt with.

[1] Sustainability is defined as maintaining the ecological system so that it can continue to support the social and economic systems

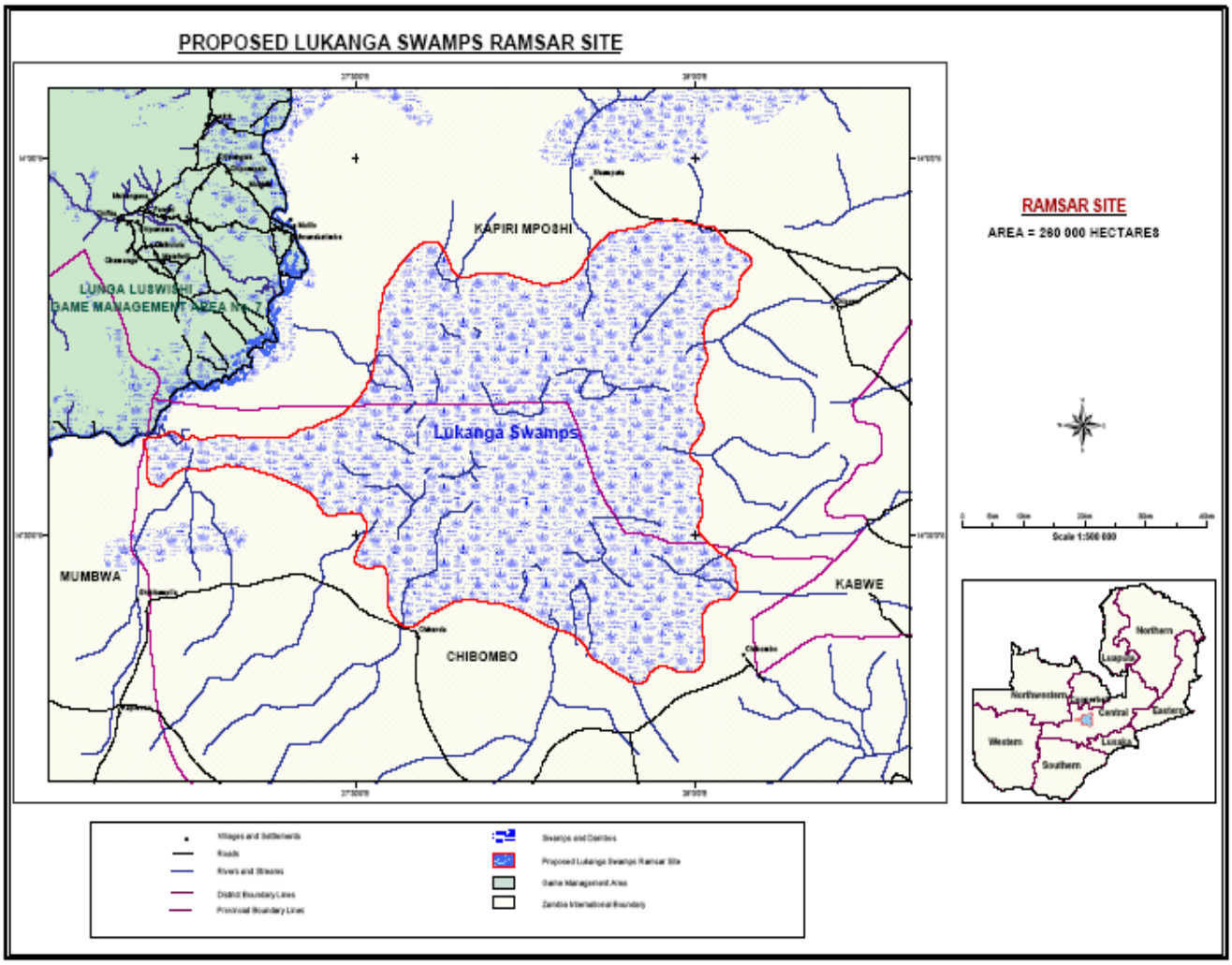

Figure 1: Map of Lukanga Swamps[2]: Source ZAWA 2008

1.2 Theoretical Framework

Overall this thesis will discuss the relationships between different stakeholders and the Lukanga Swamps ecosystem from Social Ecological Systems perspectives. This has been chosen because it deals with "the resource, its users, its governance system and associated infrastructure as a coupled system" (Andreis et al 2004:4). Each part is important and has a bearing on choices made by users within the system. It is defined as an" ecological system intricately linked with and affected by one or more social systems" (ibid).

In this paper the Lukanga swamp (the resource) is viewed in terms of its ecological functions which are defined "as a series of processes that take place within a wetland". **(**Novitzki, 1996: 2)[3]. These processes are in turn translated into functions which provide goods and services to communities (McCartney et al, 2005:3). These

[2] Also see auxiliary map in figure 4

[3] Undated

goods and services, (for example fertile land, fish, water etc) form part of the strategies employed by individuals and households to earn their livelihoods. In other words the wetland provides natural capital for individuals and communities living in and around the wetland.

Whereas the wetland ecosystem forms part of the tangible factors that contribute to the livelihoods of the people in Lukanga other intangible factors such as claims and access relationships to the wetland and its associated resources form the intangible factors these intangible factors can also be classified as social capital. Livelihoods are therefore, "an emergent outcome of multiple socio-economic, institutional and ecological drivers interacting across scales, property rights, ethnicity and class, and local resource control" (Tolossa and Baudouin, 2001:1). Sen describes some of these factors as capabilities (Sen 1999:88). According to (Sen,1999:88) "the relation between income and capability would be strongly affected by the age of the person (e.g. the specific needs of the old or very young), by gender and social roles (e.g. through special responsibilities of maternity and also custom determined family obligations), by location (e.g. proneness to flooding or drought) by epidemiological atmosphere(through diseases endemic in the region) and by other variables over which a person may have no or only limited control''. That is to say that every person's livelihood strategy is affected by his capability and role in the social system and the livelihood strategy affects the ecosystem in a positive or negative way. Of particular interest in the Lukanga system is the apparent differentiation of livelihood strategies and resource use based on ethnicity.

Property rights or lack thereof also have an impact in livelihood strategies and consequently the wetland ecosystem. The Lukanga Swamps land and water resources are essentially Common Pool Resources (CPR), defined by Ostrom et al (1998: 278) as " resource systems regardless of the property rights involved". They include "natural and human constructed resources in which (i) exclusion of beneficiaries through physical and institutional means is especially costly, and (ii) exploitation by one user reduces resource availability for others". This means that more and more users can come into the swamps and extract resources in a manner that is not sustainable without any repercussions. Nevertheless, according to Becker and Ostrom (1995:117) "the challenge of devising workable rules, however, is also affected by other attributes that differentiate among types of common-pool resources". That is to say that apart from its common pool nature other factors maybe affecting the sustainable use of resources in the Lukanga swamps. According to Andereis et al (2004:16) just the introduction of money maybe an important disturbance to the sustainable use of resources.

Hence, at rural community level, use of wetland resources is affected by a number of factors (for example property rights and introduction of money). These factors shape local livelihoods and create vulnerabilities from

both external and internal forces. According to (Haller 2008[4]:1). also among these factors are "changes in the political and economic environment (pacification, new urban centers and new markets, monetarization), in state control (laws, police, administrators), in infrastructure and transport systems (lowering costs for marketing or access by other groups)" Haller (2008) further states that as a consequence of these changes, "endogenous" features in a community like "institutions, organizations, ideology and bargaining power" are changed. This means that traditional institutions which worked in the past do not work in the same way anymore. They are changed by new institutions, formal laws and government administrative arrangements. Further, monetarizing changes culture and norms in such a way that only traditional institutions that can be translated into cash incomes survive while those which in any way hinder the adaptation of the local users to earn cash with wetland resources vanish. "Cash incomes are needed not just to purchase goods and services but for the building up of social networks which were in the past strengthened by kinship relationships and adherence to cultural norms" (Ibid). Nevertheless Logan (1995) argues that the relationship between market economy and traditional institutions is not linear, rather they impact each other in complex ways that may not be entirely appreciated. For the purposes of this paper the primary concern is how market economy has impacted the traditional ways of doing things.

1.3 Conceptual Framework

Some of the ecosystem services provided by Lukanga swamps are "ground water re-charge, and ground water discharge flood control, water quality alteration, sediment trapping, waste water treatment, detoxification, nutrient retention**,** food chain support and water transport" (ECZ, 2000). These functions provided benefits not only to the environment but also to the local communities who depended on the Swamps for food, water and other resources.

1.3.1 Climate Variability and effects on Ecosystem services

The Lukanga swamps' ability to provide ecosystem functions and benefits to the local community is threatened by climate variability. This could be seen when it dried up in mid to late 1920s (Macrae, 1934:225), 1986 and 1995 (Chabwera, 1998:12) due to droughts in the Southern African region. While vulnerability to climate change on a global scale is an important factor it is also important to examine closely the activities within the swamps catchment which serve to worsen microclimatic variability. Of particular concern is clearing of the tree cover which according to De Groen & Savenije (1995:1) reduces the replenishment rate and therefore the precipitation downwind in Southeastern Africa. Further, low rainfall has a catastrophic effect on the livelihoods of fishermen as well as small scale farmers in the swamp. Records from the fisheries department show that the

[4] This date is based on when the reference was retrieved from http://apad.revues.org/document148.html, the article was not dated.

fish catch dropped to near zero and both farmers and fishers had to depend on government aid when the swamp dried up in 1995 (Mbewe, 2006).

1.3.2 The Vicious Cycle of Poverty and Ecosystem Degradation

Further, a consequence of vegetation loss is erosion and land degradation. According to (Bationo et al 2006:10) land degradation is the most serious risk to food security and natural resource conservation in Africa (ibid) Erosion also leads to siltation of the wetland which in turn leads to loss of wetland goods and services such as arable land and ground water recharge(ibid). So peasants and fishers in Lukanga are ensnared in the reinforcing the loop of natural resource degradation and poverty commonly experienced in rural communities in Sub-Saharan Africa (see figure 2 below).

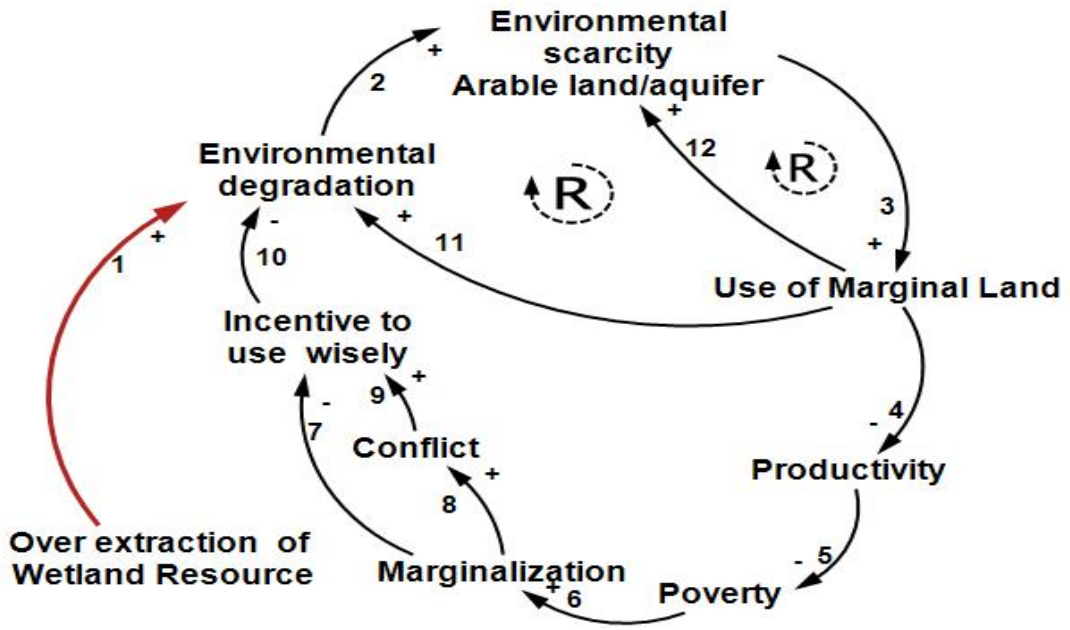

Figure 2: Causal Relationship between Environment Degradation and poverty

Further, Olsson (2000) asserts that poverty is being caused more and more by environmental shortages of arable land and water. This results in loss of livelihoods as shown by the Causal Loop Diagram (CLD) in Figure 2 above. The CLD illustrates processes driven by over extraction of wetland resources which then lead to environmental ruin (line 1). Environmental degradation means that there are less wetland resources available (line 2) and increases the use of marginal resources (line 3). In addition, as the use of marginal resources increases productivity drops (line 4) and there is increased poverty (line 5). Apart from a basic lack of income, poverty is also capability deprivation in which at least one or more of the basic conditions for an effective life is absent (Sen, 1999:88). In addition, poverty increases the likelihood of marginalization and conflict among stakeholders (lines 8 and 9) and lessens the incentive to use environmental resources wisely, leading to even more degradation (line 10). This system continually reinforces itself until a management strategy that takes into

account involvement of all stakeholders and deals with inequity in resource allocation is put in place. The loss of livelihoods as a result of environmental scarcity forms an exceptional case of increasing importance in a nation like Zambia where 60 percent of the population still lives in rural areas and are highly dependent on their environment. (ECZ, 2001). Further, 83% of rural dwellers live below the poverty line making them even more vulnerable (CSO, 2000).

