

**Forbidden (sacred) lakes and conservation: the role of
indigenous beliefs in the management of wetland resources
in the Niger Delta, Nigeria**

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To

Jehovah-nissi, the pillar of my life,

And my father, Chief Edet Etim Umiom Anwana,

for his enduring vision.

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ABSTRACT

The relationship between communities of the Niger Delta and their most important wetlands was assessed with the aim of characterizing the importance of linkages between indigenous beliefs and the conservation of biodiversity. Comparative multidisciplinary studies of the belief systems and use of four freshwater lakes, one sacred and one non-sacred, in each of two communities, Biseni and Osiana in Bayelsa State, were conducted. A combination of in-depth interviews, focus group discussions, participant observation, structured questionnaires and ecological field surveys, was used. Assessment of fish biodiversity in the four lakes was conducted in conjunction with local fishermen. Results revealed a structured system of beliefs, rules and meanings within these communities which influence the communities' use of natural resources and ensure the protection of certain reptiles, such as the threatened dwarf crocodile, *Osteolaemus tetraspis*. There are social sanctions and penalties for contravening the rules. Common ancestry and social connectedness among neighbouring communities link the management of some of these lakes together, forming a network of lakes reserved for periodic fishing. Measurements of fish biodiversity showed that the sacred lakes had higher diversities, as measured by both the Shannon-Weiner and Simpson-Yule indices, than the non-sacred lakes. Characiformes and Siluriformes were the predominant orders confirming observations made by fisherfolk within the study group. The culturally protected freshwater lakes studied provide insights into how biodiversity loss in the Niger Delta can be tackled through the involvement of indigenous people in the management of threatened biodiversity and watershed areas. A recommendation is made for capacity building of indigenous groups and training of common interest groups within the region for sustainable wetland resource management.

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ABBREVIATIONS

Cap-Caption

CBNRM- Community Based Natural Resource Management

CIA-Central Intelligence Agency

FME-Federal Ministry of Environment

GDP- Gross Domestic Product

HDI- Human Development Indicators

HIV/AIDS-Human Immunodeficiency Virus/Acquired Immune Deficiency
Syndrome

IIED-International Institute for Environment and Development

IUCN-International Union for the Conservation of Nature and Natural Resources

L.F.N-Laws of the Federation of Nigeria

LUA-Land Use Act

MDG- Millennium Development Goal

NCF- Nigerian Conservation Foundation

NDDC- Niger Delta Development Commission

NEEDS- National Economic Empowerment and Development Strategy

NEPAD- New Partnership for Africa's Development

NEST-Nigeria Environmental Study/Action Team

NPC-National Population Commission

RSPB- Royal Society for the Protection of Birds

SLA- The Sustainable Livelihood Approach

UNEP-United Nations Environment Programme

WCED- World Commission on Environment and Development

WWF-World Wide Fund for Nature

GLOSSARY

A. Biseni Vocabulary

Ado- Men's fishing baskets

Afor – Bony fish, *Citharinus citherus*

Akinma- Sacred day, traditional day of worship of Gods

Amadaowei- Elected village heads

Amaokwens- Committee of elders in charge of a clan

Andeogus- Ancestors

Asiepepe- Fear of Gods

Awata- The law makers under the *pere* system of governance

Aweaya- Not forbidden

Aweye- Forbidden

Awe-beh- Forbidden forest

Barabo- A group of men who executed the *pere*'s decisions

Béh-opukeme- Forest spirits

Berikiri- Dry season, difficult period

Boma- Flood season, period of abundance

Ibidaowei- Present day clan leadership

Inobra- Woven pieces of fibres from rattan used for fishing

Isusu- Crayfish traps used by women

Mini-opukeme- Water spirits

Opukeme- Strong men

Pere- King

Sibizaro- The highest being or the one above all

Sibizarobaden- The highest thing

Ziri- Spirits that can be invoked into inanimate things for purposes of afflicting others

B. Osiama Vocabulary

Amananaowei- Clan Head

Amaokosuwei- Committee of elders in charge of the village

Apede- Bony fish, *Citharinus citherus*

Bowe- Flood period

Bara- Planting season

Saiyeagunuwa- Bad month, November

Oru- Strong men

Oyin- The highest being

Toun-áha- Not forbidden

Toun- Forbidden

C. General

Libation – The act of pouring wine in honour of deities and ancestors

Palm wine - A liquid brewed from extracts from the African oil palm tree, *Elaeis guineensis*

Ogbono- local name for bush mangoes, *Irvingia gabonensis*

Teme- The invisible world or the land of the spirits

Kiri- The physical or visible world

Zuyei- Fishing basket used by women's group in Tungbo Town

Agala- Fishing basket used by men's group in Tungbo Town

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The standard practice in conservation science is to separate humans from the natural environment in order to protect biodiversity. This practice has been under serious scrutiny by critics who blame most of the current biodiversity crisis on this practice which, they argue, treats humans and nature as two opposed entities. This criticism has resulted in increasing demands for a more people-centred paradigm.

The research presented here was designed to increase understanding of the relationship between people's world view and belief systems and the ways in which they relate to natural systems and manage their resources. The research was undertaken among the indigenous communities in the wetland areas of the Niger Delta. Implicit and explicit narratives of their relationship with nature and natural systems exist in the world view of the Niger Delta people, as is typical of other indigenous cultures (see, for example, Trask and Pisciotta, 2006). The research explores the significance of the wetland system in the life of the local community and whether the tenets contained in their world view regulate access and control of natural systems and prevent biodiversity loss. Debates on conservation practices and the relationship between society and natural systems form the foundation for the arguments put forward in this research.

This chapter deals with the relevance of this debate in the consideration of the role of indigenous beliefs as an alternative perspective in the management and conservation of biodiversity. It begins in section 1.2 with the different arguments on the

relationship between humans and nature. introducing the practices employed to manage and protect biodiversity. Section 1.3 defines the problem of biodiversity loss and justification for the research study, while section 1.4 poses the study's research questions. The delimitation and limitations of the research are outlined in section 1.5; section 1.6 defines some key research terms, while section 1.7 explains the organisation of the thesis.

1.2 BACKGROUND TO THE STUDY

The relationship of humans with nature and its consequences raises emotive responses across disciplines (for instance in the social and natural sciences), as humans are blamed for the disappearance of species and for habitat modifications. Despite the debates and the call for a change from the expansionist era of the industrial age (Morford *et al.*, 2003) the biodiversity crisis continues to accelerate (Noss and Cooperrider, 1994; Getz *et al.*, 1999; Bawa *et al.*, 2004; Whittaker *et al.*, 2005). Human societies are on a slippery slope as they exceed environmental limits through population growth and consumerism (Doremus, 1991; Cairns, 1999). The current biodiversity crisis and slow response to the crisis is blamed on the aforementioned standard model of biodiversity management (Brosius *et al.*, 1998; Gunderson and Holling, 2002). Some argue that this model has yielded short term gains (Agrawal and Gibson, 1999; Folke, 2006), as it was intrusive and exclusionary, leaving out communities which had depended on the protected areas' resources for decades (Colchester, 1997, 2000; Ghimire and Pimbert, 1997; Muller, 2003; Kumar, 2005; Pathak *et al.*, 2005; Cernea, 2006) and consequently the model was not sustainable. Reviews of this strategy were therefore advocated to incorporate interactions between societies and natural systems for a more sustainable outcome (Gadgil *et al.*, 1993; Western and Wright, 1994; Brosius *et al.*, 1998; Mearns *et al.*, 1998; Getz *et al.*, 1999; Posey, 1999; Infield, 2001; Pandey, 2003; Ramakrishnan,

2003; Berkes, 2004; Borrini-Feyerabend, 2005). Management of biodiversity, these authors argue, should be based on the framework of incorporating local communities (including their shared rules, property rights, social norms and social relations) into the global agenda of management of natural resources.

Nevertheless, others still maintain that the inclusion of humans in protected areas has devastating consequences for biodiversity and would only aid the acceleration of species and habitat loss (Ludwig *et al.* 1993; Oates, 1995; Spina, 1998; Attwell and Cotterill, 2000; Redford and Sanderson, 2000; Galetti, 2001). Also popular media highlights the effect of human actions on natural systems and on non-human species through daily broadcasts (for example, the British Broadcasting Corporation One, June 2007 programme, "Saving Planet Earth", also available on www.bbc.co.uk/savingplanetearth/), including reports on changing weather patterns.

The dichotomized views and perspectives on the human relationship with nature suggest the need for a robust strategy and a new ecological paradigm that embraces both humans and non-human entities (Mascia *et al.*, 2003), as espoused in some evolving biodiversity management strategies. For example, 'Ecosystem Management' (Grumbine, 1994) is noted as an holistic approach different from the "classical conservation" theory, in that it views humans as interrelated with nature; and is therefore recommended by its proponents as a better management prescription for the current global biodiversity crisis, rather than the "classical conservation" science (Colchester, 1994). In classical conservation, there is a wish to protect nature without people by safeguarding species or habitats from human use and misuse (Folke, 2006). Others in their support of humans as part of nature, advocate Community Based Management (CBM) (World Wide Fund for Nature, 1993; Western and Wright, 1994; McNeely, 1995) or management which underscores

traditional ecosystem concepts (Berkes *et al.*, 1998b). as a solution for sustained use of natural systems in response to the biodiversity crisis. Folke *et al.* (1993) argue that putting a human face on biodiversity management conservation, would make for better managed natural systems as the interconnectedness of humans with nature is necessary for the resilience of ecosystem functions. This reason underscores the management styles of CBM and Ecosystem Management, which have been noted to have far reaching solutions to natural systems losses. As seen in their respective definitions (for CBM see, for example, David, 2000 and for Ecosystem Management see Grumbine, 1994) explicit attempts are made to incorporate strategies which are people-centred.

This new conservation model is a departure from the former approach mentioned in the preceding section. However, for the new conservation model to be effective in biodiversity management it must include amongst other things re-conceptualization of conservation based on sustainable development, utilization and ecological dynamics (Hulme and Murphree, 1999). In addition, it must include a move from central state-controlled governance to a community level focus (Hulme and Murphree, *ibid*). In support of this, Moralez-Gomez (1993) noted the necessity of reconsidering the value of cultural practices, traditional beliefs and social attitudes as an essential component of social evolution. Indigenous values and cultural practices apparently play an important function in understanding the dynamic relationship of humans with nature as evident from a wide range of scholarship (for examples see: Gadgil and Vartak, 1976; Brown, 1992; Powell, 1993; Ganter, 1996; Colding and Folke, 1997; Chandrashekara and Sankar, 1998; Jain *et al.*, 1999; Ramakrishnan, 2003; Arora, 2006; Barrera-Bassols *et al.*, 2006). These authors note that cultural factors including cosmology, belief, attitudes and values are influential in the way

people use and relate to natural systems. But these are in no way exhaustive, as the terms which describe and constitute a people's set of cultural beliefs are not static. For, as noted by Powers (1987: 165), on cosmology,

"Far from being a static entity, cosmology is dynamic, changing and moving through time as ritual moves through space".

Understanding social anthropological concepts such as world view and cosmology can help forestry and natural resource practitioners to understand why and how conflicts occur, including drafting sustainable conservation policies (Morford *et al.*, 2003).

1.3 PROBLEM DEFINITION, AIMS AND OBJECTIVES OF THE STUDY

The living planet index calculated by the World Wide Fund for Nature (WWF, 2002) as the average of three separate indices on the abundance of forest, freshwater and marine species, showed an overall decline of about 37 percent between 1970 and 2000. The gloomy picture of world decline in biodiversity was further broken down to show the trend of decline, using a measure of trend in the decline of populations across different categories of biodiversity. Results showed that terrestrial species' populations fell by 15 percent, marine populations declined by 35 percent and freshwater species' populations were the worst hit, falling by 54 percent. In addition the ecological footprint, a measure of humanity's use of renewable resources, exceeds the earth's biological capacity by 25 percent (WWF, 2006).

Also from their report on the world's bio-geographic regions, the regions losing biodiversity fastest are the tropical and southern temperate regions. These regions are particularly important as rural communities of these regions depend highly on goods and services from natural resources (Rietbergen *et al.*, 2002).

The analysis made by WWF covers 1970-2000, the period when there were notable global initiatives on environmental sustainability and conservation. Noteworthy conventions are that of the United Nations (UN), held in 1972 and the subsequent convention held in Rio de Janeiro, twenty years after. The 1992 conference saw the adoption of "Agenda 21" by 178 governments and the agreement on the Convention on Biological Diversity (United Nations, 2003 and Convention on Biological Diversity, CBD, 2004), in which the concept of sustainable development made popular by the Brundtland commission (World Commission on Environment and Development, WCED, 1987) was reinforced.

Many report that the critical issue is the balance between population size and available resources (World Commission on Environment and Development (WCED), 1987; Myers, 1993; Meffe and Carroll, 1997; Grimble and Laidlaw, 2002) and efforts to maintain biodiversity through conservation are a top priority within many circles (Mittermeier and Forsyth, 1997); but could this be the only reason? Some argue that the main cause of environmental degradation is due to the former assumption made by earlier ecologists that the earth is a biophysical unit divorced from humans, untouched by human perturbation (Ramakrishnan, 2003). This theory assumes that the environment is stable and infinitely resilient (Folke, 2006). However, as noted by Folke (2006) and Kinzig *et al.* (2003), homeostatic assumptions of ecosystems (where the biosphere is viewed as a steady state occasionally disrupted by change and with the implicit assumption of a self-repairing biosphere with infinite resilience for recovery after disturbances and shocks), seldom take into account the inherent complexities and resulting uncertainties associated with management of complex adaptive ecosystems. These assumptions which have driven past efforts in natural resource management and conservation have had some

short-term success locally but have eventually led to failure over wider spatial scales (Folke, 2006, see also section 1.2). In the light of the knowledge that human actions shape the landscapes within which efforts to conserve species and habitats take place (Paine *et al.*, 1998), there is a need for conservation science to move from steady state solutions to accepting that change is the rule rather than the exception.

In essence, a holistic view is probably needed rather than the mechanistic view for sustainable management of natural resources. A holistic approach to natural resource management recognises the way the different parts of nature interact with each other in ecosystems and the biosphere rather than the mechanistic view that focuses on individual parts in isolation (Carter, 2004). This is similar to some of the world views of indigenous societies, who see themselves as related to the earth and not separate from it. In some African communities for example, the relationship between people and land is a matter of spiritual concern (Schoffeleers, 1978). Land and its resources are viewed by these communities as a gift from their ancestors, belonging to both present and future generations (Omari, 1990). Elsewhere, land and the universe is identified with God (Berkes, 2001), and, as such, humans have a stewardship role towards the use of these resources. For this reason, certain practices such as the prohibition of access to some ecosystems or killing of particular species are proscribed (Berkes, 2001), which indirectly ensures that land and natural resources are managed efficiently.

Spirituality has its own attraction in the current ecological paradigm and also, perhaps, in the range of options for sustainable development and conservation. Recently, David Orr (2002) in his article on the challenges of sustainability, proposed the incorporation of indigenous world views into the sustainability agenda.

He argued that the best hope for conservation in a complex and rapidly changing world amongst other options is to exploit a multiplicity of indigenously driven approaches that draw upon accumulated local practices and institutions. This, he suggested, should include both formal and informal knowledge systems, which are locally adaptive and seek to enlarge human and social capital in addition to natural capital. Increasingly, therefore, there is support for the recognition of certain indigenous practices as adaptive systems in the overall scheme of biodiversity management with their roles as socio-ecological entities (Berkes and Folke, 1998; Berkes *et al.*, 2003), where the landscape or seascape is protected by human behaviour influenced by spiritual value (example in Byers *et al.*, 2001; Bisht and Ghildiyal, 2007).

Today's concern with environmental sustainability has taken on a global dimension as it is now commonly accepted that one nation's environmental abuse or success has both national and regional repercussions. Human and socio-cultural bases of knowledge, attitudes and customs are noted to be at the root of sustainable development and can no longer be ignored (Moralez-Gomez, 1993). Therefore evidence of socio-cultural knowledge and practices is perhaps needed to drive useful decision-making processes on sustainable natural resource management. This thesis, therefore, builds on the growing corpus of work on cultural beliefs and practices in relation to the environment, through the study of an indigenous group within the West African Guinea Forest of the Niger Delta region, Nigeria.

Acclaimed to be an important tropical zone, the West African Guinea forest is noted for its biological richness (Golubiewski, 2007). Likewise, the Delta region is regarded as a unique ecosystem and probably a Pleistocene refuge (Were, 2001), with holdings of several threatened species on the International Union for

Conservation of Nature, IUCN, red list data, including the endemic Red Colobus monkey. *Piliocolobus pennanti epieni* (Were, 1991; Powell, 1997). The Niger Delta region of Nigeria has a fragile ecosystem, comprising areas of freshwater floodplains, brackish, intertidal and marine wetlands. The 2005 estimate of the human population of the Niger Delta region, based on the 1991 census is 28 million with a 2.83% growth rate (NDDC, 2006); consequently there has been increased pressure on available natural resources. According to the report by NDDC (2006), the highest population densities are associated with lowland rainforests and derived savannah ecological zones, while the inaccessible parts of the riverine and coastal areas have lower population figures. The Niger Delta has played an important role in the global economy (through the slave trade, palm oil trade, and now fossil fuels) over the last 400 years (Odukoya, 2006; McGinley, 2007). However, it has escaped close biological scrutiny and lacks any state protected areas (McGinley, 2007). The rapid rates of destruction in the Delta paint a bleak picture for the future of its habitats and species except, probably, for areas maintained by indigenous institutions. These indigenous protected areas, such as sacred lakes, exist on several coastal landscapes in the region, mentioned by Powell (1993). Despite recent interest in traditional protected landscapes, few studies exist, if any, on the sustainability of these areas in the Delta and across the West African region (Campbell, 2005), nor have studies been done on their socio-ecological dynamics. In the light of current realities of resource conflict in the Delta and habitat conversion, within the global context of ecological sustainability and a people-centred ecological paradigm, it is important that an assessment of the traditional strategies of natural resource management be conducted if a workable wetland strategy involving local people is to evolve for the region.

Perceptions about biodiversity loss and livelihood systems in the Niger Delta are based on assumptions about the effects of mineral exploration activities and their attendant effects on the socioeconomic arrangement of communities of the Delta (see for instance, Ibeanu, 2000 and Odukoya, 2006). Villagers and workers in the Delta claim that oil companies are the main culprits responsible for losses of cultural values and of livelihood systems (examples in Junger, 2007; McGreal, 2007). If this is true, then it would be logical to assume that changes in traditional systems occurred primarily because of the interference of the oil companies, traceable to the pre-independence era from about 1956 when commercial oil activities began in the region. An alternative view would be that the oil companies do not necessarily contribute to the incremental changes which noticeably have occurred within the traditional system. If the alternative view is upheld, the question would then be what is responsible for the current changes in indigenous world view and practices which have directly impacted on the patterns of natural resource use and management? To answer this question, it is imperative to understand the linkages between the people's belief systems, the social changes and natural systems.

1.4 THE RESEARCH QUESTIONS

In characterizing the relationship between the indigenous communities of the Niger Delta and the wetland system, the research explored the hypothesis that traditional spiritual beliefs and institutions that uphold wetland systems in the Niger Delta have important roles in the conservation of freshwater species. Furthermore, the examination of the peoples' world view and its relationship with the surrounding wetlands was based around fundamental questions dealt with in this thesis including:

1. What is the significance of the wetland in the life of the local community? Are the world views of these communities and the uses and management of wetland and associated species connected in any way?

2. Do the tenets of the belief systems which regulate access and control as expressed in the norms of taboos and customary laws, prevent overexploitation and loss of biodiversity?
3. What is the status of biodiversity, in this case aquatic and fishery resources, in these indigenous protected areas?
4. What are the changes that have occurred in the traditional use of this system and what are the key drivers responsible for any changes? Are such changes internally generated or externally driven?
5. How have any changes affected the presence and abundance of biodiversity, especially fishery resources? How do any changes affect the community?
6. What lessons does this type of interaction between people and natural systems offer? Does the interaction offer any mechanism that could be adapted for wider scale biodiversity management and conservation?
7. Can this model of indigenous protected areas replace formal institutions in the monitoring, management and conservation of natural resources in the Niger Delta region?

1.5 DELIMITATION AND LIMITATION OF THE RESEARCH

The research was initially designed to cover the three states of the inner Niger Delta spread over a total area of 25,000 square kilometres (Were, 1997). However, due to the cultural similarities noted from a reconnaissance trip and from background research describing hydrological regimes (for example NEDECO, 1961; Otobo and Alagoa, 1990; Powell, 1993; Amadi, 2000), the project was limited to Bayelsa State, as a representative sample area of the Niger River floodplain. Bayelsa State is predominantly peopled by the Ijo ethnic group and has four major dialects spoken by its people; Izon, Nembe, Ogbia and Epie-Atissa, with all the languages spoken within the State belonging to the same language group, called Niger-Congo (see Eferè and

Williamson, 1999). Also, Bayelsa is noted for having several shallow ox-bow lakes formed when portions of the meandering River Niger became cut off from the main channel (Otobo and Alagoa, 1990). In addition, Bayelsa State comprises the core of the present Niger Delta, embracing the vast majority of rivers still directly discharging waters of the Niger into the Bight of Benin (Alagoa, 1999). Therefore Bayelsa State represents a characteristic sample of the flora and fauna within the Niger River basin. Most 'sacred' lakes in Rivers State were located near Ahoada, a town bordering Bayelsa State and Rivers State. It is important to note that Bayelsa and Rivers States used to be under one administrative state until the creation of Bayelsa State in 1996.

The total area of the Niger Delta seems to be an area of controversy amongst researchers on the Niger Delta. While some have estimated the total eco-region of the Delta as covering a total area of about 112,110 square kilometres of the country's total of 923,768 square kilometres (NDDC, 2006), other estimates maintain of the total area are around 25,000 square kilometres (Were, 1997), or as much as 36,000 square kilometres (Ibeanu, 2000). Some argue that a likely reason for this variance is based on the debatable classification of the national government and the grouping of all nine oil producing states under one geographical zone under the Niger Delta Development Commission Act, 2000 (see Odukoya, 2006). Some other informal sources say the present Niger Delta State is a geo-political concept of the present political class. However, for the purpose of this study, the inner Delta area is defined as the area contained in a triangle (see map in chapter 3), with the town of Aboh on the Niger River being the northernmost tip, the western boundary being the Benue River, while the Imo River marks the eastern boundary (NEDECO, 1961; Were, 2001). This area is contained in three States: Bayelsa, Delta and Rivers States.

One important aspect of research is the theoretical paradigm or epistemological orientation of the researcher; theories of knowledge inform the type of research the researcher will conduct and it also forms the backdrop for a researcher's judgement (see, for example, Crotty, 1998; Creswell, 2003). As Evans-Pritchard (1965: 109) acknowledged, 'there is a difficulty in understanding the religions and *traditions of another society* {my emphasis}, especially when one is not part of that system'. As he notes, people tend to interpret observations based on their own set of ideas and psychology which are moulded by a set of institutions different from those under study, as in the case of the group of people I investigated. I entered into the research from a positivist scientist background with the view that a post-positivist viewpoint is perhaps the better approach to understanding indigenous belief systems and practices. However, in the reflections on my observations within the project communities there are moments of interpretation based on the positivist tradition. In examining indigenous religion and spirituality, my scope was influenced by anthropological analyses of religion, such as that of Evans-Pritchard (1965) who suggested in the concluding chapter of his book on primitive religion, that rather than seek for understanding of the origin of primitive religion, religion as a social construct should be studied in relation to other social events within the society. Against this backdrop, this thesis examines indigenous world views and practices including beliefs and spirituality in relation to other events: for instance, the variability of indigenous world views among different social groups and their relationship to the wetland system.

Another issue is the limitation of the 'native' language spoken by the indigenous people group of this study which, as posited by (Evans-Pritchard 1965), may lead to misunderstandings either by the researcher or the study group. Language acted as a

barrier in deconstructing some of the research concepts; an instance is the interpretation of the word "sacred". In addition, as noted by Ahmed Djoghlaif (2007:1),

'Language is not only a technical means of communication, but acts as a vehicle for expressing emotions, transferring cultural, social, ethical and spiritual values within a community'.

This statement underscores the importance of language used for indigenous studies, and language barriers are commonly accepted as a source of error in translation. To minimise the challenge of the weakness of the researcher's minimal native language vocabulary, interviews within the project communities were conducted in Pidgin English (a variant of the English language historically derived from English and local languages spoken by natives of the area). This is the common *lingua franca* spoken by all ages. Occasionally the native Ijo language was spoken with interviewees through an interpreter. Dialect differences existed between project communities. In each community indigenes of the communities formed part of the project team.

In characterising the relationship of the research communities with natural systems, efforts were mainly concentrated on the composition of the belief systems, the traditional institutions involved in control and enforcement of these beliefs and how the resultant belief structure affected the people's practices and use of the freshwater ecosystem. The research limitations are discussed in full in the methods section in Chapter 4.

1.6 DEFINING KEY TERMS OF RESEARCH

In certain scenarios, due to the multiplicity of interpretations or inaccurate translation, usage of certain words and notions may be misunderstood. Working definitions of particular words are needed for clarity; an example is the recurrent use of the adjective 'sacred' in this thesis. At the onset of the research, the interpretation

of 'sacred' was in line with its usage and association with western religious concepts (Anttonen, 2000), enunciated in Pearsall and Trumble's compilation of definitions in the Oxford English Reference Dictionary (1996), 'as pertaining to something devoted or dedicated (to a deity or to some religious purpose)'. However, as I noted in the communities studied, the term 'sacred' had several shades of meaning different from the western concepts. Goody (1961) alludes to the fact that in many societies there are no words which translate as 'sacred' or 'profane', consequently therefore the word 'sacred' cannot be regarded as a universal concept. If sacred is not a universal term, it also implies that the dictionary definition and western concepts do not necessarily capture the superficially similar notions in some societies such as those of the Niger Delta. Anthropological nuances of the word 'sacred' are discussed in the works of Douglas (1992), Evans-Pritchard (1965) and Durkheim (1915). The comparative writings of Evans-Pritchard (1965) on 'Theories of Primitive Religion' form a backdrop for the attempt at a definition of the word, based on my observation and findings amongst the study group.

Evans-Pritchard (1965) gives an annotated version of Émile Durkheim's (1858-1917) theories on religion and the distinction Durkheim makes between two notions; 'sacred' and 'profane' which has influenced most social anthropological writers to date. In his work on Australian Aborigines, Durkheim categorised all known concepts of religious beliefs (real or ideal) into two opposing groups (sacred and profane). The 'sacred' is identified by the fact that it is protected and isolated by interdictions (authoritative prohibitions), while the 'profane' are those things to which the interdictions apply (Evans-Pritchard, *ibid*). Durkheim saw religious beliefs as the representations which express the nature of sacred things, and rites performed by adherents as the rules of conduct which prescribe how people should comport

themselves in the presence of sacred objects. Religion for Durkheim was a unified system of beliefs and practices, related to sacred things, which brought adherents together under one singular entity which he referred to as 'church' (Durkheim, 1915). The sacred, Durkheim concluded, is no more and no less than society itself, represented in symbols to its members. Durkheim therefore in this statement equates the notion of 'sacred' to society, in the sense that the 'sacred' was a symbolic representation of the 'collective soul' of society.

In summary, in Durkheim's categorisation of the 'sacred' and the 'profane', the functional relevance of the structure of religious ideals to the society in question is what counted. The 'sacred' was seen as completely social; implying that it was the society that performed the act of separating things into the two opposed categories of the 'sacred' and the 'profane'. However, Evans-Pritchard noted the confusion and ambiguity that Durkheim's explanation or definition brings and made some notable criticisms of Durkheim's generalized principle of the 'sacred'. First is Durkheim's demarcation of sacred by interdictions. Evans-Pritchard argued that it may be true for a great many people, but it cannot be universally valid as supposed by Durkheim. Also on Durkheim's opposed separation of the 'sacred' from the 'profane', Evans-Pritchard argued that such rigidity does not give allowance for 'situational flexibility' and gives the instance of the Azande of central Africa, for whom the word 'sacred' is situational. An example he noted were shrines erected for the purposes of ancestor worship in the middle of a compound which served as a focus of ritual offerings (Evans-Pritchard, 1965), but on another occasion the same shrine outside the period of 'worship', acts as a place for resting spears.

What then is the 'sacred' for the Ijos of the Niger Delta? A dichotomy of events, things and places appear in the world view of the communities within the scope of this study, which perhaps mirrors the theories propounded by Durkheim. There is the view about two worlds, the first being the spiritual world and the other is the social or physical world. In contrast to Durkheim's rigid dichotomy of the 'sacred' and the 'profane', these two worlds are interrelated and are not opposed, even though the distinctions between both worlds are sometimes blurred. They are intricately intertwined and messages are passed from one world to the other. Furthermore, it is the interrelated nature of these two distinct entities that brings on a separation of things and events into the categories of the 'forbidden' and the 'not-forbidden', evident in the social world or social unit. Places and/or things which are said to be forbidden, denoted by the word *aweýe* or *toun* are given special treatment in accordance with the world view of the people. Customary laws proscribe certain acts and conduct which regulate all individuals from within and from outside the community in the way they treat and use these forbidden things and violating these laws is anathema to the society. In contrast, places and/or things which are not forbidden, recognised in local dialect as *aweaya* or *toun-áha*, can be used by eligible members of the community. Therefore, the sacred for this society, as observed, is so by reason of spiritual/traditional edicts, enforced by indigenous institutions, based on the foundation of their historical world views. Their world view comprising a system of structured beliefs, attitudes, environmental ethics and practices, acts upon the social, moral, economic and political facets of the community.

The other problematic adjective used in this thesis is the word 'indigenous', used to describe the knowledge, ideals, attitudes, values and customs of original settlers and natives of a particular geographical region. Despite debates around the term (Agrawal, 1995), some authors prefer the word 'traditional'. Berkes (1999) argues

that traditional does not mean an inflexible adherence to the past: but simply means time-tested and wise. Others reject its use in qualifying knowledge peculiar to a people, arguing that in some circles 'traditional' evoked 19th century attitudes and conceptions of simple, savage and static societies, which do not interact with the 'outside world' (Warren, 1996; Kolawole, 2001; Oudwater and Martin, 2003), and prefer to use the word 'local' (Oudwater and Martin, 2003), which they argue embraces the notion of the dynamic and eclectic nature of knowledge systems. This thesis applies the term 'indigenous' based on Warren (1991) to distinguish the values, religion, attitudes and knowledge of the communities in this study from those of the international knowledge systems or scientific knowledge; however, in direct quotes and certain text, the word traditional is used interchangeably with indigenous.

Furthermore, another word recurrent in this thesis, open to multiple interpretations and meanings that can give rise to confusion is biodiversity (Grimble and Laidlaw, 2002). Wilson, who coined the word, clarified its meaning by writing,

"One slice of biodiversity, would be the variety of chromosomes and genes within one species of freshwater fish found in Cuba; another would be all freshwater fish species of Cuba, and still another would be the fishes and all other forms of life living in each river in Cuba..." (Wilson, 1988, cited in Koziell and Saunders, 2000: 1).

The commonly accepted definition of the word is that adopted by the Convention on Biological Diversity, which defines biodiversity as 'the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems'; put simply, biodiversity is the variety and variability of life on earth (Koziell and Saunders, 2000). Grimble and Laidlaw (2002:8) noted that,

“in everyday understanding, the term is often taken to refer to rare and threatened habitats and animals of global importance, or is used loosely almost as a synonym for nature”.

Others in humanities and the social sciences have extended the definition beyond the variable feature of biodiversity, to a social and political construct and it is these divergent perspectives that demand a tighter definition (Aylward, 1991) or a clarification at the outset of biodiversity discussions on what aspects are being referred to (Koziell and Saunders, 2000). This thesis usage of the word biodiversity refers to the variety of fish species within freshwater lakes and related aquatic species such as crocodiles. In other words, using the literal definition of the word, but as it applies to the freshwater system within the study area. In some sections, the word nature is used interchangeably with biodiversity, to mean all natural entities except humans.

1.7 THESIS OUTLINE

The research study and findings have been organised into seven chapters. Chapter 1 outlines the background to the study, introducing the rationale for it, while Chapter 2 deals in detail with the research’s theoretical framework. Chapter 3 is a description of the study area. Chapter 4 explains the research methods and approach. The research findings are discussed in two chapters. Chapter 5 presents the findings on cosmology and practices of the study area, while Chapter 6 deals with results of the aquatic resources and the different community’s protection of the area. Chapter 7 is an integrated chapter, bringing together the social and ecological aspects and making recommendations.

CHAPTER 2

THEORETICAL FRAMEWORK AND DEVELOPMENT

CONTEXT

2.1 INTRODUCTION

The value attached to biodiversity by different actors informs policies and strategies for biodiversity management (Pearce, 1994; Grimble, 1996; Carter, 2004). Two main schools of thought on the value of biodiversity emerge within the ongoing debate on the relationship of humans with biodiversity; ‘anthropocentrism’ and ‘ecocentrism’. Anthropocentric theorists maintain that human needs and interests take priority over species’ intrinsic value, thus placing humans as the central species having dominion over all living matter. Conversely, ecocentric philosophers reject this notion and insist that other non-human entities have intrinsic values and thus they have the moral right to exist (Naess, 1973).

Classical conservation theories (see Chapter one, Section 1.1), incline to the ecocentric paradigm, as proponents argue that human domination of earth’s ecosystems is the main cause of the reduction in the diversity of species within many habitats worldwide. Thus the dominant theme for nature reserves, national parks and conventional protected areas is the preservation of species for their own intrinsic value (Grimble and Laidlaw, 2002). Arguably this has yielded some results (see Chapter one, Section 1.2), however biodiversity loss is still problematic. Also, given the disappointing results of forest conservation policies in developing countries, scholars have shifted focus from state-centred policies towards solutions at local levels (Gibson *et al.*, 1999). Therefore an alternative perspective to the conventional strategy of conserving biodiversity is the involvement of communities in

conservation. Some emphasise that to ensure ecological integrity, both social and economic needs of communities must be met, by integrating livelihood strategies into conservation objectives and projects (Rowe, 1997; Salafsky and Wollenberg, 2000). But community based conservation has not been without problems. It is noted that most of the world's biodiversity is in areas used by people, who in their relationship with biodiversity have helped the renewal of ecosystems (Berkes and Davidson-Hunt, 2006). Therefore people are acknowledged as important modifiers of ecosystems. Particularly critical is the understanding of the economic, political and cultural processes involved in environmental management decisions (Cudworth, 2003). Increasingly important to natural resource management and conservation is the maintenance role of spiritual and customary sanctions, which several researchers argue have helped to preserve fragile habitats and biodiversity. Linking indigenous belief structure and practices with conservation is advocated as a long-term solution to biodiversity management and conservation. However, as stated in chapter 1, section 1.3, the sustainability of these cultures and interactions with ecosystems has not been adequately addressed, particularly in West African societies (Campbell, 2005), including Nigeria. The Niger Delta region in Nigeria is a show case of various cultures that interact closely with the natural systems. This region is noted as the richest part of Nigeria and is renowned for its ecological importance as a hotspot for biodiversity. Amongst the global biodiversity hotspots for endemic vertebrates, the Niger Delta is ranked twelfth out of twenty four (Myers *et al.*, 2000). Despite these credentials, the region is plagued by lack of infrastructure to accommodate its burgeoning human population (Niger Delta Development Commission, NDDC, 2006). In addition, there are frequent resource-based conflicts allegedly based on social injustice, inequity in revenue allocation and unsubstantiated property rights (Moffat and Linden, 1995; Ibeanu, 2000; ARD Inc. 2002; Odukoya, 2006; Hamadina

et al., 2007). The Delta's exclusion from the nation's protected area network means biodiversity management and protection is done by indigenous institutions, which have treated different ecosystems in varied ways. Against escalating environmental degradation and biodiversity loss, the relevance of indigenous natural resource regimes becomes a question of maintaining the Delta's ecological system. It is within this context, therefore, that the following discussion on the role of indigenous beliefs in the conservation of freshwater ecosystems of the Niger Delta region is presented. And in the consideration of this role, this chapter bases its arguments on the successes and limitations of past and present conservation strategies.

The chapter discusses in section 2.2, the foundational framework outlining the two dominant strategies of biodiversity management and conservation and a critique of each strategy. In section 2.3 it reviews conservation practices by indigenous societies linked with their belief structures, while section 2.4 discusses key issues involved in sustainable development and the challenges within the Niger Delta region

2.2 THE FRAMEWORK

2.2.1 The Anthropocentric / Ecocentric debate

The key concept of environmental philosophy, as mentioned above, is 'value' (Cudworth, 2003; Carter, 2004) and it is the different kinds of valuation that explain the anthropocentric-ecocentric dichotomy as theorists of each camp differ in their concept of nature and treatments of non-human species.

Anthropocentrism which sees value as resident only in humans has roots both in the inventions of the positivist science tradition and enlightenment philosophy, dating back to Isaac Newton and René Descartes (Capra, 1996). The positivist science view holds that ecosystem processes are linear, equilibrium centred (Holling 1986) and

therefore predictable and controllable and, as such, ecosystems are considered and treated in a mechanistic manner and distanced from man (Berkes *et al.*, 1998a). The 'enlightenment' age was rooted in scientific reasoning, rationalization and philosophy and also associated with the Judaeo-Christian world view. The enlightenment ideology of associating nature with God included an interpretation of the biblical verses of Genesis 1:26-28 (White 1962), where man, as the representative of God, was supposedly created to dominate all other species. Berkes (2001) noted that this interpretation of the Christian literature 'awarded man a God-given right to exploit nature without moral restraint' and as such nature was to be used as a utility for the development of man., Attfield (1983) argues that these explanations do not account for other industrial countries, such as Japan. The Japanese do not believe in the Judaeo-Christian world view but show similar environmentally damaging practices to those of Europe and North America. The anthropocentric world view, though notorious for fuelling the expansionist agenda of western countries during the 18th and 19th centuries, contributed to protected area management through men like Pinchot. Pinchot in his capacity as chief of the forest service of the United States of America transferred millions of acres of lands into national forest reserves (Morford *et. al.*, 2003). But, despite Pinchot's contribution to conservation, he faced criticism for his utilitarian-anthropocentric view of natural resources. For, as noted by Sessions (1995), Pinchot held the radical view that species including wilderness areas, had no value other than their utilitarian value to man. Some argue that the belief that humans are the only species with value is a fallacy and un-ecological (Dunlap and Catton, 1980), and therefore propose "ecocentrism" as a better view (see for example, Dobson, 2000). This alternative perspective argues that non-human entities have intrinsic value and that their value exists independent of humans (Eckersley, 1992). However, there are different

derivatives of the ecocentric philosophy, but the common thread is the rejection of the notion of the sole value of humans (Carter, 2004).

An iconic example of ecocentric philosophy is Arne Naess (1937-2004), the founder of the “deep ecology” movement (Naess, 1973, 1995). The central tenets of “deep ecology” are based on concepts of self-realization, reflecting Hindu ideologies (Berkes, 2001). Naess’s deep ecology principle of ‘biocentric egalitarianism’ refers to the fact that all forms of life have equal rights to live and flourish (Naess, 1989). However, his arguments for the intrinsic value of non-human entities are based on intuitive reasoning rather than on scientific facts (Carter, 2004), which raises questions of practicality. Generally, the ecocentric viewpoint creates a platform for species value, which is a vital point, especially for sentient species. But its application in the social and political sphere of humans is questioned, considering that decisions on which species or habitats to protect are determined by humans. The argument is then made for anthropocentrism, which appears more alluring than the ecocentric view, based on the knowledge that it is humans who prioritize decisions in the biosphere. However, common to the two dominant paradigms, it appears that humans are treated as separate from nature. And the contest revolves around the question of which entity is superior to the other. However, there appears to be a gradual shift from this impersonal view of nature and humans, where nature is treated as a bio-physical unit divorced from humans, to a view which accepts that humans are interrelated with nature (Ramakrishnan, 2003). Perhaps this shift may facilitate bridging the gap between the two value systems.

In the ongoing discussion and debate on the relationship of humans with nature, these two antithetical principles form the basis of the majority of arguments on

humans / nature, as noted in the discussions below. While one group sees the relationship between humans and nature as vital for ecosystem functioning, the other sees nature as having important value, which should be separated from human interference.

2.2.2 Humans and Biodiversity

The last two decades have witnessed criticisms and close scrutiny of conservation policies and practices, as scholars disagree on the underlying causes of species and habitat loss (for example in Colchester, 1996; Ghimire and Pimbert, 1997; Brockington, 2002). For instance, in protected area management the argument that human exploitation of natural systems is detrimental and depleting to natural resources is the justification for excluding humans from protected areas (Dobson, 2000; Redford and Sanderson, 2000). However, others maintain that most ecosystems, especially forests, are historically modified by humans and as such human-controlled exploitation within protected areas is beneficial for biodiversity management (Denevan, 1992; Gomez-Pompa and Kaus, 1992; Hughes, 1998; Schwartzman *et al.*, 2000; Bass *et al.*, 2002). Conservationists who support the presence of humans in protected areas argue that small-scale disturbances in forest ecosystems, for instance, are necessary for the maintenance of biodiversity (Bailey, 1996). Therefore, human cultures and interactions with the environment may be complementary, rather than opposed (Ramakrishnan, 1998; 2000), as observed in some traditional societies who exhibit ecological caution in their use of natural resources (Arizpe, 1996). Moreover, former theories of ecosystem functions and vegetation succession are being challenged (see Holling, 1986; Fairhead and Leach, 1996). These former theories, noted for informing policies for conventional biodiversity management, focused on population growth as the key force disrupting sustainable resource management, and as such the relationship between people and

the environment was conceived as simple and linear (see for instance Ehrlich and Ehrlich, 1991). Functional communities who lived in a state of equilibrium with available resources were thought of as having one regulated resource use and technology, and where a society increased in population with attendant changes in lifestyle and technologies, then the resultant effect created an imbalance between communities and natural resources (Mearns *et al.*, 1998).

As conservationists grapple with the loss of biodiversity, an alternative view is to understand how humans interact with landscape, in particular on the varied natural resource regimes of indigenous people (Galetti, 2001; Berkes and Davidson-Hunt, 2006), and indigenous management of biodiversity through spiritual or ritual representation of resource management (Anderson, 1996; McDaniel, 2002; Orr, 2002; Garner, 2003). However, the spiritual dimension of natural resource management appears to be a difficult terrain for conservationists (Berkes *et al.*, 1998b) as things that are daily occurrences in the social and psychological sphere of indigenous societies may be misunderstood, primarily because of the different knowledge systems. In contrasting indigenous systems with empirical scientific knowledge, Fabricius *et al.* (2004) argues that the distinctions between formal and informal knowledge are not as absolute as is often thought. They argue that sharp boundaries between formal and local systems of knowledge, as in the case of natural and social sciences, may indeed be imaginary. Perceived boundaries, as explained by Pandey (2003), may simply be the unfamiliar terrain of cognition, which challenges the need for interdisciplinary investigations. Different groups of people, whether traditional in setting or otherwise, have different perceptions and interpretations of events and their surroundings, both regarding themselves and others (Ingold, 1992). Some may interpret every event related to their surroundings as spiritual, while

others may evaluate and make inferences based on empirical scientific evidence. Integration might be a steep cliff to climb as epistemological orientation presents challenging barriers, but it is achievable (Leopold, 1966). In both settings, there is evidence of a realisation of goals and aspirations and each could be examined on the basis of common goals and interests.

It is fruitful to consider the lessons, the world views and cultural values that indigenous people offer to the current discussion on environmental sustainability (McNeely and Miller, 1984). In addition, Douglas (1973) posits that the time is probably ripe to treat everyday knowledge and scientific knowledge as a single field in sociology, and perhaps also in natural science. Some may argue that this reasoning is absurd but, increasingly, studies show that inexplicable problems within a particular discipline and domain may perhaps be resolved as disciplines inter-relate (Douglas, 1973), including merging indigenous knowledge with scientific reasoning. Some argue that there are absolutes in physics and chemistry and so there must be absolutes in biology and ecology (Mayr, 1996) but as noted above, since humans are implicitly and explicitly the primary modifiers of the ecosystem, perhaps a new conceptual definition is needed, which embraces people as an integral part of the ecosystem. People-centred objectives as suggested by Grimble and Laidlaw (2002), should take precedence over other considerations and the search for an acceptable anthropocentric paradigm where humans are seen as an integral part of the ecosystems, could perhaps lead to a better management system (Nelson and Serafin, 1992; Folke *et al.*, 1993). The challenge therefore is integrating human cultures (including beliefs, environmental ethics, social relations etc.) into ecosystem management. Perhaps, it is in meeting the needs and aspirations of society that ecological integrity may be sustained. However, human actions on the ecosystem

have not been without some challenges and, in order to mitigate perturbations of natural systems by humans, conservationists' devised useful strategies for biodiversity management and conservation. One such strategy is protected area management as described in the next section.

2.2.3 Protected Area Management and Biodiversity

2.2.3.1 Tracing the History of Protected Areas

Creation of parks and protected areas that exclude economic activities is the conventional approach to protecting biodiversity (McNeely and Miller, 1984; Western and Wright, 1994). Protected areas theories are based on fundamental theories stated above in section 2.2.2, including the theory of common-property resources, popularised by Hardin (1968). Opposition to protected areas management has come from several sources, including indigenous people, environmentalists and researchers across humanities and the social sciences (cf. Western, 1984; Wells and Brandon, 1992; IIED, 1994). Protected areas pre-date modern history; known as Royal reserves during the European renaissance period (from about 14th to 17th centuries), they were areas set aside as Royal hunting grounds for kings and other national rulers (Castro, 1991; Freeman, 1994; Manning, 1994; Eagles *et al.*, 2002; Jepson and Whittaker, 2002). Protected areas were seen then as exclusive preserves for the rich and elites of the society. It was not until 1872, with the establishment of the first national park in the United States of America, the Yellowstone National Park, that nature reserves became open to members of the general public (Haines, 1996). Soon after, Australia joined the United States of America in setting aside vast areas as national parks for recreational purposes and subsequently other countries joined the league, including European nations and South Africa (see Eagles *et al.*, 2002). Some common features of these national parks as noted by Eagles and colleagues, *inter alia*, include the fact that these parks were created by the action of

governments and were areas set aside containing vast expanses of natural ecosystems.

The tradition of delineating areas as protected areas from the European Renaissance years to the present has seen several forms of modification (Eagles *et al.*, 2002; Whittaker *et al.*, 2005) and so the notion of protected areas is different from the original reason of setting aside places for intellectual and aesthetic purposes. For instance the notion put across by scientists as they gained knowledge of humans and nature includes the preservation of sites that ensure the survival of threatened life forms (Adams, 2004). Furthermore, the problem of limitation in scientific knowledge of the causes and effects of biodiversity loss on ecosystem functions (Tilman, 2000), also contributes to the demand for protected areas. An additional factor is the shortfall in scientific knowledge of existing biodiversity such as gaps in the taxonomy of known biodiversity (Brown and Lomolino, 1998) and in knowledge of the numbers of organisms on earth (May, 1994; 1997). In situations of uncertainty where biodiversity is threatened, conservationists have had to apply the 'precautionary principle' (based on ethical responsibility of maintaining ecological integrity) of conserving biodiversity in protected areas. For instance, the IUCN (1994) recommends the delineation of forest vulnerable to threats by humans as forest reserves for the protection of biodiversity.

Conventional conservation practices have contributed in some ways to natural resources management, as protected areas form a major component of the way many national governments and other institutions utilise the earth's resources (Chape *et al.*, 2003). In order to implement a systematic agenda for biodiversity management and conservation within the conservation community, the International Union for the

Conservation of Nature and Natural Resources (IUCN, 1994:4), through its network of members, introduced a definition of a protected area. In their definition a protected area is commonly regarded as:

'An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means'.

In addition, IUCN devised a framework made up of six categories (shown in Table 2.1) for planning, managing and monitoring identified protected areas by member governments and organisations.

Table 2.1 IUCN Protected Area Management Categories (Source: IUCN, 1994)

Category	Description
Ia	Strict Nature Reserve: Protected area managed mainly for science
Ib	Wilderness Area: Protected area managed mainly for wilderness protection
II	National Park: Protected area managed mainly for ecosystem protection and recreation
III	Natural Monument: Protected area managed mainly for conservation of specific natural features
IV	Habitat/Species Management Area: Protected area managed mainly for conservation through management intervention
V	Protected Landscape/Seascape: Protected area managed mainly for landscape/seascape conservation and recreation
VI	Managed Resource Protected Area: Protected area managed mainly for the sustainable use of natural ecosystems

Table 2.2 Ranking of 2003 proportional percentage values of Globally protected areas by IUCN category (Adopted from 2003 UN List of Protected Areas compiled by Chape *et al.*, 2003)

Category	Number (%)	Category	Area (%)
IV	40.6	II	29.0
III	29.1	VI	28.8
V	9.6	IV	19.9
Ia	7.0	V	7.0
VI	6.1	Ia	6.8
II	5.7	Ib	6.7
Ib	1.9	III	1.8

With the establishment of Yellowstone National Park, IUCN's definition and subsequent classification of protected areas, the world has since seen a rapid proliferation in protected areas (see Ervin, 2003 and www.unep.org/geo2000 for reviews on extent). Of the six protected area classifications provided, four categories (I to IV) exclude people completely from using the resources within the protected areas (Salafsky and Wollenberg, 2000). In addition, most recorded increase has been within Category IV [(See Table 2.2 above); Chape *et al.*, 2003]. The World database on protected areas indicates a total of 104,791 protected areas covering an area of approximately 20 million km² equivalent to 12.7% of the earth's surface (Chape *et al.*, 2005), with the most protected areas situated in developing countries (Kideghesho *et al.*, 2007), and most further expansion envisaged still within developing countries (Naughton-Treves *et al.*, 2005).

2.2.3.2 Critique of Protected Area Management

The record in the world database indicates a phenomenal increase in protected areas, in comparison to 1980, when protected areas covered about 3% of the earth (Brockington, 2004) and perhaps this marks a record success for conservationists. However, the celebration might be short-lived due to inherent flaws in the designs and locations of most parks under the protected area scheme (Erwin, 2003). For

instance, Erwin notes, in the United States of America, a quarter of the parks are located in areas with the least productive soils, with half occurring at elevations higher than 2400 metres and thus difficult to access. In addition, the biodiversity in parks with unproductive soils is limited. Also, certain important ecosystems are not included in the protected area management. For instance in Nigeria, despite recommendations made for the inclusion of the coastal areas in the nation's protected area network (Stuart *et al.*, 1990; Lowe, 1992 and Powell, 1997), there is still a lack of formal protected zones in the coastal region. This region with a high human population is host to the remaining block of Nigeria's Guinea forest and is threatened by serious environmental problems (Oates *et al.*, 1992; Aston-Jones *et al.*, 1998). Furthermore, the current drive to increase protected area coverage is stimulated by the use of the area under protection as a key indicator of environmental sustainability, reflecting the objectives of the Millennium Development Goal No. 7 (Pathak *et al.*, 2005). However, as noted by Pathak and colleagues, in achieving this aim, management goals are focused more on increasing protected area coverage whilst ignoring the pressing issues of management and governance regimes, especially in the consideration of the rights of the people living in and around the protected areas. Also, although protected areas have conserved large areas and habitats, usually about 10-20% of a country's total area, they are rarely large enough to maintain practicable populations of large predators (Salafsky and Wollenberg, 2000). Furthermore, while it is acknowledged that creation of protected areas are an important approach to conservation, their implementations in many developing countries have been fraught with problems (Rao and Geisler, 1990). Salafsky and Wollenberg (2000) highlighted some of these problems as:

- Lack of enforceable protected area boundaries, due to inadequate government resources leading to weak management capacities

- Lack of adequate monitoring due to problems of funding
- Many protected areas have been proposed on lands or waters that are legally or customarily owned and managed by local people and so it has been impractical, illegal or impossible to declare these lands off-limits to human use
- The social and political challenges of implementing these projects have often been beyond the capacity of managers even when backed by substantial donor assistance
- Compelling economic conditions also lessen the viability of this approach. In countries where remote populations endure structural social and economic inequities, protected areas have often further restricted the livelihood options of people who are destitute. It has been politically difficult to spend money on protecting biodiversity while poor people's needs increase.

The preceding problems enumerated by Salafsky and Wollenberg appear to exist within the protected management system in Nigeria. For instance, the creation of the forest reserve of 1899 was not without opposition from locals, due to the question of land tenure (Aminu-Kano and Marguba, 2002). Despite the opposition, successive governors of the then protectorates of Nigeria vigorously pursued a reserve creation policy, which led to a rapid increase of reserves; from about 97,125 hectares in 1900 to about 7,322,031 hectares in 1950 (Aminu-Kano and Marguba, 2002). However despite the steady increase in state protected reserves, different administrations have given very low priority to conservation agencies and as a result national parks are inadequately funded. Because of the available funds few staff police the parks, leading to increased illegal logging and poaching (Aminu-Kano and Marguba, 2002).

The forest reserves also lack adequate management and are quickly de-reserved by state governments for agricultural projects (Beak *et al.*, 1998).

Indigenous beliefs and natural resource practices have just recently been acknowledged in Nigeria, as a potential conservation measure for the protection of biodiversity outside state protected areas (Ezealor, 2002). However there are gaps in national legislation on the involvement of indigenous communities in conservation. Conservation programmes have not been too successful and the alienation of indigenous communities from such programmes is perhaps responsible for some failures (Osemeobo, 1994).

In the ongoing discussion on the relationship between humans and nature, the management of protected areas is an important issue, as the decision to adopt a particular set of values does not lie within the bounds of science alone (Whittaker *et al.*, 2005), a fact which is perhaps often ignored. In the beginning of the establishment of National Parks, the need for a legislative body for park administration was recognised. This led to the constitution of park agencies. For instance, in the United States of America, (USA), the US National Park Service was established in 1916 (Eagles *et al.*, 2002). Its management philosophy, as these authors noted, included the development of management principles to manage the interaction of people and nature within these parks, therefore according these agencies the political power of access and control. One policy in protected area management which has received widespread criticism is that of excluding people from its confines (cf. Wells *et al.*, 1992; Schwartzman *et al.*, 2000; Muller, 2003). Exclusion of people from parks and protected areas is noted to have led to resettlements of former residents to areas that they are not adapted to. This results in

untold hardship and denial of people's access to natural resources (Hough, 1988; Few, 2000). Importantly, protected areas exclusionary policy is said to be the cause of wanton destruction of species as former residents of parks clash with park managers, increasing the rate of biodiversity loss (cf. Calhoun, 1991; IIED, 1994; Pimbert and Pretty, 1995, 1997; Brockington, 2002).

Some argue that the separation of humans from nature is not only alien to indigenous people (Pimbert and Pretty, 1997), but is an intrusion of western colonial ideas which infringes the social right of indigenous people to make decisions for themselves (Colchester, 1994; Ghimire and Pimbert, 1997). These authors and several others (for example, Alcorn, 1993; McNeely, 1995; World Bank, 1996; Western, 2000; Curtin *et al.*, 2002), recognise the need for multiple uses of protected areas and community participation in the management and conservation of biodiversity. The devolving of power from the state to the community, they surmise, is the way out of the quagmire of resource-based conflicts and resultant biodiversity loss. However some other scholars (for example Spingale, 1998; Attwell and Cotterill, 2000) counteract the views expressed above, arguing that adopting the approach of involving indigenous people in protected management is a dangerous trend which could possibly endanger Africa's already threatened biodiversity.

As a response to exclusionary policies various organisations, including the IUCN, proposed and experimented on extractive reserves as concessional grounds for economic development around parks and protected areas. This was done with the view to bridge the widening gap between the ideals of indigenous peoples' uses of resources within protected areas. Thus, human development strategies were integrated with conservation objectives (Hannah, 1992; Stocking and Perkin, 1992;

Wells and Brandon, 1992, Wells *et al.*, 1992; Barrett and Arcese, 1995). Integrating peoples' economic activities into park management was also popularised following earlier arguments on sustainability, espoused in the World Conservation Strategy published by IUCN/WWF/UNEP (1980). This document advised that, for development to be sustainable,

'it must take account of social and ecological factors, as well as economic, of the living and non-living resource base, including the long-term as well as the short-term advantages and disadvantages of alternative action'.

For sustainability of conservation programmes, therefore, conservationists felt that meeting local livelihood needs would achieve sustainability (Salafsky and Wollenberg, 2000). Concepts such as biosphere reserves, buffer zones and support zones which include enclaves for local communities and corridors for wildlife emerged; linking livelihoods indirectly to conservation by attempting to decrease reliance on natural biodiversity by substituting livelihood activities (UNESCO, 1972; MacKinnon *et al.*, 1986; Kremen *et al.*, 1999; Ite and Adams, 2000; Salafsky and Wollenberg, 2000). Salafsky and Wollenberg (2000) in their description of biosphere reserves note that the reserves were designed as defined spatial zones around the core zone (usually area of strict prohibition); people were entitled to use biological resources within the defined spatial zones. However, these conflict resolution packages (biosphere reserves, buffer zones) have had several setbacks and have been difficult to implement (see, for instance, McNeely and Ness, 1995; Oates, 1995; Colchester, 1996; Larson *et al.*, 1996) and have not been the panacea hoped for biodiversity loss prevention as discussed in the next section. Viable economic activities within the buffer zones' areas have created room for incursion into core areas where local people have continued to use resources (Oates, 1995). Local people view these projects as initiated by outsiders and, as such, lack of incentives to stop

external incursions to the reserves by powerful actors, such as logging companies (Brandon *et al.*, 1998), invariably undermines the usefulness of buffer zones.

2.2.4 Community Based Management and Conservation

2.2.4.1 Tracing the history of Community Based Management and Conservation

The concept of community is noted as originating from sociological writings of the 19th and 20th century (Dickens, 1992; Agrawal and Gibson, 1999). Influential writers such as the German sociologist Ferdinand Tönnies (1855-1936), whose theories are a possible basis for relating people to nature and social change, distinguished between two basic types of social groups, folk and urban, in his work *Gemeinschaft* (translated as community) and *Gesellschaft* (translated as society) (cf. Truzzi, 1971; Williams, 1986; Dickens, 1992). *Gemeinschaft* in Tönnies's formulation was a social order exemplified by the family or neighbourhood. This social order described as an organic whole was connected by ties of kinship, a common language and a sense of place. Alliances within the order are based on closeness and authority is patriarchal (Truzzi, 1971; Williams, 1986; Agrawal and Gibson, 1999), whereas, the notion of *Gesellschaft*, exemplified by the State or mass society, represents an artificial relationship that is impersonal, with social relationships based on special needs, class interests and personal ambition (cf. Truzzi, 1971; Williams, 1986). Agrawal and Gibson (1999) and Dickens (1992) posit that theories such as that of Tönnies are influential in present day conceptualizations of who and what a community is, as he (Tönnies) gives a clear picture of the character of human nature, relations amongst people and between people and nature. Involving community in biodiversity management and conservation became popular in the early 1980s as development workers such as Paul Richards and Robert Chambers advocated 'the bottom-up' approach to meaningful rural development projects (Few, 2000; Kumar, 2005). Prior to the 'bottom-up' approach, developmental work was characterised by centrally

planned developmental projects, which had the adverse effect of marginalising local populations dependent on natural resources for livelihoods, from decision-making processes (Chambers, 1983, 1997). Moreover, community in natural resource management, as noted in section 2.2.3.2, was further popularised by workers who highlighted the lack of livelihood alternatives for local human populations displaced from protected areas (Horowitz and Painter, 1986; Well and Brandon, 1992; Western and Wright, 1994; Brandon *et al.*, 1998; Mearns *et al.*, 1998). Well and Brandon (1992) for example, in their review of some conservation and development projects, note that the only option to counteract the weakness of state centred policy was community-based conservation.

As a concept therefore, Community Based Natural Resource Management (hereafter, CBNRM) is based on the assumption that communities have no incentives to use resources sustainably when not involved in resource management (Agrawal and Gibson, 1999). Therefore the new paradigm, which some argue has political underpinnings (Ludwig *et al.*, 1993), is an attempt to move towards a more people-centred policy, with recognition given to local communities' involvement in policy processes on natural resource management (Lynch and Talbot, 1995; Brosius *et al.*, 1998; Cocks *et al.*, 2001; Brown, 2003).

From the backlash resulting from flaws in protected area management, highlighted in section 2.2.3.2 and in this section, in addition to the global agenda of sustainable development as espoused in the document by IUCN/WWF/UNEP (1980, 1991), communities in natural resource management are now the priority of many organisations including international funding agencies such as the World Bank, and international non-governmental organisations, for example WWF (Spinage, 1998).

However, there are questions on how these agencies deal with communities of place, which are situated in a particular geographical locality and communities of interest who have common values and goals, in their consideration of the nature of community (Mearns *et al.*, 1998). It appears therefore that variations exist in the practice of CBNRM, as different advocates give different meanings to CBNRM. For instance, involving community in natural resource management for the conservationists means an improved method of protecting biological diversity and habitat integrity (for example, McNeely, 1995); for the social activist, the idea is a means to empower local groups with state resource management capitals (for example, Colchester, 1994), whereas for indigenous group representatives, it is a clamour for the recognition of local rights, knowledge and culture (for example, Durning, 1992). However, Adams and Hulme (2001) note that the differences in practice should be considered as the varied range of options CBNRM can offer rather than considering CBNRM as a single approach to development.

Although CBNRM has had recorded successes (for example, Child, 1996; Long, 2004), its problematic definition, practices and outcomes as indicated in the next section, call for a review in its application as an alternative for natural resource management and conservation.

2.2.4.2 Critique of Community Based Management and Conservation

One of the basic assumptions of CBNRM is the fact that human populations who depend on natural resources for their livelihoods are marginalised from decision processes (Ostrom, 1992). Proponents of CBNRM note that marginalised communities dependent on natural resources for livelihoods, bear the brunt of the cost of biodiversity management and conservation, while benefits accrue to the states and other formal institutional structures. Therefore for equity, they advocate the

participation of communities in the process of formulation and implementation of natural resource programmes (Campbell and Shackleton, 2001). However, meaningful involvement and participation of the community in natural resource decisions has been problematic and sometimes undemocratic (Fabricius, 1999; Yung, 2000), and as such over the years of practice of community based approaches, the results are said to be disappointing (Kumar, 2005). Questions on who retains decision making and how to account for national interest in Federal lands remain unresolved (Mearns *et al.*, 1998; Agrawal and Gibson, 1999). Also, as noted by these authors, is the question about how expert and non-expert knowledge is legitimised.

Deficient also in CBNRM practice, is the lack of attention to power and authority, which is important in any social relations (Mearns *et al.*, 1998). Mearns and co-authors note that differences exist between groups in any social unit and each group may have different livelihood needs and view environmental degradation differently. Perhaps the neglect of power differentiation is mediated by the flawed assumption that communities are homogenous in composition (Agrawal and Gibson, 1999), without defining who and what constitutes community. In the light of the lingering question of the nature of communities, critics such as Coggins (1998) throw doubt on the quality of participation, as he argues that the interest of different groups must be recognised for any sustained outcome. As Berkes (2004: 623) notes,

'the term 'community' in community-based conservation is gloss for a complex phenomenon, because, social systems are multi-scale and the term community hides a great deal of complexity'.

Several writers, in addressing the issue of the definition of the nature of community, suggest that efforts in implementing CBNRM objectives should be concentrated on institutions rather than community; as institutions embody the interest of the varied actors within a social unit, including their set of rules, multiple interest and

importantly their constraints in relations to the natural system (cf. Ostrom, 1990; Mearns *et al.*, 1998; Agrawal and Gibson, 1999; Berkes, 2004). In addition, these authors recommend that communities should not be considered as homogenous units but as diverse entities, differentiated along the lines of income, gender, age etc. For, as noted by Mearns *et al.* (1998), the assumption of a homogenous group, living in harmony with one another and with the environment might be true for some communities, but it should not be generalised.

Other critics are vehemently opposed to the idea of CBNRM in its entirety. For example, Attwell and Cotterill (2000) argue that tapping and using indigenous knowledge will not solve a population / resource crisis, but rather, has negative impact on conservation science particularly in Africa. They challenge the ‘romanticisation’ of pre-colonial societies as preservers of natural systems, refuting the idea proposed by protagonists (for example Colchester, 1994) that traditional African societies practiced sustainable natural resource management. They argue that sustainable practices could only have occurred under conditions of low human population density, lack of access to modern technology and limited exposure to consumerism. In the same vein, Oates (1995) labels the shift from ‘traditional protectionist conservation’ to a ‘people-centred conservation’ as an anthropocentric philosophy that would further endanger threatened biodiversity, and he gives a caveat on its adoption.

Their judgement may be plausible in the light of current human population statistics. But present evidence shows that even in heavily populated areas of the Western Ghats of India, in comparison to protected areas, indigenous biodiversity management practices such as seen in sacred groves led to high levels of biodiversity

(Bhagwat *et al.*, 2005). Perhaps, as stated earlier in section 2.2.2, biodiversity loss is not only dependent on human population sizes and technology, but perhaps on a community's objectives. In some societies, certain practices complement principles of biodiversity management and conservation. Conversely, in others their practices may be in direct conflict. In the management of certain ecosystems by religious and customary restrictions for example, these practices appear to be complementary to conservation objectives. Also, it seems community initiated rules and regulations which support biodiversity conservation cause less tension in communities, unlike external developed projects (Campbell *et al.*, 2000). Conservation initiatives, such as the case of sacred groves managed by indigenous human populations might be less expensive than formal protected area management. For as noted by Pathak *et al.* (2005), revenues for conservation from sources such as the Global Environment Fund and the World Bank meet only a small percentage of the costs of maintaining protected areas, particularly in poor countries (where there is the highest number of protected areas) and protected areas are expensive to maintain. Community regulatory rules and practices, therefore, become useful incentive for the sustainable management and conservation of natural resources.

Despite some of the misgivings on CBNRM, there still is overwhelming evidence of its contributory role in natural resource management and conservation. As suggested by Adams and Hulme (2001) and Campbell and Shackleton (2001), there is the need to be flexible and to recognise that CBNRM is a dynamic process, which displays different issues and concerns in its implementation. However, in the light of the weaknesses enumerated above, both in conventional conservation strategies and in the implementation of CBNRM, institutions within the social unit that manage and conserve natural resources through a set of constraints and workable rules (Berkes

and Folke, 1998; Berkes *et al.*, 2003), appear to offer a long-term result in the ongoing debate on biodiversity conservation and environmental sustainability.

In addition, there is evidence that indigenous institutions offer remedies for sustainable biodiversity conservation as noted in the works of Gadgil (1992), Munasinghe (1992), Warren (1992), Colding and Folke (1997), Tiwari *et al.* (1998), Falconer (1999), LaRochelle and Berkes (2003) and Drew (2005). As noted by Fisher (1993), these indigenous institutions include norms and procedures which help shape people's actions. Their codes of conduct which define practices assign roles and guide interactions; examples are taboos, rituals and repetitive cultures (Osemeobo, 1994; Kajembe *et al.*, 2003).

Furthermore, contrary to Attwell and Cotterill's (2000) criticism above, current insights show that a people-centred paradigm in protected area management, using knowledge and perspectives from indigenous resource practices (cf. Berkes *et al.*, 2000; Olsson and Folke, 2001; Blann *et al.*, 2003; Ramakrishnan, 2003, also see section 1.2 of chapter one), offers a good option for effective biodiversity management and conservation. These include the restrictions placed on certain areas based on peoples' world views as noted in the section below.

2.3 INDIGENOUS SOCIETIES AND BIODIVERSITY CONSERVATION

2.3.1 Conservation outside State Protected Areas

Traditional societies have existed for many centuries before significant change occurred in the 18th century (Morford *et al.*, 2003). These societies formed a close relationship with natural resources within religious, moral, cultural, political, economic and ecological boundaries (Jianchu *et al.*, 2004). Some were able to conserve biodiversity traditionally before the onset of state-controlled nature

reserves, wilderness and national parks. Examples are bounded areas called sacred ecosystems or sacred landscapes (Bawa *et al.*, 2004). As noted by Pretty (1990), this traditional way of managing natural resources was sustainable for hundreds of years.

Sacred ecosystems are ubiquitous, being found in several Amerindian, Asia-Pacific, European and African cultures whose indigenous cultures combine certain ecological ethics into a world view of humans being a part of nature (Berkes *et al.*, 1998b). They are not particularly associated with any specific religion (Engel, 1985), but they have a strong religious context and are influenced by traditional local beliefs (Anderson *et al.*, 2005). Indigenous people, therefore, in their association with nature, live in environments imbued with symbolic significance where such landscapes are considered as cultural constructions rather than just biological diversity (Greider and Garkovinch, 1994; Neumann, 1998). Cultural symbolic landscapes are evident from several works on sacred ecosystems, such as those of Castro (1990), Dorm-Adzobu *et al.* (1991), Ramakrishnan (1996), Pei and Luo (2000), Byers *et al.* (2001) and Campbell (2005). Dorm-Adzobu *et al.* (1991), for example, note that certain sacred landscapes in particular the Malshegu sacred grove of Ghana, represent some of the few remaining areas of closed-canopy forest in the country's northern savannah ecoregion. This could mean that for biodiversity dependent on such habitat for survival, the sacred grove would serve as a sanctuary for biodiversity, consonant with its function as a social / cultural symbol to the people, establishing the relevance and dualist function of sacred landscapes. Also relevant is the argument of Byers *et al.* (2001) who suggest that spiritual beliefs could be motivators for positive outcomes on conservation.

The world view of humans as being an integral part of nature is evident amongst several indigenous societies, particularly amongst African communities, where the concept of ecosystem incorporates not just natural objects, but spirits of both animals and human ancestors (Dei, 1993). Indigenous world views and cosmology therefore, appear as important landmarks which shape indigenous environmental ethics and practices as, for instance, in the concept of “Cosmo vision” in some traditional African communities (Millar, 2004). The hierarchy of gods, spirits, spiritual and political leaders, Millar argues, encapsulates concepts of religious beliefs which influence the way land, water, plants and animals are used within these communities. For instance, within certain communities in Northern Ghana, entities such as spirits, ancestors, spiritual and political leaders, sacred groves, lands and shrines, ritual crops and animals, food items and cash crops are all inter-related (Millar, 1993). In the same vein, a similar world view for the Shona of Zimbabwe identifies three interlinked worlds: the human, spiritual and natural world (Gonese, 1999). While the natural world provides the habitat for the spirits and sends messages from the spiritual world to the human world, the spiritual world provides guidance, punishment and blessing to the human world, therefore people have to relate to both the natural and the spiritual world. Within this traditional world view, certain places have a special spiritual significance and are used as locations for rituals and sacrifices, for example sacred groves, shrines, mountains and rivers (Gonese, 1999). However, these ecologically significant areas have been misinterpreted. In several scenarios these practices have been branded mystical, backward, represented as witchcraft or referred to as sites of ritual and secret society initiations (Falconer, 1990; Brown, 1992; Moralez-Gomez, 1993; Fairhead and Leach, 1996). But are these sites and world views still maintained today? The next section addresses this question.

2.3.2 Sacred Landscapes

The concept of the 'sacred' attached to biodiversity and natural resources is inclusive of both forested patches and wetland areas. Ramakrishnan's (2003) narrative on 'sacred landscapes', suggests that they have spatial dimension. Also, he identifies hierarchies within the description of sacred landscapes as shown below:

- Spatially diffused sacred landscape, which he gives highest ranking. Based on the notion that spatially diffused sacred landscapes have the greatest zone of influence, as they contain a set of closely interacting ecosystems. For example, the Ganga river-based sacred landscape.
- Spatially defined sacred landscape is next in hierarchy to diffused systems. However in contrast to the diffused system, defined landscapes have well defined institutional norms. For example, the Tibetan Buddhism-based sacred landscape in the west Sikkim Himalaya.
- Sacred groves, these follow closely the defined sacred landscapes. They are maintained under very diverse socio-ecological situations and are widely distributed worldwide.
- Sacred species; these have the lowest rank and may exist as part of the cultural landscape or may remain outside of it. In certain scenarios, sacred species may evolve as a mixture of conscious and unconscious decisions for their latent value. An example is sacred basil in India, which became sacred as part of a conscious decision linked to its tangible value as a multipurpose medicinal plant.

Gadgil *et al.* (1993) record examples of some of the sacred entities described above in other indigenous communities, in particularly Ramakrishna's third level of hierarchy. Gadgil and co-authors note that total protection is given to many

biological communities: including pools along river courses, ponds, meadows and forests. For example, in northeast India, the tribe of Mizoram still maintain the practice of sacred groves, despite the spread of Christianity. These sacred groves are today called 'safety forest', while the village woodlot from which regulated harvests are taken is called the 'supply forest' (Gadgil *et al.*, 1993). Major events of resource harvest are often carried out as a group effort in certain communities, in most cases usually about once a year (Gadgil *et al.*, 1993). Gadgil and co-authors inferred that this type of group exercise may have served the purpose of group-level assessment of the status of prey populations and their habitats. They posit that this type of group assessment may have helped in continued adjustment of resource harvest practices to achieve sustained yields and invariably conserve diversity. Also, the social restraint practiced by the Mizoram tribe and several other communities, provides total protection to some biological communities including habitat patches, as well as provide protection for other species during critical stages of their life history (Berkes *et al.*, 1995), underscoring their importance in natural resource management and conservation. The classical work of Colding and Folke (1997) for instance, showed that social restraints which were species specific invariably protected species classified as threatened by IUCN. Furthermore, sacred groves have been extensively reported all over India: at least 233 groves within a total area of 3570 hectares (cf. Gadgil and Vartak, 1976, 1981; Chandran and Gadgil, 1998; Chandrashekara and Sankar, 1998; Khumbongmayum *et al.*, 2005). They are also reported in China (Jianchua *et al.*, 2004) and Japan (Kawanabe, 2003). They are ubiquitous in Africa, for example in Ghana (Ntimoah-Baidu, 1995; Decher, 1997; Sarfo-Mensah, 2001; Gerard, 2002; Campbell, 2005), in East Africa (Kajembe *et al.*, 2003; Mgumia and Oba, 2003) and Nigeria (Sangree, 1970; Osemeobo, 1994; Nzegbule and Meregini, 1999; UNESCO, 2005).

2.3.3 Sacred wetlands

Wetlands comprise about 6% of the world's surface and due to the combined forces of pollution, drainage and reclamation many of the world's wetlands unfortunately are reported as lost (Maltby, 1986; Pagiola and Kellenberg, 1997; Aston-Jones *et al.*, 1998; Aminu-Kano and Marguba, 2002; IUCN, 2004). These losses pose grave threats to biological diversity as wetlands perform important biological functions (Bronmark and Hanson, 2002; Convention on Biological Diversity, CBD, 2004). Extinction rates of freshwater species may be as high as those of tropical rainforest systems (Riccardi and Rasmussen, 1999), as knowledge of taxonomy and distribution of freshwater organisms is poor in many parts of the world (Abell, 2002). Species richness is, however, highest in freshwater habitats, where for instance 40% of all fishes and 25% of all molluscs originate (IUCN, 2004) and about 15% of all animal species live (Strayer, 2001). Freshwater habitats unfortunately still face an alarming decline in biodiversity (Suski and Cooke, 2007), and are noted as the least studied in comparison to their terrestrial relatives (Abell, 2002). This also perhaps accounts for the data deficiency on sacred wetlands in comparison to sacred forest or groves.

Apart from sheltering a varied populace of biodiversity as highlighted above, wetlands play an important role in the cultural life of certain people. For instance, ancient Japanese mythology had gods of water, who were thought to live everywhere and governed all things related to water such as the rain, spring, river, lake and groundwater (Kawanabe, 2003). These gods and goddesses of water are acknowledged everywhere and festivals are held in honour of these gods where people pray to them to supply water to their rice fields (Kawanabe, 2003). There is also the example of the Batongwe and Holoholo tribes of Tanzania, who formerly lived in the Mahale mountains, before they were evicted by the creation of a national

park in 1985 (Finke, 2006). These tribes considered the rivers and waterfalls as sacred abodes of guardian spirits and left certain areas completely untouched (Finke, 2006). Examples of other sacred wetlands include Lake Wassaya in Guinea and Lac Ravelobe in Madagascar (Hekkala *et al.*, 2000; Ramsar, 2004). Also sacred are the Ganga River in India (Ramakrishnan, 2003) and Lake Bosumti in Ghana (Appiah-Opoku and Hyma, 1999).