1.3.3 Market dynamics and Depletion of Natural Resources

In addition, resource extraction in the Lukanga swamps is driven by demand for resources such as fish and charcoal. The is due to the proximity of the swamp to the major urban centers of Lusaka, Kabwe and the Copperbelt towns which has a number of negative impacts on the swamp. Increasing demand from urban centers in Zambia has caused the prices of CPRs and CPR-related goods such as cattle, charcoal and fish to rise significantly with increases of between 80 and 17 times for cattle and fish respectively. (Haller and Helbling, 2006:16) This is in comparison to agricultural produce which has only had a 9 fold increase (ibid). Haller and Helbling further states that "at the same time, prices for copper have dropped and salaries of (NRM) administrators are stagnant or decreasing". Meanwhile personal observation in Lukanga revealed that profits on fuel wood and charcoal from Lukanga rise by as much as 300% when sold in towns than when sold locally. Conveyance of goods into town is also relatively easy and cheap and peasants can be seen carrying charcoal on backs of bicycles on a daily basis in order to sell in town (pers.obs[5]). Further, according to Yengoh (2008:16), transport maybe one of the causes of land cover change. It has the effect of increasing mobility of forest products and with reduced transport costs people can exploit resources in remote areas and still make profits. Hence, the incentive to over exploit increases greatly. According to Schuyt (2005:180) "because markets are unable to regulate demand and supply for wetland goods and services, market failure causes negative externalities. That is to say, "costs associated with consumption of wetland goods by one group of stakeholders are imposed on another group of stakeholders" (ibid). In the case of Lukanga this cost will be the loss of livelihood for local communities if the system collapses due to increasing demand and over extraction of CPRs.

1.3.4 Population Dynamics and Impact on Livelihoods

Resource exploitation is intensified further by mass in-migration of different groups. According to (CSO, 2000:6) urban rural migration has become a common phenomenon in Zambia. This is due to the fact that unemployment rates in urban areas have increased from 16.1 percent in 1990 to 26.5 percent in 2000 while rural unemployment rates have shown a decline from 14.4 percent in 1990 to 6.6 percent in 2000(ibid). This is in contrast to the rural urban migration in other parts of tropical Africa which have occurred in spite of rising levels of urban unemployment (Tadaro, 1996). Tadaro asserts that this paradox occurs because

[5] Pers. Obs – Referes to personal observations made by the researcher

rural migrants take into consideration the possibilities of getting employment in the long term rather than their inability to get employed immediately they reach urban areas. Nevertheless, the observed phenomenon in Zambia is that net out-migration rates in urban areas and in-migration to rural areas show evidence of lower employment opportunities in urban areas versus employment opportunities linked to agricultural and fishing in rural areas.(CSO, 2000:6) Lukanga swamps has therefore had many retrenched miners from Kabwe settle in fishing camps such as Waya and Kaswende (Chileshe, Munyakasa, Lyombe pers. com[6],2008).Further, the drought and fatal cattle diseases that have been ravaging the Southern Province have altered the agricultural life of the Tonga people in that province, hence, their migration to Central Province where weather conditions are comparatively stable (CSO, 2000: 6).

Seasonal migration by fishermen has also increased populations to the extent that Villages that should only hold populations of a few hundred have thousands of people (Lyombe Pers.com, 2008). In-migration of commercial fishermen and other groups interested in exploiting resources in the swamp has also led to conflict particularly between the indigenous Lenje people and predominantly Bemba fishermen. Haller and Marten 2005:21 describe a similar situation in the Kafue flats downstream whereby "Local stakeholders would like to re-establish old rules or new regulations but outsiders consider that, as Zambians, they are allowed by the state to get access under formal laws". However, "the State is absent when it comes to the enforcement of these laws due to lack of manpower and equipment to adequately police CPRs" (ibid). Further, the larger part of the 6 Metric Tonnes (MT) fish caught annually in Zambia is by seasonal fishermen and 70% of them are not local fishermen but seasonal immigrants (ibid). So we are faced with an important part of CPR users who are highly mobile (ibid). Lukanga is no exception as a good number of the fishermen live outside the swamp in slums such as Kabwe's Makululu compound. The Slum has a population of around 80,000 residents (www.cathrynironside.com/makululu) and many of them are connected to fishing and the fish trade in one way or another (Munayakasa, pers. comm., 2008).

[6] Pers. Com refers to interviews with key informants, see appendix 1 for more details

Factors such as mass in-migration, increase in prices of CPRs and institutional change are illustrated further by the CLD Figure 3 below

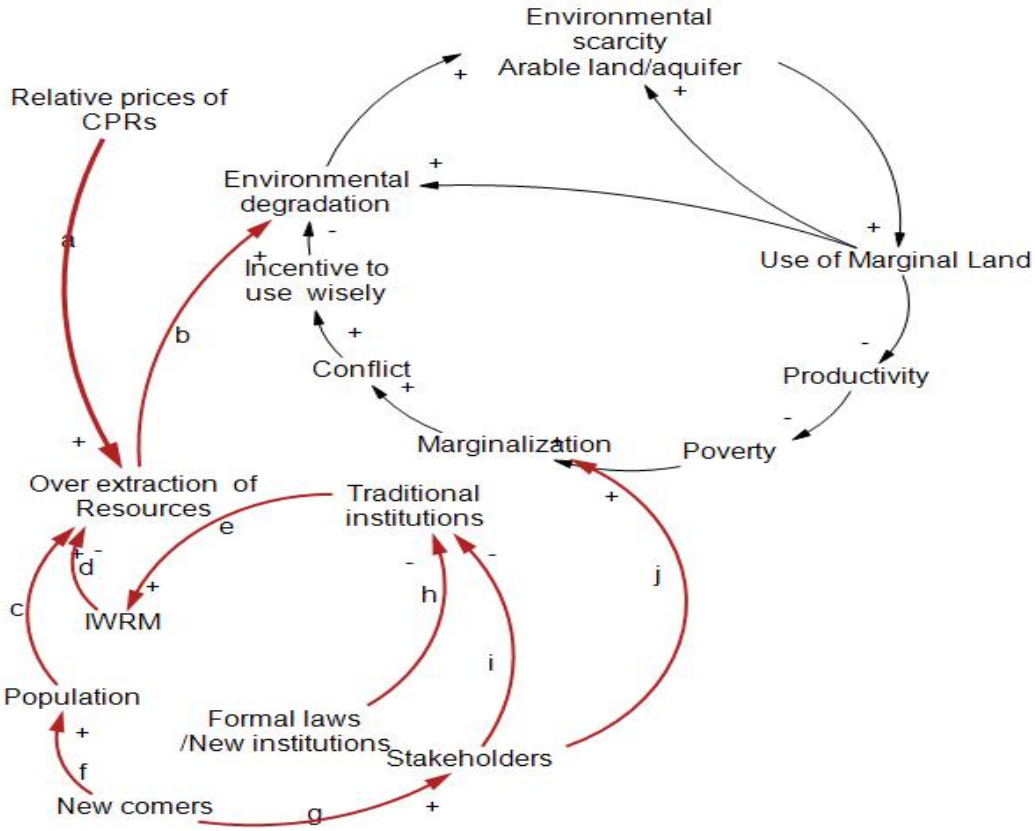

Figure 3: Drivers of Environmental degradation in the Lukanga Swamps

The black loops in figure 3 are the same as figure 2 above. Lines **a** to **j** (in red) are described as follows: Line **a** shows the rise in prices of common pool resources which leads to incentive to over extract resources. Line **f** shows newcomers coming in which leads to increase in the population. Line **c** shows that population increase also leads to over extraction of resources. Line **g**, **h**, and **i** show that new stakeholders may transform traditional institutions which in turn reduces the capacity to protect natural resources and leads to over extraction. Line **j** shows that the more stakeholders there are the higher the likelihood that some stakeholders will be marginalized. All the links in red eventually link to over extraction of wetland resources and enter into the cycle of poverty and environmental degradation as described earlier.

2.0 Materials and Method

2.1 Study Area

The Lukanga swamps are part of the greater Kafue system. The Kafue Basin has a total catchment of 154,000 km^2 and covers nearly one fifth of Zambia's total area. (Chabwera, 1998). The Lukanga swamps have a catchment area of 19,490 km^2 and the palustrine wetland covers 12% of that area. They have a seasonally dependent water level, with depths ranging from 1.5 m to over 6.0 m in exceptionally high floods. The swamps main sources of water are rainfall, sub surface run off, the Lukanga River, the Kafue River and other channels which drain into the swamp from the catchment (see figure 4 below).

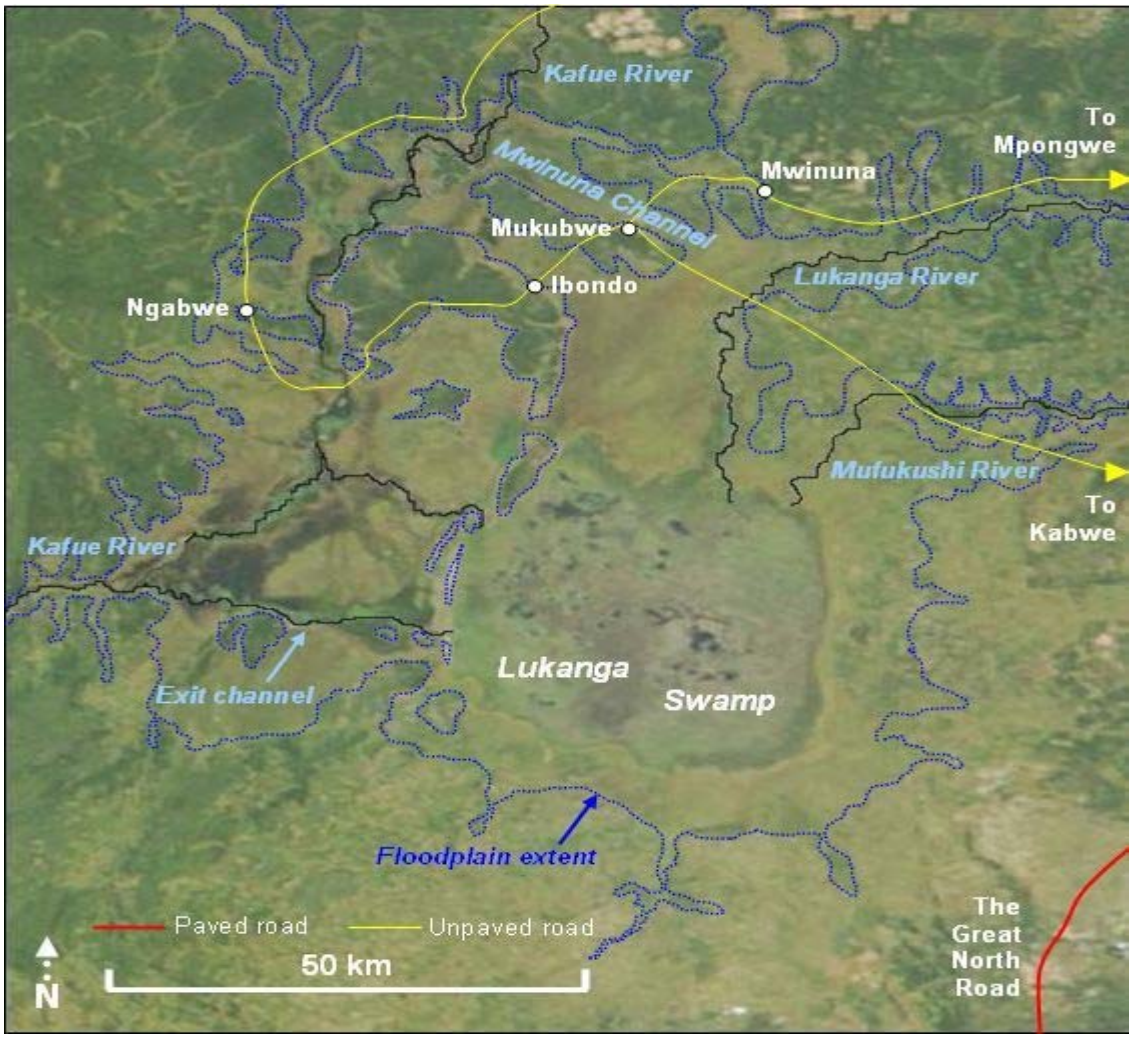

Figure 4: Lukanga swamps; Source: wikipedia.org

The swamp is inhabited by 250,000 people (CSO, 1990) and covers Chibombo and Kapiri Mposhi districts in central province and Mpongwe district in the Copperbelt province. The people in and around the Lukanga swamps depend on it for fish, charcoal and hunting of wildlife. Their main activity however, is agriculture

practiced mainly at subsistence level. Crops grown are maize groundnuts sweet potatoes beans and sometimes citrus fruits and vegetables grown for sale to residents of the nearby urban centre of Kabwe (Chabwera 1998)

Like most of Zambia, the Lukanga swamps experiences three seasons. They are: (1) the wet season beginning in November and ending in March (2) the cool dry season, from April to August and (3) the hot, dry season which starts in September and ends in October (Chabwera, 1998). Mean maximum temperatures peak in October (31.8°C) and the mean minimum temperature is indicated as 14.8°C. (ibid)

The area covered in this study is Chief Chipepo's area in Kapiri Mposhi district on the eastern part of the catchment 50km and 150km from Kabwe and Lusaka respectively.