Several customary laws guide the protection of these sacred wetlands and like their terrestrial counterparts, sacred lakes may act as refugia for some unique flora and fauna. Sacredness has implicit and explicit meanings in different communities. In Lake Bosumti for example, the sacredness of this lake means that no human waste is deposited in it and in certain portions of the lake fishing is completely forbidden (Appiah-Opoku and Hyma, 1999). This observation in Lake Bosumti mirrors practices of some tribal groups in the Niger Delta. Also, within the Batongwe and Holoholo tribes' sacredness of certain areas meant that fishing was done only with nets with mesh sizes measuring about 12cm (Finke, 2006). The next section outlines practices of sacred landscapes in Nigeria.

2.3.4 Sacred Landscapes in Nigeria

Language is an important aspect in communicating cultural, social, ethical and spiritual values within a community (Djoghla, 2007). It provides important evidence for historical profiles of communities. In Nigeria, for instance, there are three language families in Nigeria including the widely spoken languages of the Niger-Congo family, which is the largest in Africa. It cuts across a wide swathe of areas in Sub-Saharan Africa and includes about 1, 400 languages (Olson, 2004). Linguistic evidence shows that tribes classified under the Niger-Congo family were originally based in the south-western highlands of Senegal and Gambia. Dispersal of these

tribes to other parts of Africa was by river routes (Alagoa, 1999). And it perhaps explains why most of the Niger-Congo communities are predominantly found in the coastal areas in Nigeria. For instance, it is assumed that the Ijo tribe possibly migrated through the River Niger to settle in their present location (Alagoa, 1999). Fishing as an occupation is a significant aspect of their life-style and communities have close affinity to the habits of fish and are known to move around seasonally in search of better fishing grounds (NEST, 1991). Across the southern region, tribes belonging to the Niger-Congo family (e.g. the Ijos, Yorubas, Edos, Igbos and Efiks) share similar belief systems, traditions of dressing, entertainment culture and occupations (cf. Harris, 1965; Osunade, 1988; Alagoa, 1999; Okaba and Appah, 1999). These communities are thought to be deeply spiritual and their belief systems and relationships with the environment are intimately connected (Alagoa, 1999). However, this does not imply that other regions of Nigeria do not share common characteristics; for despite the nation's diverse ethnic groups there are common similarities, such as the same patterns of lineage organization based on a patrilineal system (NEST, 1991) and a world view that upholds practices, such as ancestor worship and delineation of nature and natural resources for different purposes (NEST, 1991). These practices of setting aside whole ecosystems, or certain patches of area, have relevance in maintaining forest cover or protecting watersheds. For example, amongst the Irigwe tribal group of the Jos plateau in the northern region, Sangree (1970) noted that the only remaining forest cover around the settlement of these tribal groups is that contained in several sacred groves. The Irigwe group are no different from other traditional settlements in Nigeria. As a segmentary society, they lack a traditional centralized political chieftaincy. However, they have a form of rulership, where the highest authority is granted to the priestly elders of several tribal subdivisions [similar to the traditional setting in Bayelsa State (Sangree, 1970)].

These elders are in charge of the ritual held to be of supreme importance to the well-being of the tribe, including maintaining the traditions of the sacred groves around their settlement (Sangree, 1970). In most traditional communities across the country, the elders were known to make up the highest traditional governing body, as these elders were the ones charged with initiating and making laws relating to the tribe (Okaba and Appah, 1999). However, from observations made during the field work for this thesis, there appears to be a transition in some of these traditional communities, where even young men are elected into the highest traditional governing body. Nevertheless, elders in traditional Nigerian communities continue to play an important role in the maintenance of customary rites, order and social relations. It appears, however, that the delineation of nature and natural resources for different purposes is commonly found in the southern region of the country. Amongst the Yorubas of south-western Nigeria for instance, forested patches known as *Igbo egbee* (Spirit groves) are left uncultivated, because of the belief in evil spirits, who are said to reside within these areas (see Box 2.1 below). Similarly, the Edos have species that are treated reverently (Osemeobo, 1994). Also, in Okigwe South in Imo state, sacred groves and sacred trees are still in existence and restrictions on entry to these groves are still maintained (Nzegbule and Meregini, 1999).

Box 2.1: Traditional Practice of Forest Reservation in Yorubaland
 (Source: Adapted from Osunade, 1988)

- *Igbo egan* (High forest). Mostly primary forest, where activities are limited because of accessibility and terrain.
- *Igbo Ode* (Hunting forests). These are secondary forests located at some distance away from settlements which are mainly devoted to game. Hunting lands are named according to the type of animal commonly found. For instance *Igbo erin* (Elephant forest) and *Igbo efon* (Buffalo forest).
- *Igbo oro* (Religious groves). These are places set aside for religious worship of many of the elements of the physical environment. Usually they are less than a quarter of a hectare in area and are uncultivated forests located on the borders of a settlement and in as many separate locations as there are families of the deities. They are called various names, depending upon the deities and the locations in Yorubaland. Names include, *Igbo awo*, *Igbo egungun* etc.
- *Igbo egbee* (Spirit groves). These are reserved forests for burial of 'strange' and abnormal deaths within the community. For instance, people struck by lightning, victims of smallpox infestations (in the past, before the disease was eradicated). These lands are sometimes referred to as lands of sorrows and are usually isolated and far away from the settlements, they are uncultivated lands and are designated as lands belonging to fearful and evil spirits. Such lands are characterised by rugged topography and are still preserved in several places.

An interesting phenomenon amongst the Edo tribal group is the characterization of natural resources into two groups, 'holy or unholy' (Osemeobo, 1994). Holy resources are resources which are used differently from the unholy ones. Holy resources include the Boundary Tree (*Newbouldia laevis*), African Rock Python (*Python sebae*), Nile crocodile (*Crocodylus niloticus*), African elephant (*Loxodonta africana*) and the Cola nut (*Cola acuminata*), which can be used as charms for protection from negative spirits or as medicine (Osemeobo, 1994). Unholy species such as Silk-cotton tree (*Ceiba pentandra*), Bushbuck (*Tragelaphus scriptus*), Olive

baboon (*Papio anubis*) and Iroko tree (*Chlorophora excelsa*) are rarely preserved outside their natural habitats. The unholy resources are believed to have some negative spiritual connection with man and so are avoided (Osemeobo, 1994). This belief is similar to the practice observed in Togo, where the Iroko tree is thought to be the source of river blindness infections (Cheke, 1987). However, some species such as the tortoise have dual classification and are widely used for rituals and traditional medicine amongst this tribal group. An important notion in Edo folklore accentuated in Osemeobo's narrative is the view that biotic resources are God-given. Biotic resources therefore act as media for communication between humans and their creator. This type of conceptualization of natural resources reverberates around the different ethnic groups in Nigeria.

Osemeobo's (1994) record of natural resources amongst the Edo reflects a similar practice amongst the Ijo people group, especially the veneration of certain animal species. An instance is the account of the Meins' (an Ijo tribal group) veneration of the black cobra (Okaba and Appah, 1999). It is not clear which of the two species of black cobra is referred to here but both the black spitting cobra (*Naja nigricollis*) and the black tree cobra (*Pseudohaje nigra*) have extremely toxic venom. Even though known to be deadly, the black cobra is believed to exhibit love and affection to the Mein people. Its form of body representation communicates a message from the spirit realm to the people. For instance, as reported by Main (1930: 30) cited in Okaba and Appah (1999: 154):

'If the cobra coils up when it enters a house, it means all is well; if it lies at length, sacrifice must be offered to the deity it represents; if met in the bush crossing a path, it is there to warn the traveller or farmer to return and it is so gentle to the Mein that it will allow itself to be pulled'.

The veneration of the serpent (known as Ophiolatry) is also practiced in Nembe, Bayelsa State where the Royal Python (*Python regius*) is described as the mother of

the clan. If one of these snakes is accidentally killed, burial rites are carried out in the same fashion akin to human obsequies (Innocent Omons, 2004 personal communication). In addition, similar to the practice of the Yorubas shown in Box 2.2 above, the Ijos also demarcate forest areas into sacred and / or evil forest. In Wilberforce Island of Bayelsa state, communities have sacred forests which are attributed to gods, while evil forests are thought to contain evil spirits (Hamadina *et al.*, 2007). The Ijos also have similar animal species associated with their world view to those catalogued for the Edos. However, some categories of animal species are termed totemic, while others are associated with taboos (Hamadina *et al.*, 2007). Taboo is a Polynesian word, which is difficult to translate (Richards and Dickson, 1990); however, it is commonly used as an adjective to describe things which are withdrawn from common use by an institution (Durkheim, 1915). Totems refer to a class of objects, viewed as special to a group (for instance a clan) and are revered by members of the group (Richards and Dickson, 1990). Generally, totems are species of animals or of plants. A totem can be common to a whole clan and is passed on by inheritance from generation to generation (Durkheim, 1915; Richards and Dickson, 1990). Totemic animal species listed by Hamadina *et al.* (2007) are species of the class Reptilia, including the Nile Crocodile (*Crocodylus niloticus*), Rock Python (*Python sebae*), Black-necked Cobra (*Naja nigricollis*), Royal Python (*Python regius*), Nile Monitor (*Varanus niloticus*) and Hinge-back Tortoise (*Kinixys erosa*). In addition, some bird species are associated with certain taboos such as the Palm-nut Vulture (*Gypohierax angolensis*), West African River Eagle (*Haliaeetus vocifer*) and Green-crested Turaco (*Tauraco persa*). It appears that this custom is widespread across West Africa, as certain classes of birds form part of tribal rituals and magic (Cocker 2000).

Forms and types of plants and animals appear to have some significance in many indigenous world views. Ancient archaeological records show that Ophiolatry was common amongst numerous primitive groups and belief structures. And so serpents were deified long before other animals had any symbolic importance (Mundkur, 1976). The primordial instinct of humans regarding serpents is that of fear, instinctively serpents are either avoided or killed. However, it appears that this basic element of fear underpins primitive belief structure and world views associated with serpents as suggested by Mundkur (*ibid*). Perhaps then, the veneration of these classes of animals as noted amongst the Ijo, is motivated by fear? However, the snake worshippers of the Python Temples at Ouidah, in the Republic of Benin, know that their pythons are harmless to them and even handle them in public as part of a tourist attraction and allow visitors to handle them as well (R.A.Cheke, pers.comm.; see also <http://web.mac.com/sarahjcarlson/iWeb/SarahinAfrica/Blog/41DBA771-70B2-43DF-9120-91D05D9C4E34.html>). Folklore, proverbs, drum names, myths, rituals, totems, shrines and altars erected for the veneration of certain deities are part of the world view of the majority of tribal groups in Nigeria. From all the records and narratives on the various culture and natural resource practices, there appears to be a relationship between world view and utilisation of natural resources. In some situations, beliefs encourage the protection of biodiversity and influence the way such biodiversity is utilized (cf. Osemeobo, 1994; Ezealor, 2002; ARD Inc., 2002; FME, 2006). However, as noted amongst the Edos, different communities even within the same tribal groups have varied classifications of what is acceptable.

Despite their role as repositories of indigenous flora and fauna, sacred ecosystems' contribution to conservation has been largely overlooked and undervalued by state and conservation agencies (Oviedo *et al.*, 2005), in contrast to open access areas and

state managed reserves (Oates *et al.*, 1992; Byers, *et al.*, 2001; Mgumia and Oba, 2003), especially in Nigeria. Institutions which maintain rules and norms of sacred landscapes such as sacred groves may serve as entry points for broad based approaches to sustainable management of resources (Appiah-Opoku and Hyma, 1999). And with the annual rate of forest loss of 663,000 hectares within the Niger Delta region (Golubiewski, 2007), these regulatory practices become important to these communities to check biodiversity and livelihood loss. The practice of conservation within the Niger Delta region and elsewhere is established even in the absence of conventional protected area systems. Culture is perhaps an important driver of these community conserved areas as they are conserved based on cultural constructs (Pathak *et al.*, 2005). However their sustainability is important, if they are to continue their functions as sites for conservation, outside conventional protected areas. The next sections are discussions on important aspects of sustainability.

2.3.5 Linking Livelihoods with Conservation

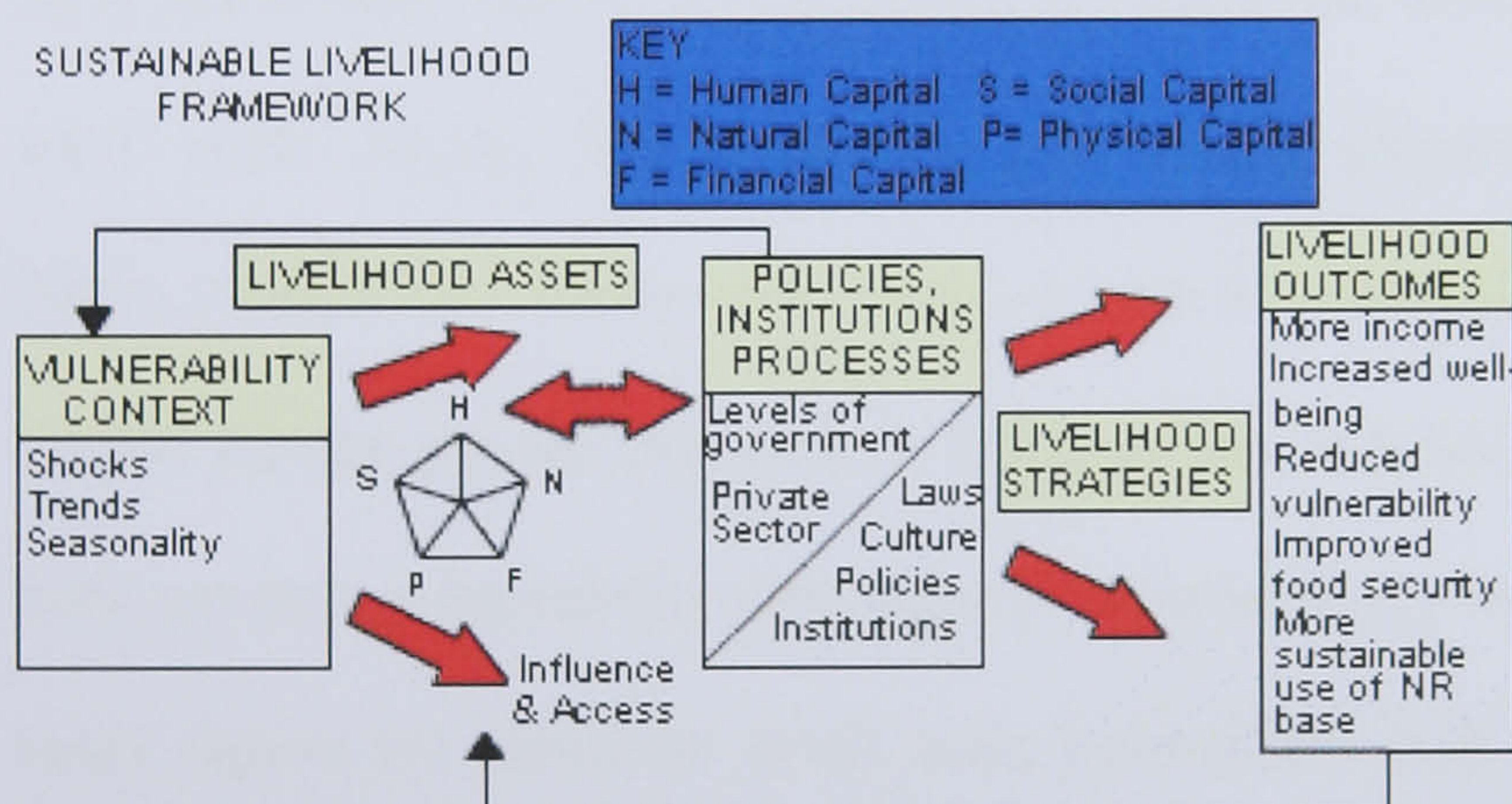
In the ongoing discussion, achieving livelihood objectives is perhaps top of the agenda for integrating the three broad components of sustainable development, mentioned in section 2.4. Also as stated in the same section, biodiversity is linked with the well-being of humans. Therefore, ensuring that rural communities who depend largely on biodiversity are not left vulnerable to biodiversity loss becomes important, if sustainable development is to be achieved. Poverty is multidimensional and includes several definitions including the definition of poverty based on social exclusion (Sen, 2000). Social exclusion involves situations within a social unit where certain groups of people are excluded from economic opportunities or achieving their livelihood objectives. Groups become vulnerable as they are excluded from social networks and political processes (Sen, 2000). Vulnerability is a function of the risks which people are exposed to (Adger *et al.*, 2004). This concept is particularly

important in the examination of indigenous belief institutions. For instance, questions such as what happens when people are denied access to the natural resource base become important for the sustainability of these institutions. Livelihood therefore is not just a means of living but it comprises,

“people, their capabilities and their means of living, including food, income and assets (tangible assets are resources and stores and intangible assets comprising claims and access). A livelihood is said to be sustainable when it can cope with and recover from stresses and shocks and maintains or enhances its capabilities and assets both now and in the future, while not undermining the natural resource base” (Chambers and Conway, 1991:7; Department for International Development, DFID, 1999).

The Sustainable Livelihood Approach (SLA, hereafter) developed by DFID, offers a framework of analysis of rural livelihoods cutting across different sectors and issues which could be synthesized in the decision-making process for sustainability of the ecosystem, as it pools together peoples’ assets and activities (see Figure 2.1 below).

Figure 2.1 Sustainable Livelihoods Framework (DFID, 1999)



The SLA has its strength in its interactive linking of research, policy and practice (Solesbury, 2003). Based on this observation, the SLA is relevant in this thesis in linking indigenous beliefs and institutional processes to environmental sustainability. In the consideration of the research objective of characterising and assessing the importance of the relationship of the Niger Delta communities with the wetland system, a key outcome based on the research question (see chapter 1, section 1.4), is

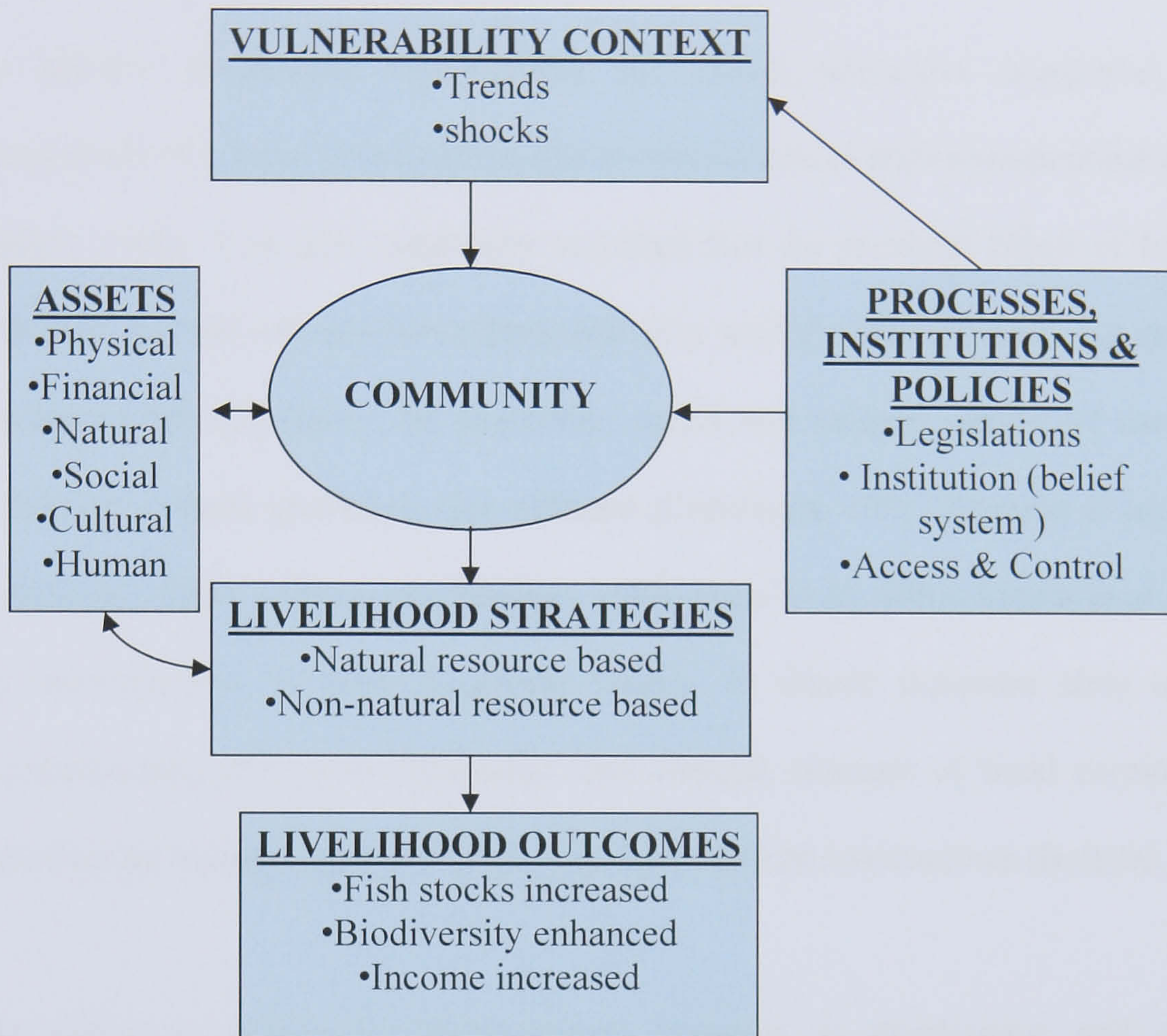
the sustainability of the natural base as the people depend on freshwater lakes for their economic activities. Are the observed social practices resulting in desired livelihood outcomes or are these practices undermining the productivity of these systems both in the short and long term? These questions may be answered by examining the methods of indigenous resource management. Kajemba *et al.* (2003) give suggestions on ways of characterizing indigenous resource management. These include:

- The indigenous social organization that controls access to natural resources within the community
- The customary norms and procedure for control, acquisition, maintenance and transfer for natural resources (Osemeobo, 1994) and
- The indigenous utilization techniques for conserving and preserving resources.

These three features are enshrined in the Policy, Institution and Processes box of the SLA framework above. Furthermore, the SLA has been shown as a useful tool in small scale fishing, fish processing and trading (Neiland and Bene, 2004; Stirrat, 2004; Allison and Horemans, 2006), to show how building on human and social capital among people involved in fisheries can support existing attempts to reduce their poverty, vulnerability and resource dependency. A majority of livelihoods in the study region are based on small scale fishing and it is important to identify which policies, institution or processes impact upon artisanal fishers' livelihoods within or outside the fisheries sector (see Neiland and Bene, 2004). Therefore, adapting the framework in this research helps in the understanding of the sustainability of the social practices of the people within this region. Moreover, the framework in the long run will help to prioritise interventions, particularly those processes which influence livelihood outcomes. However in following Neefjees's (2000) suggestion, the

sustainable livelihoods framework above is adapted to suit the context of the research and the region under study as shown in figure 2.2 below.

Figure 2.2 Conceptual Model



2.4 SUSTAINABLE DEVELOPMENT

The concept of sustainable development therefore acts as a muster point for research in human ecology (Ramakrishnan, 1999). The term 'sustainable development', became popular through the report of the World Commission on Environment and Development, WCED, in 1987. However, the concept is said to have emerged in earlier writings, through the work of Wes Jackson on progressive era forestry, in the later part of the 1970s (see Orr, 2002; Newton and Freyfogle, 2005). Therefore as a scientific doctrine, the term 'sustainability' emerged early in conservation,

particularly in managing single resources in perpetuity (Salwasser, 1990). In the report by the WCED (1987:8) sustainable development is defined as,

'development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs'.

To achieve sustainable development the report advocates integrating three components of human development, the economic, social and environmental aspects (Smith, 1998). It is also commonly accepted that the resultant effect of humans' activities on land and sea has effects not only on the natural system but on other aspects of life. Likewise, the economic, social and cultural sphere of society in addition to natural systems is also affected (Constanza, 1991; Perrings *et al.*, 1992; Folke *et al.*, 1993; Githinji and Perrings, 1993; Dietz *et al.*, 2003; Cinner *et al.*, 2005). For conservation to yield long-term results, it should therefore shift towards accommodating the social, economic and cultural interests of local communities including the values, rights and responsibilities of local communities (Beltrán, 2000).

The notion of sustainable development, however, is problematic and appears amorphous with multiple meanings (Paehlke, 2005). As such, it is ever changing and its practical application is debatable and questioned by scholars in the field of conservation (cf. Willers, 1994; Mebratu, 1998; Banuri, 1999; Cairns, 1999; Ehrenfeld, 2005; Newton and Freyfogle, 2005; Padoch and Sears, 2005; Paehlke, 2005). For instance, some argue that sustainable development theory is a veneer for perpetual growth and that achieving sustainable development is an impossible mission, especially in the light of Malthusian theories (Willers, 1994; Newton and Freyfogle, 2005). However, others maintain its applicability as a bridging concept, particularly between the natural and social sciences and therefore admonish that it should not be scorned (Paehlke, 2005). Also, as a bridging concept, sustainable

development recognises the interdependence of the three components, stated above, as an essential criterion to be met for development (Salwasser, 1990).

Despite its ambiguity, the concept is particularly relevant in the ongoing debate. For it is in the synthesis of the social, economic and ecological aspect of development that we can actualize any meaningful and long lasting development that would in essence outlive the present generation (Holling, 2000). Part of the problem and confusion is the question of what is sustained and who does the sustaining (Orr, 2002). Orr (*ibid*), in dealing with this question, amongst other things suggests incorporating indigenous world views into the sustainability agenda, which implicitly involves indigenous belief systems. In this light, perhaps, therefore, incorporating indigenous world views, including their environmental ethics and practices, such as sacred landscapes, is the needed incentive for indigenous support for natural resource management and conservation which would invariably lead to sustainable development.

Rural communities, such as those in the Niger Delta are dependent on their natural resources for their livelihoods (Rietbergen *et al.*, 2002). It therefore means that a healthy ecosystem would be likely to improve the livelihoods of humans. Poverty and biodiversity are intimately linked, therefore biodiversity loss exacerbates poverty and *vice versa* (UNDP, 2007). Sustainability, perhaps for the ecosystems managed and conserved by indigenous people entails reducing the vulnerability of both the human and natural systems to stress, as mentioned in the previous section. In examining the Niger Delta systems, there are important issues presented in the next section which draw attention to the relevance of sustainable development within this region.

2.4.1 Sustainable Development and Natural Resource Challenges of the Niger

Delta

The natural topography of the region is in itself a challenge to sustainable development, especially with increased urbanization and population pressure. Heavy rainfall patterns in the region and riverine flow means most of the floodplain areas are prone to flooding, owing to its constituent soil type, mainly clay (Amadi, 2000; UNDP, 2006b). Increased population puts people in competition with each other for available land for housing and as a result more floodplains are reclaimed for housing and agriculture. Climate change is expected to dramatically increase the size and frequency of floods, causing coastal erosion. Because of the low elevation of land over extensive areas in the region, any rise in sea-level affecting the Niger Delta could have disastrous consequences (Moffat and Linden, 1995). Furthermore, the construction of upstream dams for electricity on the Niger River influences the way water and sediment flow into the Delta (McCully, 2007). The resultant effect of sediment loss would be significant for fishing communities within the region. Sediment flow losses to the Delta may affect fish and shellfish stocks of the coastal areas, especially the freshwater swamps (Portmann *et al.*, 1989). The implication is that livelihoods would be threatened by dwindling fish stocks and communities would become vulnerable in the face of flooding, erosion and sediment loss to watersheds. Therefore flood management is an important emerging issue for communities.

The continued environmental degradation and loss in biodiversity and people's livelihood systems draws attention to natural resource management regimes of the Delta. Apparently the government's methods have serious drawbacks which should either be reviewed or discarded. For instance, existing forest reserves lack formal

protection by government as they merely exist as gazetted areas on paper. They lack regular surveys and are constantly de-reserved for agricultural purposes (Oates, 1995; Ezealor, 2002; Hamadina *et al.*, 2007). Therefore, forest reserves which should be sanctuaries for biodiversity are fast becoming fertile ground for loggers who further exacerbate biodiversity loss. The need for protected areas within the region is perhaps critical to the management of the fragile ecosystem. The question however is how can this be achieved and sustained within the Delta? Unresolved issues of property rights and ownership of land would undermine the involvement of indigenous people in the nation's formal protected area programmes. Also, since biodiversity exists mostly where people live, not involving indigenous communities in biodiversity management could have negative effects on sustainable development as noted in the politics of oil exploration. These issues point to the already stated need of re-examining community protected areas and their management regimes. However, policy reforms and legal instruments which recognise and legitimise these indigenous protected areas are important in the issue of sustainability.

The industrial activities, especially those of the oil multinationals are important priorities. For instance, the suspended material resulting from drilling sites increases the organic content of rivers and water bodies which affects benthic fauna (Moffat and Linden, 1995). Other detrimental effects result from high levels of metals in rivers polluted with industrial waste, and high levels of siltation in areas with extensive logging and farming (Ita, 1994). In addition, freshwater habitats in the Delta region and other parts of the country, including the brackish water and the coastal areas, are faced with problems that undermine their productivity and ecological integrity. Also important is the intrusion of saltwater into freshwater systems as a result of construction of navigable canals which devastate fish spawning

sites (Moffat and Linden, 1995). Since coastal areas are not very rich in fishery resources, the future of fish as a major contributor to the protein needs of Nigerians depends on how these freshwater fishery resources are managed (NEST, 1991).

Oil producing communities within the delta therefore are in a constant battle against devastation caused by oil exploration on communal lands, livelihoods and biodiversity (Ikein, 1990; Saro-wiwa, 1992; UNDP, 2006). These communities pay for the high cost of oil production while the gains accrue elsewhere, as they are the most affected by oil drilling effects. Interventions to reduce incidences of pollution, gas flares, silting and turbidity caused by dredging and digging vegetation at drilling sites is therefore important for sustainable development in the delta. However, the preponderance of oil in the region means the region neglects other renewable natural resources. Unfortunately it appears that in the Delta almost all environmental degradation is attributed to the visible oil companies' activities. This undermines and disguises other causes of biodiversity loss. Ignoring other causes of biodiversity loss may perhaps have far reaching effects on natural systems and the society more than oil mining itself. Sustainable development is a holistic approach and for this to be achieved in the Delta, remote causes of biodiversity losses are as important as the visible ones. An example is the extensive growth of Nypa palm (*Nypa fruticans*) and the prolific growth of water hyacinth (*Eichhornia crassipes*). Both plants compete with the native flora and impact negatively on fisheries. Interventions geared towards tackling some of these exotic species may perhaps be more beneficial to indigenous communities.

Migration is on the increase in the Delta. The limited area of habitable land means population densities per habitable area are very high (Ashton-Jones *et al.*, 1998). For

instance, within the freshwater swamp zone, habitation is limited to levees along the river banks. The population on these areas probably exceeds the highest rural population densities found in other parts of the nation (Moffat and Linden, 1995). Increased migration, therefore, increases ecological demand on the environment (Hamadina *et al.*, 2007). Since migrants are attracted to the prospects within the oil companies, part of the migrant population turn to logging, fishing and farming when there are no jobs in the oil companies (Niger Delta Wetland Centre, 1995; Amadi, 2000). Deforestation and depletion of natural resources becomes an issue for sustainable management. In addition, migrants arrive with varied taste and lifestyles which could affect indigenous lifestyles (Hamadina *et al.*, 2007). This is important as heterogeneous populations could result in change in belief systems and practice of sustained natural resource use.

The environmental component of sustainable development is equally important in considering the natural systems of the Niger Delta region. Achieving environmental sustainability amounts to the minimization of elements that degrade the environment ensuring that ecosystems function optimally, through practices that do not deplete the earth's natural capital (Christie, 2002).

Environmental sustainability can be considered on two scales, local and global (Chambers and Conway, 1991). The local level includes activities which maintain and enhance the local natural resource base or otherwise deplete and degrade. For instance in Edo State, Nigeria, cultural practices ensure that resource users are cautious of the fact that any wilful damage to wild biotic resources may have a negative impact on future prospects (Osemeobo, 1994). Such practice, if sustained,

enhances the local natural resource base, as they have substantive positive impact on species and habitat protection and controls of misuse and overuse of biotic resources.

On the second level, is the consideration of activities, especially livelihood activities, which make net positive or negative contribution to the long-term environmental sustainability of other ecosystems and other livelihoods. Indigenous world views as discussed in the last two sections become important in achieving the goal of environmental sustainability. Indigenous peoples' action on the ecosystem serves to conserve or in some cases transform existing ecological features and processes, such as those observed in certain lakes in the Niger Delta. These institutions appear to foster ecological and cultural diversity and retain the seeds of innovation on the landscapes (Carlsson *et al.*, 2004). Perhaps, these innovations play a role in reducing the vulnerability of both the natural system and human communities.

2.5 SUMMARY

This chapter has highlighted management and conservation strategies, first by the antecedents of conventional protected area management, followed by the perspective of the community based management paradigm. However, as noted in each strategy, results have not yielded long-term solutions to the current biodiversity crisis and as such the need for a more robust strategy is recognised. To overcome the consequences of the problematic definition of 'community', as described by Agrawal and Gibson (1999), the involvement of indigenous belief institutions is proposed as an alternative approach for biodiversity management and protection. Working within the component of the Policy, Institution and Processes of the SLA, the social institution of indigenous beliefs of the Ijaws of the Niger Delta is characterised with the view of accentuating possible feedbacks on natural resource management regimes, useful for achieving the objectives of sustainable development. Also, the

preceding sections outlined some of the natural resource practices of the people within the study area. These people through spiritual affinity to land and the natural system set aside certain ecosystems and treat these systems differently from other areas. However, many of these customs and cultures appear to be threatened. Invasive species, oil mining activities and the lack of a people-centred legal framework are salient issues which appear to undermine the sustainability of traditional methods of managing and protecting biodiversity. Even though the government appears to give a perfunctory acknowledgment to ecosystems and species which have been managed by indigenous people over the years, it appears lacking in a concomitant legal instrument for the protection of these areas.

CHAPTER 3

STUDY AREA

3.1 INTRODUCTION

This chapter gives a description of the study area's physical, social and political attributes. Section 3.2 outlines the different ecozones within the region and gives information on classes of biodiversity. It also discusses Nigeria's political and social environment, including the country's involvement in protected area management. Section 3.3 outlines important ecological aspects of the Niger Delta region, while section 3.4 gives details of the institutions and governance of the two study communities. It also outlines areas visited during the reconnaissance. The chapter ends in section 3.5, which gives details of the vegetation profile of the study communities and lakes.

3.2 PHYSICAL DESCRIPTION

Nigeria stretches over a total area of 923,770 square kilometres (356,700 square miles), in addition it has a coastline spanning about 853 kilometres (530 miles) [ARD, Inc. 2002; Central Intelligence Agency, CIA, 2007]. The country is bounded to the north by the Niger Republic and the Gulf of Guinea to the south. Her eastern neighbours are Cameroon and Chad, while the Republic of Benin is to the west. Nigeria is approximately situated on latitude 10 degrees North and Longitude 8 degrees East (Ezealor, 2001; Hamadina *et al.*, 2007). The Niger-Benue and the Hadeija / Komadugu / Yobe systems define the hydrological landscape of the country (ARD, *ibid*). The total surface area of water bodies in Nigeria excluding the deltas, estuaries and miscellaneous wetlands is estimated to be 148,869 km², 16% of Nigeria's total area (Ita, 1993).

3.2.1 *Ecosystems and Natural Resources*

The country has a seasonal tropical climate with distinct wet and dry seasons. The south is characterized by a humid climate, while the air is hotter and drier towards the north (Ezealor, 2002; Status of Tropical Forest Management, SFM, 2005). As noted by Ezealor (2002), rainfall ranges between 4,000mm per annum in some coastal locations to about 600mm in the far north. The dry season starts from about November and lasts until March, while the rainy season starts from about April and runs until October (Sarumi *et al.*, 1996). This rainfall pattern determines the natural vegetation. Although the country has varied biomes, there are two major vegetation zones, the forest and the savanna (NEST, 1991; ARD Inc., 2002; SFM, 2005). The forest zone exists in the south within a belt of about 50 to 250 km inland along the Atlantic coast. This zone covers about 20% of the country; however about 90% of Nigeria's forest cover has either been degraded or lost (Ezealor, 2002). The forest zone is characterized by rainforests and along the coast by mangrove swamps, sandy beaches and barrier islands. The savanna is to the north and can be subdivided into the moist southern Guinea savanna zone and the drier northern Guinea savanna zone (SFM, 2005). The moist Guinea zone or Sudan-Guinea comprises 70% of the country. The banks of rivers within this zone support gallery forests which contain flora similar to the southern forest ecosystem, although its northern fringes show effects of deforestation and periodic drought. The drier savanna type covers less than 10% of the country and runs across the north-eastern corner (Ezealor, 2002).

Nigeria's varied ecosystems contain a vast number of plant and animal species (Sarumi *et al.*, 1996). The moist forest, for instance, contains over 560 species of trees which are capable of attaining a height of 12 metres, reaching a girth of about 60cm (Ola-Adams 1977; Sarumi *et al.*, 1996) and there are 911 species of bird recorded within Nigeria's borders (<http://www.africanbirdclub.org/fpdf/test31.php>).

Unfortunately, various studies done on the country's biodiversity remain unpublished, especially those of the Niger Delta region (ARD Inc., 2002; McGinley, 2007). The paucity of reliable data often leads to variations in estimates of biodiversity numbers and unconfirmed sightings of animal species.

However the country is known for several 'Red list data' species, especially primates and mammals occurring in the Guinea forest. For instance, the Cross River gorilla (*Gorilla gorilla diehli*), the most endangered sub-species of gorilla in the world, is reported to be found in the forest of Cross River State contiguous to Cameroon (Basse and Oates, 2001). Documented evidence of Nigeria's biodiversity includes the avian species detailed through the Important Bird Areas project of the Nigerian Conservation Foundation (NCF) with support from the Royal Society for the Protection of Birds (RSPB) and Birdlife International. From this project, Ezealor (2002) recorded 904 bird species (although the national total has now reached 911; <http://www.africanbirdclub.org/fpdf/test31.php>). Of the 904, 436 are confirmed breeding residents, 165 are residents suspected to breed, about 150 are Palaearctic migrants and 90 are intra-African migrants. The remaining numbers are made up by either vagrants or species of unknown status, with some near endemics who share habitats with neighbouring Cameroon (Ezealor, *ibid*). Important endemics include the Ibadan Malimbe (*Malimbus ibadanensis*) and the Anambra Waxbill (*Estrilda poliopareia*).

Nigeria's known primates and large mammals include endemic species such as the Niger Delta's Colobus Monkey (*Piliocolobus pennanti epieni*), Sclater's Guenon (*Cercopithecus sclateri*) and the White-throated Monkey (*Cercopithecus erythrogaster*) (Powell, 1993; Oates and Bergi, 2001). The swamps of the Delta also

harbour a subspecies of the Pygmy Hippopotamus (*Hexaprotodon liberiensis heslopi*). Information on reptiles, amphibians, fish and invertebrates is poor in comparison to that for mammals, primates and avian species. However Aminu-Kano (2001), notes that a snake species (*Nehelya egbensis*) and five Amphibians are endemic to Nigeria. Overall, data compiled by EarthTrends (2003) summarises the numbers and status of animal and plant species found in the nation as follows:

- Higher Plants (flowering plants, conifers, cycads, ferns, excluding mosses)

Total number of known species, 1992-2002	4,715
Number of threatened species, 2002	119

- Mammals (excluding marine mammals)

Total number of known species, 1992-2002	274
Number of threatened species, 2002	27

- Breeding Birds(excluding migrating and wintering birds)

Total number of known species, 1992-2002	286
Number of threatened species, 2002	9

- Reptiles

Total number of known species, 1992-2003	154
Number of threatened species, 2002	2

- Amphibians

Total number of known species, 1992-2003	53
Number of threatened species, 2002	(not available)

- Fish (include both freshwater and marine species)

Total number of known species, 1992-2003	95
Number of threatened species, 1992-2002	2

However, these numbers are not exhaustive as data entries are subject to current updates. For instance, the current IUCN Red List of Threatened Species (2006) lists a

total of 398 different species as either endangered, vulnerable, near threatened, critical, or extinct in the wild. The list included 190 plants, 79 mammals, 38 fish, 37 birds, 25 amphibians, 15 primates, 10 reptiles, 2 molluscs and 2 insects.

Fish comprise an important category, as fish are a major source of protein for most people living in coastal states (NEST, 1991). Also, it is a relevant livelihood resource in the research study area. Fish provide an estimated 40% of the total animal protein consumed in the nation. However, in coastal states they probably account for about 80% of the animal protein consumed by the people (NEST, *ibid*). In addition, the fishing sector provides employment to about 1.5 million people including artisans and secondary employment associated with them (Ajetomobi *et al.*, 2001). While the entire inshore fishery is conducted by local residents, about 80% are involved in coastal area fishing with a majority of artisans using simple fishing gear (Sikoki and Otobotekere, 1999; ARD Inc., 2002). Nigeria's inland waters have over 230 fish species, while her coastal waters boast of about 199 species of both finfish and molluscan shell fish (Shimang, 2002).

Decisions on areas to be designated as wilderness and protected areas occur within highly politicized settings (Yung, 2000). Importantly therefore, key aspects of social and political processes which drive conservation interventions cannot be ignored (Wilshusen *et al.*, 2002). In other words conservation is not just about biodiversity but also involves understanding the political and social environment in which decisions are made for the management of biodiversity (Alcorn, 1993). In this light, the next section outlines some key aspects of the Nigerian environment and its involvement in protected area management.

3.2.2 *Administrative Structure*

Nigeria, a former British colony, gained independence in 1960. The country operates a federated system, as specified in the 1999 Constitution of the government.

Therefore according to the Constitution {Chapter 1, Part 1 Section 2(1)}:

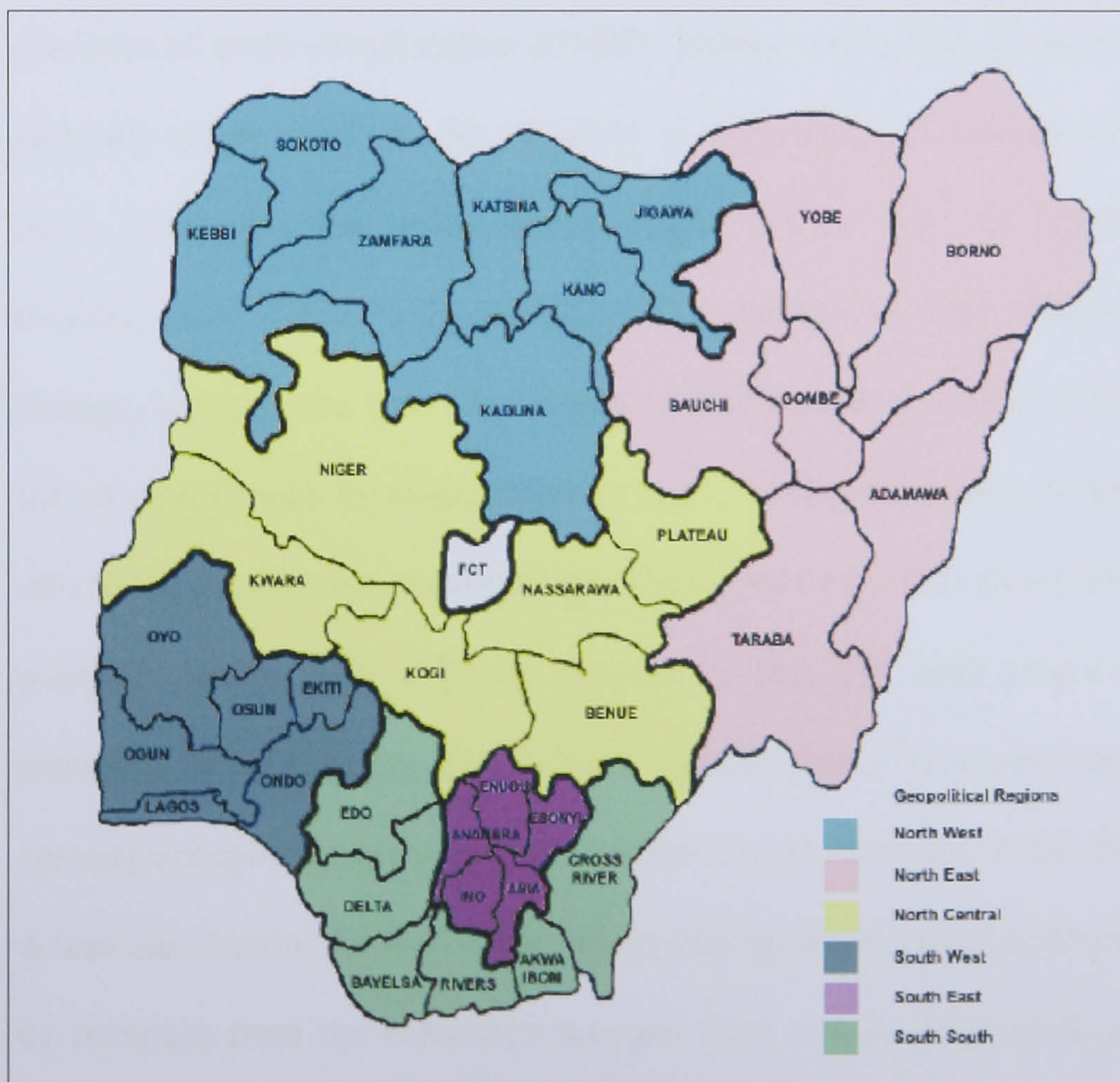
'Nigeria is one indivisible and indissoluble sovereign state to be known by the name of the Federal Republic of Nigeria'.

In Section 2(2), it is stated that the Federal Republic of Nigeria consists of thirty-six states with a Federal Capital Territory in Abuja. The states are further divided into 768 local governments. The country, as stated in the Constitution, has a three layer government: the Federal government, the State government and the Local government. The local governments are in charge of administration of the different clans under their jurisdiction (Millennium Choice Technologies, 2007). Therefore, matters related to natural resources which cannot be resolved within the clan are channelled through the local government chairperson to the state government. Also, under the current democratic dispensation there are three arms of government, the Executive, the Legislative and the Judicial. Each of the thirty-six states (figure 2.1) is administered as a microcosm of the federal system and each of the states of the federation has its own executive, legislators and members of the judiciary council. The Legislative is a bicameral system, with a lower house, known as the House of Representatives and the upper house called the Senates. The Executive, made up of the President of the Federation, the Vice-President, Ministers and Ministers of State, Federal Executive bodies, including Special Advisers are accountable to the Legislative arm of government. The functions and roles of the cabinet and the different levels of government are all specified in the 1999 Constitution of the federation.

In addition, under the present democratic dispensation, the country is divided into six geopolitical Zones [shown below in figure 3.1 (ARD Inc., 2002 and Brieger *et al.*, 2003)]:

- South-east: Abia, Anambra, Ebonyi, Enugu, Imo
- South-south: Akwa- Ibom, Bayelsa, Cross- River, Delta, Edo, Rivers
- South-west: Lagos, Ekiti, Ogun, Ondo, Osun, Oyo
- North-west: Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, Zamfara
- North-east: Adamawa, Bauchi, Borno, Gombe, Taraba, Yobe
- North central: Benue, Kogi, Kwara, Nassarawa, Niger, Plateau

Figure 3.1 Nigerian Geopolitical Zones
(Source: Adapted from ARD, Inc. 2002)



In Nigeria's forty-eight years of independence, the dominant political power has been the military. Leadership under the military was accompanied by autocratic rule

and a multiplicity of natural resource decrees which were inconsistent and lacked implementation (see, for instance, Federal Ministry of Environment, FME. 2001). Nigeria currently is a democratic state, but even with the country's nascent democracy, little change exists in its natural resource laws, as discussed later. Pre-colonial Nigeria was characterised by linguistic and political fragmentation with existing groups such as the Sokoto Caliphate in the north, Oyo and Benin Empires in the south and the Kanem-Borno Empire in the northeast (Mustapha, 2006). Each group was ruled under different systems of governance. It was these groups that shaped the structure that the British built upon in 1887, to form the northern and southern protectorates. The amalgamation of the southern and northern protectorates that took place in 1914 was supposed to merge the different regions into one entity. However, at the root of the amalgamation of the north and south protectorates was the issue of cross-subsidization (UNDP, 2006b). Cross-subsidization meant that the allegedly richer south would subsidize developments and endeavours in the poorer north. However, the level of cross-subsidization was not specified until the establishment of the Phillipson Fiscal Commission in 1946 (UNDP, 2006b). The linkage between the two administrative entities was founded more on economic infrastructure, such as roads, railways and a common currency to link the northern area to the south rather than on unity. The regions were still administered as separate political entities with different systems of law and land tenure even after the amalgamation (Mustapha, 2006). Equity distribution of revenues from the federation account is important in the nation's politics. As the need to control resources perhaps drives the clamour for leadership, leadership has been sustained at the national level by revenues from the federation account. First it was agricultural resources and in recent decades oil. Therefore, natural resources capital, particularly oil, is an important component of exploitation (Robson 1999).

Ethnic polarisation also underpins inequity in revenue allocation. Predominant ethnic groups form stronger political coalitions dominating smaller ethnic groups (Mustapha 2003, 2006). Dominant groups appear to have the advantage of numbers in terms of population and therefore exercise political and economic dominance over the minority. Forty-seven years after independence, Nigeria is still embattled by the problem of ethnic polarisation. And intermittently political groups make demands that threaten the coalition of the Nigerian State. A typical example is the recent fracas on the inclusion of Sharia laws into the legal system in northern Nigerian states (see review in Kenny, 1996; Hargreaves, 2001; Amidu, 2007). In a secular state like Nigeria, issues of religion are potentially lethal to the stability of the government. The complexity of a pluralistic society like Nigeria is perhaps challenging, especially against the background of oppressive leadership as noted by Robson (1999). However, the current democratic rule has developed strategies to expunge some of these political log jams. An instance is the recent attempt of the democratic government to divide the nation into six geo-political groups. This is targeted towards liberating many ethnic minority groups which were previously included in a broader categorization of dominant ethnic groups, with the intention of giving the minority group the opportunity to express their needs and interest (Iwuchukwu, 2003). However experiments such as this perhaps need time to erase years of colonialism, autocratic military regimes and social injustice engrained in most peoples' minds. Ironically, although Nigeria grapples with internal stability of her politics, she is a respected leader in the sub-region, playing a leadership role in the African Union. Nigeria, amongst five other African States, was involved in the development of a comprehensive and holistic framework, known as the New Partnership for Africa's Development (NEPAD). The NEPAD framework which

enshrines the principles of sustainable development was recently adopted by the African Union.

3.2.3 Demographic Index

Globally Sub-Saharan Africa has the most rapid demographic growth in the world, about 2.1% in 2001 as against 0.8% and 2% in other developing regions (Tabutin and Schoumaker, 2004). And as one of the forty-eight states within the region, Nigeria's population is doubling at an alarming rate with a projection of about a 40% increase in 2025 from the present population figure (Leahy, 2006). Within the sub-region, the nation's population stands as the highest (National Population Commission and ORC Macro, 2004; Leahy, 2006) A recent census survey carried out in March 2006, puts the country's population at over 140 million, although these figures are being reviewed because the results are contentious, as almost all post-colonial censuses have produced contested results (Mustapha, 2003). However, using the 1991 population data, Nigeria, with a population of about 120 million then and a projected figure of 135, 031,164 in 2007, stands as the largest country within the Sub-Saharan Africa region (cf. Nigeria Environmental Study/Action Team, NEST, 1992; CIA, 2007). In addition to the high population figure is an annual growth rate of 2.83%, with an increased rate of rural-urban migration (NEST, 1992; National Population Commission, NPC, 1998). For example, in 1960 only about 14% of the population lived in the cities. But in 1990 the proportion was 35% and a projection for the year 2000 and beyond was put at 43% (NEST, 1992). The rate of urbanization at 5.3% is one of the highest in developing countries (National Economic Empowerment and Development Strategy, NEEDS, 2004). Leahy (2006) notes importantly that the country has a high proportion of young people with three-quarters of its population under the age of 30 years, which perhaps is responsible for the country's unstable

democracy, as governments in countries with very youthful age structure face increased pressures for social services, natural and economic resources (Leahy, *ibid*).

Nigeria's economy which was once driven by agriculture now revolves around oil earnings, which accounts for 93% of export earnings and about 80% of national revenue (Obi, 1997; Odukoya, 2006). However, the country has become an importer of most products she once traded in (Library of Congress, 2006; Odukoya, 2006). Although the nation is the eighth largest oil exporting country in the world, it is paradoxical that Nigeria is ranked among the poorest and least developed countries in the world, with socio-economic and debt profiles paralleling those of highly indebted countries (Arikawe, 2001).

Furthermore, the nation's Human Development Indicator, HDI (UNDP, 2006a) is ranked 159 out of 179 countries, with an HDI value of 0.448. The country's Gross Domestic Product (GDP) per capita (Purchasing Power Parity US\$) is \$1,154. This puts the country at the 154th position out of 172 countries (UNDP, 2006a). At an average growth rate of 3.6% the country's GDP is lower than the minimum benchmark of 5% required for preventing deteriorating rates of poverty. Also, the low GDP is less than the 7% mark needed to meet the Millennium Development Goal (MDG), target of halving the incidence of poverty by 2015 (NEEDS, 2004). The low score sheet of the nation's socio-economic index translates to about 70% of the population living on less than \$2 a day (Arikawe, 2001). Also, the nation's population growth rate means there is a high demand for land, especially agricultural land (Aminu-Kano and Marguba, 2002). In the rural areas for instance, about two-thirds of the rural population depend on the natural forests for their livelihoods (UNDP, 1998). This means that losses in forest products and biodiversity could have disastrous effects on livelihoods (Osemeobo, 2001). Therefore, the carrying capacity of natural resource

systems cannot be overlooked. Increase in population translates to more people making demands on available natural resources. In maintaining natural systems the question of how to protect important ecologically sensitive areas and the livelihoods of people dependent on such systems comes to the fore.

The formulation of relevant policies and environmental regulations has been a challenge for policy makers working with Nigeria's inherited legacy from colonialism (NEST, 1991). The approach adopted by policy makers was to treat environmental issues from an exploitative perspective, treating natural resources for economic gain. This, perhaps, explains why early policies were geared towards exploitation of timber and forest products. Also, the exploitative perspective meant government succeeded only in incorporating a minority of indigenous Nigerian 'elites' into the category of the beneficiaries of environmental strategy (NEST, 1991).

3.2.4 Nigeria's Protected Area System

The nation operates a formal protected area system which revolves around the central government. Most of the nation's national parks were created from upgrades of Game reserves, which in turn were former Forest reserves (Aminu-Kano and Marguba, 2002). The National Park Service, in the creation of the nation's eight parks adopted Category II of the IUCN protected area classification [(Aminu-Kano and Marguba, 2002), see section 2.2.3 for IUCN categories]. Following the establishment of the first national park in 1975, Kainji Lake National Park, the number of parks has grown to a total of eight covering an area of about 24,000km² or 3% of the country's total (Aminu-Kano and Marguba, 2002). Recent increase in the country's protected area shows a total area of 55,020 km² (6%), however this figure includes all six categories under the IUCN criteria (EarthTrend, 2003). Forest

reserves which are managed in Nigeria by the state government through their forest departments are excluded from global protected area lists but are recognized nationally. Provisionally, if the forest reserves are added to the protected area systems, the maximum coverage of state protected area would total about 11% of the country (Aminu-Kano and Marguba, 2002). Overall, five categories of protected areas are nationally recognized (Ezealor, 2001; FME, 2006), they include:

- National Parks. These are assets of the Federal government and are managed under the National Park service of the Ministry of Environment.
- Game Reserves. Areas set aside for protection of wildlife. These are state governments' assets managed under the Ministries of Agriculture and Natural Resources. Included are Wildlife Parks, Bird Sanctuaries and Strict Nature Reserves. Hunting is allowed under license from the government.
- Forest Reserves. Each state has at least one, managed by state Ministries of Agriculture and Natural Resources. These areas are set aside by state governments for protection of timber, fuel wood and other forest resources. Harvest of resources is usually allowed under permit or as special concessions to local people.
- Biosphere Reserves. Omo Forest Reserve was designated as a biosphere reserve.
- Special Ecosystems and habitats. These are sites revered by local communities, including sacred groves, streams and lakes. Mostly in the south, they serve as homes for "local deities".

3.2.5 Institutional Framework

Overall responsibility for monitoring, compliance and enforcing environmental legislation in Nigeria is vested in the Ministry of Environment, established in 1999 by the past democratic regime (Aminu-Kano and Marguba, 2002; FME, 2006;

Hamadina *et al.*, 2007). The Ministry of Environment was created with the mandate listed below to ensure the sustainable management of Nigerian's biodiversity (FME, 2006):

- Provide selected service functions such as environmental data management
- Environmental Impact Assessment
- Environmental education and awareness to other sectors
- Assist in the development and improvement of environmental legal and regulatory framework
- Manage ecosystems and promote sustainable use of natural resources
- Enforce environmental quality norms, standard and rules.

Although institutions like the Federal Ministry of Environment have been given a mandate to manage resources they are, however, crippled by fluctuating government policies. An example is the programme on combating desertification which has been stalled because of the frequent shifts in policy by government (FME, 2001). Nigeria has a national policy on Environment which was launched in 1989 and revised in 1999. The policy covers all major sectoral issues identified in Agenda 21 (FME, 2006). However the implementation of this policy like many others has been painfully slow. Also, as part of a redemptive measure for the ongoing environmental crisis in the Niger Delta, the Federal government established the Niger Delta Development Commission, NDDC, by an Act of Parliament in 2000 (NDDC, 2006). Part of the mandate of the NDDC, was the development of a 'regional master plan' for the sustainable development of the region (NDDC, 2006). The master plan has recently been launched and hopefully it may provide a template for the region's sustainable management of its vast human and natural resources. However within the region, the NDDC is viewed as an imposition of the government on the people, and

local people object to the government's lack of consultation with them on the composition of the commission (UNDP, 2006b).

Furthermore, in the thirty-six states of the federation there are State liaison offices which aid the functions of the Ministry of Environment. In addition there are multiple ministries which also manage and protect certain ecosystems and natural resources. Examples are the Ministry of Agriculture and Natural Resources and the Ministry of Water Resources which appear to have some similar functions. Therefore, the question of who does what in certain sectors, like forestry, is perhaps difficult to answer (SFM, 2005). This apparent lack of coordination of environmental policies and responsibilities among various governments' ministries including frequent changes in governance results in a lack of continuity with negative consequences for the nation's biodiversity (ARD Inc., 2002). The multiplier effect is that the inconsistencies in policies and implementation trickle down the tier of government, affecting communities. Situations of crisis involving natural resources and people are exacerbated by the bureaucracy in government and unspecified roles within natural resource sectors. State level environmental legislation is on the increase as depicted by Kebbi State in the north (Beak *et al.*, 1998). But some states of the federation are still struggling with environmental policies, as many of the state assemblies do not have environment committees and are still operating with obsolete environmental laws inherited from the colonial era (ARD Inc., 2002).

3.2.6 Natural Resource Legislation

Legislation in Nigeria is made up of statutes and subsidiary legislation (Beak *et al.*, 1998). The statutes as noted by Beak *et al.* (*ibid*) are laws enacted by the legislature such as Ordinances, Acts, Laws, Decrees and Edicts. The subsidiary legislation is referred to as subsidiary instruments or delegated legislation. This consists of rules,

orders, regulations, bye-laws and other instruments made under the authority of statutes. Furthermore, Beak *et al.* (1998: 3) note that;

'any enactment made or deemed to have been made by the Federal Legislature/National Assembly is called an Act while an instrument made by the Federal Military Government and expressed to be or be made is called a Decree. Similarly, any enactment made by the State House of Assembly is called a law while that by a State Military Administration is called an Edict'.

There are five sources from which Nigerian natural resources and environmental laws are derived (Worika, 2004), they include:

- Received English laws; English Statute and Common law as it existed in England on January 1, 1900.
- Local legislation; statutes passed by the Nigerian legislature, including military decrees and edicts and added to this category is the Nigerian constitution.
- Judicial pronouncements by courts of competent jurisdiction.
- Customary laws and
- International Agreements.

The Land Use Act is important for any natural resource activity in Nigeria as it accords ownership rights and rules of access.

Land Tenure Systems

Principally, land acquisition in Nigeria can be obtained through inheritance, purchase, lease, pledge, exchange and gift (NEST, 1991). Nigeria's Land Use Act (LUA), defines people's rights to land in the interest of socioeconomic development. However the implementation of the LUA has been a source of contention in Nigeria, because policy makers lacked understanding of the varied meanings of land to indigenous people (NEST, 1991; Worika, 2004). Land as an entity, including water bodies, has a spiritual component for indigenous people including those in the Niger Delta (Warden-Fernandez, 2002; Worika, 2004). Nigeria's Land Use Act was

promulgated in March 1978 by the then Military regime as Land Use Decree under Caption (Cap. 202) of Laws of the Federal Republic of Nigeria (L.F.N., 1990). Subsequently it was re-named the Land Use Act in September 1980 (NEST, 1991).

The act,

'provides measures for making land easily available for development and agricultural purposes, primarily by vesting land in state governors, requiring his consent for the transfer or alienation of interest in land and conferring him with power to revoke rights of occupancy for over-riding public purposes (Amadi, 2000: 28)'.

By this act the state has monopolistic powers over land. However, in reality (see box 3.1. below) there are other forms of land tenure rights operating in concurrence with the State's Act. Land tenure rights in Nigeria have the propensity to benefit the state more than indigenous people, especially with the clause in the Act, *'of the state being conferred with powers to revoke...'* The principal interest of the state is to increase earnings by making investment and development on lands. This is in contrast to the perspective of indigenous communities on land. It is perhaps this disparity in perspective which results in conflict. The conferment of powers on the state means if the state decides a poor farmer's land is to be used as a site for a factory, then the rights of the farmer over the land would be revoked. Land tenure conflicts are particularly visible in the case of the explorative activities of oil mining especially when an oil spill occurs. Communities appear helpless in the face of oil spills that affect their lands and wetlands since they can not effectively fight the government. They eventually pay the high cost of environmental pollution caused by oil exploitation as livelihood systems are destroyed.

Box 3.1 Land Tenure and Use

(Source: Adapted from ARD, Inc., 2002)

The land use Decree of 1978 was designed to regulate ownership of land, the principles of land tenure, rents and rights of occupancy.

Essential components of the decree include the following:

- The transfer of land tenure from traditional rulers, village heads, heads of family, etc. to the state
- Overall responsibility for the control and management of land in urban areas, including land allocation, was to become the responsibility of the governor of each state
- Responsibility for land allocation in rural areas was to fall to local government

However, in practice, the decree has failed to supersede customary law for communal ownership of land resources. Therefore in Nigeria, in reality there are three basic tenurial laws in existence. These include:

- State Tenure: land estates put under the management of the state, either federal or state government. Lands under this caption are held in trust for the use and benefit of the entire Nigerian population
- Communal Tenure: includes land rights held by members of a community within their geographical location
- Private Tenure: includes land tenure rights given to an individual, corporate entity acquired through purchase, inheritance, or as a gift

Legislation

Natural resource legislation is traceable to early forestry legislation, dating back to 1887 with the establishment of the first forest reserve created in 1899 and a unified forestry department structure in 1916 (Beak *et al.*, 1998; Aminu-Kano and Marguba, 2002). A summary of early forestry laws noted in Beak *et al.* (1998) is shown below:

- Forestry Ordinance, 1916: this consolidated and amended existing forestry enactments. Elaborate provisions were made for the establishment of forest reserves, with forest reserves placed strictly under government control. The policy trust was the reservation of at least 25% of the total land area of the country. The management tool was the principle of sustained yield management with focus on known timber species.

- Wild animals Preservation Act, 1916, which provided the protection of all wild animals and endangered species in Nigeria.
- The Forestry Ordinance, 1937: the law was promulgated for the preservation and control of forests. This is the principal forestry law applicable in almost all states of the federation with a few amendments made to the substantial provision to accommodate the emerging political components of the country. This Ordinance amended and consolidated all the previous Ordinances.

Since the nation became independent some other laws were promulgated derived from English laws and resulting from the country's participation in international treaties as noted below. National Laws relevant to natural resources especially for aquatic resources include (NEST, 1991; Beak *et al.*, 1998; Amadi, 2000; ARD Inc., 2002);

- African Charter on Human and Peoples Rights Act Cap.10 LFN 1990; this act makes provision to implement Nigeria's obligations under the African Charter on Human and Peoples Rights and it recognizes the right of people to a generally satisfactory environment favourable to their development.
- Federal Environmental Protection Act Cap. 131 LFN 1990; this act established the Federal Environmental Protection Agency (FEPA). FEPA has the mandate of establishing environmental guidelines, and standards. However FEPA is now subsumed in the Federal Ministry of Environment.
- River Basins Development Authority Act Cap. 396 LFN 1990; this act established the river basin authorities with the charge to develop surface and ground water resources for irrigation, control of floods, erosion, watershed management and collection of water resources data.

- Inland Fisheries Decree No. 108 of 1990; the decree regulates fishing in the inland waters of Nigeria, construction of dams, wells and other barriers in inland waters. It also provides for license of fishing crafts.
- Live Fish (control of importation) Act Cap.209 LFN 1990; the act prohibits imported live fish into Nigerian waters, in the bid to prevent the spread of fish-borne diseases.
- Minerals Act Cap. 226 LFN 1990; this act regulates non-oil mining activities and prohibits mining operators from cutting trees without consent. It also prohibits the pollution of water courses, water bodies, sacred areas and other objects of veneration.
- Petroleum Act, Cap. 350 LFN 1990; this act regulates the prevention of the pollution of water courses and the atmosphere. It enjoins a licensee or lessee to adopt all practicable precautions to prevent the pollution of inland waters, rivers, water courses, the territorial waters of Nigeria or the high seas by oil, mud or other toxic fluids.
- Oil Navigable Waters Act Cap. 339 LFN 1990; this act controls pollution of the sea by oil and prevents pollution in the navigable waters of Nigeria. This act is in line with Nigeria's obligation as signatory to the 1954-1962, Convention for the Prevention of Pollution of the Sea by oil.
- Harmful Waste Act Cap 165 LFN 1990; this act prohibits the deposit or dumping of any harmful waste on Nigerian soil, inland waters and sea, including the exclusive economic zone of Nigeria.
- Exclusive Economic Zone Act Cap. 116 LFN 1990; this act empowers the state to exercise within the Exclusive Economic Zone of Nigeria her sovereign rights in relation to the conservation or exploitation of the natural resources of the seabed, its oil and waters.

- Endangered Species (Control of International Trade and Traffic) Act Cap. 108 LFN 1990; this act is in agreement with Nigeria's signatory as a party to the Convention on International Trade in Endangered Species (CITES).
- Sea Fisheries Decree No. 71 of 1992; this decree controls and regulates the conservation and protection of fisheries resources and fishing in the territorial waters of Nigeria. It prescribes suitable gear and prohibits destructive fishing methods.
- Environmental Impact Assessment (EIA) Decree No.86, 1992 to integrate environmental concerns into all major activities throughout the country; this decree enables FEPA to assess impacts of developmental projects on the environment and it empowers the agency with the authority to stop the execution of any project they consider detrimental to the environment.
- Water Resources Decree No. 101 of 1993; this decree confers management and administrative rights on the government of the federation of all water resources.
- National Parks Decree No. 46 of 1999; this decree established the National Park Service, for the control and management of the national parks and the promotion of the preservation and conservation of vegetation and wild animals in the nation's parks. Under this decree, the country has 8 national parks.
- Niger Delta Development Commission Act 2000; this act established the Niger Delta Development Commission for management and administration of the sums received from the allocation of the Federation account for tackling ecological problems and for the development of the region.

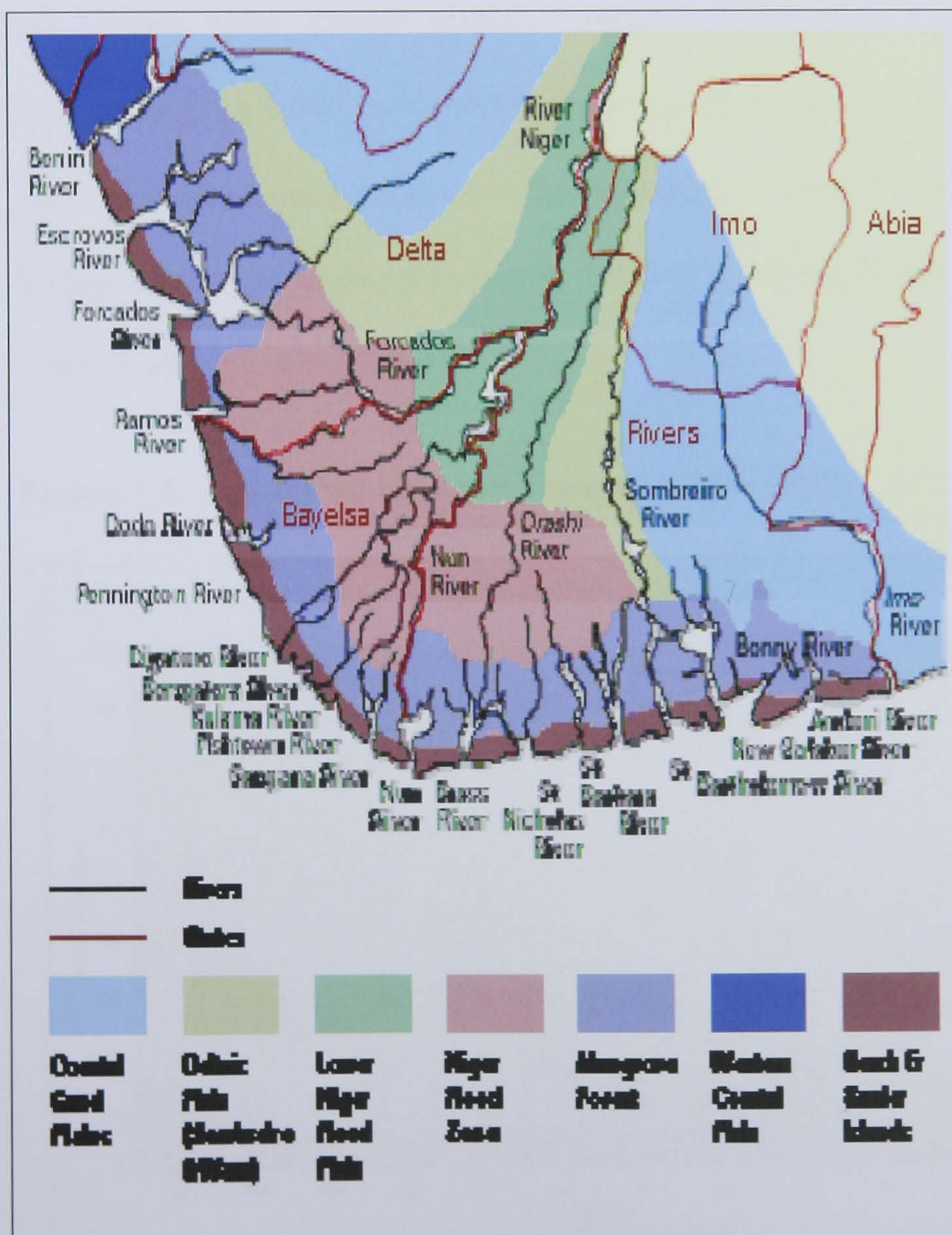
International Ratified conventions include the following:

- Convention on International Trade in Endangered Species; ratified in 1974

- Convention on Migratory Species of Wild Life (signatory only, 1987)
- Convention on Biological Diversity; ratified in 1994
- Convention on Climate Change; ratified 1994
- International Convention to Combat Desertification; ratified in 1997
- Ramsar Convention; ratified in 2001, with the designation of the Hadejia-Nguru wetland as the first designated Ramsar site

3.3 THE NIGER DELTA REGION

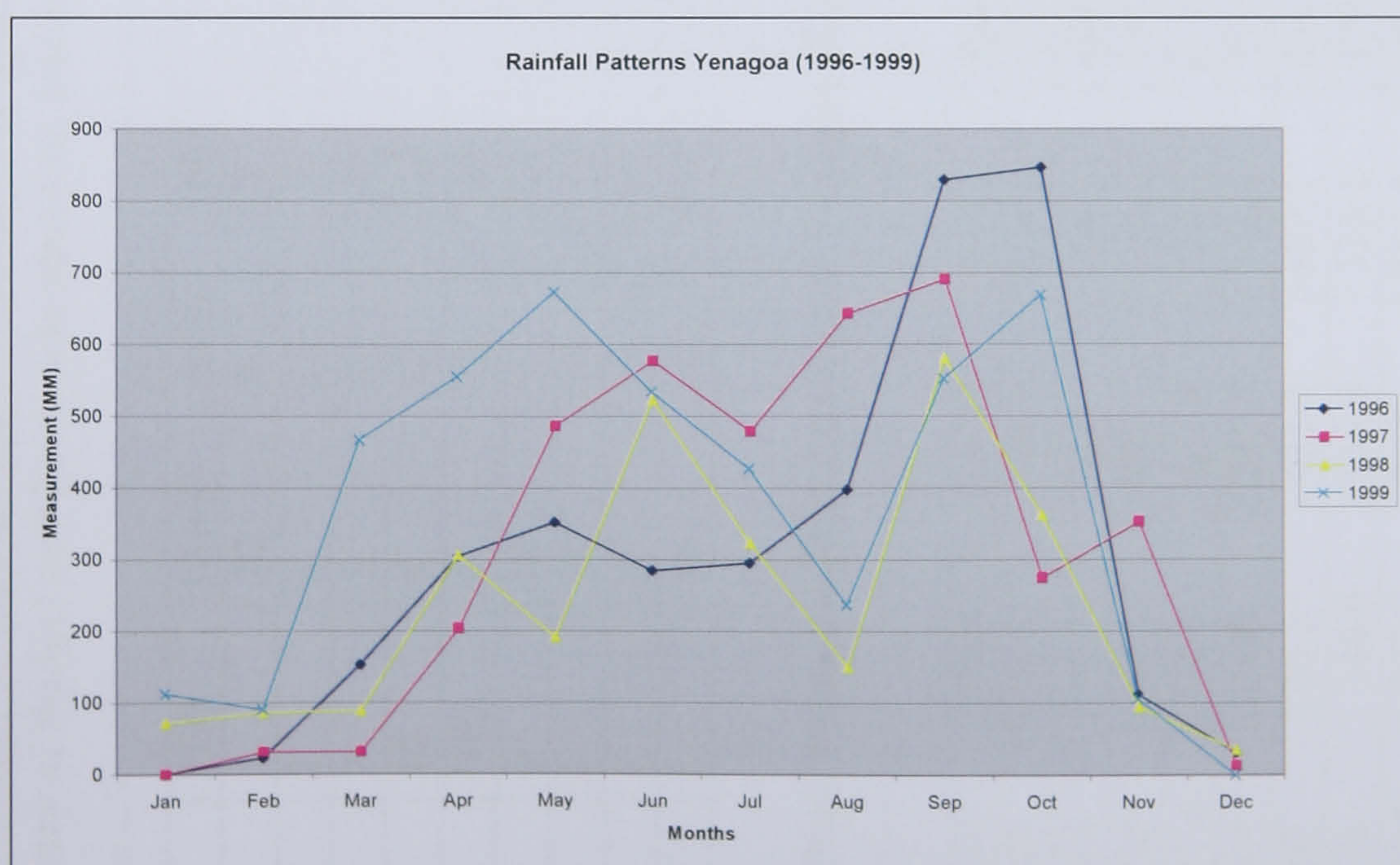
Figure 3.2 The Niger Delta area showing major rivers and ecological zones
(Source: http://www.waado.org/nigerdelta/Maps/NigerDelta_Rivers.html)



The Niger Delta floodplain located in southern Nigeria, forms part of the West African Guinea forest and is considered as the ninth largest drainage area of the

world's rivers and the third largest in Africa (Rangeley, 1994; Moffat and Linden, 1995; Hamadina *et al.*, 2007). Characterized by its low-lying flat plain, the Delta consists of numerous rivers, creeks and estuaries which empty into the Atlantic Ocean (see figure 3.1 above). In addition there is the alluvial deposit of late Pleistocene to Holocene period contained in the region's soil which probably accounts for its rich deposit of minerals (Akpokodje, 1987). The Delta's constituent soil varies, depending on the topography (Aston-Jones *et al.*, 1998). The Delta's low relief and high water table coupled with heavy rainfall, imply many riverine areas of the region are prone to flooding and erosion that occur within its coastline (Moffat and Linden, 1995; UNDP, 2006b). Annual rainfall patterns vary within the region from as high as 4,000 millimetres in the coastal towns of Bonny (Rivers State) and Brass (Bayelsa State), to about 3,000 millimetres in the towns of Ahoada (Rivers), Yenagoa (Bayelsa State, as shown in Table 3.1, 3.2 and figure 3.3 below) and Warri (Delta State) (UNDP, 2006b).