2.2 Methodology

The methodology chosen to answer the questions above is that of a single case study (Bryman, 2004:49). Consequently the study was based on socio-ecological interactions in a particular location (i.e. Chief Chipepo's area in Lukanga Swamps). Furthermore, the study dealt with current practices and can be said to be a typical case of a wetland in terms of ecology, function and livelihoods (Yin 2004: 41, 8). That is to say that the Lukanga swamps is similar in many ways to other wetlands in Zambia and Africa as a whole, therefore, results from this study may offer insights for other wetlands or be starting points for studies in wetlands elsewhere. However, understanding patterns and processes at the local level is also essential since land-cover change is context dependent and closely linked to the sustainability of socio-economic development (Giannecchini et al 2007: 26). Further, in Africa, context based studies have produced valuable knowledge about relationships between rural livelihoods, socio-economic change and environmental change, with important outcomes for development policy (ibid).

The initial part of this study involved a literature review on the past and current status and use of the Lukanga swamps. Unfortunately, literature on the Lukanga Swamp itself was scanty and some inferences with regard to population and economic status were made based on provincial and country data. Though not vast the literature helped to clarify research questions further and also helped to refine and revise research techniques during the study. (Bryman, 2004:33). Literature also provided statistical data in terms of population dynamics and resource use which can be linked back to the wetland functions. The literature also created a historical background and context which conveyed knowledge on what exists and has existed in the past in relation to the phenomenon under investigation (ibid). Nevertheless, the literature review brought with it aspect of comparative research into

the design as it focused on some differences and similarities between the chosen areas compared to other areas with similar characteristics.[7]

The study also included a Stakeholder Analysis. According to Wellard and Grimble (1997) Stakeholder Analysis (SA) was developed as a response to the problem of multiple interests and goals. It is one of the approaches available for the study and formulation of development policy and application. For the purposes of this paper SA will be presented in 3 of ways: Firstly, stakeholders were divided into primary stakeholders (i.e. those that are directly dependent on the resource) and secondary stakeholders (those with an interest but not directly dependent on the resource for their livelihoods). Primary stakeholders included local and resource-poor people who are directly affected by environmental scarcity (Gavin and Pinder 2001:2 Warner 2005:13). Secondary stakeholders included Government departments and NGOs who play an intermediary role and bring in knowledge and facilitation skills (ibid). Secondly, recognizing that the valuation of utility has a strong cultural component (Wellard and Grimble 1997) and given that ethnic and tribal identity were important issues within the Lukanga swamps, stakeholdership was also assigned along ethnic and tribal lines (Warner, 2005:4). A third division among stakeholders maybe between those who determine a decision or action, and those affected by this decision or action (whether positively or negatively); these groups may be termed active and passive stakeholders. The distinction may not be absolute; however, as some groups (certain local people for example) may be involved in natural resource management in both active and passive ways. Based on this definition of passive and active actors all local community members in Lukanga are classified as passive because they have very little input on current policies governing wetland conservation. Government departments and NGOs on the other hand where classified as active since they had the ability to effect policy wetland conservation.

A stakeholder analysis was important because it highlighted the needs and interests of people who may have been under-represented both politically and, in terms of limited buying power. Stakeholder analysis acknowledges that various actors are involved in NRM, both directly and indirectly (Billgren 2008). Further, "It may prevent the tendency for the rural elites to hijack benefits through an array of ingenious devices" (Bwalya 2007:22). It also brings to the forefront "tensions between traditional authorities and new democratic institutions and conflicts between individuals within the community with rent seeking behavior as well as members of a collectively organized groups, spiritual leaders whose roles are ignored in projects and gender conflicts" (ibid) Further, stakeholder analysis can be used to understand environmental systems by defining the aspects of the system under study; identifying who has a stake in those aspects of the system; and prioritizing stakeholders for involvement in decisions about those aspects of the system (Grimble and Wellard, 1997; Mushove and Vogel,2005).

[7] Lecture notes given by Anne Jerneck for Research Methods course: March 2007

However, stakeholder analysis does have some draw backs. Firstly, it is often criticized for being a rationalistic and reductionist approach to social phenomenon and offering simplistic definitions of stakeholders that may not capture heterogeneity (Bwalya, 2007) Stakeholder analysis may also fail to capture long term dynamics of Socio-ecological systems. It may fail to show how peoples' adaptations affect the ecological resource over time. It also does not adequately deal with power relations between different stakeholders as shaped by their institutional positions (ibid).

2.3 Data Collection

Collection of field data was done during 4 visits to Chief Chipepo's area between January 10 2008 and February 26 2008(See appendix for details 1).. The Researcher conducted 2 focus group discussions one at Waya fishing camp on the edge of the Swamp and the other at Chapula Village 7km from the Swamp 10 people attended at Waya (4 Women and 6 men) while 10 people attended at Chapula (1 woman and 9 men).

Interviews were conducted with key informants from the Ministry of Agriculture (Departments of fisheries and field services), ZAWA, WWF and Lenje traditional leaders. The researcher also observed day to day activities and was able to attend 2 meetings between the WWF wetlands coordinator and fisheries committees at Kapoka and Chilwa Islands within the swamp. The fisheries committees consisted of 10 members each with 50% representation of women.

These interviews together with the background literature aided in the formulation of questionnaires. This also brings in the retrospective aspect between the research and the theory where one moves between theory and data collection throughout the research (Ragin 1994:47).That is to say, with the theories from the literature one is able to go into the field with some knowledge of the problem, however, the data collected provides new knowledge. The Literature, interviews, observations and questionnaires also provided information for the stakeholder analysis.

Data on present land use and the role of wetlands in rural livelihoods was also collected via field observation, interviews and questionnaires (See appendix 2 for details). The questionnaires where designed to collect quantitative data on income as well as qualitative data on community perspectives of wetland use and conservation. The sample size of the questionnaire consisted 90 respondents out of a population of 22, 364 in Chief Chipepo's area (CS0, 2000). It was therefore not a statistically significant sample. It was rather meant to reinforce data collect from focus group discussions, key informants and literature. However, some basic statistical analysis on average income, levels of education, household sizes was captured and analyzed using SPSS software.

As mentioned earlier, this was not a statistically representative sample rather it depended on informational redundancy. The rational here was that people from the same stakeholder group would have similar opinions and views and hence having a larger sample would not give significantly different results (Sandelowski, 1995). Further, "in qualitative research, events, incidents and experiences and not people per se. maybe the objects of purposeful sampling" (Sandelowski, 1995:2). In addition "sites, artifacts" and secondary data are sampled for the information they are likely to yield about a particular phenomenon (ibid). For this thesis the phenomenon was the interactions between stakeholders and ecosystem and a mix of different data types were used in order to ensure data quality and reinforce analysis.

The method used to select respondents was purposeful random sampling. The aim was to capture at least 30% of the respondents from fishing villages on the edge of the swamps and 70% from villages further away from the swamp where respondents were mostly Lenje and Tonga farmers. The respondents also had to meet the criteria of being the head of a household. A household is defined by CSO, (2000) "as a group of persons who normally live and eat together. These people may or may not be related by blood, but make common provision for food or other essentials for living and they have only one person whom they all regard as the head of the household. A household may also consist of one member. The head of a household is the person who is considered to be the head by the other members of the household. He/She is the one who normally makes day-to-day decisions governing the running of the household. In a matrimonial household, the husband was usually taken as the head of the household" (ibid). This criterion has a weakness in that it may have biased towards the male perspective. For example the male respondents may not have highlighted problems that women may have faced such as lack of healthcare facilities for children or the inability to access credit facilities because they could not offer securities as they often did not own land. It also means that the specific ways that women use natural resources that may be important for sustainability were not highlighted. Gender bias was overcome by having as many informal discussions with women as possible.

2.3.1 Limitations of Research Methods

Some of the challenges of carrying out interviews are the translation of concepts of environment and sustainability into local languages which the researcher did not speak. According to Temple and Edwards (2002:1) "rather than there being an exact match, word for word, in different languages, the translator is faced with a dazzling array of possible word combinations that could be used to convey meaning" So one can never be sure of how much was lost in translation and this may give rise to "triple subjectivity" (Temple & Edwards, 2002: 11) in which case the respondent, the interviewer, and the interpreter all bring their own preconceptions of the subject under discussion. (Ibid). Nevertheless, the interpreter also played the role of key informant and was able to provide insights into the respondent's behavior that the researcher would

otherwise have missed (ibid). The researcher also made an effort to make it clear to the interpreter that there were no wrong answers and whatever the respondents said was valid.

Another challenge faced was the possibility of under reporting income and over emphasizing challenges in day to day livelihood strategies (Bwalya 2007:55). This was mainly due to 2 factors: One was that there was an expectation based on respondents past experiences with surveys that there would be some monetary gain as a result of participation in a project that followed the research. The second reason is that respondents did not keep records of what they grew, caught and sold. In order to minimize the effects of under reporting it was made clear that while the research was meant to input into management of the study area, participating in the research would not bring any benefits in cash or in kind to any one individual.

There were also possibilities that respondents gave answers knowing that the researcher was an employee of ZAWA[8] and there may have been some repercussions due to illegal use of wildlife resources. Every effort was made however, to assure respondents that their answers were confidential and there would be no negative outcomes as a result of their answers. These efforts met with some success as some respondents wrote hunting as one of their livelihood strategies even with the possibility of arrest hanging over their heads.

Despite the difficulties of getting good information from interviews, they were an important part of the research design because they deal with the stakeholders views of wetland use. “This represents the interpretive part of the research in that the way each stakeholder sees the problem will guide the intervention required in order to create awareness” (Bryman 2004.13). “It also brings in the concept of hermeneutics, whereby the individual interview topics will be deciphered and closely scrutinized in order find the meaning of the text in relation to the whole” (Alvesson and Sköldberg, 2004:53).

3.0 Results

This section will begin with a stakeholder analysis in order to give an overview of each stakeholder, what is at stake for each one in relation to the Lukanga Swamps and how they perceive each other and the swamp ecosystem. The stakeholders were divided into primary stakeholders and secondary stakeholders as well as active and passive stakeholders as defined in the methodology. Information on stakeholders was obtained from the questionnaire survey, interviews with key informants and secondary sources.

The Stakeholder Analysis will be followed by a discussion on institutions for natural resource management from a historical perspective. It should be noted that for the purposes of this thesis institutions are defined as “humanly constraints that structure human interactions” (Berkes et al 2003: 12). These constraints are informal

[8] ZAWA is often considered as an organization which considers wildlife more important than people and/or their livelihoods

"norms of behavior, conventions and self imposed characteristics" (ibid). Institutions are therefore a platform on which stakeholders interact and studying how institutions have changed within the Lukanga and helps one to understand these interactions better. Information on institutions for natural resources in the swamp was obtained from Headpersons and community elders. Secondary literature on traditional institutions in Zambia and Africa in general was also used.