Figure 3.3 Rainfall Patterns Yenagoa (1996-1999)



**Table 3.1 Number of Rainfall Days in Yenagoa (Capital City), Bayelsa State
(Source: Ministry of Budget and Economic planning {statistics department}, Yenagoa)**

YEAR	Rainfall Days											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1996	3	5	10	9	7	17	12	12	12	14	2	2
1997	1	2	4	10	11	17	18	23	17	11	17	3
1998	3	2	5	11	12	17	18	17	24	23	9	2
1999	2	10	8	12	14	14	20	15	23	23	9	NIL
2000	3	NIL	4	15	14	19	14	21	27	23	7	1
2001	1	4	10	9	15	15	15	25	22	16	10	2
2002	1	6	11	14	13	14	24	21	22	15	8	1
2003	7	7	7	8	12	20	22	26	17	19	10	1
2004	4	3	10	12	13	17	23	24	21	15	7	4

Table 3.2 Nine Years Rainfall Patterns in Yenagoa (Capital City), Bayelsa State

YEAR	MONTHS (mm)											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1996	0.45	23.0	153.2	304.5	352.3	284.6	295.1	397.4	829.8	847.0	111.7	31.4
1997	0.60	31.7	32.5	204.3	486.6	577.2	479.2	643.4	691.0	275.0	353.0	14.5
1998	71.4	86.2	89.0	306.3	191.5	523.0	323.2	150.3	581.1	362.3	95.2	35.2
1999	111.8	90.2	467.0	555.0	673.0	534.0	426.3	236.3	552.1	668.3	105.0	0.00
2000	41.4	0.00	245.5	148.5	22.4	7932.0	2952.4	352.1	984.6	159.5	117.5	19.0
2001	0.07	33.3	431.3	407.5	836.5	106.3	417.0	417.0	662.8	116.8	169.8	124.0
2002	0.34	240.6	339.9	323.1	379.3	509.4	1270.3	6148.9	119.1	772.3	1455.1	90.5
2003	296.6	575.5	82.8	352.4	3026.7	7520.7	8301.7	466.0	881.0	8476.1	2832.5	0.33
2004	2.00	15.0	329.0	557.6	464.7	779.6	977.1	628.0	863.3	436.3	72.0	22.5

The Niger Delta has three major divisions; the Central axis, the Eastern block and the Western block (Oyebande *et al.*, 2001). The main ecological division is between the southern tidal freshwater or Marsh forest zone and the inland Flood forest zone of the Eastern flanks (Powell, 1997). In the dry season, the soil of the inland flood zone dries out leaving numerous lakes, flood gullies and swamps (Powell, 1997; UNDP, 2006b). The Taylor Creek area where the Biseni people live is an example of the inland flood zone. The Marsh Forest zone in contrast has greater tidal influence with permanent swampy channels and its species of wildlife are different from those of the flood forest zone (Amadi, 1990; Powell, 1997; UNDP, 2006b).

Characterized by extensive mangrove vegetation, the Marsh Forest zone harbours the Red Colobus Monkey subspecies (*Piliocolobus pennanti epieni*) and the Black-fronted Duiker (*Cephalophus migrifrons*) (Powell, 1997). Osiana town lies within the Marsh Forest zone. The western block of the Niger Delta, composed of a mix of mangrove forests, is contained in Bayelsa State and adjoining Delta State (Oyebande *et al.*, 2001). From surveys done by Powell (1993, 1995, 1997), the region is noted to house many of Nigeria's endemic species. For instance, the aforementioned Red Colobus Monkey, Sclater's Guenon (*Cercopithecus sclateri*) and the Spotted-neck Otter (*Hydrictis maculocolis*) all listed as threatened on the IUCN Red List Data (Hilton-Taylor, 2000). Its vegetation is equally rich in a variety of commercially important large trees including Iron wood (*Lophira alata*) and *Abura* (*Mitragyna ciliata*) (Were, 1991; Ezealor *et al.*, 2004). Its rich fisheries resources include 16 endemic species with a record number of about 197 fish species, more than any coastal system in West Africa (ARD Inc., 2002).

Currently in the Niger Delta, the oil and gas industry is the most important sector. Its crude oil and gas reserves are estimated at 25 billion barrels and 130 trillion cubic feet, respectively (Omene, 2004; Aaron, 2005). These enormous crude oil and gas reserves have attracted several multinational companies, whose activities have impacted negatively on the rich biodiversity of the region (Ezealor, 2001; Luiselli and Akani, 2003). Ironically, although the area accounts for over 85% of the nation's GDP, it is considered to be the poorest region with its GDP per capita below the national average (Aaron, 2005).

Bayelsa State is a typical state of the region and is considered as the central Niger Delta owing to its geographical position (Alagoa, 1999). It receives flood water directly from the river Niger at its northern apex and has over 70% of its total area inundated with floodwater during the wet season (Oyegun, 1999).

3.3.1 Bayelsa State

Bayelsa State lies within Latitude $4^{\circ} 15' N$, $5^{\circ} 23' S$ and longitude $5^{\circ} 22' W$ and $06^{\circ} 45' E$ (Millennium Choice Technologies, 2007). It shares boundaries with Delta State in the West, Rivers State in the East and the Atlantic Ocean in the South. The Niger River flows south of Bayelsa, bifurcating into two main distributaries; the Nun River and the Forcado River. While the Forcado River demarcates the western borders of the State, the Nun flows north to south through the State breaking up into many other rivers and creeks, which eventually empty into the Atlantic Ocean (Alagoa, 1999). The 2006 census statistics are still under review by the federal government, but extrapolation from the 1991 census data put the population of Bayelsans' at 1,121,693 spread over a land area of $12,000 \text{ km}^2$, most of which is wetland (Alagoa, 1999). However, a recent publication on the Bayelsa State government website.

which contradicts Alagoa's aerial coverage, estimates a current population of about 3 million people in an area of 21,110 km² (Millenium Choice Technologies, 2007).

There are eight local government areas recognised in the Constitution of the Federation. They include Brass, Ekeremor, Kolokuma/Opokuma, Nembe, Ogbia, Sagbama, Southern Ijaw and Yenagoa. However the former civilian governor, dissatisfied with the number of local governments, initiated a bill to the state house of assembly for the creation of more local governments in 1999. Subsequently, under the state administration, there are thirty-two local governments.

3.4 PROJECT COMMUNITIES

Reconnaissance surveys were conducted in Bayelsa and Delta States. Towns covered (see map and table 3.3 below) in Bayelsa State included Osiana (4° 53.147'N; 6° 02.635'E), Tungbo (5° 07.470'N; 6° 10.025'E), Sabagreia (5° 02.344'N; 6° 15.025'E), Biseni (5° 17.310'N; 6° 31.099'E), Igbedi (5° 01.342'N; 6° 12.110'E), Ikibiri (4° 54.308'N; 6° 12.676'E), Bomadi-Ekpetiama (4° 58.697'N; 6° 16.383'E), Akumoni-Okordia (5° 08.737'N; 6° 23.556'E); and in Delta State, Uzere (5° 20.560'N; 6° 13.767'E).

The second phase of surveys based on defined selection criteria (see chapter 4), involved collection of data from Biseni and Osiana. In Biseni, physical data were collected from Lake Esiribi (5°17.247'N; 6°31.177'E) and Lake Obaa (5°13.582'N; 6°27.545'E). The four villages within the Biseni clan's area, namely Akpede (5° 14.354'N; 6° 32.467'E), Tuburu (5° 14.394'N; 6° 32.590'E), Egbebiri (5° 14.749'N; 6° 32.341'E) and Tein (5° 14.440'N; 6° 31.961') were where the qualitative data were obtained. Likewise in Osiana, data were collected from Lake Adigbe (4°53.367'N; 6°02.637'E) and Lake Ameneduno (4°51.014'N; 5°59.842'E) and

Osiama1(4°52.480'N; 6°02.366'E), Ogbubolama (4°51.460'N; 6°01.771'E), Awegbene (4°50.778'N; 6°00.046') and Ogbunugbene (4°49.311'N;6°01.188'E).

Figure 3.4 Project Area

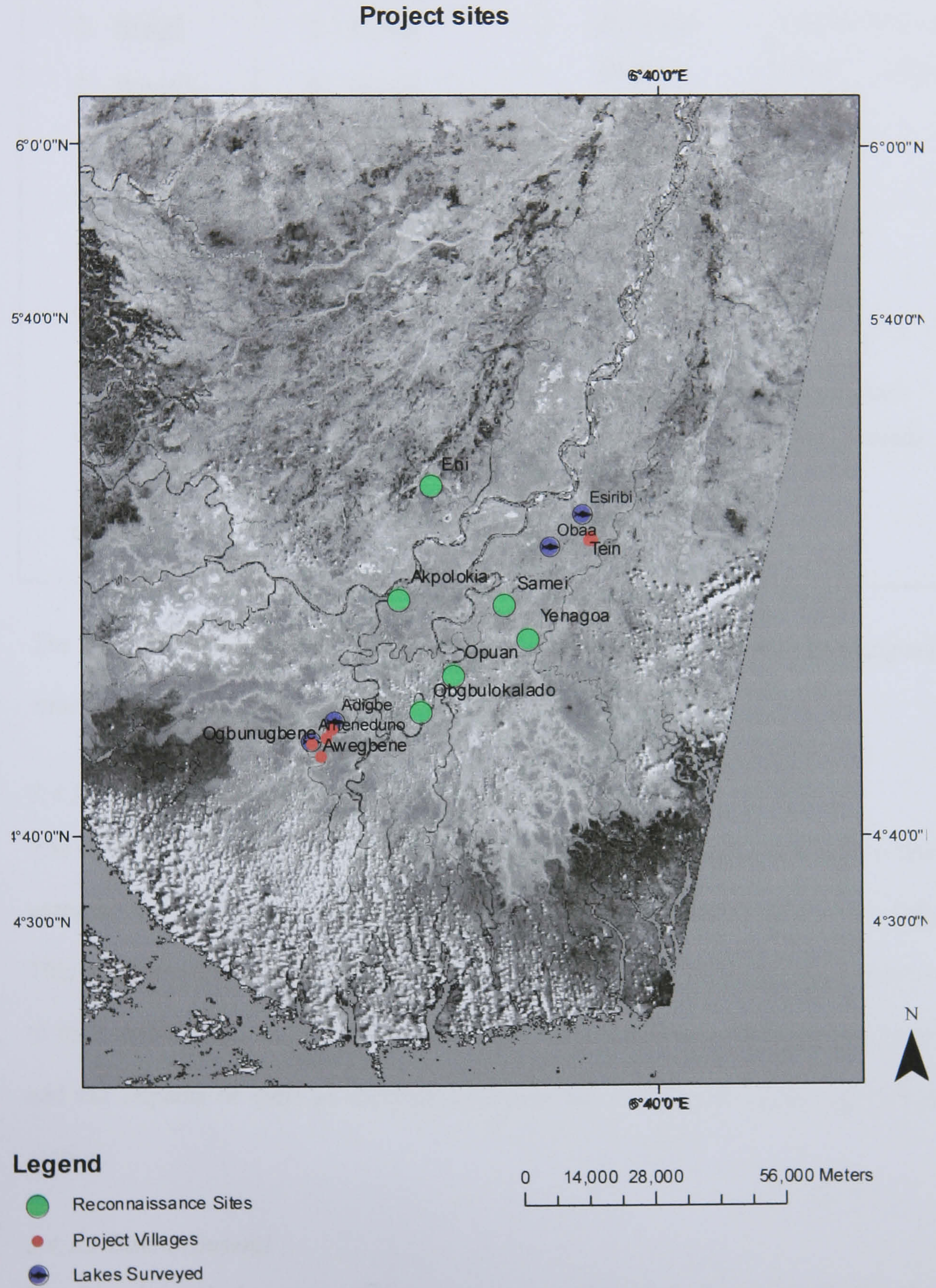


Table 3.3 Names of Project Communities and their sacred lakes

Reconnaissance communities	Sacred Lakes	Detailed study Villages	Lakes Surveyed
1. Akumoni-Okordia	1. Samei		
2. <u>Biseni</u>	2. Esiribi	<u>A. Biseni Area</u>	Esiribi (Sacred)
3. Bomadi-Ekpetiama	3. Opuan	Akpede, Egbebiri, Tein Tuburu	Obaa (Non-Sacred)
4. Igbedi	4. Akakotokoto		
5. Ikibiri	5. Obgbulokalado		
6. <u>Osiama</u>	6. Adigbe	<u>B. Osiama Area</u>	Adigbe (Sacred)
7. Sabagreia	7. Efi	Awegbene	Ameneduno (Non-Sacred)
8. Tungbo-Sagbama	8. Akpolakia	Ogbubolama	
9. Uzere	9. Eni	Ogbunugbene Osiama 1	

The next section is a discussion focused on the institutions, governance and language structure of the two study communities: Biseni and Osiama.

3.4.1 Institutions and Governance in Biseni and Osiama

The discussion of the governance structure in Biseni and Osiama starts with a short narrative on the history of each community as reported by informants in the field. This is followed by a description of the social organization, with particular reference to their relationship with the wider Ijo group. The differences between the groups and the impacts of their governance structures are summarized at the end of the section.

3.4.1.1 Biseni (Buseni)

The Biseni people have two different accounts of their historical origin with slight variations from person to person. The first narrative maintains that the Biseni people

migrated from the former Benin kingdom. The second account upholds that Biseni had been in their territory as long as could possibly be remembered. 'Biseni' (translated as the 'fateful day') depicts the result of a decision taken after an event. However, this is my own deduction, influenced by information obtained from meetings held within the villages. The clan head in reply to the inquiry on what the 'fateful day' represented, reflectively replied:

"The fateful day was when something happened and people scattered".

The caveat however, is the lack of information on what actually occurred that necessitated the dispersal of people. Therefore my theories on the said event are based on simple assumptions. However, these assumptions have some support from general narratives on the Ijaws' origin. Owonaro (2006), in his account of the history of the Ijaws (represented in some texts as Ijo), alleges that Ijaw was one of the sons of Oduduwa. Oduduwa in turn was the progeny of a renowned hunter named Nimrod. The description of Nimrod is akin to the biblical account of one Nimrod who was the founder of the town called Babel (Genesis 10: 8-10). In Owonaro's account, Ijaw departed from his father at Ile-Ife through Benin, eventually settling on the banks of the River Niger. A similar account is noted by Alagoa (1999). However, Alagoa (1999: 83) citing Newington (1938: 11), adds that,

"...the founder of Buseni was a brother of the same father with Akida, founder of Okordia".

Generally, the claim of origin from Benin is popular amongst the Biseni people and the link with the biblical Nimrod appears justified for the Christianized Biseni group. It appears, therefore, that this account of their origin is perhaps based on the Bible's link of humans to Adam, which is a belief system premised on the existence of the creator-God and a system that rewards / punishes human demeanour. However, for the traditional Biseni settler, this narrative is perhaps off-the-mark. As observed in

over two years of interacting with the Biseni community, the belief system of the traditional Biseni person who refused the teachings of the Christian missionaries, appear different from those of modern day Biseni. The modern day Biseni person can be described as eclectic having been exposed to other exogenous cultures and thoughts. The less popular second view is upheld by a handful of persons including the clan head who in the following statement refutes the Benin theory:

"I disagree with the fact that we came from Benin and also with the version that we came from Nembe. I believe that the Biseni people have been on their present site for a very long time. I also disagree that the founding fathers of Biseni clan-that's the original ten sons were from the same father".

Both theories on Biseni origins are based on unsubstantiated evidence which perhaps needs more ethnographic work. However interactions during these meetings provided information on affinities with other Ijo communities. The Biseni share similar belief systems with the Opokuma people, a tribal group scattered along the River Nun who speak Izon, not Inland Ijo like the Biseni group. This perhaps would be considered strange, but as expressed by the clan head in the following statement;

"We have similar juju, which we worship and we share some common words of speech".

There appear to be cultural affinities, which perhaps reflect a common ancestry. In the narrative below on Osiana, similar religious beliefs are strong underpinnings of a unified ancestry amongst lineage groups. It is also important to note that these two tribal groups (Biseni and Opokuma), although not speaking the same language, still share common words of vocabulary. This is perhaps not strange, as both language groups are divisions of the same phylum (Efere and Williamson, 1999; Olson, 2004).

3.4.1.2 Biseni Social Structure

The original formation of the Biseni clan was made up of ten villages. From the interview held with one of the elders in Biseni (Akha), the ten villages are constituents of the ten sons who left Benin:

“Biseni were ten sons who resided in different places to form their own families. When they left Benin they were many. Biseni resided up to Joinkrama 4, having other people as neighbours. In those days, there was land dispute and during the war some of the initial (ten villages) of Biseni were wiped off, while others escaped as far as Omoku (neighbouring village across the Taylor creek) and to other places. Eventually the initial ten villages were reduced to three”.

The former ten villages were Tuburu, Egbebiri, Tein, Kalandika, Brama, Nyinigilege, Ebila, Inanima, Isein and Okunwa. Of the ten, Tuburu was the eldest, followed by Egbebiri and then Tein. Presently Biseni clan is made up of four main villages. When asked how the fourth village became a constituent of the clan, Akha had this to say:

“Akpede (the fourth village of the clan) and Biseni are brothers, who both left Benin. While Biseni went from Benin to Nembe, Akpede first settled in Isara, from there to Akpedetoru eventually locating Biseni who had left Nembe for the Taylor creek area. Akpede in his search for Biseni, found many lakes, including Esiribi, this is why Akpede people have a lot of lakes in Biseni”.

Akpede from all the accounts expressed during the meetings was not part of the original ten sons that initially settled in Biseni. Inter-tribal wars and migration reduced the original ten villages to four villages (Tuburu, Egbebiri, Tein and Akpede). However, these villages appear to re-constitute the village structure in line with the original pattern which existed in the past. Whether this is born out of political underpinnings, it is difficult to say, but it is a most likely reason for this emergence. The ongoing reformation has therefore produced nine additions to the current four. Biseni clan therefore is composed of thirteen villages namely Tuburu, Egbebiri1, Egbebiri2, Tein, Kalama, Akpede, Kalandika, Akudonu, Oturuama, Aleibiri, Tambiri1, Tambiri2, and Akpedetoroma.

The governance structure in Biseni has evolved through the years. Two known systems of clan administration as reported by the elders were practised prior to the current governance structure. The first system was operated under a monarch referred to as the “*pere*”. Subsequently, based on historical accounts of misconduct, the *pere* office was abolished and replaced by the elders’ government known as the “*Amaokwens*”. The “*Ibidaowei*” structure instituted after the *Amaokwens* leadership is the current system in operation. The present system of government is a democratic one in contrast to the former systems which were based on lineage inheritance (the *pere* system) and rights based on seniority (the *Amaokwen* system). The following time-line stated by one of the elders (Akha, Akpede village), gives a chronological order for the governance system:

“From 1943 to 1960, the Amaokwens ruled the clan. The clan head leadership was instituted in 1960. The clan head is elected through majority votes and all Biseni villages are eligible for the post. The first elected clan head was installed in 1960 and was addressed as “IBIDAOWEI 1 of Biseni clan”. He was from Kalama village and his name was Mr. F.F. Igaran. The current clan head is the IBIDAOWEI 2 and he is of the Tuburu community”.

The Pere Structure

The *pere* structure as described by the elders comprised two groups, the inner group and the lawmakers. The inner group called “*Barabo*” were a group of men who executed the king’s decisions, while the “*Awata*” were the ones empowered to make laws for the clan. The *Awatas* were very influential in the affairs of the clan and, as described by the clan head, were held in awe. They had specific times of meetings and whatever laws / decisions passed by the *Awatas* were considered irrevocable. The *Awata* council was an exclusive sect of a few elders of the community. Next to the *Awatas* in governance of the traditional Biseni group were the various compound chiefs from the extended families. Last on the social step were the different nuclear family heads.

The Ibidaowei Structure

The present day leadership is made up of a council of chiefs rather than a dominant leader as in the *pere* system. Elected village heads (*amadaowei*) from each of the villages within the clan form the council of chiefs. An elected clan head sits as leader of the council. Therefore the current clan head, Chief Luckson (the 2nd *Ibidaowei*) is the leader of the presently constituted Biseni council of chiefs. However, the clan head in comparison to the *pere* does not have sovereign rights. Decisions affecting the clan are reached through concession of the council and executed accordingly.

3.4.1.3 Osiamama

Osiamama community is one of the villages that make up the Oyakiri clan in Sagbama local government area. The community is made up of four small villages, situated on levees along the Osiamama creek. The villages include Osiamama1, Ogbubolama, Awegbene and Ogbubolama. Members of the Oyakiri clan are widely scattered over Sagbama and Ekeremor areas of Bayelsa State, therefore they make up a large tribal group in Bayelsa State (Alagoa, 1999). Furthermore, in a similar situation to that of Biseni, the Oyakiri clan originally made up of ten villages is currently about thirteen (personal communication, Elder Asei, Osiamama1 village). The present thirteen villages comprise Akede, Aleibiri, Anyama, BolouAdagbabiri, Eriama, Ibeni, Isampou, Isonu, Kunou, Lalagbene, Ogbosuowari, Osiamama and Tietiegbene.

In contrast to Biseni, interviews held within Osiamama were less informative on historical origins. However, the widespread view is that Osiamama people migrated from the Koluama area. It however appears that the Osiamama people (as part of the Oyakiri clan) are more directly linked to Ijo than Biseni (Owonaro, 2006). Owonaro describes the ancestors of the Oyakiri clan as a direct son of Ijaw named Beni, who left his father's settlement to establish his own settlement. Similarly Alagoa (1999)

citing Fellows (1932) notes that historical accounts of the Oyakiri clan show that their original ancestor was a man called Ijaw (Ijo), who lived in Benin and eventually moved to the town of Aboh on the Niger River. Oyakiri was the grandson of Ijaw whose original settlement was along the Kunu creek. The Oyakiri towns had a corporate religious institution called the Ibeni Egbesu. Annual festivals were usually celebrated as a unifying structure for the original ten settlements until the shrine was destroyed by a British force in 1911 (Alagoa, 1999).

3.4.1.4 Osiama Social Structure

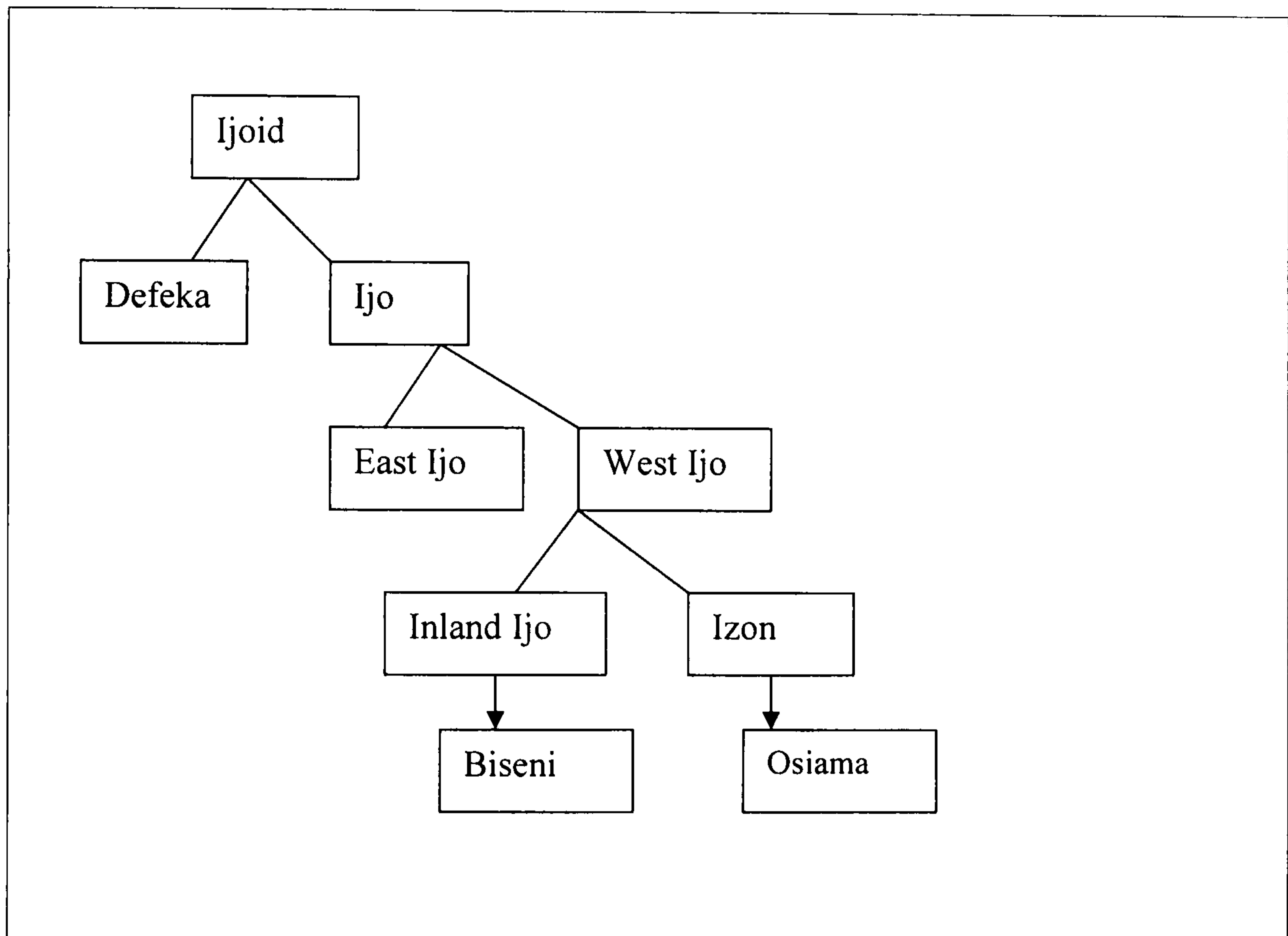
In similarity to Biseni, the clan is headed by The *Amananaowei of Oyakiri*. His Royal Majesty King Joshua Igbagara. Its present structure mirrors that of Biseni. However the Oyakiri clan is bigger than the Biseni clan. In addition, governance of the clan in the past was by the oldest man in the community, known as *Amaokosuowei* who also served as the spiritual head of the community. The *Amaokosuowei* was traditionally considered the chief priest to the gods of the community and in charge of carrying out the necessary rituals to the gods on behalf of the community. The *Amaokosuowei* ruled his village with a group, made up of the oldest male of each extended family unit (similar to Biseni).

3.4.1.5 Biseni and Osiama Language Groups

From the preceding narrative, both Biseni and Osiama appear to have common ancestry as descendants of Ijo. The apparent difference is the language. Importantly, from field observation, several persons in Biseni could communicate in the Izon language. However, the Osiama people do not understand the Inland Ijo spoken in Biseni (although perhaps a handful may understand a word or two). Overall, the two major language groups spoken in Bayelsa State are Ijoid and Benue-Congo [both belonging to the Niger-Congo family, mentioned in chapter 2, section 2.3.4. Efero and Williamson, 1999]. However, only details of the sub-division of the Ijoid group

are shown in box 3.2 below, as the two project communities in question belong to the Ijoid language group. Interestingly, while Defeka language is limited to a small group in Rivers State, the Ijo sub-group is widely spoken cutting across five states, including Bayelsa, Delta, Edo, Ondo and Rivers (Efere and Williamson, 1999).

Box 3.2 Language sub group of study communities: synthesized from Efere and Williamson (1999).



In summary, in the Biseni community, it appears that the transition in governance structure has had a minimal effect on decisions affecting natural resources. The ownership of certain resources, for instance Lake Esiribi, is not contested and issues that affect Lake Esiribi, including its laws are the strict prerogative of the members of the family (the Erewaris).

In contrast, there are changes in Osiana, which perhaps are attributed to a changing leadership pattern and politics. Throughout the period of this study (2004-2007), the governance of the community was placed under an elected committee known as "The

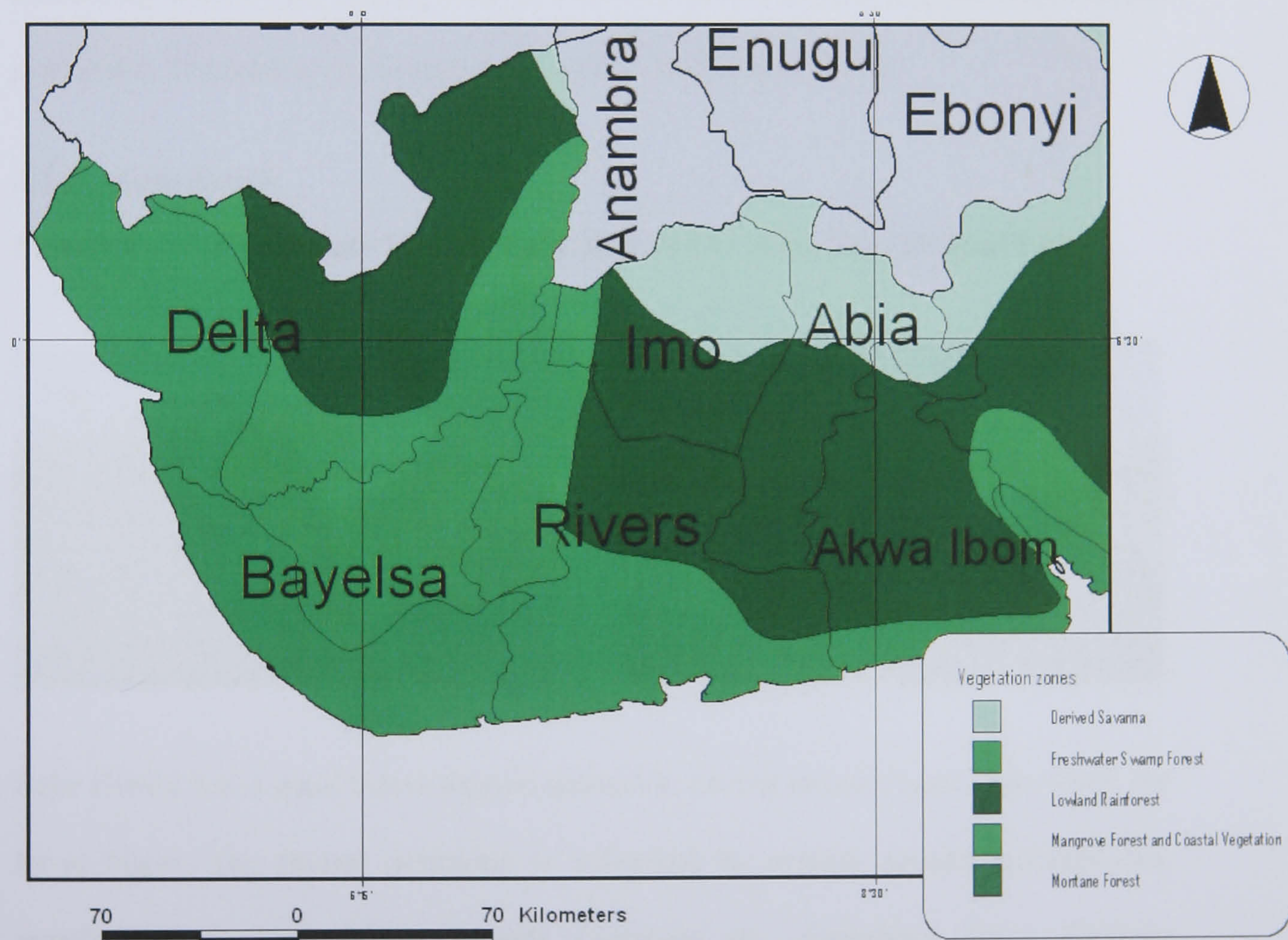
Community Development Committee” (CDC). It is therefore the CDC that now decides the date of the fishing festival and, within the study period of the project, the chairman of this committee changed twice. This might also have implications for the future management of resources within this region. Stable governance is important in decision making processes and is indicative of the health of a community and sustainable management of its resources. In addition, the change in ownership of Adigbe from family to community indicates a trend which is likely to reverberate in other communities in future. Also, from the changing roles of leadership, it appears that in the days of the *amaokwens/ amaokosuwei* the leaders acted in the capacities of being both administrative and spiritual heads of the community, but today the situation is different.

The affinity between cultural groups within this region is instructive, for instance as recounted by the clan head of Biseni in section 3.4.1.1, on their relationship with another tribal group, the Opokumas. The fact that the two groups speak different languages is a pointer to the level of social evolution within the region. Relationships between tribal groups such as depicted by Biseni and Opokuma could act as a good platform for exploring the potential for wider scale sustainable natural resource regimes within the region. Related tribal groups are more inclined to consider and accept strategies that build on their common heritage.

3.5 VEGETATION OF STUDY AREA

The vegetation profile of the Niger Delta communities varies depending on the ecozone. However, Osiana and Biseni are within the fresh water swamp forest ecozone, with Osiana in the inland flood zone and Biseni in the marsh forest zone. The following subsection discusses observations on the vegetation structure found at the time of data collection from the communities in question and their lakes (see appendix 5 for full table of distribution and map below).

Figure 3.5 Niger Delta Vegetation Map
(Source: Archives of The Nigerian Conservation Foundation)



3.5.1 Biseni Area

The main water source for the wetland is the River Niger, from which Lake Esiribi takes root. Other sources of water for the surrounding swamp forest are the Taylor creek which, as shown on the resource maps drawn by the community (Appendix 2),

delineates the Biseni clan's area from its neighbours. Vegetation around the community is mainly made up of shrubs, herbs and grasses. Plants seen in abundance around the settlement are mostly cultivated food crops. Common food plants are *Musa paradisiaca*, *Musa sapientum* and *Manihot esculenta*.

It is important to note that during the field trips, chain-saw operators were noticed quite often and as a result of their activities most of the important commercial trees are declining fast in the forests around the settlements. However on both extremes of the community there are secondary forest growths, with a few areas of riparian forest containing useful hard woods such as *Alstonia boonei*, *Irvingia gabonensis*, *Ceiba pentandra*, *Treculia africana* and the common *Mitragyna ciliata*.

3.5.2 Lake Esiribi

Plate 3.1 Panoramic View of Lake Esiribi (A: West End, B: East End)

[A]



[B]



Lake Esiribi has a good forest support around it, having annual flood water from the River Niger. The littoral perimeter is colonised by several aquatic macrophytes, mostly free floating. These include *Ludwigia* sp., *Nymphaea lotus*, *Salvinia nymphellula*, *Azolla africana*, *Pistia stratiotes*, *Ipomoea aquatica* and *Eichhornia crassipes*. Main woody species seen include the prevalent species of rattan, made up of two species, *Calamus deerratus* and *Laccosperma secudiflorum*, while floor

vegetation has scattered numbers of *Costus* sp. and species of the Zingiberaceae family mainly *Aframomum* sp. and seedlings of rattan plants.

3.5.3 Lake Obaa

Plate 3.2 Panoramic View of Lake Obaa (A: East End, B: Centre)



Lake Obaa, in contrast to Lake Esiribi, has mixed vegetation with both primary and secondary forest. The difficulty of accessing these areas may account for the untouched patches of primary vegetation. Woody plants noted were approximately 40 metres in height. The forest floor is moist with scattered seedlings of the rattan plant *Oncocalamus* sp. Old logs seen from the outer perimeter of the lake showed the presence of a variety of bryophytes and epiphytes including members of the Orchidaceae such as *Bulbophyllum* sp. Forest around the lake can be described as secondary. Plant species seen included *Pterocarpus patens*, *Nauclea* sp. and *Symphonia globulifera*. Aquatic vegetation included the dominant species *Scirpus cubensis*. Other macrophytes seen were the sub-emergent plant *Ceratophyllum* sp., *Pistia stratiotes*, *Azolla africana* and *Eichhornia crassipes*.

3.5.4 Osiana Area

Osiana community is a riverine community situated on elevated levees on the Osiana Creek, with fringing forest on opposite sides of the river bank containing both closed and open forest canopy. Vegetation composition around the villages is

open made up of shrubs, grasses and stands of *Mangifera indica*, food crops such as *Manihot* and stands of *Musa* spp. Forest at the outer perimeter of the village and across the river is swampy and full of levees, indicative of swamp forest. Woody plants seen included *Nauclea* sp., *Mitragyna ciliata*, *Irvingia* sp. and *Lophira alata*. Logging is similar to the situation in Biseni.