Thereafter Livelihood strategies will be discussed in the context of their external and internal drivers as well as their impact on the wetland ecosystem. This part will not only discuss income as well as some other factors that affect livelihoods (e.g. institutions, access, education etc). Tools such as pie charts, tables and CLDs will be used to display and analyze data.

Finally the results will conclude with a discussion on perceptions of the wetland by local communities.

3.1 Stakeholders

3.1.1 Primary Stakeholders

There are 3 main groups living in and around swamps they are considered based on tribal affiliations, namely Lenje, Tonga and Bemba (really various peoples from the Northern and Luapula provinces who speak *icibemba* or similar languages).There are other groups within the swamps including Luvales, Lozis and Lambas among others. For the purposes of this paper only the three main groups will be discussed. Nevertheless it should be noted that these groups are not homogenous. There are differences within these groups with regard to attitudes towards the management of the wetland as well as perceptions of other groups. The intention in this paper is to highlight some of the differences between groups that may bring about conflict and are detrimental to effective resource conservation and management.

3.1.1.1 The Lenje

The largest tribal grouping within the vicinity of the Swamps is the Lenje. They are considered the indigenous people of the area although it is not clear when they arrived. They are however mentioned in passing by (Macrae, 1934:1) as "balenge" who were probably related to "batwa" who were at the time major inhabitants of the swamp. Sicard and Vogel (1969:465) also mention the possibility of their existence in the area as far back as the 17th century. Present day Lenje are generally subsistence farmers growing maize during the rainy season and vegetables during the dry season, they burn charcoal as well as keep a few cattle, goats, chickens etc. Nevertheless, some especially those closer to the edge of the swamp, fish or are involved in fish trade.

Having been in the Lukanga swamps the longest the Lenje have developed traditional norms and values that relate to the management of the Natural resources and the Lukanga swamp in general. These traditions are

usually linked to religious rights which are discussed and expanded on under the institutional analysis below. Many Lenje recognize this link strongly and continually mentioned that the loss of the Swamps cultural importance was one of the causes of reduced fish catches. Further 43% of survey respondents acknowledged that the swamp had some religious significance or was important for certain rights and that a lack of respect for these traditions has had negative outcomes for their livelihoods. In particular, the majority of respondents blamed the reduction of fish catches on the "newcomers" lack of respect for local customs.

The Lenje have a stake in the Lukanga swamp due to historical and religious connections to it. It also provides them with soil, water and plant resources which allow them to have food security and earn incomes. They perceive the land as theirs and are resentful of outsiders who are ripping the benefits of selling fish in town. This resentment leads to conflict between themselves and the fishermen and has a detrimental effect on the conservation strategies in the swamp. That is not to say that the Lenje themselves use the resource sustainably. They also participate in environmental degradation particularly through indiscriminate charcoal burning.

3.1.1.2 The Bemba

The Bemba group began to arrive in the mid to late 1960's (Chileshe, pers comm., Mbewe 2006:6.). The main reason for there migration was and still is the fishing in the Lukanga swamps. Fishing is an integral part of the Bemba culture and boys begin to fish at a very young age to the extent that in "Bangweulu swamp there are more girls than boys going to secondary school" (Kamwenshe, Pers com). One Lenje farmer stated "they started fishing and buying and selling fish very young" and once they see that they can make a living without going to school, they do not bother with it".

Although fishing is the sole source of income for many Bemba, some grow crops during the fish ban which lasts from 1st December to 1st March and coincides with the breeding seasons of most fish species. Others however hire out their labour to the farmers among the Tonga and Lenje groups. The Bemba are generally perceived as "those people who can't farm even when they are given land". It is seen as not a part of their nature and/or culture. The Parents Teachers Association (PTA) chairman stated "it (fishing) comes naturally to them since that's all they know from the time that they were young". Hence, it appears that the wish of the "indigenous Lenje" is that Bemba's should be more involved in farming. Bemba's who have turned to farming were even described by some as "clever".

The Bemba have a stake in Lukanga because it provides them with fish resources and land on which they are dependent for their day to day livelihoods. They have less of a spiritual connection to wetland but focus group discussions revealed that they have a great deal of respect for the beliefs of the Lenje. However, even Bemba

who settled in the swamp during the 1960s admitted to feeling like outsiders. They felt sidelined when it came to receiving agricultural inputs and extension services from the Ministry of Agriculture.

Among the fishermen are what can be termed as resident fishermen and migrant fishermen who live in town and merely come to fish during the open season (March 1st to November 30th). These two groups are different in that while permanent residents have tried to integrate into the local community, the migrant fishermen are highly mobile, have less to lose and so they had less respect for traditional norms. The migrant fishermen seem less likely to care about the conservation of the resource since they can simply move to another area once it is depleted.

3.1.1.3 The Tonga

The Tonga were the latest group to come to the swamp. Linguistically, they belong to the same group as the Lenje (Mapedza 2008:2) and they appear to have fewer conflicts with them. Their migration northward became particularly noticeable following the persistent droughts of the early 1990s (DACO, Pers comm., CSO 2000.) The Tonga are cattle keepers but also grow crops on a slightly larger scale than Lenjes, they tend to have bigger fields and are perceived to be more "serious" about their farming than the Lenje (DACO, Pers com, Chabwera, 1998).

Their stake in the swamp is the pasture and water for their animals and crops for which they migrated from the southern province. The increase in the population of cattle has caused conflict between them and the Lenje. They were perceived as being wealthier in terms numbers of animals and so able to pay greater tribute to the chief and his headmen. They are seen as having a greater advantage in terms of resource allocation for grazing and watering their animals.

3.1.2 Secondary Stakeholders

3.1.2.1 The Zambian Government

Apart from the local communities the most important stakeholder in the Lukanga swamp is the Government of the Republic of Zambia through its various ministries, departments and agencies. The Ministries involved are the Ministry of Agriculture - Fisheries Department and -Department of Field and Extension Services, the Ministry of Energy and Water affairs through Water affairs department, the Ministry of Tourism, Environment and Natural Resources through the Forestry Department and the Zambia Wildlife Authority (ZAWA) and the Ministry of Local Government and Housing which runs the district council. For the most part the above ministries work in the Swamp independently of each other. The exception is a long running collaborative effort between the Fisheries Department and ZAWA officers to arrest fish poachers during the fish ban.

Apart from this collaboration between officers on the ground there is a fragmentation of the natural resource management regime symptomatic of the entire legal framework dealing with natural resources in Zambia. Just as an example, despite belonging to the same ministry, forestry officers do not work in wildlife areas and wildlife officers do not participate in protection of forestry reserves. This does not make ecological sense since forests are habitat for wildlife. This situation is further confounded by many institutions depending on the forest resource for their own finances through the collection of revenue. A case in point is forestry department's target to collect at least ZMK[9]65 million from levies on charcoal burning and conveyance in 2007 (they exceeded this target by ZMK 100 million) (DFO Pers.com, Forestry Department, 2007:2) Given that the department does not have any way of controlling charcoal burning or having it done in a sustainable manner this simply serves to increase the rate of deforestation since the department is highly dependent on what charcoal burners pay in order to continue its operations (DFO, pers com, 2008).

Further the fisheries department is in conflict with the district council which is also mandated to collect levies from the fishermen but do not participate in protection and/or monitoring of the resource (Munayakasa pers, com, 2008). The Fisheries Department considers this as a case of reaping benefits without sowing, and according to Ostrom (1990) appropriation not balanced by provision precludes collective action and breeds conflict. This is because "local appropriators face the risk that any benefits they produce by their efforts will be reaped by others who have not contributed" (Ostrom 1990:1)

Even more conflict is created when interventions by one government department directly contradict those of another department. One example in Lukanga was the provision of relief food and inputs for wetland agriculture by the Disaster Management Unit and a project promoting wetland agriculture from the PAM. (MACO, 2008). The interesting aspect of this input donation is provision of fertilizer for what would probably be wetland recession agriculture on rich alluvial soils. This serves to highlight the disconnect between agriculture and wetland conservation and is symptomatic of the disjointed natural resource management system in Zambia. It may also create conflict between institutions that support conservation and those that support poverty alleviation to the detriment of primary stakeholders who have much to gain from both.

Further, an interesting development is that since Lukanga swamp was designated a Ramsar site it has had to come under the jurisdiction of ZAWA. In order to streamline management of the wetland with ZAWA operations (based on the ZAWA Act, 1998), discussions are underway on the possibility of transforming

[9] 1 US $ = 3500 Zambian Kwacha (ZMK)

Lukanga swamps into a GMA[10] as a way of enhancing conservation and increasing wildlife populations and providing alternative sources of income. This has a number of implications:

1) A more active presence of armed Wildlife officers;
2) Formation of Community Resource Boards;
3) Hunting companies may come into the area;
4) Tour operators many come into the area and;
5) Changes in stakeholder dynamics.

This also raises a number of questions

1) Will the people benefit from this in the way they want to?
2) How long will it take for people to see the benefits?
3) What about the institutions that already exist that help to facilitate Natural Resource Conservation and Management, what happens to them? After all this idea comes from ZAWA and has not spontaneously generated from the local people themselves.
4) Essentially wetland conservation maybe at odds with current livelihood practices in Lukanga which involve clearing of forest cover, charcoal burning and overfishing. How will this be overcome?

Further, there has been a critic of ZAWA's Management style as being "protectionist" (Mapedza et al 2008:6). Implying that ZAWA has a tendency of excluding all other stakeholders (particularly other government departments) and not really involving the community in resources management decisions. This maybe because ZAWA has not completely shed of its "stick and fence" or exclusionary fortress conservation skin, a management approach which prior to 1998[11] had been the way wildlife was managed in Zambia. Many also view the GMA model as inappropriate in view of the population density and effects of urban rural dynamics on the Lukanga. It can be argued that the application of the GMA model is yet another example of the use of a "blueprint approach" to resource management; with no regard for local context and heterogeneity.

Further, ZAWA and fisheries officers were accused of corruption by many locals. It was alleged that often when they caught fish poachers they simply confiscated the fish and took it to their homes in order to feed their families. This is hardly surprising given the low salaries of Zambian Civil servants, especially field staff (.pers.obs). Unfortunately, it means that the community does not trust government officials in charge of the

[10] "There are 35 Game Management Areas (GMAs) in Zambia and are categorised VI in accordance with the IUCN categories. These GMAs were set aside principally to serve as buffer zones around the National Parks. It is in the GMAs were the CBNRM programmes are advocated with the view to co-manage the wildlife resources. Thus, GMAs are not only important reservoir of the wildlife resources but also cornerstone in the implementation of the various strategies in wildlife management. Partnerships become very crucial in this case" (www.zawa.org.zm)

[11] It was at this point that ZAWA was transformed from the National Parks and Wildlife Service into ZAWA through an act of parliament. The new act included a requirement for ZAWA to work with communities and share benefits of Wildlife utilization with them through Community Resource Boards. However, it is often argued that this is not a real partnership and communities are still left out of the decision making process.

resource and is less likely to report offenders. The government officers are also suspicious of the local community as they are perceived to be either poachers or illegal charcoal burners. This mutual suspicion, arguably, makes cooperation between these two groups of actors difficult, especially since the Lukanga swamp is under consideration to be declared and managed as a GMA. The formation of a GMA entails local peoples involvement in NRM will be required (even if only at the level of rhetoric) once this happens, the current relationship between them, and the government officials will be even more problematic.

Overall, various government departments are in a position to be mediators and bring all concerned parties to the negotiating table. Nevertheless, Ostrom et al (1998:281) argues that "national governments can at times hinder local self-organization by defending rights that lead to overuse or maintaining that the state has ultimate control over resources without actually monitoring and enforcing existing regulations". In the case of Lukanga the Zambian government assures the rights of migrants to exploit fish resources without the capacity to limit this exploitation, and also issues charcoal burning and conveyance licenses when it's monitoring procedures have, time and again, been proved to be ineffective.

3.1.2.2 Non Governmental Organizations

In terms of environmental protection and conservation 3 INGOs are currently at various stages of involvement in Lukanga. One is the WWF while the others are IMWI and the third DAPP. DAPP and WWF are more actively involved with on the ground activities to improve local livelihoods and enhance wetland conservation while IMWI is currently carrying out studies that will extend to December 2009 on the social, economic and ecological status of the swamp.

There seems to be efforts on the part of these organizations to actively incorporate the local communities in order to achieve their objectives. However, on close perusal of DAPP and WWF project documents it is clear that these organizations already had set goals even before the project began and to some extent community involvement is on their terms rather than on the communities' terms. Further, who they represent is not always entirely clear as these NGOs are not democratic institutions themselves (Carter, 2004:137). There is also a fear that influence from INGOs with a more resources maybe greater than those from developing countries. This, however, does not take away from the positive role played by INGOs in influencing "political agendas and international Law, direct action, scientific research and compliance monitoring" (Elliot, 2004:121).

Nevertheless, it appears that decision makers may view the Lukanga Swamps system in a static manor. This is evidenced by the continued push for community involvement that really does not include all stakeholders. It's a system that favors permanent residents and excludes migrant fishermen who make up as much as much as 70% of the population. Further, many times government and NGO interventions are governed by priorities and

discourses set by international donors who will never set foot in Africa and have only theoretical ideas on what should be done. As Metcalf (1997 cited in Marks, 2002: 122) states "the stimulus, funding, staffing, and concepts for integrated wildlife programs did not come from the rural communities, nor were resources expended to make these programs more community friendly". Metcalf continues "the communities were expected to receive projects gratefully as passive recipients, to participate in proscribed "committees," and to accept benefits in prescribed packages". While Metcalf speaks in the past tense, these issues are still relevant for many community based programmes in Zambia today (per. obs.).

Further, projects and interventions by NGOs are relatively short term compared the actual ways the socio-ecological systems works. Projects proposed for Lukanga Swamps had an average lifespan of 5 years which is may not be enough time to build trust, facilitate social learning and impact local institutions which have evolved over hundreds of years.

3.2.2 Active and Passive Stakeholders

Table 1 below gives a summary of stakeholders in the Lukanga swamp their interests, perceptions of other stakeholders and impact on Lukanga swamps. The table also highlights a third classification of stakeholder i.e. passive versus active. The division between the 2 categories is based on which stakeholders make decisions or action (active), and those affected by this decision or action (passive) as described in the methodology above. It was also based on the general responses given by the stakeholders with regard to how they felt about their involvement in NRM. For instance, there was a general feeling among respondents that resources in the swamp did not belong to them since they were not the headman, government official or belong to any committee. The phrase *ifya buteko (it* belongs to the government) was a mantra heard over and over again and hence it was the governments' role to make sure "rules were followed". In addition, Government department and NGOs were seen as "providers" and/or primary policy makers while the locals were mere recipients. This attitude does not create sense optimism with regard to community resource management

Table 1: Stakeholders in the Lukanga Swamps

Stakeholder	Type	Stake/ interest	Problem	Implications for NRM
Lenje Farmers	Primary stakeholders, Passive	To benefit from Land, pasture other wetland resources	See the land as their own and new comers as imposters	May not cooperate with newcomers in conserving the wetland resource
Tonga Pastoralists	Primary Stakeholders Passive	To benefit from Land, pasture other wetland resources	Wealthy, able to use weaknesses in traditional institutions in order to obtain resources	Unchecked increase in numbers of livestock detrimental to the wetland
Bemba Fishermen	Primary stakeholders Passive	To benefit from the fish resources in the swamp	A large proportion are seasonal migrants with no permanent stake	May not be interested in participating, may also be left out by policy markers
Government Departments	Secondary Stakeholders Active	Have national interests, development and protection of the resource	Still top down approach mentality, may not trusted by community, Sectoralism of government dept.	Communities less likely to cooperate in NRM, Interventions are fragmented and ineffective
INGOs	Secondary Stakeholders Active	Have interest in conservation of the resource and enhancing sustainable livelihoods	Undertake short term projects, it's unclear who they represent, agenda may be set by international donors	Short term Projects may not bring about real change, they may hinder progress made by local NGOs

Source: Field data 2008

3.2 Institutions for Natural Resource Management

3.2.1 Traditional Institutions

Historically, among the Lenje, all natural resource management were the forte of the chief and his headmen and women who formed part of an advisory council called *Ndunas*. Ndunas are selected based on kinship relationships and inheritance of the chieftainship through family leanage. The power vested in the Chief was of a spiritual nature as he was seen as the connection between the people and the ancestral spirits worshiped in the Swamp. Therefore, when the chiefs spoke it was seen as not just a message from him but rather one from the gods and disobedience to the chief was also disobedience to the gods with dire consequences.

Apart, from spiritual alienation members of the community who did not follow the rules could potentially lose their rights to land and influence in the community. Nevertheless, many traditional religious practices brought the people closer to nature and tended to have conservation value. One rule which allowed fish to breed was a traditional "fish ban" practiced by the Lenje who were not allowed to fish during the rainy season from around November to March the following year. During the rainy season "we all had to come out of the water and grew crops" this is something the new comers do not do". There were also rules about where "commoners" could not go within the swamp and women and certain implements such as black pots where not allowed in the swamp. The Lenje also practice traditional ceremonies such as *Kulamba Kubwalo*, paying homage to spirits in the swamp.

However, Local institutions for natural resource management have been transformed by the colonial and pre-colonial eras. According to Chipungu, (1992:8) the colonial era saw the alienation of indigenous Zambians from

their resources. He describes a situation in which colonial authorities forced the villages to aggregate thereby causing over use of land; and agriculture policies which forced Africans to switch from drought resistant crops such as sorghum and millet to maize for the European market. Zambians were forbidden to hunt and fish under new game laws. This exclusionary approach culminated in the establishment of "protected" areas like National Parks and National Forests, which paradoxically are present to this day.

Nevertheless, that is not to say that pre-colonial institutions ensured equality for all. Murombedzi, (2007:21) argues "available evidence does indicate that as pre-colonial society became first regimented then stratified, access to and use of natural resources also came to be stratified, and conservation practices reflected attempts to balance competing interests. Such recorded pre-colonial conservation practices as the demarcation of sacred areas, the allocation of totems, the expropriation of labor for conservation etc, did not necessarily reflect egalitarian and consensual conservation, but rather the exercise of power over people and resources by dominant clans or classes, as the case would have been".

To a great extent this exercise of power continues to date and traditional rulers in Africa have simply adapted to current political situation. According to (Haller 2008[12]) "indigenous institutions, are being transformed by a wider national and international economic system and natural environmental changes and are more inclined to support unsustainable resource use which give access to cash, while sustainable practices are transformed or eradicated". In Lukanga, this can be seen through corrupt practice by Headmen who give grazing land to wealthier outsiders and indiscriminately give out plots to charcoal burners in order to get a cut of the profits. Further, some respondents revealed that the traditional establishments were reluctant to have transformation of land rights from customary to leasehold title because it reduced their control over local residents[13].

However, new formal institutions in the form of laws and regulations governing natural resources have led to the loss of some power among the traditional elite. In Lukanga this inability to exercise traditional power extends to migrant fishermen and causes a great deal of frustration among the Lenje traditional leaders. In Headwoman Lyombe's words "I have had no control, I don't know most of the Villagers in my own village". She further states "they do not come and report themselves when they arrive" and says the result is an increased population from just a few hundred people to at least 4000. In Headwoman's Lyombes' village she has lost control because she cannot really punish the seasonal migrants who do not have land. As the custodian of land her role is to

[12] Article not dated on http://apad.revues.org/document148.html

[13] "Approximately 90% of Zambia is traditional/customary land under customary tenure arrangements and 10% is under lease tenure arrangements. The underlying principle of the traditional system is that land use is held in common ownership by the community in perpetuity and transferable following family/community traits. The lease tenure system entails that title to land is given to the applicant for a period not exceeding 99 years after which the leasee has to apply for renewal of the title. At policy level, Zambia through the Lands Act recognizes Customary Land as eligible for registration for leasehold title in order to provide rural people with security and ownership of tenure to land. Thus, people owning land under customary tenure are able to convert it to leasehold title" (Phiri, 2005, 8)

allocate land rights to those "deserving" and to take away land from those who do not follow the social norms or "contribute" to development (by donating money or gifts in kind for projects such as community school construction). Her power is further diminished as she has no power to punish people who overexploit the resource. This is "ZAWAs role" she says and "I need backing in order to enforce it".

Some of the norms that the headwoman is unable to enforce are religious and cultural norms which were important to Lenje and were believed to create balance in nature causing everything to flourish. One of the reasons for the reduced fish catches given by Lenje traditional leaders is the lack of respect for the spirits by the Bemba immigrants. They "take women, black pots and play loud music in the swamp, the spirits are unhappy that's why there is no fish". While Headwoman Lyombe cannot prove her claim it is clear that many of these beliefs hitherto reduced the number of people who settled within the swamps as Lenje men would not take their families into the swamp. Despite being the Headwoman, Headwoman Lyombe said she needed backup in form of some documentation from ZAWA and the Fisheries department in order to enforce good fishing practices. Without that she felt that she would not be heard. Thus natural resource management moved from being overseen by traditional leaders into the states jurisdiction and despite their best efforts the role of traditional leaders is becoming more diluted. For example wildlife and fisheries officers do not report to them and they can no longer command young men to clear canals in the swamp (Lyombe, pers com 2008).

Nevertheless, it may not be easy or even desirable to return to purely traditional institutions due to a number of factors: Firstly, they have been transformed by monetarization of the resource and national politics and secondly religious beliefs even among their own people have changed as indigenous peoples have become exposed to monotheistic religions such as Christianity and Islam. However, that is not to say that traditional rulers have no role to play in current natural resource management. They are still well respected and in many cases the people of Lukanga have differed to them. Their role in conflict resolution is key to bringing together different stakeholders. However, they still need to become more accountable to the people through some form of democratic process.

3.2.2 New Institutions

In order to counter bad fishing practices and enhance community participation in management of the fish resource, the Fisheries department has facilitated the formation of fishing committees in the fishing camps. Members are elected to the committees by community members and they have a mandate to work with Fisheries department staff in spearheading sustainable fisheries education. They also assist in the enforcement of the fish ban. Unfortunately, the fisheries committees are also seen as sale outs and are particularly unpopular among some members of the community. This perception seems to be pervasive in NRM whenever committees are

formed. Bwalya 2007 describes a similar situation in Joint forest management where it was found that villagers just did not like being represented and often saw committee members as the only beneficiaries of NRM projects and funds.

Further, there is also a lot of self interest among the committee members who tended to be generally more educated and relatively wealthier members of the community. During meetings with the WWF wetlands coordinator at Chilwa and Kapoka there were many queries about the possibility of remuneration for the work done by committee members. Committee members felt justified as they spent time and provided labor for various community projects. Some members implied that they needed an "incentive" in order to work more efficiently and with greater "enthusiasm". Bwalya (2007:102) reports a similar phenomenon among committees involved in Joint forest Management in Katinino forest on the Copperbelt province. She further states that "local elites within a forest community may capture the bulk of the benefits", quite possibly making the poor poorer. Cilgett et al 2006 also describes a situation in the Gwembe valley (Southern province) where local elites have tapped into both the employment opportunities and "development endeavors," that result from NGO and government interventions. She further states that "For those outside the network of local power holders, access to these benefits is not guaranteed".

Apart from individual self interest hampering NRM strategies of the committees there were also committee members who appeared to be actively working against the committees set objectives. One committee member said "there are plenty of fish, there are simply hiding among the reeds which have increased in number". He further stated "It's not true that bad fishing methods have depleted the resource" and even advocated for the abolition of the fish ban which should be replaced by selective fishing.

Further, there has also been conflict between the fishing committees and some headmen as well as local political leadership. One committee member at Chilwa Island told a story of an incident in which a political leader in the village held a meeting in the village telling all fishermen to disregard the fish ban. This was unfortunately supported by the headman and hence it was impossible for the committee to work effectively. This conflict between new and old institutions is an important hindrance to effective NRM. The new institutions are often trying to institute sustainable natural resource management strategies while old institutions may be trying to "ensure that only rules that pay stay" (Haller 2008). These rules include exclusive power over land and resources and actively discourage the formation of democratic institutions.

3.3 Resource extraction and Livelihood Strategies

There are diverse ways in which local communities make their living. At first glance livelihood strategies appear to be based on tribal affiliation. The questionnaires however revealed that this had more to do with scale and perception rather than strict boundaries based on tribe. Like rural peoples in many parts of the developing world all the members of the community did not just participate in one livelihood activity. Rather they had various strategies as insurance against total catastrophe during periods of drought and other disasters (see figures 4 and 5 below).Ellis (2000) defined "Rural Livelihood Diversification as the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and to improve their standard of living" (quoted in Bwalya 2007:61) It should be noted however that "Livelihood and income are not synonymous but are inextricably linked as the composition and level of individual or household income at a given point in time is the most direct and measurable outcome of the livelihood process. Income comprises both cash and in-kind contributions to the material welfare of the individual or household deriving from the set of livelihood activities in which household members are engaged" (Ellis, 2000:10 quoted in Bwalya 2007:61).