3.5.5 Lake Adigbe

Plate 3.3 Panoramic View of Lake Adigbe (A: West End, B: East End)



Lake Adigbe is an open lake with a good forest growth on the east side of the river. However, with the yearly fishing festival there are obvious and increased signs of deforestation as trees and vegetation make room for housing tents and bonfires. Vegetation close to the community is a mix of both secondary and tertiary forest growths. Trees include *Ceiba pentadra*, *Raphia hookeri*, *Alstonia boonei*, *Mitragyna ciliata* and *Elaeis guineensis*. Aquatic macrophytes present on the surface of the lake include *Ludwigia* sp. and *Eichhornia crassipes*, but this Water hyacinth's invasion is minimal and the water surface appears to be well aerated.

3.5.6 Lake Ameneduno

Lake Ameneduno is a shallow lake and fits descriptions of some of the lakes observed by Otobo and Alagoa (1990), threatened by serious silt deposition and prolific vegetation growth. Ameneduno is infested with leeches and its water surface

is covered with *Pistia stratiotes*. Common woody plants around the lake are *Irvingia* sp., *Elaeis guineensis*, *Mitragyna ciliata* and *Raphia* sp.

3.5.7 Lake Efi

Plate 3.4 Panoramic View of Lake Efi (A: West End, B: Centre)



Lake Efi (a sacred lake belonging to the Sabagreia community) was an extra site added to the original four lakes assessed, based on the fact that the annual fishing festival of the lake coincided with the timing of my field trips. In addition, this was the community where the pilot test of the household questionnaire was done. Fish were therefore sampled in Lake Efi, however because of the number of fisherfolk at the lake during this period, physiochemical tests were not carried out as it was practically impossible.

The east end of the lake (looking from the settlement) is well forested and shows a similar vegetation profile to Lake Adigbe. Also, at Lake Efi there are obvious signs of deforestation attributed to camp sites built around the lake for the fishing festival. From observations, the lake is free of water hyacinth incursion.

CHAPTER 4

THE RESEARCH METHOD AND APPROACH

4.1 INTRODUCTION

Chapters 1 to 3 set out the background and theoretical framework for investigating the Niger Delta people's relationship with natural systems. The overall aim of the research ultimately the research questions posed in section 1.4 led to the choice of appropriate methods (Babbie, 1997; Punch, 2000; Creswell, 2003). This chapter discusses the choices of methods and methodology made for the research.

There is a common assumption that a connection exists between epistemology, theory and method (Brannen, 1992). As a result, the choice of a methodology derives from established philosophical assumptions or perspectives (Creswell and Plano Clark, 2007). Hence, researchers bring into the research process different world views which form the foundation of the varied methods of conducting research. In the choices made for methods of inquiry, the chapter commences in section 4.2 with salient methodological issues. Subsequently, the thesis research design is detailed in section 4.3. Section 4.4 depicts the data collection process, which was done in two phases. Section 4.5 is an account of the steps employed in data management and analysis. The chapter ends in section 4.6 with discussions on the methodological limitations and weaknesses.

4.2 METHODOLOGICAL ISSUES

As mentioned earlier in the introduction, the different world views that researchers bring into research determine the choices made. Several world views exist, but prominent is that of the positivists, constructivists and pragmatists. I employed

multiple world views in the mixed methods design, based on the suggestion of Greene and Caracelli (2003), who advocate the use of multiple paradigms rather than an overall paradigm, such as pragmatism (Crabtree *et al.*, 1993; Creswell, 2003). To make the concept of sacred ecosystems and cosmology operational, I drew from various theories such as the constructs of the sacred (Durkheim, 1915; Goody, 1961; Evans-Pritchard, 1965; Douglas, 1992), cognitive anthropology (D'Andrade, 1995), Introspective ethnography (Griaule, 1970; Riesman, 1998) and human ecology (Ramakrishnan, 2003). Consequentially I applied both qualitative and quantitative methods for sampling, data collection, interpretation and analysis rather than a single method (Campbell and Fiske, 1959; Smith, 1983; Howe, 1992; Wolff *et al.*, 1993; Tashakkori and Teddlie, 1998, 2003; Creswell, 2003; Onwuegbuzie and Leech, 2005), as the mixed methods approach gave opportunity to clarify subtleties. The logic of triangulation in mixed methods gave this research the ability to check the results of my qualitative investigation against other quantitative measures used in the study (Sieber, 1973; Denzin, 1989b; Morse, 1991; Bryman, 1992). More so, it allowed the use of qualitative and quantitative approaches in combination to provide a better understanding of the research problems than either approach alone (Smith, 1983; Brewer and Hunter, 1989; Wolff *et al.*, 1993; Tashakkori and Teddlie, 1998). Using both qualitative and quantitative data, information on indigenous world views, attitudes, practices and relationships with the natural systems was drawn from various sources and comparisons made across different scales. For instance, group interviews were conducted to complement both the survey research and the participant observation for cross-validity and reliability of results (Morgan, 1988). Hence, the combination of both forms of data gave a more complete picture through direct quotes of participants' perspectives, generalizations and notations of trends (Miles and Huberman, 1984; Black and Ricardo, 1994).

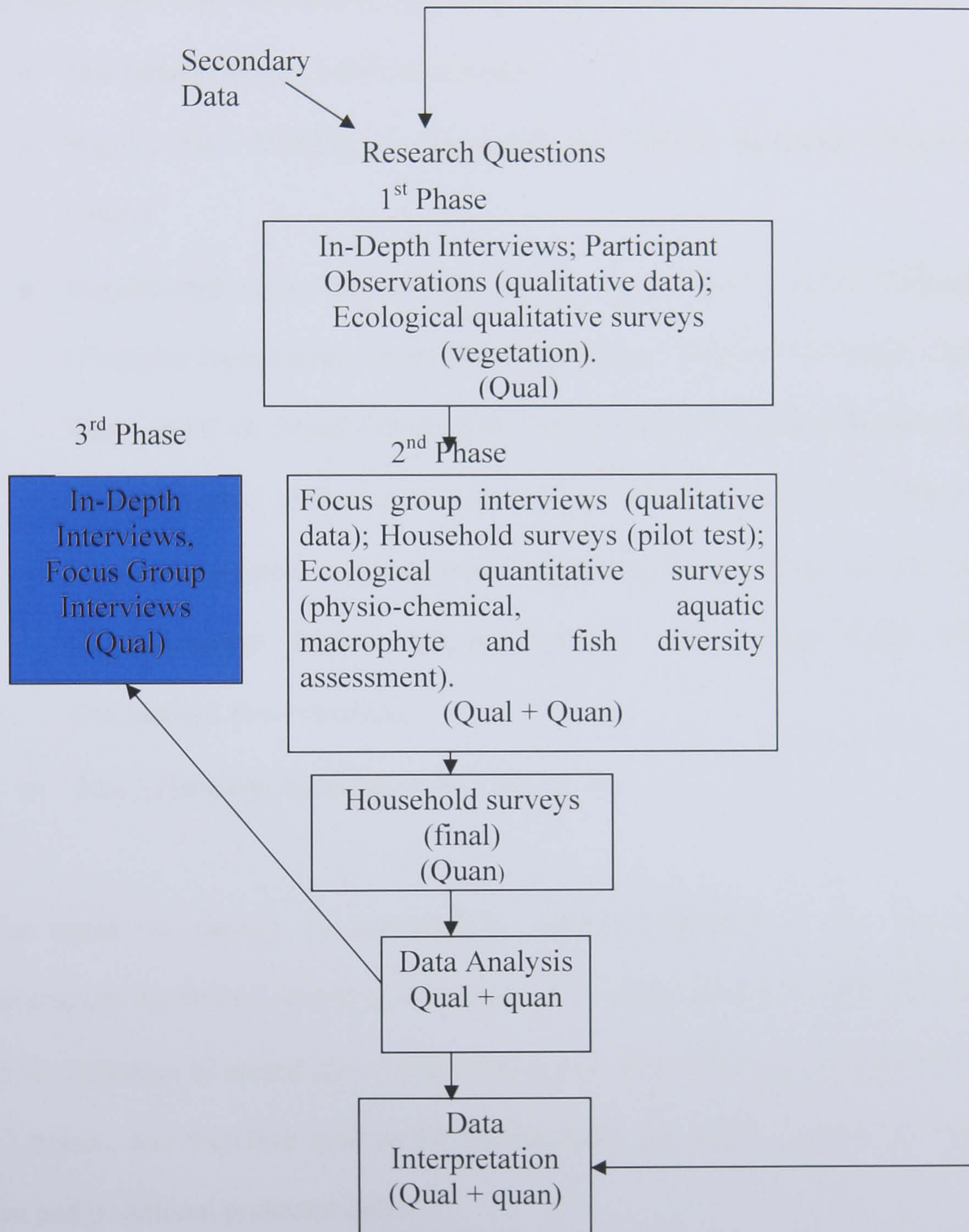
4.3 THE RESEARCH DESIGN

Data collection was done in two main phases, this ensured that data were collected systematically and allowed data analysis from the first phase before undertaking the second phase. This structure conforms to the exploratory design (Creswell *et al.*, 2004; Creswell and Plano Clark, 2007). In most methodology literature (for example, Morse, 1991; Morgan, 1998; Tashakkori and Teddlie, 1998; Creswell, 2003; Creswell and Plano Clark, 2007), the priority given to either method (qualitative or quantitative) is commonly expressed in capital letters. In the schematic research process shown in figure 4.1, priority is given to the qualitative (Qual) method. The research goals and research question (see section 1.4) influenced which of the two methods received greater priority (Morse, 1991). In this case, exploring the different subtleties of the world views of the people meant qualitative data methods weighed more than quantitative methods. In implementing the mixed-methods strategy for this research, both the qualitative and the quantitative data were collected sequentially in phases (cf. Steckler *et al.*, 1992; Ulin *et al.*, 1996; Tashakkori and Teddlie, 1998; Creswell, 2003; Creswell and Plano Clark, 2007). The whole research process is best described as a continuous loop, however for clarity it is depicted as a flow diagram.

The process involved a series of continuous events of data collection, interpretation and verification done with reference to research questions. The first phase, as shown in the figure below, began with a reconnaissance of villages within the Delta which culminated in the collection of various qualitative data. Subsequently, from preliminary assessment of the data, a second phase evolved with more in-depth data collection and a testing of measures used at the household level. On analyzing both the quantitative and qualitative data, a final phase evolved, which helped to verify findings of the research in consultation with the community. The interpretative stage

in the research process involved comparing the different data sets (i.e. qualitative and quantitative). Elaboration of each phase and process is detailed in the next section.

Figure 4.1 The Research Process



Secondary data were important for background knowledge of the world views of the people of the Delta and to categorize the different uses of natural resources. The sources of secondary data are detailed in the next section.

4.3.1 Secondary Data

Secondary data on background information on the distribution of sacred lakes within the Niger Delta were obtained by consulting archive materials from:

- The Federal Ministry of Environment,
- Bayelsa State Ministry of Agriculture and Natural Resources (Registry of Lakes),
- Unpublished works; for instance survey reports by Dr. A.J.T. Otobotekere (Fisheries Department, Niger Delta University, Wilberforce Island, Bayelsa State) and C. B. Powell (Biological Unit, Institute of Pollution Studies, Rivers State University of Science and Technology, Port Harcourt, Rivers State).
- Non-governmental environmental organisations operating in the region (Environmental Rights Action, Yenagoa and Living Earth Nigeria Foundation, Port Harcourt),
- Key informants identified within the region.

The report on species of conservation interest submitted to the River State government by Powell (1993) corroborated most of the informal and formal reports on the existence of sacred lakes within this region. Powell's list, reproduced in Table 4.1 below, was therefore used as the starting point for initial visits to communities that had traditional protected lakes.

Table 4.1 Local governments in Bayelsa State and towns with sacred lakes (Source: Powell, 1993). Asterisks indicate lakes visited during this study.

S/N	L.G.As	Town	Lake
1	Ekelga	i. Ogbogbene ii. Isampou iii. Lalagbene	i. Ayei ii. Pouduno iii. Ebilowei and Ere-ama
2	Salga	i. Akedei ii. Ogobiri/Kabiama iii. Toru-Angalabiri iv. Kabiama v. Osiamia vi. Toru-Eberi	i. Opuduno ii. Embietie iii. Pirituadun iv. Itoinduno v. *Adigbe vi. Gbenegbene
3	Southern Ijaw	i. Amassoma ii. Ekowe iii. Oporoma	i. Adegbe ii. Adegbe iii. Bouperre
4	Yelga	i. Akpide-Biseni ii. Tein-Biseni iii. Odi iv. Sabagreia	i. *Esiribi and Sabiyo ii. Atumatu (Awowari-Tein), Asa (Ikuluduno-Tein) iii. Ebebe, Lala and Mgbesi iv. *Efi and (with Ayebabiri) Evira

4.4 DATA COLLECTION

Before commencing discussion on the methods used in generating the qualitative data, it is important to discuss the rigour achieved in selection and training of personnel used in the data collection process. The mixed-methods design of the research meant field assistants had to be versatile in the knowledge and use of different method tools to achieve set objectives. The three core field assistants, who were present from the onset of the field work, had varied experiences. All three were graduates from the Universities of Port Harcourt and Rivers State University of Science and Technology. However, even though all three had basic experience of field interviews and surveys, three days of training had to be conducted before the field work commenced. Role play was adopted as a technique to reinforce learning. So, for example, someone had to act as an interviewer, while another acted as the interviewee. At the end of each day's activities, feedback was important to establish learning outcomes. This exercise ensured that team members operated on the same basis. Strengths and weaknesses of each team member were spotted during the training exercise and subsequently addressed.

Sampling

Deciding how many samples were sufficient for my analysis was informed by my findings from the reconnaissance. Having conducted a series of interviews within most of the nine communities visited, I noticed at a certain point that subsequent information gathered during interviews included repetitions of previously collected data (Lincoln and Guba, 1985; Patton, 1990; Perry, 1998; Pansiri, 2006). The nine communities visited were combined to define my unit of analysis in a bounded context (Miles and Huberman, 1994). Each community was taken as a separate case (see Appendix 1) and within-case sampling was done by interviewing an individual or a group for insights on the concept of sacred ecosystems (Patton, 1990; Miles and

Huberman, 1994). Subsequently in the second phase I chose two cases out of the nine communities, based on selection criteria developed from the reconnaissance survey. These two communities reflected the major variations of the phenomenon being studied and provided a rich narrative for a thorough in-depth study.

Composition of Participants

The composition of participants involved in the qualitative sampling is shown in the table below. There were more male participants, including youths and elders (66.07%) than females (33.93%) as shown in Table 4.2 below.

Table 4.2 Group Composition and Types of Data

Group Composition	Type of Qualitative Data							
	Reconnaissance Survey (Semi-structured interviews, SSI) (9 Villages)	Focus Group Interviews (FGI)		Personal Interviews (SSI)		Follow-up (FGI)		Number of Participants
		Osiamama	Biseni	Osiamama	Biseni	Osiamama	Biseni	
Elders Men	6	-	3	1	3	2	6	21
Elders Women	-	-	9	-	1	1	1	12
Youths Men	3	6	5	-	-	1	1	16
Youths Women	-	-	7	-	-	-	-	7
Participants	Total							56

4.4.1 First phase

This phase, the reconnaissance, provided the research with a working template of qualitative data to hone the initial research questions. Qualitative data provided the cultural contexts within which the community uses resources and provided descriptions of the community's interaction with the natural system.

In order to build up patterns and theories, visits had to be made to the sites of participants (Beebe, 1995). Therefore, I employed the methods of asking open-ended questions and recording narratives from identified relevant individuals. Qualitative data were obtained mainly through in-depth interviews and participant observation, discussed in detail in sections 4.4.4.1 and 4.4.4.2 respectively. The data collection process was initiated using the 'Snowball or chain sampling' technique (Patton, 1990). This process led to a list of key informants and names within communities ultimately visited during the reconnaissance. The snowball sampling method (discussed further in section 4.4.1.2) was useful in locating cases. For instance in Osiana, the name of Elder Asei, was constantly mentioned through the referral links formed within the community. This established him as a potential participant for the initial in-depth interview held in the community.

The next section describes the various methods employed during the first phase of data collection.

4.4.1.1 In-depth Interview

In-depth interviews provide a greater breadth of data than any other type of interview format (Fontana and Frey, 2003). Many qualitative researchers differentiate between in-depth interviewing and participant observation. However, as pointed out by Lofland (1971) the two go hand in hand, and many of the data gathered in participant observation come from informal interviewing in the field. This was the case in the interviews conducted during the reconnaissance and subsequent field work. For instance in my role as a participant observer in the fishing sites, it was mostly at the times of interviewing my informants that certain practices were observed. This ultimately led to my either using probing questions to clarify the observed phenomenon or blatantly asking direct questions. Before discussing the in-depth

interviewing process of the study, it is important to enunciate on the sampling technique employed in my choice of suitable persons.

Snowball Technique

As mentioned in section 4.4.1, the snowball sampling method was the chosen technique because the research was explorative and the snowball sampling provided an efficient way to locate cases (Hendricks and Blanken, 1992; Faugier and Sargeant, 1997). Snowball sampling through social networks has been used in research on several sensitive topics, particularly in the health sector such as drug use (Cusick and Kimber, 2007), non-heterosexual women (Browne, 2007) and prostitutes (Faugier, 1996). Although the focus of this research is unrelated to sexuality, it has the element of a hidden population. Adherents of indigenous beliefs are sometimes hidden within a wider population and are thus difficult to locate. In order to obtain rich narratives on indigenous belief systems, my strategy was to target a select group of active practitioners of this system. Therefore, in the recruiting process once a name was mentioned, I determined their suitability for interview, by asking simply if the person attended church. This question (which was my spotlight to locating the hidden population) helped me to assess whether to ask more probing questions to further determine either to recruit the respondent or to ask for referrals. In the reconnaissance, I had to weed through the many referrals given until I established the type of chains that were useful. The snowball technique aided my access into the communities and helped me to gain trust with the respondents (Fontana and Frey, 2003). This familiarity made them willing to participate in the research.

In summary, snowball sampling is a 'purposeful' sampling technique (Patton, 1990), meaning that the researcher has a purpose in mind or has a specific pre-defined group to be sampled. Ultimately, snowball sampling is a biased sampling technique.

because it does not select individuals randomly (Biernacki and Waldorf, 1981). However as Patton (1990) posits, samples chosen through snowball sampling are those selected as information rich cases. These are cases which cannot be generalized, but are able to provide maximum theoretical understanding of the social process (Faugier and Sargeant, 1997). One disadvantage of snowball sampling is that it can exclude some categories of people such as women (Etter and Perneger, 2000; Browne, 2007). Personal bias may be introduced as some individuals are more obvious targets than others. For instance, the likelihood of targeting individuals who are popular is greater than those who are less popular (Faugier and Sargeant, 1997). Division of labour in these communities meant that in most cases women who should be considered as eligible respondents were not mentioned, as women do not assume leadership roles. To reduce this sampling bias, information obtained from the in-depth interviews was triangulated with focus group interviews (Denzin, 1989b) and, when possible, female indigenous belief practitioners were particularly sought for interviews.

As soon as I identified the individuals within each community to be interviewed, convenient meetings were arranged, within the natural setting of each participant (Beebe, 1995). In most cases, interviews were held at fishing sites or at homes of participants after the day's work. Series of recorded interviews (notes were taken, but in cases of oral history discussed in the next paragraph, a tape recorder was used with permission) with chosen participants were held in all the communities visited. For the in-depth interview sessions, a series of semi-structured questions to guide the interaction were used (Piaget, 1947). The semi-structured interview format was chosen as a tool to capture how the participant thought of his / her domain (Barrio *et al.*, 1999). It created a forum to investigate more about how the people's world view

influenced their relationship with natural resources (Moser and Kalton, 1971; Patton, 1990; Babbie, 1997; Warburton and Martin, 1999; Denzin and Lincoln, 2003). However, although key points of the interviews conducted with participants involved a series of questions, these questions were varied depending on the response received from the interviewee (Fontana and Frey, 2003). The interview script used in the in-depth interviews had the following set of questions as starting points (the full explorative subcategories are outlined in Appendix 1):

1. Oral History
2. Natural Resource Use
3. Sacred Lakes and the community,
4. General Issues (particularly, relationships with other communities and external actors)

Oral history was an important starting point for interactions with participants. It particularly provided a rich narrative on the settlement history of the communities, ancestry, governance structure and ownership issues relating to natural resources. Importantly, it highlighted the differentiation between uses of natural resources within the domain of the community. Furthermore, it created a forum for understanding the culture and beliefs of the people under study. Commonly, participants during interview sessions referred to changing patterns in technology and belief as, ‘in those days...but nowadays it is ...’ Oral history has been used to make visible the history of groups whose views are hidden or marginalised, as for example in feminist studies of history (Gluck and Patai, 1991). People often recall critical occurrences in their lives in relation to other events or in their experiences with others (Schwartz, 1999). Interviewees who were >50 years old were able to describe in detail the beliefs and practices of the past and the changes in systems of governance. However relating these narratives to actual dates required identifying

their link with key happenings in the wider society. Dates that people could recall related to events in the 1960s such as independence and the Nigerian civil war.

Plate 4.1 **Personal Interview-Village Head Tungbo**



4.4.1.2 Participant Observation

Observation in itself has been described as the fundamental basis of all research methods (Adler and Adler, 1994), and can be related to the positivist tradition of making inference from the field, void of interference. On the other hand, it also could refer to the constructivist view of understanding varied meanings of subjects, through participating in the field. Achieving a balance between participation and observation is a delicate balance and remains as an ideal for researchers, particularly anthropologists (Stocking 1983). In describing participant observation, Werner and Schoepfle (1987) posit that it is the mainstay of ethnographic activity. Perhaps for this reason it is sometimes used interchangeably with the term ethnography (Agar, 1980). Gold (1958) cited in Angrosino and Mays de Pérez (2003) classified participant observation on a continuum starting from the complete participant stance to the complete observer. In between, lies the participant as observer and the observer as participant. Other workers (e.g. Spradley, 1980; Adler and Adler, 1994)

also follow Gold's continuum type classification. Therefore, there are different varieties of participant observation and perhaps this accounts for the lack of a single agreed meaning (Savage, 2000). However, for the purpose of this study, the definition offered by Grbich (1999) is adopted, in which participant observation is used as an inconspicuous subjective data collection approach. The aim of this data collection technique was to identify 'what was going on in the community' through watching events with an open mind (Kemp, 2001). Also, in agreement with Lofland (1971), mentioned earlier in section 4.4.1.1, most data gathered in participant observation came from informal talks and interviewing in the field. Moses and Kalton (1971) posit that the dual approach of study using semi-structured interviews and participant observation supplements the biases and setbacks of using only participant observation as a survey tool. As a non-paying tenant of one of the village chiefs during the different periods of my field trip, I was privileged to pick up on conversation on important aspects of the 'lived experiences' of the community and also observe how beliefs translated into practice.

Interpersonal Relations

Interaction with the community was a tentative process that involved the continuous testing by all participants of what my role in the community was about. I was introduced as a U.K. based student to elders within each community visited. Initially this role limited my access to some information. It took weeks of living amongst the people for some of the 'formal stiffness' of relating with an 'educated woman' to wear off. After a while the awkwardness wore off as participants interacted with each other and explained my role. The traditional leaders, particularly in Biseni and Osiana expedited this process of my integration, as they constantly related to their subjects that my research was for the good and prosperity of the clan. The later interviews went smoothly and I was more or less accepted like a daughter of the

community, with an offer to work within the community after my studies by the village head in Biseni. Therefore I moved from the position of outside status to a status of member of the society, where I could move freely within the community and people more or less accepted my presence as normal. This leads to the second issue, reciprocity, reported by several qualitative researchers as a growing issue in research ethics, particularly amongst feminist researchers (e.g. Harrison *et al.*, 2001; Tersbol, 2004).

Reciprocity implies the exchange of goodwill, favours and goods between people (Tersbol, 2004). Interviewing, particularly in ethnography, is a powerful tool in invading other people's lives, as we make use of other people's time (Spradley, 1979). It is through interacting with people during field work that insights and information are gained on the subject matter. As a result, reciprocity is important in ethnographic research, particularly in settings where the researcher is an outsider (Brislin and Holwill, 1979), like I was in these societies. The decision to insert oneself in a social setting other than one's own has emotional consequences (Behar, 1996). Hence, the challenge was how to establish rapport with participants. In my relationship with informants and participants within these societies, I was constantly reminded to convey to the government the needs of the community. However, interview stereotypes demand that the interviewer maintains a distance from the interviewee (Selltitz *et al.*, 1965 cited in Fontana and Frey, 2003). Developing trust and good rapport between the interviewer and interviewee is important but a hidden danger is that a good rapport opens the researcher to becoming a spokesperson for the group studied or going 'native' (Fontana and Frey, 2003). In situations where a researcher lives, eats and practically becomes a part of the social group, it is a precarious balance to maintain a total professional distance from one's subjects. It is

perhaps for this reason that feminists (e.g. Oakley, 1981; Hertz, 1997) advocate breaking the hierarchical stereotype (discussed in detail in section 4.6). with the respondent / participant being in the subordinate position. It is instructive that Oakley (1981: 49) posits that there is '*no intimacy without reciprocity*'. Thus there are growing calls for an appraisal of former models of the whole interviewing process and qualitative research (for instance, Smith, 1983; Reinharz, 1992; Weston, 1998), which is perhaps necessary to make research useful to both the respondent and the researcher.

4.4.2 Second phase

Transcripts from the first phase of fieldwork led to a review of the selection of lakes and villages for the second phase of data collection. Qualitative inquiry typically focuses in depth on relatively small samples. In this light some criteria of choice for selecting information-rich cases were formulated as enumerated below in section 4.4.2.1. After selecting the project villages, focus group interviews were conducted as a follow-up to the individual interviews held in the first phase.

4.4.2.1 Village Selection Criteria

Project villages were selected through a ranking exercise conducted with four field assistants. Ranking was done using a scale of 1 to 5, where 1 was the lowest rank and 5 the highest. The following criteria were used for selection:

- Age / size of sacred lake and accessibility of the site (sites which had strict taboos, limiting access only to the “initiated few” were avoided), also accessibility in terms of topography of lake terrain was a strong consideration for safety reasons
- Existence of extractive industries within or close to the boundary
- Clan / community within the same region without extractive industries

- Representative villages of different ecozone (i.e. marsh forest zone and inland flood forest zone)
- Presence or absence of endemic, vulnerable and threatened biodiversity (i.e. species of traditional, national and regional conservation interest)
- Government and External Actors' interest within the community (for instance tourism site, development projects).

Based on the selection criteria, two communities, Osiana town (Sagbama local government) and Biseni (Yenagoa local government area) were selected (see chapter 5 for profile of study communities). Also, in order to further understand the effect of the world views of the two communities on the wetlands, preliminary assessment of the biological community of four lakes was done. This was necessary to see if there was a possible relationship between belief and traditional practices. Hence, in Osiana, two lakes were assessed: Adigbe Lake (sacred) and Lake Ameneduno (non-sacred). In the same vein, in Biseni, Lake Obaa (non-sacred) was assessed alongside Lake Esiribi (sacred).

4.4.2.2 Focus Group Interview

Focus group interviews involve conducting open-ended interviews with groups of five to eight people on focused issues (Patton, 1990; Morgan, 1993). They involve bringing together people of similar backgrounds and experiences to participate in a group interview on major issues common to them (Field, 2000; Överlien *et al.*, 2005). Hence, within each community exploratory focus group interviews were conducted. The group interviews also provided a platform for validating or testing some of the theories derived from the individual in-depth interviews (Fabricius *et al.*, 2004). Groups were segregated by gender and by age to reduce to a minimum the issue of domination by certain groups (for instance women who could be inhibited by

the presence of their husbands). The snowball technique described in the preceding section also proved useful in identifying participants for the focus group interview sessions. However, in Osiana because of the instability in the community's governance, the group participants were chosen by the chairman and representatives of the Community Development Committee (CDC). The focus group interviews were interactive sessions, as group members recalled events and elaborated on the research topic. However, to maintain proper group interactions and ensure active participation from all group members, two participatory tools (i.e. seasonal calendar and natural resource mapping) were employed. The focus group interview was conducted systematically based on asking a set of questions. These questions were derived from thematic patterns obtained from analysing individual in-depth interviews and from observations. Thus, the sequence of questions which guided group discussions was:

1. Cosmology and world view

- The belief systems,
- Relationships between living and non-living objects,
- Symbolic representation of world views,

2. Natural Resource Use

- Differences in natural resources,
- Users and division of labour.
- Boundaries / restrictions on natural resource use.

3. Wetlands Management and Conservation

- Different wetland types,
- Resources useful for livelihoods within wetland types,
- Challenges / problems within the wetland area and influence on livelihoods.

- Community response to challenges.

4. Sacred Lakes and Conservation

- Restricted lakes and species of biodiversity protected,
- Reason for restrictions and importance of restrictions,
- Group responsible for these lakes,
- Fishing practices within these lakes and other lakes,
- Groups to which these restrictions apply.

Plate 4.2 Elders Focus Group Meeting-Biseni



4.4.2.3 Participatory Rural Appraisal (PRA) Tools

As discussed above, two participatory tools were used to ensure group participation and to explore in-depth knowledge of the project's key issues (Chambers, 1994; Warburton and Martin, 1999).

The Natural Resource Maps

Drawing diagrams had the added advantage of allowing each participant a chance to contribute to the discussions. Diagrams also brought to light participants' abilities to recall the location of resources around the community. Livelihood was a salient point

for memory recall, as participants recounted objects and areas important for income. Maps generated by each group differed, particularly between those of men and women where gender specific locations and activities were discussed and recorded (see Appendix 2).

Seasonal calendar

Similarly, the seasonal calendar generated for each group differed in the type of livelihood activities done. For men, it showed the pattern of fishing activity, yam cultivation and other occupations between the fishing seasons, while for women it showed the timing of farming activities, the collection of forest products, swamp fishing and crayfish trapping. In addition, the seasonal calendar enriched group interactions and showed diversity of livelihood (see also Appendix 2).

4.4.2.4 Household Interviews

As with the training given in the first phase of data collection, field assistants and personnel used during the household interviews had to be trained in administering questionnaires to respondents. In Biseni for instance, the questionnaire had to be translated into the Biseni language (inland Ijo) for uniformity amongst the group. However, this was not done in Osiana, because the field assistants understood the Izon language spoken in Osiana.

The survey, using the methods of closed-ended questions to generate multiple choice questions (Parkhe, 1993; Kutner *et al.*, 1999; Pansiri, 2006), was targeted at heads of households within sample communities. Households were the units of analysis in this situation, simply because an individual household is considered as the basic unit in the community setting. In addition, secondary sources portray these societies as a patriarchal society. Household heads are therefore considered as important decision makers and should be able to enunciate on assets, activities including livelihood

copied strategies and access to resources within the community. For the purpose of this study, the definition of household was as defined by Kideghesho *et al.* (2007): a group of one or more persons living together under the same roof or several roofs within the same dwelling, who all feed from the same pot. Data were collected from a random sample of 262 household heads. The first phase reconnaissance interviews revealed that lakes within Bayelsa State were either community- or family-owned. 'Family' in this case refers to an extended family of three generations under the leadership of the eldest male. Hence, a good representative sample had to involve random sampling of households within the family groupings, as discussed in the next paragraph.

Census data obtained from the Bayelsa government (see Appendix 6) were inadequate. Therefore, to obtain a good representation of respondents from each sample community, a sampling plan had to be devised. Household groups in Biseni, Sabagreia and Osiana are stratified by family compounds. The different family compounds constituted a cluster, from which samples were drawn. In each sample community, the service of a local key informant was employed for compilation of all the names of the family compounds. This list which was verified by the village head / chiefs formed the sampling frame. Subsequently, a simple random sampling of households from each cluster was conducted for the face-to-face interviews. In order to randomise the selection, the number of houses within each cluster was counted and alternate houses were picked to obtain the number required. To determine which house was to be visited, an unbiased member of the team (aside from principal investigator) was chosen to mark the required number of houses for the face-to-face interview session. This sampling procedure guided questionnaire administration both in the pilot test and final household interviews.

4.4.2.5 Pilot Test of Questionnaire

The pilot survey was conducted to check the reliability of the survey methods and to assess the time needed to complete the questionnaire (Litwin, 1995; Babbie, 1997; de Vaus, 2002; Pallant, 2006). In addition, the distribution of questionnaires based on the sampling technique discussed above also had to be verified. Questionnaires were distributed in Sabagreia (location of Lake Efi, see map in chapter 3) community. A random sample of thirty household heads was investigated in two days. The average time spent within each household was forty-five minutes. However, for households where translations had to be made, the time required extended to approximately ninety minutes. On completion of the household interviews in Sabagreia, valid responses were checked and entries made into a database using the Statistical Package for Social Sciences (SPSS) version 14.0 for subsequent analysis.

4.4.2.6 Final Household Interviews in Project Villages

The final questionnaire (see Appendix 3) used consisted of four main sections: Section A consisted of variables measuring effect of belief on natural resource use. Section B included items that assessed the wetlands and livelihood components. Section C had variables that assessed the concept of sacred lakes and their relevance to conservation, while section D made up the scale used to measure the importance of sacred lakes to conservation and livelihoods.

In summary, questionnaires were distributed within the four villages of the Biseni clan according to the total number of families within each village. Sampling ratio (calculated as sample size / population size, Babbie, 1997) in Biseni (185/500) was 37%. In Osiana, questionnaires were distributed to the four communities which make up Osiana. However, fifteen questionnaires were not returned from Awegbene. The sampling ratio in Osiana (77/200) was 38.5%.

4.4.3 Vegetation of Project Areas

In each of the project communities, vegetation, important and economic trees (value based on narrative from interviewees and key informants within each community) found around each community and the lake areas were identified. Identification of trees was done in conjunction with a taxonomist (Dr. Alex Chinda) at the University of Port Harcourt and also in comparison with keys from Keay *et al.* (1964). Also, in order to compare convergent / divergent views and attitudes of the people towards the wetland resource under investigation, fish species diversity within the representative lakes earlier mentioned were assessed quantitatively. In addition, physiochemical parameters such as pH and turbidity helped to characterise the productivity and effectiveness of the traditional method of managing these lakes.

4.4.3.1 Physio-chemical Assessment of Lake Systems

Water samples were collected from three different points (stations 1, 2 and 3) on each of the four lakes. At each sampling station the following physical readings were taken: geographical coordinates read from a hand-held Global Positioning System (GPS) [GARMIN etrex Legend] (as indicated in table 4.3 below), water temperature, pH ion reading, the depth, and turbidity.

Table 4.3 GPS readings of sampling points

Name of Lake	Sampling points	Longitude (°N)	Latitude (°E)	Altitude (Metres)
Adigbe	1	4°53.168'	6°2.453'	4.88
	2	4°53.367'	6°2.637'	8.23
	3	4°53.180'	6°03.038'	4.57
Ameneduno	1	4°51.009'	5°59.795'	17.98
	2	4°51.014'	5°59.842'	20.73
	3*	-	-	-
Esiribi	1	5°17.667'	6°31.403'	7.01
	2	5°17.247'	6°31.177'	6.71
	3	5°17.573'	6°31.376'	6.10
Obaa	1	5°13.859'	6°27.679'	5.49
	2	5°13.582'	6°27.545'	6.10
	3	5°13.425'	6°27.450'	3.96

Notes (*) Readings could not be taken due to overcast sky or thick tree canopy

Plate 4.3 **Physio-chemical Testing-Lake Esiribi**
 (Note extent of water hyacinth *{Eichhornia crassipes}* in the background)



Measurement Procedure

The pH measurements of each of the lakes were taken at each site at about 5cm below the water surface using a pocket pH meter (HANNA HI-98103). Prior to pH measurement, the pH meter was calibrated using a buffer solution of pH 4.01 and pH 7.01 (HANNA HI – 77400P). Similarly, temperature readings were measured using a pocket thermometer (HI- 98501). The lake transparency (which is an index of trophic level and water quality) was measured using the Secci Disk (SSD, diameter 30-cm) method (LaPerriere and Edmundson, 2000; Amarasinghe and Welcomme, 2002). Depths of each lake type were determined using a 50m fishing line with a weight at its end and dropped until it touched the bottom of the lake.

4.4.3.2 Aquatic Macrophyte Assessment of Lake Systems

Aquatic macrophytes constitute the basis of the entire aquatic food chain and provide valuable habitat for many organisms both aquatic and terrestrial (Pojar and Mackinnon, 1994). Hence, observation and relative estimates of aquatic macrophyte populations were conducted. These included populations of submergent and emergent flora, indicative of the health of the ecosystem (Lindsey and Hirt, 1999). Dominant surface water vegetation over each lake's coverage area was noted and visual estimations made.

4.4.3.3 Fish Diversity Assessment in Lakes

Fish sampling was done by observing catches of local fishermen in each project community. Permission was sought from fishermen to sample the different species of fish to determine standard body length of the different fish species. In the two communities, fish caught were purchased for measurements. Samples of each species of fish were measured using a 15.4m rule and readings recorded in millimetres. Catches made by local fishermen were examined for species diversity and relative abundance adapting the method employed by Koranteng *et al.* (2000) who enumerated the number of fishes caught by fishermen during the day at 3-hour intervals from 06:00 - 18:00 GMT. However, the point of departure from Koranteng *et al.* (2000) was in the 3-hourly intervals. It was impossible to achieve this, as my observations had to be done in concert with the stipulated time of harvesting from these lakes. Additionally, it was unethical to intrude on the stipulated rules of the fishing group.

Local fish traps and netting sufficed for fish enumeration and diversity. This is in line with the observation made by Southwood and Henderson (2000), who noted that local methods of fish trapping are often designed to perform well under specific

conditions of water and animal behaviour. Fishing materials observed and sampled in each of these lakes included:

- Esiribi; cast nets with mesh size (from one knot to the other) of 127 millimetres.
- Obaa; fishing nets with mesh sizes of 50.8 millimetres and 110 millimetres.
- Adigbe; fishing nets with varied mesh sizes (35, 110, 115 and 130 millimetres).
- Ameneduno; traditional constructed trap called *Etie* (made out of rattan). The trap is conical in shape with the anterior end wider than the posterior. Baits (mainly groundnut paste) are set far inside the posterior end to trap fish.

Fish sampling dates and times are shown below in table 4.4.