Although livelihood diversification is practiced by all regardless of ethnicity, respondents indicated that their main livelihood strategy was informed by their tribal heritage. Bemba were mainly fishermen while Lenje and Tonga practiced both farming and herding. The questionnaire survey revealed that 54% of respondents had at least 2 sources of income followed

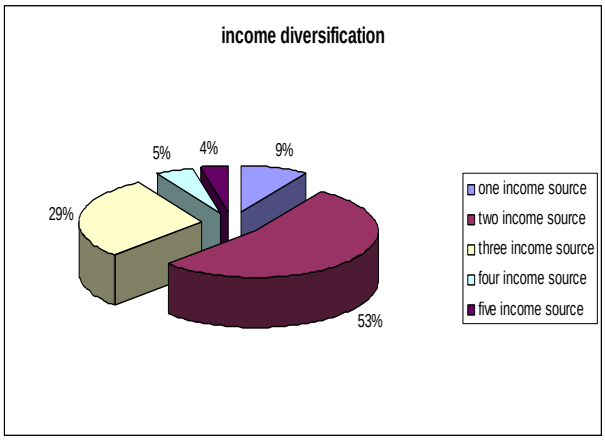

Figure 5 Income diversification, Lukanga Swamps

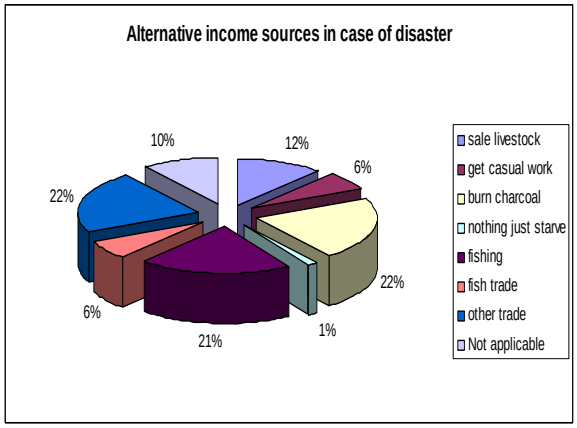

Figure 6: Alternative income sources In the Lukanga Swamps

29% percent with 3 or more sources and the remaining had 4 or more income sources (See figure 4 above). The more income sources the respondents had the more income they generated per income source and the higher the aggregate income overall. This appears to support Ellis (1998:1)'s assertion that diversification is not just a "transient" economic state; rather it may be linked with achievement of livelihood security under "improving economic conditions as well as with livelihood distress in deteriorating conditions". It

should be noted that there are conflicting interpretations on diversification (Ellis, 1998). However, they are beyond the scope of this paper and thus will not be discussed at length.

The main crop grown was Maize and all households including the 26% who reported fishing as their main activity grew at least 1 hectare of maize per annum. Tables 2 and 3 give summary basic information on demographics and income sources of respondents. What follow will be an elaboration on different income sources and their drivers and possible impact on the resource.

Table 2: Basic Household information of Sample, Lukanga Swamps, Zambia, 2008

Variable	Mean Age	Modal age	Median age			
Age of household head (yrs)	43	42	48			
Education level of household head*	Lower Basic 32.4%	Middle basic 31%	Upper basic 19.7%	High school 4.2%	College/university 1.4%	No formal education 2.8
Marital status	Married 90.1%	Divorced 2.8%	Widowed 2.8%	Separate 1.4%		
Sex of Household Head	Male 93%	Female 7%				

Source: Field data: 2008

Table 3: Income Survey, Lukanga Swamps, 2008

Variable	**Mean annual Income in ZMK[14]**	**Modal annual income In ZMK**	**Median annual Income ZMK**
Crop sales	1,528, 031	540,000	240,000
Animal sales	1,066,071	200,000	200,000
Income from fish	1,656,666	1500,000	500,000
Income from Charcoal	459,259	300,000	300,000
Income from other trade	1,438,620	1,150,000	2000,000
Income from casual labor	225,000	225,000	200,000

3.3.1 Farming

Farming is the main livelihood strategy in the Lukanga catchment in the sense that most of the population (85% of the rural population in central Province, according to CSO, 2000) are in involved in growing of crops in one form or another. The questionnaire survey revealed major crops grown were Maize and Sweet potatoes while Other crops were groundnuts, cotton and different types of beans. Generally, farmers grew more than one crop as illustrated in figure 6 below. Figure 6 shows that 37% grew only one crop, often this was maize grown in

[14] 3500 ZMK = 1 dollar

fields less than 1 hectare by fishermen and other respondents who obtained their incomes from other trades such as carpentry or casual employment.

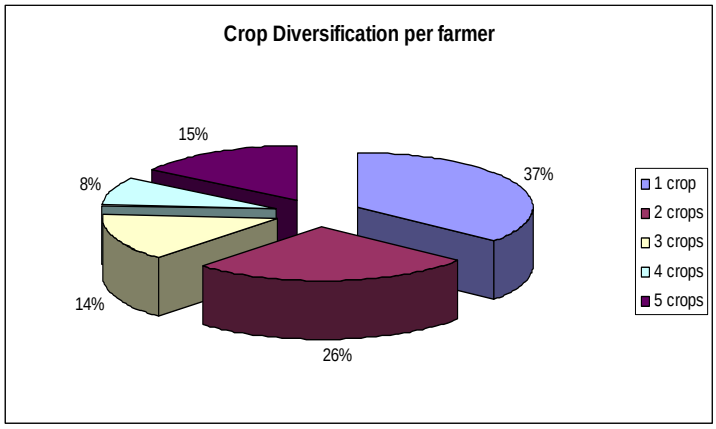

Figure 5: Crop diversification

Source: field data, 2008

Nevertheless, despite all respondents growing at least 1 hectare of maize, soils of the Lukanga swamps catchment area are "characterized by strong acidity, low nutrient retention and low water holding capacity, dominance of coarse textured top soils (abrupt textural change) and severe topsoil capping which results in seedling emergence problems" (FAO,1998). Hence, the typical Miombo woodland surrounding Lukanga is particularly unsuitable for growing maize (Chabwera, pers. Com.) The low soil fertility was highlighted by 65% of respondents who reported having to use inorganic fertilizer while only 9.8% said the soil was good enough to farm without fertilizer (these were ones very close to the swamp) the rest meanwhile could not afford inputs and/or were not beneficiaries of the governments fertilizer subsidy programme, the FSP.

However, despite the continued need for expensive inorganic fertilizers in order to successfully grow maize, it is still the major crop grown(Pers. Obs., Siegel and Alwang,2005:2) The government continues to subsidize its production as way for improving food security at the local as well as national levels. However, this is problematic because according to Siegel and Alwang (2005:2) this has lead to maize-biased public agricultural research, extension and contributed to maize being produced in areas not particularly suited for it. Over-cultivation of maize has led to decreasing soil fertility and natural resource degradation (ibid). The maize monoculture has "also increased vulnerability to drought and other natural disasters" (ibid). Therefore, while the government's desire maybe to increase food security they may actually increasing vulnerability among peasants in Lukanga. According to NFU (2008:2)[15] "by any rational measure maize is probably the least appropriate carbohydrate staple by which to feed the nation (Zambia). It demands a relatively high level of management, is labor intensive, increasingly expensive to grow and highly susceptible to droughts and dry periods".

[15] http://www.conservationagriculture.net/assets/images/media/20070508_095632_Brief1-HistoryofFoodInsecurityinZambia.pdf

Nevertheless, "weaning" Zambians from maize requires not just a change government policy but a cultural change as well and this is easier said than done.

Further, as a result of government policy peasant farmers see fertilizer as the main way to improve productivity. When asked what help they needed, all farmers interviewed said they wanted help in purchasing fertilizer. Although, there is no empirical evidence to support it, based on personal observation, there was little adoption of conservation farming practices such as intercropping, and use of nitrogen fixing trees by peasant farmers in the Lukanga swamps. These practices may help improve productivity while at the same time conserving the resource.

3.3.2 Charcoal Burning

At least 22% of respondents listed Charcoal burning/wood sales as one of their income sources (See figure 6 above). The main reason for burning charcoal was that it was a supplemental income source and coping mechanism during periods of poor harvest. It was also a way of profiting from clearing new fields for agriculture. Once a farmer had obtained the rights to a piece of land from the headman, he would burn the trees in that field for charcoal. However, during the focus group discussions it was revealed that many headmen where "corrupted" since charcoal burning was a profitable business. For very little investment a farmer could make ZMK 15,000 selling a bag of charcoal in Kabwe Versus ZMK[16] 5000 selling locally in Lukanga swamps. During the meeting with various community members at Chapula, it was implied, that many headmen were giving out land under the pretext that it was being given for farming when in actual fact it was being given out for charcoal burning and the headman would get a cut of the earnings. It was interesting to note that there were headmen present when this accusations were made and while not admitting to having been corrupted themselves, they agreed that there was a problem. The Headmen even admitted that indiscriminate cutting of trees was detrimental to the environment. However, there seemed to be no will to change behaviors because many traditional leaders would rather make profits from unsustainable practices rather than encourage sustainable practices.

Unsustainable practices continue due to increasing populations and demand for charcoal from Lusaka, Kabwe, and the Copperbelt. In fact, deforestation due to clearing for agriculture and charcoal burning may fast be becoming the greatest local threat to the Lukanga swamp and its catchment area. I often noted that bicycles with at least 2 bags of charcoal each would be seen traveling towards the direction of Kabwe in the morning and coming back with empty sacks. On a busy day as many as 10 bicycles could be seen in the space of an hour. It was further reported that apart from the bicycles, light trucks were used to ferry charcoal to Lusaka when the

[16] 3500 ZMK=1 dollar

road was dry. Many locals were also able to point out areas just 15Km from the swamp which were once dense tree thickets that were now taken over by tall grasses. It was reported that charcoal burners were now going deeper into the bush in order to cut trees for charcoal.

The main problem with charcoal in Zambia is the degree to which demand surpasses that of other fuels. (ECZ, 2000:127). According to Chidumayo (1993: 596) about 66 percent of Zambia's energy supply comes from wood in the form of charcoal and firewood. Further, "The sectoral consumption of wood is estimated at 69% in rural households, 19% in urban households, 9% in industry and 3% in agriculture" (ibid). In the rural areas, households' energy utilization is mainly in form of wood fuel, whereas in urban areas charcoal is the main source of energy. (ibid) Consequently, clearing of land for fuel wood maybe a serious threat resulting in soil erosion and damage to watersheds. Further, "the increased population growth and the slow pace of change to non-carboniferous household energy resources in the developing countries (such as Zambia) implies that the rate of carbon dioxide release from biomass burning is likely to increase in the foreseeable future. This will further speed up the build-up of atmospheric carbon dioxide with resulting effects on global warming and climate change"(www.worldwildlife.org/bsp/publications/africa/inventory_wood/inventory.html).

3.3.3 Livestock Rearing

Apart from arable farming and charcoal burning, the Lenje and Tonga also kept cattle, goats, chickens and other livestock. (See Table 4 below)

Table 4: Livestock Kept by Respondents, Lukanga Swamps, 2008

Livestock	Mean livestock numbers	Modal livestock numbers	Median livestock numbers
Cattle	18.23	2	6
Goats	12	1	8
Poultry	18	10	12
Other livestock*	3.26	2	2

Source: Field data 2008*these included pigs, sheep and donkeys

The most valued livestock owned were cattle which had an average price of ZMK 1 to ZMK 1.5 Million per herd followed by goats which went for as little as ZMK100,000 per herd. Cattle formed the bulk of the livestock sold. Selling livestock was also listed as one of the main coping mechanisms during periods of drought and/or natural disaster (See figure 6 above). However, some respondents reported selling livestock even when their crops were good in order to buy cash items such as clothes, radios, televisions and other consumer goods. This is a shift from the tradition among the Tonga in particular where livestock were security and a form of wealth storage, and most livestock sales were distress sales. This new phenomenon has made the rural dwellers more vulnerable as they cannot cope during periods of environmental stress as they have no safety nets. Haller, (2008) describes a similar situation among the Ouldeme and Platha of Northern Cameroon. In these groups the staple

crop sorghum was considered sacred and not allowed to be sold in the past. This prevented the excessive use of the harvest. However, in today's economy the need to gain cash is very high especially when other cash crops such as cotton and groundnuts fail. Consequently the "granaries are often empty before the end of the rainy season" and "there are no longer any reserves in times of famine" (Ibid).

Another factor causing vulnerability is competition for pasture. During the dry season the cattle were driven to the wetland in order to utilize the more palatable grasses as well as have easy access to water. Every year farmers obtain user rights from their respective headmen. The headmen allocate "Lutanga's" or sleeping areas for the cattle. Unfortunately, there is not enough room for all the cattle and so this system also appears to have been corrupted. Many locals complained that the allocation of the Lutangas was based on how much one gave the headman and as one local put it "those who gave more got more". In addition there was no security from one year to the next since Lutangas were given on a yearly basis. One could have grazing land "this year and not the next". Hence, the lack of secure access rights has caused conflicts not just among Lenje herdsmen but between Lenje and Tonga. Many Lenje complained about the chief and headmen giving Tonga large tracts of Land and grazing areas because they were wealthier in livestock and so can give larger tributes.

It was, however, difficult to tell the extent of the damage on the wetland due to overgrazing because the research was done during a particularly wet rainy season and responses regarding changes in the physical appearance and extent of the wetland were inconclusive. Further, if one compares the current size of the wetland to Mecrae, 1934s description of the Lukanga swamps, it would appear that the area currently covered by the swamp has increased by at least 600km² (i.e. from 2000km² (Mecrae, 1934) to 2600km² (Ramsar 2006). Mecrae (1934's) description of the swamp is also very much the way this researcher observed it and it would appear at face value nothing has changed. The biggest difference was that he described it as an area teaming with Lechwe and Sitatunga while the only wildlife this researcher came across were some birds, a few snakes and the ever present mosquitoes.

Nevertheless, even without empirical data on wetland loss, lessons can be learned from Lake Victoria and the Speke gulf in Kenya which has also experienced a high influx of immigrant pastoral herds from drought prone districts. (Hongo and Masikini 2003). The increasing livestock numbers have led to serious degradation of wetlands. The type of damages includes: soil erosion, loss of vegetation cover and deforestation. Further, surrounding wetlands were seriously degraded causing heavy soil erosion and environmental pollution during rainy season. (Hongo and Masikini 2003). Hence, based on responses from pastoralists and reports from CSO about increasing herds of cattle one can conclude that the Lukanga system maybe heading the in the same destructive direction.

3.3.4 Fishing

The Lukanga wetland is an important source of income for fishermen who sell their fish in Kabwe, Lusaka and the Copperbelt. Average income from fish given in the questionnaire survey was ZMK 1,656,666 per annum (see table 2 above). Fish is an important source of inexpensive protein in the Central Province and Zambia as a whole (Mapedzi et al 2008:3). In 1996, for instance, households in the Province spent 6 percent of their household food outlay on fish (Ministry of Agriculture and Cooperatives 2002 quoted in Mapedzi et al 2008:3). The Lukanga Swamps produce an estimated 1,710 tons of fish annually. Chibombo District's fish catch for the year 2000 was about 822 metric tons (Mt) while Kapiri Mposhi's share for the same year was 483 Mt (ibid). The common fish species in the Lukanga swamps are Tilapia, Barbus and Catfish. Fish is also an important source of protein in rural Zambia as is the case in most poor and developing countries (ECZ 2000 quoted in Mapedzi et al 2008).

"Serious", fishing in Lukanga began in the mid to late 1960s following immigration of Bemba fishermen (Chileshe, pers. Com) This is probably the time when buying and selling of fish became important and permanent fishing camps were created at various harbors around the swamps including Waya (one of the interview sites) which was established 48 years ago (Mbewe, 2006:6). It is alleged that migration was a result of depletion of fisheries in Luapula and Northern provinces, after as one Lenje fisherman put it "they finished the fish where they were, they came here".

In terms of fishing a number of issues came to the fore: the number of fishermen in Lukanga is growing at an exponential rate (CSO, 2000). It is nearly impossible to exclude new users let alone police the fish ban since man power from the fisheries department and from ZAWA (which often comes to their aid) is stretched thin on the ground. At Waya, there only 5 fisheries officers, one boat and little in the way of fuel and food supplies to police about one-fifth of the wetland area. Further, on some occasions law enforcement has taken a violent turn with reports of ZAWA officers disarmed by groups of fishermen.

Further, the general trend among fishermen was their inability to diversify their livelihood strategies and or reinvest their earnings from fishing into other activities (Nosiku pers.com, 2008). This may be due to a lack of basic education as highlighted by table 5 below. According to (Iiyama et al 2008) there is a direct positive correlation between levels of education and skills within a household and its ability to pursue highly diverse income diversification strategies. Nevertheless, others argue that other factors such as access to resources may be the primary cause for fishermen's inability to improve their livelihoods (ibid). The fishermen themselves say it is difficult to go into other livelihood strategies particularly agriculture because "we are seen as people who cannot farm and we are sidelined". They further state they "are not given inputs" nor are "extension services made available to us". This is in sharp contrast to the Department of fisheries reports on efforts to help fishermen

diversify their livelihoods by holding field days for various fishing communities and working through fisheries committees comprising local people (Nosiku, pers.com, 2008). It maybe that the fisheries department are not reaching the fishermen in the manner that suitable within that community which is often the case among many government departments where the assumption is that simply giving extension services will turn fishermen into farmers (pers. obs.).

Table 5: Education Levels of Fishermen, Lukanga Swamps, Zambia

Education Levels	Proportion of fishermen (%)
Lower basic (Grades 1-4)	45.45%
Middle basic (Grades 5-7)	22.72%
Upper basic (Grades 8-9)	27.27%
High school (Grades 10-12)	4.45%

Source: Field data 2008

Apart from law education levels and lack of access to farming inputs, reduced fish income due to falling fish catches may hinder fishermen's ability to invest in alternative livelihoods. Many Fishermen admitted that fish catches are not as large as they used to be and income from fishing has fallen over the last decade. They blame this on ever increasing number of fishermen and bad netting practices. Further, according to Kamwenshe et al (2007) a decline of fish catch from 2,600 t/pa to 1,200 t/pa has been noted and is largely due to over-fishing. Particularly problematic was the use of mosquito nets and gill nets less than 2 inches (Nosiku, Munyakasa, pers com, 2008). Overall, there appears to be a reinforcing loop in that more fishers leads to less fish caught per fisher, this increases competition among fishers which then leads to pressure to use unsustainable methods such as mosquito nets. The CLD in figure 8 below helps to illustrate this.

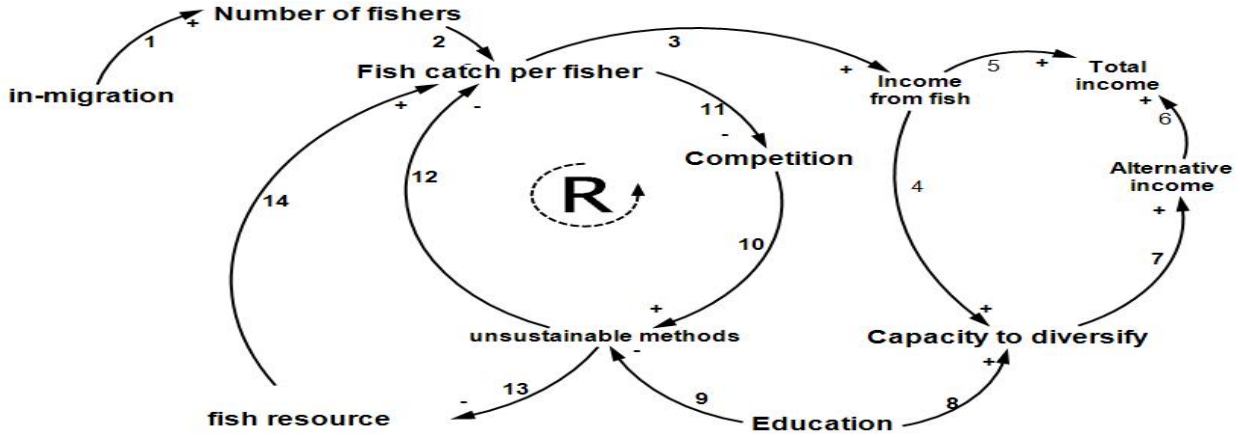

Figure 6: Fish Catches and income diversification in the Lukanga Swamps

The CLD above shows how the influx of migrant fishermen (line 1) increases the number of fishermen and reduces the fish caught per fisherman (line 2) this in turn reduces income from fish (line 3) and reduces the fishermen's capacity to invest in other livelihood strategies (line 4). The reduction in the capacity to diversify leads to less alternative incomes (line 7) which leads to a reduction in total income from all livelihood strategies (line 6). Lines 10 and 11 show that increased competition leads to use of unsustainable methods which reduces the fish caught and the fish resource overall (lines 12, 13 and 14). Lines 8 and 9 show that less education leads to less capacity to diversify and a higher likelihood of using unsustainable methods respectively

3.4 Overall Perceptions of the wetland by local communities

Despite the conflict within and among different groups there is some appreciation of how the communities are interconnected. The Lenje, provide firewood for the fishermen to dry their fish, while the Tonga provide animal draft power for transport and ploughing of fields. Both the Lenje and the Tonga buy fish which is a significant source of their dietary protein. There is also an understanding by some that if the swamp gets dry "we all suffer". Further, there is some understanding that when "we cut trees it can affect the rain".

Nevertheless, there is also a tendency to think about the wetland ecosystem as only "where the water is". This attitude was highlighted in a speech given on behalf of Chief Chipepo on World Wetlands day (Feb 2nd) in which ZAWA was advised to next time take the event to the wetland. Other locals spoken to argued "we are farmers with very little to do with the wetland, take this to the fishermen". The unfortunate part of this attitude is that this was in an area less than 7km from the swamp where active clearing of land for charcoal and agriculture is taking place.

Further, while the fishermen acknowledged that overcrowding and bad fishing methods were bad for conservation and detrimental to their livelihoods there seemed to be general lack of realization of the connection between activities in the catchment and the status of the wetland. They also questioned why the world wetlands day celebrations were taking place "so far away" from the wetland with farmers who "do not respect the wetland". They also did not see cutting of trees to provide them with firewood for smoking the fish as problematic or in any way linked to sustainable wetland management.

Another common view that came from the interviews with locals was the desire among many that the wetland should bring "development" through the creation of a tourist industry or some other investment opportunity that will bring wealth into the Lukanga. This echoes the view of many local and national politicians who saw the designation of Lukanga as a Ramsar site as an opportunity to bring "development". This idea is being sold on the people without really analyzing who is going to benefit and what are the long term impacts of such economic activities. The sort of development described by most respondents involved complete transformation of the

wetland. Respondents further away from the swamp described development as “bringing investors”, “privatizing the wetland” and building more infrastructure so they can transport the goods to town more easily and quickly throughout the year. In contrast respondents living closer to the swamp felt that there was need to “restock the swamp with fish” and that they saw the swamps continue to provide them with fish in the future.

4.0 Discussion

This section of the thesis will discuss the findings of this research project with regard to the implications of diverse stakeholders, institutional capacity, resource extraction and livelihood strategies on the overall sustainability of the Lukanga Swamps system.

The problems brought about by new stakeholders, change in prices of CPRs and institutional change are not unique to Lukanga Swamps. This is illustrated by various studies by Haller 2008, Haller and Marten 2006, Campbell et al 2001 among others. It however does pose a unique challenge in that the multiplicity of stakeholders may hinder community action. Campbell et al (2001:592) states that “while CPR institutions are possible in highly heterogeneous communities, it is generally acknowledged that they are less likely to work”. However, Yadama and Argawal (1997:436) argue that this pessimistic attitude is the result of “focusing primarily at the macro-structural level of analysis and looking at aggregate figures on forest area, population, and economic growth. It “neglects `the findings and perspectives of micro-level research on specific communities and regions' researchers”. Yadama and Argawal (1997:441) further state that “local communities can create and sustain local institutions to manage their collectively owned resources” even in the face of adverse pressure from markets, the state and demographic changes. However, in the case of the Lukanga Swamps, Campbell’s pessimism maybe more accurate because state policies have not yet adequately dealt the complexities within the Lukanga system.

According to Mitchell 1997:15 state policies have a potentially core role for interactions between people and their environment as they help to establish priorities and practices for the state as well as structure debate about environmental change. Hence, community based initiatives will fail in Lukanga swamps if sectoral thinking exhibited by government institutions is not dealt with in a concrete manner. Lukanga wetland is not divided into fisheries, forests, or wildlife areas, with distinct boundaries where say fisheries end and forests begin, but is one interconnected system. It is important for instance that the agricultural activities carried out in the catchment are streamlined with conservation concerns for the benefit of all users in the Lukanga Swamps. After all catchment users do not only handle their own plots, crops, forests. “Collectively, knowingly or not, they manage landscape patterns and bio-physical processes that transcend their fields” (Ravnborg and Guerrero, 1999:257). Therefore managing the Lukanga Swamps along sectoral divisions is simply reinforcing disciplinary divisions that do not exist in the natural world. This may also be confusing for the locals, especially with the now

ubiquitous Community Based Natural Resource Management (CBNRM), where every type of resource has a management structure which presupposes the participation of locals through the formation of some committee (s). The inevitable questions are: How many committees are going to be formed in Lukanga? With the proposal to transform the wetland into a GMA; are the fisheries committees going to be disbanded to make way for ZAWAs' CRBs? Will the Fisheries dept will have to move out?