Table 4.4 Periods and Times of Fish Sampling

Lake	*Date of Sampling	Time of Sampling (period nets or traps were set)
Adigbe	03/07/2006	First sampling, 7:00a.m (1:00a.m to 6:45a.m) Second sampling, 11:30a.m (1:00a.m to 11:30a.m)
	04/07/2006	First sampling, 6: 45a.m (12:00a.m to 6:45a.m) Second sampling, 7:30a.m (12:00a.m to 7:00a.m)
Ameneduno	03/05/2006	Sampled at 1:30p.m (traps set overnight)
Esiribi	16/03/2007	Sampled at 8:00a.m (4:00a.m to 7:45a.m)
	17/03/2007	Sampled at 8:00a.m (4:00a.m to 7:45a.m)
Obaa	16/03/2006	Sampled at 6:45a.m (12:00a.m to 6:00a.m)
Efi	10/07/2006	First sampling, 8:00p.m (6:15p.m to 7:50p.m) Second sampling, 8:30p.m (6:00p.m to 7:30p.m)
	11/07/2006	First sampling, 7:00a.m (12:00a.m to 6:30a.m) Second sampling, 12:15p.m (7:30a.m to 12:00p.m)

Notes (*) Dates of sampling were during fishing festival periods

Fish species from fishermen's catches were identified to species level, but where fish taxon was not known identification was done using the services of a fishery expert (Dr. A J.T.Otobo) at the River State University of Science and Technology, Port Harcourt. Fish diversity for each lake type, sacred and non-sacred, was measured using Simpson's index of diversity (Simpson, 1949; Southwood, 1978; Bakus, 1990), expressed as:

$$D = 1/C,$$

Where $C = \sum \frac{N_i(N_i-1)}{N_t(N_t-1)}$

$$N_t(N_t-1),$$

But usually:

$$C \sim \sum (N_i/N_t)^2$$

N_i being the number of individuals of the i th species and N_t is the total number of individuals in the sample. Also D (the diversity index) can be expressed in the form $1-C$ (Southwood, 1978). Also, comparisons were made using two other biodiversity indices, The Shannon-Wiener function (H) and the Berger-Parker dominance index. The Shannon-Wiener function for each lake assessed was calculated using the formula:

$$H = -\sum P_i \log_e P_i,$$

Where P_i = the proportion of individuals in the i th species (Southwood and Henderson, 2000).

The Berger-Parker dominance index, expresses the proportion of the total catch, N_T that is due to the dominant species, N_{max} and is calculated using the formula (Southwood and Henderson, 2000):

$$d = N_{max} / N_T$$

4.5 DATA MANAGEMENT AND ANALYSIS PROCESS

4.5.1 Qualitative Data

Creswell and Plano Clark (2007) outlined five basic procedures in quantitative and qualitative data analysis. These include preparing the data for analysis, exploring the data, analyzing the data, representing the data analysis and validating the data. In the same vein, Miles and Huberman (1994: 11) defined data analysis *'as consisting of three concurrent flows of activity: data reduction, data display and conclusion/verification'*. Against this backdrop the data management and analysis process was done in five steps as follows:

Step 1: Data obtained from the different interviews (in-depth interview, focus group interviews, participant observations) are presented in Appendix 1 and 2, in the form of narratives or free flowing texts to outline the perspectives of the people (Ryan and Russell Bernard, 2003). The context wherein words were used was important for exploring the research topic. Therefore text was not fragmented into bits as in the case of word counts. Word counts analysis considers neither the contexts in which the words occur nor whether the words are used negatively or positively (Ryan and Russell Bernard, 2003). Hence, in order to emphasize meanings, large blocks of text were analysed (Pansiri, 2006).

Step 2: Verbatim transcripts collected were read through, key phrases were underlined and coded (Lofland and Lofland, 1995), using the coding process shown in appendix 3. In addition at the end of each case a short memo was developed enunciating salient issues in each case (Miles and Huberman, 1994).

Step 3: Next, these terms / phrases were grouped into categories and labels assigned for easy retrieval.

Step 4: Recurrent phrases were noted in order to identify general patterns and make comparisons between texts. As suggested by Miles and Huberman (1994), general themes derived from literature review were built upon as the research progressed from the first phase into the second phase of data collection. The third phase validated some of the emerging themes as participants were presented with some of the results.

Step 5: Findings are presented as verbatim quotes in the discussion of themes and categories in chapters 5 and 6 as exemplars of concepts.

4.5.2 Quantitative Data

Responses obtained from the multiple choice questions were coded categorically and data collected were entered into the Statistical Package for Social Sciences (SPSS versions 15.0, 2007).

Statistical Analysis

Analyses using descriptive statistics (frequency) and cross tabulation were done to determine the trend in responses (Kangalawe and Liwengai, 2005; Pansiri, 2006). Frequency tables determined the percentage of responses and subsequently I ran chi-square tests, as it is the appropriate test used in categorical data analysis to determine if results between and within groups are significantly different (de Vaus, 2002).

4.6 METHODOLOGICAL WEAKNESS AND LIMITATIONS

The different methods used in data collection have their peculiar weaknesses. However, the advantage of using a mixed methods approach is that one method may compensate for the weaknesses of the other (Tashakkori and Teddlie, 1998; Onwuegbuzie and Leech, 2005; Creswell and Plano Clark, 2007), although it could equally compound the errors. Nevertheless, it is important to outline some of the weaknesses of the approaches chosen in this research. Methodological weakness stems from sampling and non-sampling errors which can affect the reliability of data collected (Fontana and Frey, 2003). Extra care was therefore taken to reduce non-sampling errors as described in previous sections. For instance information which was obtained from personal interviews but which was suspected to be an exaggerated or a socially accepted response was triangulated within and between methods (Bradburn, 1983). In addition, the training given to field personnel minimized some of the mannerisms which could hinder the flow in communication between the interviewer and interviewee and introduce a source of error (Bradburn, 1983). However in other quantifiable methods, sources of errors could not be totally removed, for instance, sampling of the lakes.

Overt and covert domination (Field, 2000) was minimized by careful planning of group dynamics, interaction and facilitation. Relying on interpreters during some of the interviews, introduced layers of meanings and interpretations (Freeman, 1983), however, to minimize some of the misinterpretation in meanings of local terminology, some local words are used as expressed (as noted in chapter 5). In addition having lived within these communities I picked up some useful vocabularies which were invaluable during subsequent interview sessions.

An important methodological weakness for consideration in this section is the challenge of gender interviewing enunciated by feminist researchers. Oakley (1981) notes that traditional interview is a masculine paradigm, which stresses masculine traits. This model excludes traits such as sensitivity and emotionality, which are culturally viewed as feminine traits. Denzin (1989a) maintains that gender filters knowledge and as such the sex of the interviewer and that of the respondent do make a difference. Denzin's observation is true for the Niger Delta communities, as differences in narratives and experiences exist amongst the group which I interviewed. As a way to circumvent the traditional interview paradigm, these feminist researchers (i.e. Oakley, 1981; Hertz, 1997) suggest a closer relation between interviewer and respondent. The complementary methods of the study, in particular the informal interaction and participation observation helped to achieve this. Where structured interviews were conducted with female participants they were done alongside a female assistant, who was a member of the community.

CHAPTER 5

RESULTS I: RESULTS AND DISCUSSION OF COSMOLOGY AND PRACTICES

5.1 INTRODUCTION

Results of the research are presented in two chapters, chapters 5 and 6, which highlight comparisons of the relationship between people and natural resources in the two study communities. Four thematic areas, listed below, emerge from this thesis' consideration of the socio-ecological interaction of the indigenous group under study.

The Research Thematic Areas are:

1. COSMOLOGY AND WETLANDS
2. ACCESS AND CONTROL
3. BELIEF AND FISHERY
4. COMMUNITY PROTECTION OF AQUATIC AND FISHERY RESOURCES

The results presented in this chapter are grouped under two of the four thematic groups (Cosmology and wetlands; Access and control), covered in sections 5.3 and 5.4. Under each thematic group presentation, the research questions are first outlined before the discussions of the results. Section 5.5 gives a summary of important findings from the two communities.

The chapter begins with an overview of the livelihood patterns and natural resource use within the two communities. It continues with analyses of the content of in-depth interviews and focus group discussions on the people's world view and how their belief system influences natural resource practices. Also under each thematic area discussion, relevant results from the household questionnaire survey at village level

are included in comparison with the qualitative narrative. The questionnaire survey covered 262 households, of which 222 were male-headed households and the remaining 40 were female-headed. A summary of the socio-economic characteristics of the household respondents based on these interviews is presented in Appendix 5. The major points of analysis within this chapter include: the significance of wetlands within and between different social groups of the two study communities, belief structure and regulative influence on natural resource use, factors of change in beliefs and practices and access and control of natural resources.

5.2 WETLAND USE AND LIVELIHOOD PATTERNS IN BISENI AND OSIAMA

5.2.1 Introduction

The wetland means several things to different categories of people as observed in the two communities. The different interpretation and significance of this natural resource base is detailed below in the section on cosmology and wetlands. This section introduces salient livelihood patterns of the two communities, For instance as noted from the natural resource maps shown in the next section, women placed value on the swamps and particularly pointed out areas where they harvest non-timber forest products.

5.2.2 Biseni and Wetland Use

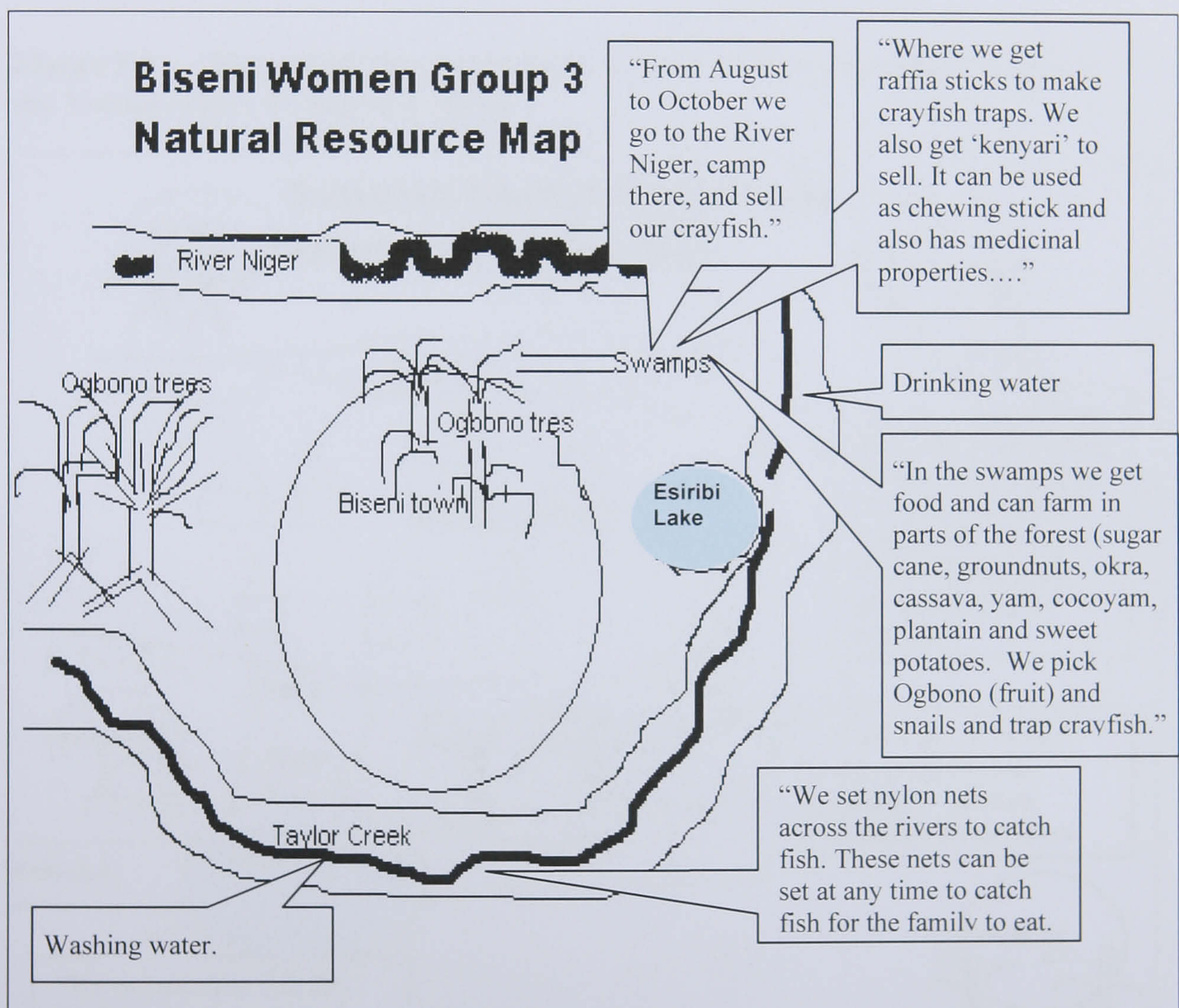
Natural Resources play an important role in the lives of both female and male groups in Biseni. The livelihood activities carried out by men in Biseni in different seasons (shown in table 5.1) indicate that the greater part of their time is devoted to natural resource related activities

Table 5.1 Summary of Men's Seasonal Activities in Biseni

Activities	Month of the Year
Creek Bailing	December to February
Pond bailing	February to March
Lake fishing	April to June
Fencing of creek	July to September
General fishing	July to October
Covering of creeks with traps	November to December
Farming (yams, cassava, plantain)	November to March; May to June
Harvesting of crops	August to October
Cutting of cane rope (rattan) for fish traps	January to December (all seasons)
Ogbono (<i>Irvingia gabonensis</i>) picking	July to September
Hunting	January to December (all season)

The gender division of labour means that some livelihood specializations are restricted to either men or to women; for instance, the crayfish trapping carried out on the Niger River is done exclusively by women. The women's focus group showed the importance of this river in their natural resource diagram shown in figure 5.1. The lakes were not so important to the women, as fishing of lakes in Biseni is done by men. The different significance of the wetlands and other natural resources to men and women is further elaborated in section 5.2.4.

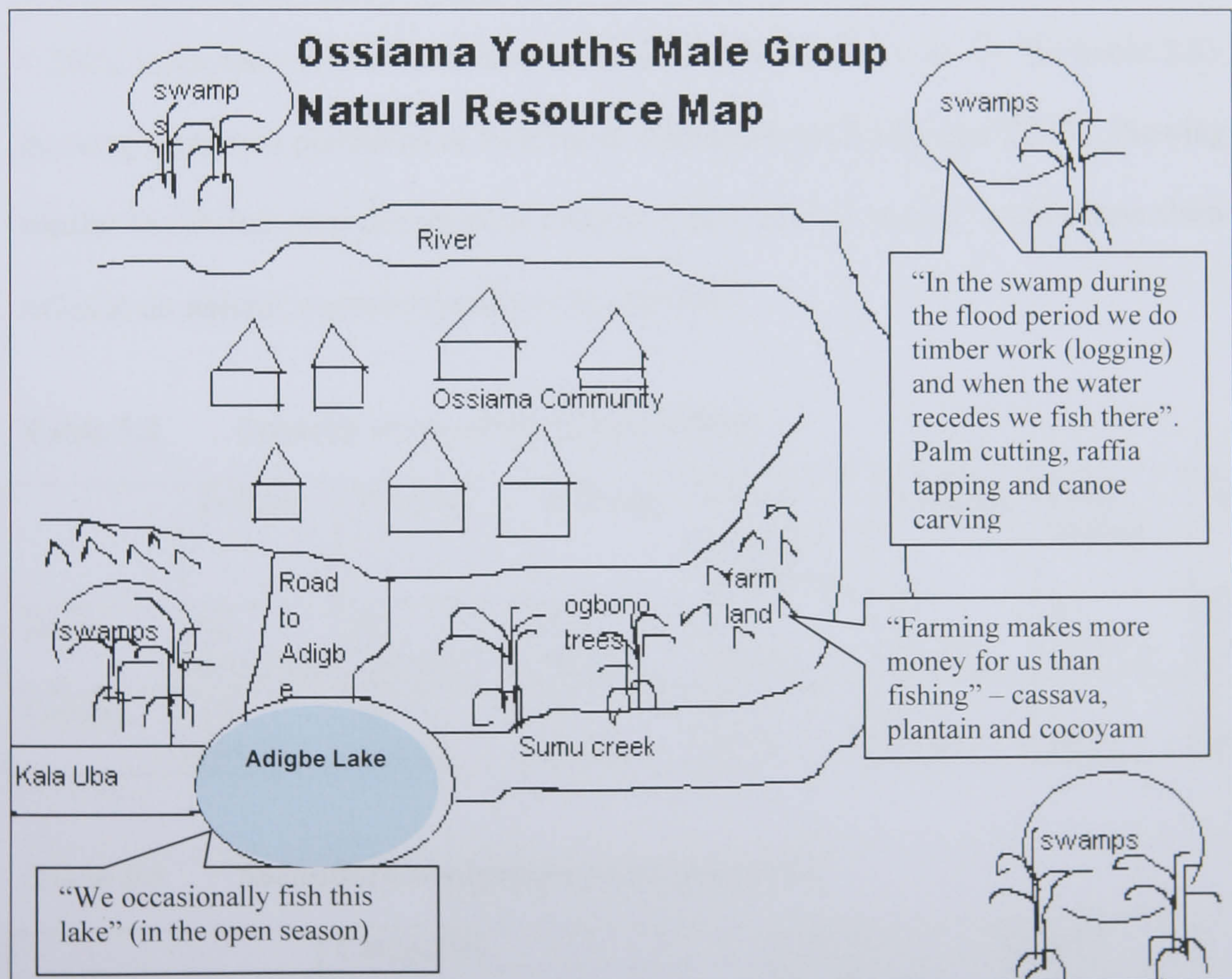
Figure 5.1 Graphical Representation of Natural Resource Map Drawn by Women in Biseni



5.2.3 Osiama and Wetland Use

The Osiama community, like the Biseni community, relies heavily on natural resources exploitation to meet their livelihood demands. Fishing and swamp farming form the major occupations of this group; this is evident in the young men's natural resource map shown below in figure 5.2. There is differentiation between genders as noted in the different focus group interviews. As in Biseni, lake fishing is restricted to men; however, women fish in the surrounding river and within the swamps during flood periods.

Figure 5.2 Graphical Representation of Natural Resource Map Drawn by the Young Men's Group in Osiama



Differences in livelihood patterns within and between groups define different livelihood strategies adopted by households. The next sections present the results of discussions on these strategies. Comparison of livelihood patterns were made along the following lines: occupation, gender and seasonal diversification.

5.2.4 Significance of Wetlands

The significance of the wetlands for various households is indicated by the extent to which the wetlands provide the basis of their occupations and their main sources of income.

In Biseni, fishing is the primary occupation expressed by 49.7% of respondents (table 5.2), while in Osiana, 53.2% of the respondents are farmers. Table 5.2 below demonstrates that environmental resources contribute significantly to the livelihoods of the population interviewed in the two communities. For instance, in Biseni, a total of 84.8% (by aggregation of all natural resources occupations, see table 5.2 below) of respondents were involved in natural resources related vocations. All respondents (N = 262), indicated various secondary sources of livelihoods, with 43.8% (table 5.3), showing up to two portfolios of livelihood alternatives in Biseni and 22.1%, showing similar livelihood diversification in Osiana. Important secondary occupations show reliance on natural resources products and services.

Table 5.2 Primary occupation of respondents

	Fishing	Farming	Hunting	Forest products gathering	Logging	Petty trading	Others
Biseni	92 (49.7%)	62 (33.5%)	0 (0%)	1 (0.5%)	2 (1.1%)	4 (2.2%)	24 (13.0%)
Osiana	19 (24.7)	41 (53.2)	3 (3.9)	0 (0.0)	0 (0.0)	5 (6.5)	9 (11.7)

Table 5.3 Secondary occupations of respondents

	Categories	Biseni	Osiana
What is your secondary occupation (mark as many as are applicable)?		Frequency	Frequency
	0	1 (0.5%)	0 (0.0%)
	1 (fishing or farming)	22 (11.9)	36 (46.8)
	2 (fishing and farming)	81 (43.8)	17 (22.1)
	3 (fishing, farming and one other item on questionnaire, e.g. hunting)	63 (34.1)	16 (20.8)

	4 (fishing, farming and two other items on questionnaire)	15 (8.1)	7 (9.1)
	5 (fishing, farming and three other items on questionnaire)	3 (1.6)	1 (1.3)
	Total	185	77

As indicated in the quote below, these two communities interact with natural resources daily:

“Our men engage in fishing from January to December and if rich enough can buy lakes for a certain period or they go in groups. Farming is done subsistence; fishing is what brings money into the family”.

The above statement by an elder in Biseni summarises the activities done by men and, elaborating further, the men’s group described their activities as:

“Drawing from the lakes, pond bailing, hunting and plantain farming...The non indigenous residents of the community work as palm – wine tappers, loggers and carvers of canoes.”

While the women’s group indicated a different livelihood pattern:

“Farming [is] more important for us than fishing, we pick Ogbono, snails and trap crayfish... Just the crayfish trapping, it is strictly for women”.

In Osiana, however, it is a different story with both men’s and women’s groups giving preference to farming activities, *“Farming makes [more] money for us than fishing”.*

While fishing of lakes in both communities is the prerogative of the men’s group, crayfish trapping (like in Biseni) is the women’s trade. Both activities involve spending months in fishing camps away from home and activities are done together in groups. Visitors or non-indigenes resident in these communities are hired by local people for jobs such as logging and brewing of an alcoholic beverage (locally called illicit gin), made from the sap of the oil palm tree (*Elaeis guineensis*). An important activity to note amongst these groups of people is that they have well defined skills in the gathering of seasonal non-timber forest products. The Bush mango (*Irvingia*

gabonensis) fruiting season is an important season and most households are involved in its trade. They also collect forest snails (*Achatina* spp.) which are an important source of animal protein in this region and throughout most forested parts of West Africa.

In both communities, traditionally the first person who discovers an area of valuable natural resource such as lakes, allocates it to his family and thus the resource is passed on through his lineage via the males. This is illustrated in the statement below made by an elder in Biseni;

“Akpede people in their search for Biseni found many lakes including Esiribi (Akha, Akpede village, Biseni)”.

5.2.4.1 Gender and Livelihood Significance of Wetland

Differentiating by gender; 65.0% of women in Biseni (as shown in table 5.4 below), and 85% in Osiana, are involved in farming as their main occupation, rather than fishing.

Table 5.4 Numbers and percentages within each gender in parentheses involved in different primary occupations of respondents in Biseni.

Primary Occupation	Statistics	Sex of respondent		Total
		Male	Female	
Fishing				
	% within Sex of respondent	86 (52.1)	6 (30.0)	92 (49.7)
	% of Total	46.5	3.2	49.7
Farming				
	% within Sex of respondent	49 (29.7)	13 (65.0)	62 (33.5)
	% of Total	26.5	7.0	33.5%
Forest products gathering				
	% within Sex of respondent	1 (0.6)	0 (0.0)	1 (0.5)
	% of Total	0.5	0.0	0.5
Petty trading				
	% within Sex of respondent	4 (2.4)	0 (0.0)	4 (2.2)
	% of Total	2.2	0.0	2.2
Logging				
	% within Sex of respondent	2 (1.2)	0 (0.0)	2 (1.1)
	% of Total	1.1	0.0	1.1
Others				
	% within Sex of respondent	23 (13.9)	1 (5.0)	24 (13.0)
	% of Total	12.4%	.5%	13.0%
	Count	165	20	185
	% within Sex of respondent	165 (100.0)	20 (100.0)	185 (100.0)
	% of Total	89.2	10.8	100.0

This confirms the findings of the informal discussions held with the women's groups in both communities, where women in Biseni ascribed lake fishing to men as shown in the statement below:

"...Farming is more important for us than fishing, women are not allowed to fish in the lakes, [why?], because lake work is tedious, but we can set nylon net..."

However, assessment of the broader significance of the wetland is similar for both genders. Data from Osiana community show that both females (24.7%) and males (57.1%) in table 5.5, regard the main significance of wetland as a source of livelihood (see further discussion in 5.3.2.3).

Table 5.5 Importance of Wetlands by sex of respondent in Osiana

Response Categories		Statistics	Sex of respondent		Total
			Male	Female	
Wetland significance	A source of livelihood	% of Total	44 (57.1)	19 (24.7)	63 (81.8)
	An inheritance from my ancestors	% of Total	12 (15.6)	1 (1.3)	13 (16.9)
	A place whenever I think of it I have satisfaction	% of Total	1 (1.3)	0 (0.0)	1 (1.3)
Total		% of Total	57 (74.0)	20 (26.0)	77 (100.0)

5.2.4.2 Occupation and Significance of Wetlands

The two communities share similar occupations, though with slight variations. Both are geographically located within the same ecozone; however Biseni is in the inland flood zone, occupying the Taylor Creek area, while Osiana is at the inner Delta, situated in the marsh forest zone (see chapter 3). Both communities have seasonal flooding and crops farmed include sugar cane, plantains and cassava, as noted by an elder in Biseni:

"Farming is mainly cassava and yam, but since about 1960 we took to farming plantain; cassava is our major source of food".

It is probable that in the case of Osiana, taking more to farming than fishing is a recent development. There may be several underlying causes, but it is likely that population increase, and its attendant effects are important. Throughout the field work period, I noticed that fisherfolk usually set nets overnight across the Osiana creek (a tributary of the River Nun) and harvested the following morning. In most cases the fish catch witnessed was negligible. People within this community eat more frozen fish (sold by itinerant merchants from the capital city, Yenagoa) than fish

caught from the river (which were non-existent most of the time). Also in contrast with Biseni, Adigbe is the main lake of the Osiana community, whereas in Biseni there are about seven lakes.

In Biseni, 80.5% of the respondents reported that household income is made from fishing. While 35.7% of respondents enumerate fish earnings per month as being between N5,000-10,000; 25.9% say they make between N10,000, 000 - 15,000 (table 5.6 below). However, although fish earnings per month are more than the national minimum wage of N5,500 (National Minimum Wage Amendment Act, 2000) in both categories, income generated from fishing is said to be inadequate in meeting the needs of their households. However in Osiana, the 28.6% of respondents who make the same amount as their Biseni counterparts, say the money realised from fishing activities is adequate to meet their household needs (table 5.7). This is probably explained by the fact that in Osiana, as mentioned in section 5.2.2.1 above, the dominant occupation is farming.

Table 5.6 Estimated Earnings from Fish Sales (1 Nigerian Naira ~ 0.004537 Great Britain Pound)

	Categories	Community	
		Biseni	Osiana
How much do you make monthly from this activity?	0 (Not applicable to respondent)	36 (19.5%)	19 (24.7%)
	N5,000-10,000	66 (35.7)	22 (28.6)
	N10,000-15,000	48 (25.9)	11 (14.3)
	N15,000-20,000	18 (9.7)	10 (13.0)
	N20,000-25,000	8 (4.3)	7 (9.1)
	N25,000-30,000	4 (2.2)	4 (5.2)
	Others	5 (2.7)	4 (5.2)
	Total	185	77

Table 5.7 Adequacy of fish earnings

	Categories	Community	
		Biseni	Osiama
<u>The money you make from fishing is it enough to meet your family needs?</u>	0 (Not applicable to respondent)	36 (19.6%)	19(24.7%)
	very adequate	6(3.3)	4(5.2)
	somehow adequate	28(15.2)	23(29.9)
	uncertain	23(12.5)	1(1.3)
	somehow inadequate	50(27.2)	9(11.7)
	very inadequate	41(22.2)	21(27.3)
	Total	184*	77

Note: *Missing value omitted

The next section presents results and discussions on the cosmology and belief system of the two communities and shows the linkage between beliefs and natural resource practices.

5.3 COSMOLOGY AND WETLANDS

Theme 1:

What is the significance of the wetland in the life of the local community? Are the world views of these communities and the uses and management of wetland and associated species connected in any way? What are the changes that have occurred in the traditional use of this system and what are the key drivers responsible for any changes? Are such changes internally generated or externally driven?

5.3.1 Introduction

This section discusses the indigenous belief system and its connection to natural resource practices. In examining the belief structure of the two communities, regulations associated with these beliefs are important in understanding its role in natural resource management and conservation. Also important, is the relationship of this institution with the wider social group, therefore, comparisons are based on the responsibilities and regulation of the belief institution.

5.3.2 Belief System and World View

Throughout the fieldwork period, it appeared that the majority of respondents shied away from discussions on the Gods within their traditional belief systems; others wanted to be identified by the most widespread religious orientation, Christianity. Focus group meetings threw light on certain areas on cosmology, but most information gleaned was from the in-depth interviews held with identified elders of each of the communities in the study.

In the cosmology (particular reference is made to aspects of cosmology that define the relationship of humans to the universe tied to beliefs and practices) of the two communities under study, there is the concept of two distinct worlds or realms of reality. These two realms of reality are the visible world, generally in both

communities referred to by the word *Kiri* and the invisible world, *Teme*. These two worlds are intricately inter-twined. While it is said that the visible world is that which is perceived with the natural senses and contains both humans and non-human species, the invisible world is composed of spirits which are not perceived by the physical senses. The spirits in *Teme* appear to possess the ability to administer blessings or curses on human endeavours here in *Kiri* and these spirits are revered and make up the portfolio of Gods that are worshipped in these societies' traditional systems. This is evident in the statement made by some of the elders in Biseni in a focus group:

"In the time of our forefathers we have Gods that we serve; there are many".

It is not clear whether all spirits in *Teme* are equated with Gods, but from the conversations held with several people within these communities it appears that spirits that are called Gods have functional roles in the life of the people and a majority associate Gods with these specific functions or roles: for example, the Gods of certain natural systems as narrated by the men's group in Biseni:

"Gods of certain areas were identified by names like humans, example the Esiribi God, who is in charge of Esiribi Lake".

Gods in the study areas appear to exercise some form of authority over these areas, which were identified or named after the Gods (synonymous with present day ministerial position, where each minister is identified by his portfolio, for example Minister of Foreign Affairs). Examples include Lake Esiribi, which reflects the name of the God worshipped in the lake. Similarly Lake Adigbe represents the Adigbe God worshipped by the traditional Osiana people. As expressed by Chief Luckson of the Biseni clan when describing the composition of the spirit world:

"The spirit world is as real as the physical world, spirits can see beyond what the human being sees, they can direct and prevent ills".

The spirit world is made up of the “highest being” called *Sibizaro* in the Biseni language or *Oyin* in the Osiamia dialect, in a system that has hierarchical order. *Sibizaro* in most quarters in Biseni is addressed as the creator, in the same way that in Osiamia, *Oyin* is a creator God and as noted by the clan head:

“Sibizaro is depicted by femaleness” (for, as he explained only women can bring forth children). Others say *Sibizaro* translates as: *“The one who every one faces with their head”* (Chief Festus Oputa, Tein village); yet others say, *“He is the one above all”* and when suffixed with the word *baden* meaning the highest thing, it gives another flavour to the multiple interpretations.

The common denominator is that *Sibizaro / Oyin* is the highest being operational in both *Kiri* and *Teme*. *Sibizaro* does not exist alone in *Teme*, as there is a group of spirit beings addressed as *Opukeme* - meaning strong men. As further narrated by the clan head of Biseni:

“Opukeme are of two types; man-made Opukeme (images made in the likeness of the God, which are kept in designated areas). These images have human beings as their priest / priestess. Examples include the clan level and family Gods, including Biseniamacri, Ibazoo and Opudo of Biseni. The second type of Opukeme are Gods (not fashioned in any image form) which dwell in certain spatial locations and have the ability to possess a human being without the person’s consent. Examples are the water-spirits, known as Mini-opukeme and forest-spirits known as Béh-opukeme. Mini and Béh-opukeme express themselves by strange utterances made by the possessed human being. The language uttered by the possessed person is not understood by other human beings except if it is interpreted by a priest / priestess”.

Ziri is a phenomenon relating to the spirit world, as explained by the village head of Tein village, Biseni:

“Ziri is medicine which a man can invoke to harm another human being”. He expounds further saying, *“the sand can be used as Ziri or even water”.*

For an object to become *Ziri* therefore, means some incantations (invoking a bad / vengeful spirit) are said over the object of use (such as water or sand). This suggests

that *Ziri* are not worshipped, neither can they be called Gods, but these can be confusing when some people use the word *Ziri* for *Opukeme* and *vice versa*. This happened in the elders' forum between the clan head and the village head of Tein. The argument for classifying all *Opukemes* as *Ziri* meant that the two words *Opukeme* (strong men) and *Ziri* (medicine) were sometimes used interchangeably. This brings to the fore the issue of multiple interpretations even within a reasonably homogenous society. Ancestral spirits also play roles in these societies and in Biseni are referred to as *Andeogus*, classified by the men group "*As dead ancestors*".

The *Andeogus* are men and women spirits who once lived as humans and were translocated from the visible world to the invisible at death. The clan head tells of a myth which captures the traditional Biseni concept of death where the living is translated into the spirit realm:

"In Biseni, before now when someone wants to die he would eat and prepare. A rope comes from the sky to pick the person, if people cry enough, due to their love for that person then the person would not die, because the rope would be taken back. But if they cry less, the person would climb the rope when it comes and would die. There was this incidence at Egbebiri, where a man was to die. When the rope came down and he began to climb, his family members and other people cried so much that the rope was cut from the sky and became a tree; I saw the tree when I was a little boy".

Death in the narrative above means a transformation from one form to the other, where the living goes to join the group of the spirit world. This provides an insight into why the people believe that their ancestors are ever present with them. The *Andeogus* would punish a family member who disobeys or violates a stipulated family law and on the other hand, reward those who adhere to family laws and observances. No shrine is erected for *Andeogus*, but rather, as noted in a focus group session:

"...you speak to them as you would speak to a fellow human being...ancestors act as spirits which fight at a family level. They are always with you and accompany you everywhere you go; they are addressed in most family occasions and gatherings (council of chiefs)"

It appears from what I gathered that the *Andeogus* act as some sort of guardian spirits. The clan head in his description of this group of spirits and others said:

“Usually in Biseni when the oldest man of the family dies he is buried in his sitting room. When an Andeogu is called, it is usually the past head of the family unit. Andeogu can appear to a man sometimes in the dream and by doing what the Andeogu says and seeing the positive results, our system of belief is strengthened. On the individual family level, there are individual household Gods whose primary aim is to protect the family units and usually the family shrines are manned by the head of the family”.

5.3.2.1 The Invisible: Polytheism in Biseni and the Osiamas World view

Attempting to understand the traditional Biseni peoples' world view and those of other communities within the Niger Delta region, which have similar world views, is complicated by multiple interpretations and meanings given to names. Biseni and Osiamas people appear no different in believing in a pantheon (the set of all of the Gods within the community) of Gods. Different Gods have different roles to play and it seems that the people know which God to resort to in every situation. As noted from some of the discussions held (see next paragraph below on interview with Akha), if the solution cannot be found within the community, consultations are made with external communities. It is not clear whether these Gods relate to each other in any form, but both communities pride themselves in the knowledge of *Sibizaro / Oyin* acting in the capacity of a ruler who appears to have sovereignty over the multiple Gods in the invisible realm. An interview held with a female elder in Biseni throws light on this belief. Madam Okwin Godoma noted that in a traditional Biseni setting, it was customary to first call the name of *Sibizaro* before demands were made on either the *Andeogus* or the *Opukemes*. In my interactions with some of the Biseni elders, I explored with them the roles and hierarchical relationship of their different categories of Gods. While the details were not unanimous the consensual opinion was that *Sibizaro* is the highest and the *Opukemes* have defined roles, while the *Andeogus* are their closest invisible relatives. On the other hand, either because of

the limited period spent in Osiana, or probably the limitation of the language used in communications, the Osiana people tend to compound all other Gods aside from *Oyin* (who is synonymous to *Sibizaro*) under the group *Oru* (synonymous with *Opukemes*).

The reasons for the variety of Gods in the cosmology of the people are varied, but it appears that the traditional Biseni person constructed ways of predicting and controlling events within their own sphere of influence through reliance on several Gods like the clan and family Gods. This emerges from the narrative below given by one of the elders:

“Sibizaro-baden does not react immediately in matters which affect the people. For instance during war time, people have the need to know ahead how to prepare for the war and what the outcome would be... But Isubu, Ibazoo, (war Gods) Biseniamacri (clan Gods) act immediately. Ibazoo, Isubu had a person servicing them, so people go to these persons, who in turn talks to the God who appears to the person and immediately answer comes” (Akha, Akede village, Biseni).

It appears that the historical context of war and conflict plays a role in understanding the structure and functions of the belief system of these societies. People in indigenous societies had to invent ways of control, as Akha testified:

“Biseni fought a lot of wars and so needed to have protection against her neighbours”.

He went further to say that the war Gods used by Biseni (*Isubu* and *Ibazoo*) were originally in Benin (Nigeria, not the Republic of Benin). It therefore implies that these societies adopted beliefs from others, which suggests that societies indeed learn from each other and that the beliefs understood and practiced by a social group are not new and have the potential to be transformed to fit in with newer innovations or ideas.

Going back to the different Gods found in each of the communities in question, Akha, for instance, says that the *Ibazoo* and *Biseniamacri* Gods are clan Gods who are

kept within certain families in Tuburu village and that these Gods gave Biseni victory in wars, by appearing to the serving priest / priestess to give direction on how the war was to be conducted. The Biseni class of Gods was founded on traditional institutions. There were specific ways to approach each God and if people obeyed and kept the rules they would achieve the desired result. There are of course areas of uncertainty and the language barrier restricted my understanding of some of the representations of the concepts and functions of these Gods. However it is clear that these traditional societies created a belief structure which gave the people a common bond or provided a platform to measure causes and effects apparent in their own society. Therefore, in attempting to define or unravel the beliefs and cosmology of these traditional societies, I noted the underpinnings of a group of people translating into workable realities a construct of perceptions, rules and prescripts which act as a mechanism of “maintained order” in their society. The question then is, were they successful in their attempts (at maintained order) and, if yes, are those codes of ethics still obtainable today? The sections below provide a platform for comparison.