In addition, if sustainable livelihoods are defined as those that can manage and recover from pressures and upsets while at the same time maintaining or enhancing their capabilities and assets without undermining the natural resource base (Chambers and Conway quoted in Bwalya 2007), then the four main livelihood strategies i.e. fishing, farming pastoralism and charcoal burning as they are currently practiced are not sustainable. More and more land is being cleared for charcoal burning and new fields and fishermen continue to use mosquito nets and other unsustainable fishing practices. However, this may not be the result of simply not caring by the resource users rather it can be likened to observations made by Cilgett et al (2006:) among the Gwembe Tonga in the southern province where "the most recurrent pattern, and most reliable response to living in conditions of extreme uncertainty, is an increasingly opportunistic use of the environment and other resources".

Hence a common thread throughout the execution of this thesis was that all stakeholders desired development and often saw the use of wetland resources as a way in which this development could be achieved. According to (McCartney et al 2005) this is the case in many developing countries where progress in natural resource management is commonly perceived to be the key to sustainability, and vital to dealing with both developmental and environmental problems. However the trade-off involving environmental protection and development is even more difficult in fragile ecosystems like wetlands (ibid). Given the complexity and uncertainty of the Lukanga Swamps system it is difficult to tell what the acceptable trade off would be.

Despite the uncertainty, decisions must be made in order to safeguard or at least ensure wise use of wetland resources. The notion of wise use is promoted by the Ramsar convention which recognizes that human development requires modification of wetland ecosystems. Wise use as defined by the Ramsar convention differs from traditional natural resources management because it gives higher priority to those processes that maintain the ecosystem and the communities that are dependent on them (McCartney et al 2005).

If higher priority is to be given to ecosystem functions that sustain livelihoods it is important that users have good information of external limits and internal environments and have dependable and suitable indicators of resource conditions. Ticheler et al (1998:81) states that proper feedback on the findings by research institutions enhanced awareness of exploitation patterns and management consequences in the Bangwuelu swamps. Further information that is reliable and useful and to all helps people decision about whether they should worry about

the environmental degradation they see (Mckean 2000). It also helps them learn about methods available to tackle the problems they identify as being worthy of their concern (ibid). Stakeholders also need to share an image of how the resource system operates and how their actions affect each other and the resource. This is an important part of building social capital and creating trust among stakeholders and an important step on the path to sustainability.

5.0 Conclusion

Overall this study found that the multiplicity of stakeholders, lack of trust between them and prejudgments based on tribe hindered community action in the Lukanga Swamps. There is also a lack of trust between the community and government institutions which has a detrimental effect on effective NRM. This is exacerbated further by the sectoralism exhibited by government departments.

This study also found that institutions for traditional NRM had broken down due to newcomers, new legislation and markets for CPR goods. However, that is not to say that how things were done in the past would still work today. Rather, it is important to take what was good from these institutions (for example a special respect for and connection to nature) while doing away with what is undesirable (for example elitism and the lack of democracy. These undesirable factors brought conflict between traditional institutions and new CBNRM institutions to the detriment of all stakeholders.

Further, formal government institutions had no capacity to police the resource due to lack of manpower and finances. So while they have replaced traditional institutions for NRM on paper, in reality the Lukanga Swamps have become a common pool resource and may face the “tragedy of the commons” (Hardin, 1968) if greater participation by stakeholders at all levels of policy formulation and implementation does not become a reality

In addition, this paper found that while stakeholders may use resources on different temporal and spatial scales their livelihood strategies still had negative impacts on each other. For example, clearing of trees in the Lukanga catchment may eventually cause erosion and siltation leading to reduced wetland area and less fish while overfishing will lead to loss of dietary protein as well as loss of income for all wetland users. Therefore, even if their livelihood strategies do not at first seem connected, unsustainable exploitation by either group may lead to a collapse of the entire system.

An un expected finding of this study were the migrant fishermen who formed an un accounted for part of the stakeholders. These stakeholders are present mostly during the fishing season and can move from one fishing ground to another throughout Zambia. They therefore, have no apparent reason to care about the wetland resource and if their activities lead to the collapse of the system the can simply move on. This creates a special

challenge for community action in the Lukanga swamps and other wetlands in Zambia. It requires special action on the part of the state and national NGOs to make sure that this group is also included in any intervention for the benefit of all stakeholders.

This study also found uncertainty among stakeholders was due to a lack of secure tenure (particularly among pastoralists) and lack of information on the real status of the resources on the part of local community. There was also a lack of a sense of ownership for the resources among the local community who were directly dependent on them for their livelihoods. This was reinforced by government departments which preach community participation but whose actions still do not allow communities to have a say in how their resources should be managed.

5.1 Lessons Learned

In the past I have written about wetlands and community participation in Zambia from a purely theoretical point of view. Having visited Lukanga I could see how complexity plays out in real life and how solutions suggested from a more theoretical point of view are more difficult to implement than previously thought. This paper has shown the difficulty of defining the local community, the dynamism of institutions and that they are sometimes powerlessness against external forces such as markets, new legal frameworks and climate change. It also highlights the difficulties faced by government and, NGOs such as balancing local and national interests while at the same time catering to multilateral and bilateral donors.

5.2 Recommendations

This paper recommends the facilitation of a process of social learning, and creation of stakeholder platforms in order to build trust and social capital. This is not a panacea but is an important part of reducing conflict and increasing the likelihood of cooperation between stakeholders. Communication among stakeholders will help create information in a format that will be useful for all stakeholders and will give a clear picture of what changes have actually taken place in ecosystem.

This paper therefore recommends further study into the relationships between stakeholders, particularly power relations between different local groups which have not been fully explored here.

Another important study would be one linking land use change and livelihood strategies in the Lukanga swamps. In this case tools such as Geographical Information Systems (GIS), systems models and participatory mapping would be useful in order to determine wetland loss and changes in the Lukanga ecosystem.

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Appendix 1

Field Work Summary

I arrived in Lusaka on the 10th of January 2008 and immediately began to make consultations on the 11th of January with the Director of Research, Planning and Information at the ZAWA on their interests in the Lukanga and the possibility of logistical support in order to facilitate my field work. Fortunately, I discovered that world wetlands day would be held in Lukanga swamps on the 2nd of the following month and a number of preparatory trips were scheduled by the Ecologist in charge of Wetlands for the 24th of January 2008.

As part of preparation for this initial trip I scheduled interviews with a number of Key informants. Key informants were selected based on their expertise on wetland conservation issues in Zambia and involvement in Lukanga. It was during initial interviews with key informants that I realized the variety of stakeholder interests in the swamp and the possible usefulness of exploring their relationships. The following were some of my key informants and the dates I interviewed them.

1. Dora Kamweneshe – WWF Wetlands project Coordinator – 30th January 2008
2. Dr. Harry Chabwera- Wetlands Specialists and Senior Lecturer at the University of Zambia – 18th February 2008
3. Sesele Sokotela- Soil Specialist at the Ministry of Agriculture and Deputy Headman in Lukanga – 23rd January 2008
4. Mr Willbroad Chansa- Head of Research at Zambia Wildlife Authority and Former Ranger in Charge of Lukanga Swamps – 21st January 2008
5. Headwoman Lyombe- 14th February 2008
6. Headman Chapula - 2nd and 14th February 2008
7. Mr Munayakasa- Fisheries Officer in Lukanga -2nd February 2008
8. Dr Chileshe -Kapiri District Agricultural Officer (DACO) - 19th February 2008
9. Kapiri District Forestry Officer (DFO) – 19th February 2008
10. Ms. Nosiku- Fisheries Department Kabwe office also former fisheries officer in Lukanga- 15th February 2008

11. Nevers Chabusali (interpretor/research assistant) - Communication was ongoing from 2nd February, he helped distribute the questionnaire as well as translate during focus group discussions.

As one can easily tell I did not meet all the above mentioned prior to my first trip to Lukanga Swamps. However, the 2 people I did meet before 24th February had firsthand knowledge of the area (Willbroad Chansa had been a wildlife officer in the area while Sesele Sokotela was a Deputy Headman in the area). They both gave me Historical perspectives on the area and some ideas on the social dynamics among different groups in the area. It was at this time I began to reformulate my ideas about what the issues were in Lukanga.

Following, these initial meetings I also had casual conversations with sources at the Ministry of Agriculture as well as the Environmental Council of Zambia to see if I could get any documents on Wetlands and Lukanga Swamps in Particular. I found out that there was very little in the way of published or unpublished documents. I was however given some pointers as to who I could see in order to obtain Secondary data. Among the people identified was Dr Harry Chabwera from the University of Zambia who had carried out an ecological inventory in Lukanga Swamps in 1998.

On the 24th of January 2008 I travelled to Lukanga with Pricilla Mwinji (Ecologist and Interpreter for that trip). We arrived at Waya fishing camp late that afternoon and were able to immediately meet with Jack Chileshe a camp elder and former Chairman of the Village Fishing committee. After having a brief discussion with him (about 30 minutes) we asked about the possibility of having a focus group discussion with some residents in the camp. 4 women and 6 men were then picked. They were mostly community elders. I asked them some of the following questions:

1. When was this Fishing camp established?
2. Where were the residents from?
3. What type of livelihood strategies do they have?
4. How do they relate to the local chief?
5. How did they relate to other local communities?
6. How do they relate to the fisheries and Wildlife Departments?

7. How is the community involved in the management of fisheries and Natural resources in general?

These questions led to robust discussion on issues pertinent to fishing people and brought out the issues of underlying tensions between the fishermen and the Lenje people. This tension seemed to be based on tribe.

On the 25th of January I met with Mr Sikala the Headmaster at Nsenga primary School who introduced me to Senior Headman Chapula. I also had casual conversations with the PTA Chairperson at the school as well as other headmen (who chose to remain unnamed). I obtained more information based on questions similar to the ones asked of the fishermen. It was at this point that I decided to create a questionnaire given to two groups i.e. fishermen at the edge of the swamp and Farming communities further away from the swamp in order to capture the views of as many people as possible within the short time that I had. It was to be a self administered questionnaire. I decided on the 30 to 70 ratio i.e. 70% of the respondents was to come from Senior Headman Chapulas Village and beyond while 30% of the residents would come from the fishing camps at Waya and Kaswende. I based this on the assumption that there were more Lenje farmers than Bemba fishermen. I also assumed that I would able to capture representatives from other tribes as well. The questionnaire also captured quantitative data on income as well as qualitative data on attitudes and perceptions of the swamps from locals I also used the focus group discussions, Key informants, personal observations and secondary data to confirm my findings.

I formulated a questionnaire based on some studies that had been done previously on the Kafue flats as well as responses I had received so far (see appendix 2 for questionnaire). On the 2nd of February I returned to the Swamp and did a trial run of 10 questionnaires in order to gauge the answers and adjust questions to fit the local scenario. It was on this day that I met Mr Nevers Chabusali who became a key informant, translator and was able distribute questionnaires to Villages and fishing camps on my behalf. He was introduced to me by Mr. Sikala. He would also helped locals to answer the questionnaire where the need arose (if they could not read or write). I went through the questionnaire with him and we administered the questionnaires together on that day. I then adjusted the questionnaire and came back with the new questionnaire on the 6th of February 2008. I asked that whenever possible respondents could put their name down so that I could follow up on them for clarification. This meant I had to work extra hard in order to assure them of confidentiality of their answers.

I returned to the Swamp on 2 more occasions i.e. on the 14th of February when I held a focus group discussion at Chapula Village and the 20th to the 23rd of February to make further observations and attend meetings between the WWF Coordinator and Fishing committees at Chilwa and Kapoka Islands.

During the WWF meetings the following issues were discussed:

- Problems faced by fishermen
- The role of the fishing committees
- Relationships between the committee and the fishermen
- Relationships between committee and government institutions
- What interventions the local fishermen would like and how they could be helped

I was also able to ask them questions similar to the ones I had asked in my focus group discussions and observe day to day activities. Casual conversation was also an important way for me to collect information as many people seemed more relaxed and more open than when they answered the questionnaire or during the focus group discussions.

Other questions I asked Key informants were about:

- The roles Played by traditional institutions in NRM
- The Local significance of the swamp
- How different government departments worked in the Swamp
- How ordinary people are involved in NRM