5.3.2.2 Differences in World Views: Polytheism and Monotheism

It appears that both Biseni and Osiana are communities in transition and apparent changes are noticeable in all aspects of these communities’ social settings. As observed, in both societies, there are a few who still maintain traditional beliefs and tenets and strive to maintain the traditional institutions. Some people, especially members of Christian churches however, question the traditional theology of polytheism and favour belief in the existence of one deity. In their statements they classify the pantheon of Gods as juju and do not want to be identified as a “juju worshipper”. This was noted in the young women’s focus group where the influence of Christianity was apparent as noted in the following statement:

“I know there is a creator, I can’t believe in juju”.

Some changes appear to have occurred within these societies. In Biseni, for instance, one elder commented on the fact that there was no church in the community until the year 1910 and in his quote said:

“People had no knowledge of the almighty God and so the people were idol worshippers”.

Another said that in Osiana things have changed due to the present belief system and noted an incident where there was a confrontation between Christians and traditional believers:

“Due to the present belief system of Christianity, the people do not satisfy the requirements of the Gods. Christianity came to Osiana in 1914 when C.M.S. was founded. During that period our belief system changed, this led to a case between the traditional believers and the Christians during that period. Well, since 1914 our belief system has drastically reduced in this community. After that in 1927, the Roman Catholic Church was established in the community”.

It is apparent that strict adherence to former ethical codes passed down by founding fathers to the present day people of these societies is strained. Also from the individual household survey results, Christianity appears to be the dominant religious orientation of most respondents. In Biseni (sample size, $N = 185$), 83% said they were Christians and 17% practiced traditional religion. Similarly, in Osiana (sample size, $N = 77$), 87% are Christians and 13%, traditional religion. However, from informal interviews and interactions in these communities, there seem to be three sets of people coexisting within the present setting of these communities. On one extreme of the continuum are those who insist on traditional beliefs and values and are staunch adherents of the past; on the other are those who are changing to what they see as Christian beliefs. In the middle are those who say they can have the best of both worlds. Despite this difference, the three groups are synchronized in maintaining customary laws set by traditional belief institutions and perceive them to be beneficial to the community as shown below. It appears, therefore, that traditional

beliefs influence the way people relate within these societies and the way each community relates to natural resources.

In the belief system described above, institutions evolved that acted as proponents of the belief system and the medium for transactions between the Gods and human beings. Means of communication between the visible human realm and the invisible Gods was via dreams, as explained below by an elder from the Erewari family in Biseni.

“...the priest of the lake got revelation of the laws we observe directly from the God of the lake who appeared to him, then the priest passed it on to the community...”

Shrines to these Gods, who speak to human mediums dot the landscape of all of the communities visited (e.g. Plate 5.1) and I considered that these shrines, apart from serving the purpose of acting as consultation rooms for faithful adherents, are visible representations of the traditional systems of belief.

Plate 5.1 Priest of Water Shrine at Lake Samei



In other words the shrine and everything that it embodies, including the statues, the sacrifices or methods of service and the priesthood (in terms of the human mediums)

constituted an institution which acted as a visible force in each of these communities. This institution as observed in both communities accorded them an identity and has had an influence on the social life of the people. As explained by Chief Bethuel of Biseni community, in reference to fishing in one of the lakes of the community:

“If you want fish plenty, you have to sacrifice to the juju in charge of the fishing place... sometimes if one did not follow these processes, the person will have a poor catch”.

This means as a member of this community, getting a good harvest is not dependent on luck or the type of fishing gear used, or even on the physiological attributes of the water body but rather on the benevolence of the God of the lake. The male youth group had this to say about the influence of this institution on everyday life:

“Bad spirit can kill us if we don't serve them properly...”

As noted in my daily interviews within these communities, the traditional institution described above still exists and its code of ethics is still practised. Some persons have attempted to break free of the behavioural boundaries imposed by this institution; some are seen to have escaped without obvious signs of punishment, while others have not been as lucky. Although the majority seem to frown at the system of many deities and would not openly be counted as an adherent of this traditional belief system, they still maintain the rules / laws established by the same system that they scorn. It was a perplexing observation: when asked why these laws were kept, the young women's group had this to say:

“laws bring fear and also allow fish in the lakes to grow”.

In the same vein, the men's group commented on the unity brought on by the laws amongst the men involved in fishing. Judging from the statement made above, in keeping the laws, there are beneficial outcomes which seem important and perhaps suppress the differences in the belief systems. It appears, therefore, that even though

someone does not subscribe to the worship and service of several Gods in deference to the tenets of monotheism, they still want to uphold the “social connection” with the community. It seems, therefore, that the largest group on our continuum are those in the middle.

5.3.2.3 The Visible: Beliefs and Natural Resources

Natural resources are defined *inter alia* by the young men in Biseni:

“[As] things created by God, the wealth of the clan, that we [they] make use of”.

Natural resources, as illustrated in the statement above, represent assets for generating wealth. In addition, natural resources are considered for their non-consumptive use as places representing the historical continuity of the community as indicated by the chief of the Tungbo community (in a town visited on reconnaissance field work):

“The Akpolokia, the greater of the two lakes, represents our ancestry and prosperity for us as a people”.

Overall, it appears that the consumptive value of natural resources is more significant than its non-consumptive use. The survey results from Biseni and Osiama show an overwhelming number of informants representing natural resources as a source of livelihood, particularly in the wetland. In response to the question on what significance does the wetland hold for you? 100 % ($N = 185$) of respondents in Biseni said the wetland was a source of livelihood. A similar trend was recorded in Osiama as shown in table 5.8 below. A majority (81.8%) identified with the economic role of the wetlands. However, 16.9% of respondents noted the spiritual / cultural role of the wetland and the remainder (1.3%), the non-use function of the wetlands.

Table 5.8 Wetland significance in Osiana (N = 77)

Question	Response category	Frequency
What significance does the wetland hold for you?	A source of livelihood	63 (81.8%)
	A place of worship	0 (0)
	An inheritance from my ancestors	13 (16.9)
	A place of enjoyment	0 (0)
	A place whenever I think of it I have satisfaction	1 (1.3)
	Others (please specify)	0 (0)
	Total	77

Also, within these communities, there are differences in the use of certain natural areas. This difference is evident from observations and comments on the consequences of their actual use, as shown in the narrative of the interview with an elder in Biseni:

“Through certain encounters in the dream and some strange deaths within the village when one uses a particular resource; certain areas and resources become Aweye - forbidden to us, while others are not forbidden - Aweaya. An instance is forest places that people do not go - (Awe-beh)”.

Others in Osiana note that;

“Certain areas are Toun (forbidden); example the forest towards the tail end of the Adigbe Lake is Toun... In the eastern part of the lake there is a sacred forest that no person steps on, only the priest and his team that steps there during the time when they are doing their rituals, because of the laws passed on by our ancestors, while others are Toun-áha (not forbidden)”

Things and areas termed *Aweye / Toun* are treated specially or, in the case of whole ecosystems, are restricted zones where certain laws and practices are maintained.

The two project communities uphold that certain non-human species possess a spirit representing the God of the water. As expressed by the women’s group in Biseni:

“... the crocodile, Mininema, is the Goddess to whom they libate [a pouring of wine to the deity] during the fishing season. After this libation all the crocodiles come to the shore”.

The God in the water is able to communicate with humans as narrated below by elders from the Erewari compound in Biseni:

[Talking about a forefather] "When he slept, the God inside the water spoke to him in the dream and told him certain things".

This is, perhaps an allegory (a symbolic representation) of the traditional belief system and seems to seek to perpetuate this traditional system. Some writings in literature (for example Durkheim, 1915; Richards and Dickson, 1990), however, refer to the representation of Gods by non-human species as totems (an animal, plant or natural object serving among certain tribal or traditional peoples as the emblem of a clan or family and sometimes revered as its founder, ancestor or guardian). Interestingly, from my observations within these groups of people I noticed that what is considered emblematic for a particular family might not be the case for others (also see discussion in Chapter 2, section 2.3.4). But within the society, the general populace acknowledges and respects the laws and restrictions of the family with the emblem that embodies a spirit. An example is the case of Esiribi Lake. This particular lake is owned by the Erewari family, Akpede-Biseni. The crocodile is an emblem to this family and is rooted in their ancestral history and so it is not killed, but revered and treated as a human being. Other families in Biseni (34 in number, see appendix 5), respect this traditional history and value system and would not even so much as go to the lake without the permission of the family (Erewari). It therefore is justifiable to say that irrespective of someone's conviction, either within the Erewari family or within the rest of the clan, the institution that enshrines the protection of the crocodile in Esiribi wields enough power to ensure that members of its society recognises its existence. This fact has implications in recognising and building capacity of existing institutions of these societies as regards management of natural resources.

The point to note is that the traditional belief structure of these societies hinges on the principle of relating to a non-human species, identifying and communicating with the spirit within that element or organism; in essence that non-human species have a spirit akin to the human spirit (perhaps even greater - in terms of Gods inhabiting species) and must therefore be accorded the same respect that humans deserve. This may be the plausible explanation for the story about the crocodile speaking to the head of the family about wrongs done to it (the crocodile) by his people (the individuals of the family) as explained by some of the elders of the Erewari compound, owners of Esiribi lake.

“Before if any one from the Erewari compound joins the youths of the village to share in crocodile meat, when that person sleeps at night, the crocodile will appear to that person in the dream. It will accuse you of what you did to it in the dream, that when you should have had mercy, you refused [referring to when the crocodile was butchered]. It will keep hunting you in the dream until you confess and make the necessary sacrifice and if you don't, something bad can happen to you”.

Also, from my interactions with the fishermen at Esiribi, they make reference to the crocodile as being their blood brother, and because of this they do not harm the crocodile and the crocodile likewise does not harm them. However, there seems to be another reason why non-human species are treated differently, as observed in the Osiana community. The Adigbe Lake, according to the legend narrated by elder Asei Meshach, resulted in retribution from the God *Adigbe*, who was not worshipped after the death of the founding father of the land, as shown in his narrative in box 5.1 below.

Box 5.1 The Origin of Lake Adigbe- Osiama

The following narrative is part of interview held in Osiama on the people's world view on the origin of Lake Adigbe (Full transcript is in appendix 2).

Q: Sir Can you tell us how Osiama came here?

I was told by my forefathers that Osiama-owei came from Ebeni in Ebeni-Oyiakiri clan, in the course of wars they departed to different areas for settlement. Initially, Osiama-owei settled in Apoi creek which stretches from Sumu to Ananabogbene. Osiama-owei had six children; Akordi, Kuro, Boyi, Abiyia, Tanyi and Kpakala. Ossi, their father worshipped Adigbe as his god. He used to sacrifice black male sheep to the god in the ancient time. Christianity was not known, so the children too were serving this god. When he was about to die, he handed over the god and everything to his eldest son Akordi and advised him to take care of the worship requirement of his god. He also made him to understand that it was the god that had made him have the six sons. But the children did not carry out their father's advice. After his death, none of them worshipped the god. Akordi, Ossi's first son had five children, three sons and two girls. Their names were Ogi, Atai, Azaringha, Atoikoseirigha and Otorubo. Apart from these children, he had a second wife called Keke, who traditionally was called Bere-ere (woman whose big dowry is paid). She (Keke) had seven daughters for Akordi; these seven children are the founders of Adigbe Lake. Akordi shared his lands and properties among his children and the present Adigbe area was shared to his last wife Keke. It was a swampy area and since the woman's occupation was mainly fishing she always went fishing with her seven children. Due to her persistent fishing, her husband's brothers and sisters nicknamed her Sama (meaning swamp) which later changed to Sumu. The Adigbe god was a very powerful and strong god. But nobody worshipped it after the death of Ossi, It began to cause havoc in the family. Because of the lack of a priest to service this god, Akordi's last wife (Keke) lost all her children. It all happened when the woman with her seven children went fishing. In the course of fishing there was an earthquake which caused the place they were standing to shake. As they attempted to run for safety, they (the seven children) got lost. Their mother was able to run to Apoi creek where she fell by the river side. Before she died she narrated the story of the event to her family people. The family decided to go in search of the children. On getting to the swamp it was discovered that a big lake had formed with seven outlets (canals). These canals they said, represent the seven dead children and the canals exist till today. The present Sumu in those days was a foot path leading to the swamp. Also it is told how in the lake there were a lot of fishes and crocodiles brought on by strong waves. Eagles and human beings who tried to pick up the fishes were threatened by the crocodiles. Because of the death of Keke and her children who were said to be killed by Adigbe, the lake which emerged from the spot where they died was then named after the Adigbe god.

The narrative in box 5.1 amplifies one important linkage of belief to natural resources; - treating an area differently because of the antecedents of historical events. In this situation, the Adigbe Lake is named after the God which apparently was ignored until he caused the death of a woman and her children. The Adigbe Lake is considered by the traditional institution as a gift of the Gods (though given in

vengeance) and so the approach within the spatial location of this lake had to be made within the stipulated rules of conduct of the belief system. The fact that crocodiles are not killed in either Esiribi or Adigbe, does not imply that they are not killed elsewhere. For instance in Biseni, the Erewari family (owners of Esiribi) mentioned that:

"We can eat outside this lake, but not when it is killed from here. But since we cannot know where the crocodile brought into our village comes from, we are very careful to eating crocodile".

This appears to be the situation also in Osiana, as observed during the period of the field work; reptiles caught by hunters were not crocodiles but mainly monitor lizards - *Varanus niloticus*. However in Osiana, Lake Adigbe is the largest lake where you expect to find crocodiles. One parallel with conservation science is the theory of elevating one area above the other. While the elevated area (synonymous to protected areas) protects a certain biological species, the other area is a free range area for harvesting / hunting of the species. Another ecological concept is predation pressure whereby predators are conserved to keep populations of their prey below their carrying capacity, in order to prevent overexploitation of the environment e.g. by overgrazing. Also, when coupled with competition theory, predators are conserved as there is evidence that they maintain species diversity amongst a variety of prey species (Chesson 2000, Gallen *et al.*, 2007). Perhaps the Niger Delta people are also aware of the role that crocodiles play in conserving the environment and the diversity of the fish that serve as food for both themselves and crocodiles.

5.3.2.4 Natural Resource and Customary Restrictions/Laws

As noted by the clan head of Biseni, *"every society has its own laws"*. Noting from the transcripts of meetings within these communities most laws supported the maintenance of the sanctity of their Gods; for example, statements on observing the *"Akinma"* day in both communities, as noted by one elder in Biseni:

“Akinma day is sacred and it was the day that is set aside by the people to arrange and decorate their juju shrines for the idols to be brought into the shrines...”

Akinma day was a traditional day of the week when people were barred from going into the forest and lakes for any activity. It is said that the *Akinma* day was holy and if one flagrantly disobeyed, the Gods would punish the person while out in the forest / lakes, in most cases resulting in death. Some of these laws, especially in relation to *aweýe* areas were gender specific, especially in certain conditions. An example includes some of the laws mentioned by women during a focus group discussion:

“no woman is allowed to bathe in the lake, menstruating females are not allowed into the lake, ...[and if it] starts at the lake, such women has to appease Gods with drinks, if you do not the bleeding would continue, also you cannot have sexual intercourse around the perimeter of the lake and twins are not allowed in the lake”.

Some laws served to maintain order, fostering a kinship spirit among the people, as noted by the males of a youth focus group meeting:

“We have a law, which binds everybody not to do fishing until time permitted, when it is time for fishing, all men have to go into water at same time, if not you would pay a fine”.

Other laws set a defined boundary on natural resources as mentioned also by the men’s group - *“For example, Esiribi, crocodiles and monitor lizards are protected, if you kill them, you are to bury the animal as you would a human being”*; and in the in-depth interview with a key informant in box 5.2:

Box 5.2 Restrictions on use of wetland species - excerpt from interview with a Chief from Biseni on Lake Esiribi

Q: Chief please could you kindly tell us the history of this lake and why this lake is special to you?

This water is special to us as a family because of the instructions our forefathers gave us concerning this lake. This lake was discovered by our forefathers as far back as during the Benin massacre. The person that saw this lake first was called Erewari. He was hunting when he came and saw the lake. When he slept, the god inside the water spoke to him in the dream and told him certain things, which he then told his children.

Q: What are these things?

Number 1, is that crocodiles inside the lake guard the lake and as such can not be killed. If we see a crocodile dead in the lake, we must bury it like we bury a human being.

Q: So you don't eat crocodile?

We can eat outside this lake, but not when it is killed from here. But since we cannot know where the crocodile brought into our village comes from, we are very careful to eating crocodile. Also we are not allowed to bring the wife that we paid bride price on into the lake, but we can bring girlfriend or other women.

Q: What do you do with your catch since your wives are not here?

*The ones we want to give our wives to sell or take home, we can give to our children or sometimes they (the wives) stay a way from the lake (**on the way to the lake I had seen some camps along the way; this gives an insight into the people living in those camps**).*

I observed the practice of fishermen at Lake Esiribi releasing crocodiles, which accidentally got caught up in fishing nets. When asked why they did this (painstakingly releasing the crocodiles despite the potential harm), the response was:

"The crocodile is like a brother, and so cannot be hurt".

Interestingly, from the survey analysis, a small fraction (5.3%) of respondents indicated that they were not aware of any customary laws or restrictions on the use of the wetland. Table 5.9 below presents responses from the two communities on perception of restrictions.

Table 5.9 Wetland Restrictions/laws (N = 262)

Question	Response category	Community		Total
		Biseni	Osiama	
Are there restrictions placed on the uses of the wetland within your community?	Yes	182 (98.4%)	66 (85.7%)	248 (94.7%)
	No	3 (1.6)	11 (14.3)	14 (5.3)
What are these restrictions?	No restrictions	3 (1.6%)	11 (14.3%)	14 (5.3%)
	Gender restrictions	36 (19.4)	4 (5.2)	40 (15.3)
	Ownership restrictions	22 (11.9)	0 (0.0)	22 (8.4)
	Species restrictions	42 (22.7)	5 (6.5)	47 (17.9)
	Gear restrictions	5 (2.7)	0 (0.0)	5 (1.9)
	Belief system restrictions	77 (41.6)	57 (74.0)	134 (51.1)

In addition, it is important to note that in both communities these restrictions are considered necessary because the laws bring an abundance of fish (table 5.10). It therefore appears that economic benefits are important outcomes of maintenance of these laws in these communities.

Table 5.10 Impact of Restrictions on Community

Question	Response category	Total (n = 262)
Do you think they (the laws) are necessary?	0 [not applicable to respondent]	14 (5.3%)
	Yes	238 (90.8)
	No	10 (3.8)
Do you think they (the restrictions) should be removed?	0 [not applicable to respondent]	14 (5.3%)
	Yes	11 (4.2)
	No	237 (90.5)
Why are they (the laws)	0 [not applicable to respondent]	14 (5.3%)

necessary?	Because of the laws we always have fish to eat and to sell	174 (66.4)
	Because of the laws there is peace in our community	63 (24.0)
	Others (specify)	11 (4.2)
How do these restrictions/laws affect your livelihood activity?	0 [not applicable to respondent]	14 (5.3)
	I make enough during the fishing season to meet all my needs, so it doesn't change anything	130 (49.6)
	I do not make enough during the fishing season to keep my family, so I have to look for other alternatives of making money	64(24.4)
	I borrow money from money lenders till the next fishing season	4(1.5)
	I have to move to other fishing communities to continue fishing	50(19.1)

5.3.3 *Natural Resources as Natural Capital*

In all the group meetings held within each community, there was enthusiasm to enumerate the materials obtained both from the wetlands and the forest. Judging from the submissions made, I noted that each group was particular about the resources that made money for them.

The men's group in Biseni, for instance, knew where all the lakes were located as shown in the natural resource map they drew (see Appendix 2) and, in addition, knew where the flow stations of the crude oil mining were located. In Osiana, things listed as important to their livelihoods included palm trees, arable land, lakes and swamps. Of these resources the men's group said:

"Are important for our livelihoods, we depend on them for every day living".

The older women's group enumerated resources obtained from the swamps and creeks as indicated below and indicated farming as their collective occupation rather than fishing:

"...ogbono trees, in the swamps we get raffia sticks we use to make crayfish traps called isusu, we also get a plant called kenyari to sell...Farming is more important for us than fishing, women are not allowed to fish in the lakes, [why?], because lake work is tedious, but we can set nylon net. In the swamps we get food and we can farm in parts of the forest, the creeks [are] important to catch crayfish".

The reason for the periodical fishing of Esiribi given by both the young men's group and their older relatives is that:

"Esiribi is a big lake, we set it apart to make money... they are so because we want to preserve our fishes, to always be there for us".

From the statements above, it is clear that the wetland is a resource for generating wealth. It appears from my interactions amongst the people that despite someone's belief, livelihood needs may be an important impetus for attending to the restrictions imposed by the traditional institutions or perhaps for not following the restrictions.

5.3.3.1 Seasons and Livelihoods

Berikiri is a difficult period in Biseni and it indicates the dry season, usually from December to June, in contrast to *Boma* - the period of abundance and as described by an elder:

"Boma is a period of abundance of fish".

Similarly, as noted from the elders' focus group discussion in Osiam, *Bowe* is the flood period starting in June and continuing until October (synonymous with *Boma* of the Biseni people), while *Bara* is the planting season, starting in November and continuing until June (synonymous with *Berikiri*). When asked what characterised the onset of each season, an elder in Osiam replied by saying:

"We look at the moon and note the level of water in the river, if the level of water in the river is down; you know you have entered Bara... Saiyeagunuwa is a bad month,

usually this month is November time, the juju people don't come out and nothing is planted in the ground".

In both communities, two distinct seasons exist and in each season, different livelihood activities are carried out by different gender groups. It is important also to note that even in carrying out livelihood functions, the cosmology of the people plays a role. An example is taken from the statement quoted above, where in the month of November (the *Bara* period) the "juju" people are not seen, outside their own domain, and no farming activity is done. This is suggestive of the role the "juju" people play in the communal functions of this society. This probably may be an explanation of the remark made by an elder in Biseni, who said:

"In the time of our forefathers it was the juju worshippers that enact rules, people believed in idolatry, anything soothsayer said they believed".

Festivals (celebrations) to mark each season of the year also have a symbolic role in the cosmology of the people (explained in detail in section 5.3.4.1). In addition, in both communities in the past, the days of the weeks were counted in cycles of four and not in the pattern of today as shown from excerpts from an interview held with an elder in Biseni:

"In the olden days, market days were every four days, but these days markets are held once a week. Days of the week was four cycle.

Ingruba ----- Day 1 Market day

Ingrubadeinwa ---- Day 2 after the market day

Akinma ----- Day 3 Rest day

Akinmadeinwa----- Day 4 after the rest day

After every four days is Ingruba, while Akinma is a rest day; fishing, farming and going into the bush was forbidden (Chief Osakwe, Egbebiri village Biseni)".

The planting season (*Bara* period) lasts about five months and, as noted by the women in Osiana, the main crops planted are cassava (*Manihot esculenta*), okra (*Hibiscus esculenta*) and plantain (*Musa sapientum*). Cassava and plantain they described as their major food crops and main sources of income. Likewise plantain

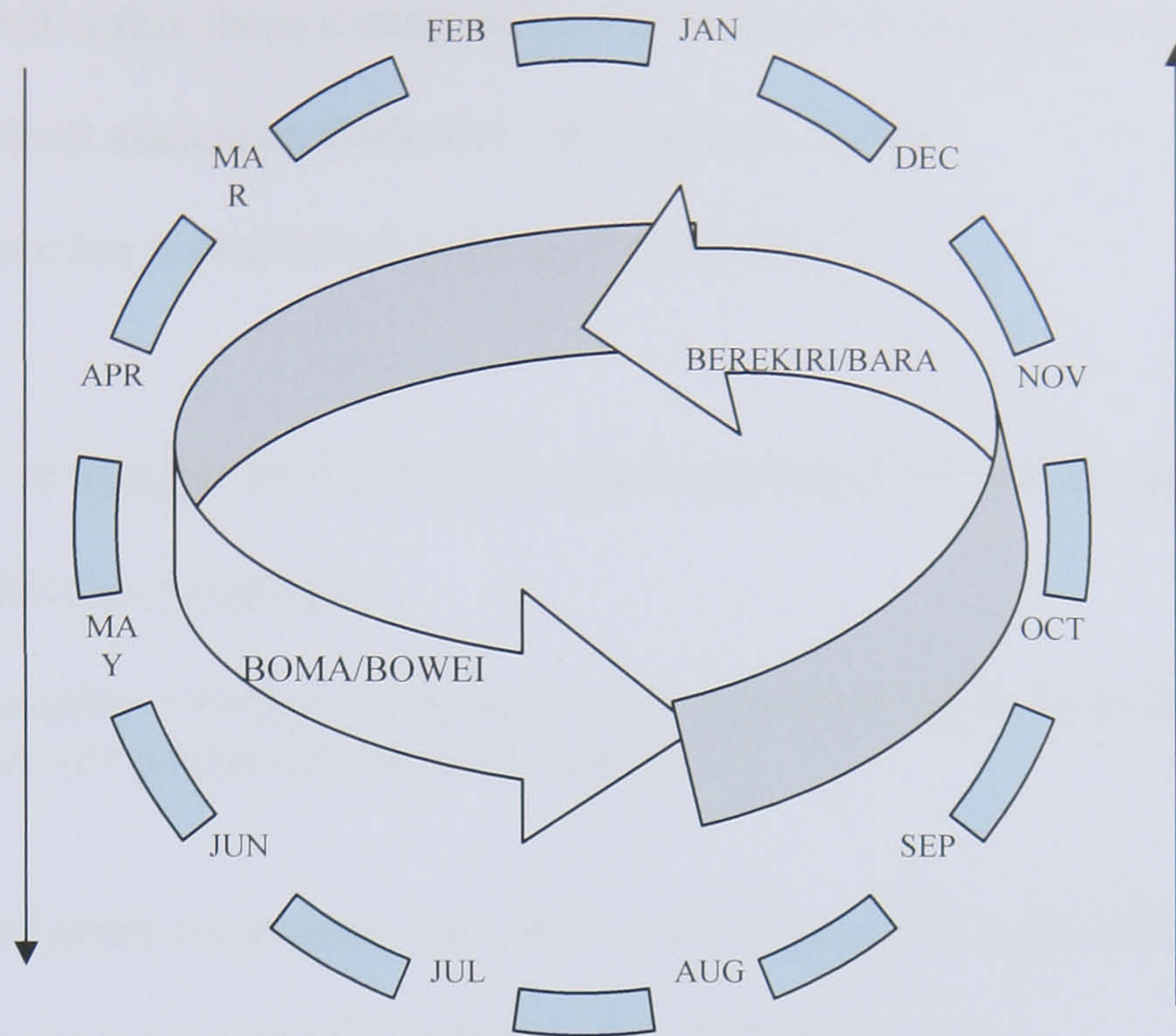
farming, in addition to fishing, is the men's main source of livelihood. Intensive plantain farming is a recent development, especially in the lowland rain forest areas such as Biseni. From my observations, major farm lands in Biseni are made up mainly of plantain and banana (*Musa paradisiaca*), the fruits of which are sold through middlemen, weekly, at a nearby market close to Yenagoa. Likewise, it is likely that the Osiana community's involvement in plantain farming is primarily for its viability as a cash crop. Farming activities are done around the swamps as attested to by an elder in Osiana:

"Usually farming starts after the flood, around November / December and lasts up to March, cropping is done on moulded ridges (levees) or on cleared vegetation around river area and surrounding swamps".

The main Adigbe fishing expedition in Osiana is usually done in May / June, while the lesser fishing expedition on the Lake is within November / December. Both periods are marked by communal celebrations and group fishing done by men. The fishing expedition is known locally as the fishing festival and it is characterised by sacrifices made to the Gods, merriment and fishing in Lake Adigbe. Adigbe lake fishing mirrors the Esiribi Lake fishing of Biseni. They both reject women fishing in the lake and certain customary rites are observed (see Appendix 1, case 3 and 8).

There are overlaps in the two seasons described above. Bayelsa State is generally known as the state having the highest rainfall within the Niger Delta, with some areas having over eight months of rainfall, averaging about 4,000mm (UNDP, 2006b). Therefore these two seasons are depicted below (Figure 5.3) in a circular form, showing a continuum of livelihood activities. An example of an activity done throughout the year is fishing which is done both in the dry (*Bara*) and wet (*Bowe*) seasons.

Figure 5.3 Livelihood Seasons in Biseni and Osiamama Communities



5.3.3.2 FreshWater Lakes Delineation

From interviews and interactions within the region (during reconnaissance field work and the second phase period), three different categories of lake, defined according to their usage within the studied region emerged. The men's group in Biseni in discussing reasons for special treatment of Lake Esiribi had this to say:

“Esiribi is a very big lake and we have set it apart so we can make money from it”.

This is a departure from the response received from the women's group on the same lake. In response to the question posed in the statement below they made the following submission:

“[Let's take Esiribi as our reference, why is Esiribi different from the others, is it because of its size?] No, because of the laws placed by the family”.

However in consonance with their male counterpart they affirmed in their own words that;

“The biggest out of all of them is Esiribi”

The responses received from the two groups differ from the views of some elders interviewed within these communities. For instance, in the same community (Biseni), Chief Bethuel associates Gods with lakes and asserts that:

“Every lake has a god, which is the god of the lake”.

Similarly in Tungbo community, the paramount ruler had this to say on the different lakes within the community:

“The Akpolokia, which is the greater of the two lakes, represents our ancestry and it also represents prosperity for us as a people”.

Yet in the Igbedi community the youths interviewed also associated with the mystery attached to a particular lake as shown in the following quote:

“Akakotokoto is a very mysterious lake. It is completely sacred and nothing can be removed from the lake, not one fish or plant. If you do, something bad would happen to you and people do not go there”.

Furthermore, the young women’s group in Biseni gave two categories of lakes as noted in one of the focus group meetings below:

“We have Esiribi, where we have certain laws governing the place. For instance; don’t kill crocodiles, women married into the family owners can’t go to the lake. Whereas in a lake called Asa, we can kill crocodiles, there women can go to this lake”.

In Osiamia, the young men’s group acknowledged that there are differences in their use of fresh water lakes as shown below:

“In the lake we have a law which binds everybody not to do fishing until the time permitted. We occasionally fish these lakes and because of this we have a high yield of fishes”.

In some of the lakes set apart, some practices are prohibited and are said to contaminate the sanctity of the lake if done, as noted in the following quote:

“Sleeping with your wife [during the fishing festival] is not allowed; also women are not allowed to wash their clothes in the lake... it will affect the sacredness of the lake (Akumoni-Okordia)”.

Apparently, different groups within these communities gave various reasons for why one lake is set apart from other lakes within the community. Some lakes appear to be set apart for fish regeneration; others are set aside based on cosmological underpinnings, while some lakes assume a dualist function, serving as a social emblem and also for group fishing of members of the community. On the household level, more respondents (>70%, see table 5.11 below) chose the response that lakes were set apart from others for fish regeneration.

Table 5.11 Reasons for different type of lakes

Question	Categories	Communities	
		Biseni	Osiama
Why is one type of lake different from the other?	I don't know	2 (1.1%)	0 (0%)
	For spiritual purposes	3 (1.6)	5 (6.5)
	For fish regeneration	139 (75.1)	59 (76.6)
	Customary laws	41 (22.2)	13 (16.9)
	Total	185	77

5.3.4 Natural Resources as a Social Capital Focus

It is clear from the narrative in section 5.3.3.2 that certain wetland types such as lakes are treated differently from others. Certain observed practices of these people indicate that these wetland types are treated as *aweýe / toun* (forbidden) and *aweaya / toun - áha* (not forbidden). In the former, the wetland assumes its position because of the ancestral history of a God which oversees the affairs of the wetland in question, symbolized in most cases by a non-human species. On the other hand *aweaya / toun - áha* areas do not have a family / clan symbol and therefore non-human species within these areas can be exploited at will by owners of the resource. In order to get the best from these lakes in the cosmology of the people certain things have to be done as noted by some elders:

"...God owns lakes and gives resources as he wants...if you want fish plenty, you have to sacrifice to the juju in charge of the fishing place...shrine set up as you can

see in front of the lake... ..sometimes if one did not follow these processes, the person will have a poor catch... ”

In maintaining certain norms, group activities such as fetching drinking water and fishing were done by different peer groups, including the young men or women and elders as shown in plate 5.2.

Plate 5.2 Weaving fish traps. A Female group in Sabagreia



For instance, the young women’s group in Biseni gave reasons for their preference for the river:

“For us the river is more important because we drink from it and we wash there”.

I observed that going to the river to fetch water was preferably done early in the mornings or in the evenings. As a participant observer, I noticed that at the river side, women share time together, talking about each others’ children and husbands. It was also a time of exchange of events in the community. On one occasion, I noticed women spent a lot of time on activities such as laundry, washing dirty crockery and

generally chatting languidly in the relaxed atmosphere of the company of their peers. A lot of economic activities within these communities involved groups living and interacting in a confined space for months. The women's group in their comment on Biseni's main occupation said:

"Fishing is what our forefathers passed on to us".

I imagine that as their progenitors passed on the skills of fishing, they also passed on ethics which formed the social norms of these communities. Also, as each successive generation fished in these lakes, especially Lakes Esiribi, Adigbe and Akpolokia there was a reinforcement of history and traditional rites. Therefore, against this backdrop, natural resources, in particular the wetland is more than a tangible resource for these people. The belief and practices associated with the lakes contributes to the sustainability of the connectedness or social capital which exists within a group (an example being the Erewari family, owners of Esiribi) or the whole community. An expression of social connectedness within these societies is the celebration of festivals before the commencement of the fishing season as narrated in the next section.

5.3.4.1 Festivals

Festivals are aspects of Biseni and Osiana community life which serve to reinforce the traditional belief structure within these communities. These festivals serve the purpose of commerce and foster a strong kinship spirit amongst the groups as noted by the level of camaraderie amongst participants.

Plate 5.3 Dance rites (A) performed by female and male groups to honour Gods before (B) commencement of fishing festival (Lake Samei-AkumoniOkordia)

(A)



(B)



The origin of these festivals is apparent from the statements below made by an elder from Biseni:

“...this is then followed by fixing the days of the yearly festival by predictions and sighting their Gods spiritually by the juju priest or priestess... both the idol worshippers and church people take part in the celebrations... Tuburu being the eldest and having custody of the Gods of our land, led most times in the worship of these Gods... Oduah in those days was the man who declared the time of festival. Once he received the sign, he would take banga [palm fruits] to the river to produce palm oil. Subsequently he would make a feast inviting every one to dinner; this act heralds the fishing festival. After Tuburu’s celebration, Egbebiri and the other remaining villages of the then ten villages would subsequently declare festivals. We had two festival periods, the fishing festival and the farming festival (Chief Bethuel)”.

Festivals, therefore serve as a unifying force for different social groups within these societies. As shown in the narrative above, despite the difference in religious orientation, both idol worshippers [traditional religion] and church people [Christians], as enunciated by chief Bethuel come together during these festivals. It appears from conversations held with Chief Bethuel, that these festivals, whether farming or fishing, were celebrations observed by Biseni founding fathers as a means of re-enacting their allegiance to their Gods in the belief that maintaining the code of ethics of this institution would accord the practitioners the necessary desired results. For, as narrated by Okwin (one of the oldest women in Biseni):

“Belief in those days was only in Opukeme, when our people want to go to the bush and water, they speak to the Opukeme for safety and when they come back they come to drop drinks for appreciation”.

Cosmology and practices seem to play out again in this narrative. The festival periods coincide with the two important seasons (see section 5.3.3.1) in the annual cycle of livelihood activities of the people, as noted by the clan head of Biseni:

“The first festival was done during the dry season, between the months of March and April; while the second festival was done during the flood / rainy season, which is usually around October”.

Osiama community follows the same pattern, celebrating a feast to mark its fishing season with the involvement of the chief priest / priestess performing rituals to the Gods of the water. *Okoroso* and *Adigbe* are the main festivals celebrated by the Osiama people. While *Adigbe* (which marks Adigbe fishing) is celebrated annually, *Okoroso* is celebrated after seven years.

For these two communities, the wetlands obviously serve more than their primary purpose of a natural productive system and as an asset for wealth. Important are their inherited beliefs and practices laden with meanings that foster traditional value

systems. However, it is apparent that changes have occurred in the way several users of this wetland system use it. What are these changes, their resultant effects both on the natural system and within the institutions which have maintained each community's fundamental principles? The next section highlights changes noted by participants in these communities as key agents of change responsible for the shift in cosmological paradigms and practices within the communities studied.

5.3.5 Changes in Belief and the Community

There has undeniably been a change from the traditional belief structure which favours polytheism to the dominant visible Christian doctrine of monotheism as stated in the earlier section on cosmology (section 5.3.2.2). It is also obvious that the advent of Christianity and the proliferation of churches in these societies has affected certain customary norms, but has not completely replaced them. This observation is based on my interactions within each community, where mixtures of traditional practices with Christian ideologies were noticeable. This observation is not isolated as some elders confirm that even though some people go to church, they still resort to the traditional institutions, for example during times of war / conflicts; as noted by an elder in Biseni:

“People sacrifice and obey the instructions of the priest / priestess of the war God (Ibazo) along with the Christian God”.

People who live entirely by the tenets of the traditional belief system are very few in number and are recognisable within the community (with emblems of their belief adorning the exterior / interior of their homes) and are sources of reference for discussions on such matters. In most of the group meetings, a majority appear to favour the change from traditional belief to Christianity and shy away from discussing openly the tenets of their ancestral traditional beliefs. Remarkable were arguments which ensued during both the women's and men's group meetings in

Biseni. During the women's group meeting, one participant started the discussion on Biseni's pantheon of Gods: responses from others were provocative and remarks such as the one below were made:

"...there are some Gods, some believe, not all of us".

However, personal interviews held with some elders revealed some of the worries within these communities on the changes that they perceive have occurred in their society and the resultant effect on traditional laws:

"...in the olden days, people had asiepepe (fear of Gods)... the myriad of choices in the society, it was better in those days, because of the fear of the ancestors that they would kill us if they don't do those things that were forbidden, they were able to live together because of the juju..."

Some elders, in addition, noted various behavioural patterns tied to beliefs:

"We have varying belief in God, some believe in God and have the fear, would desist from disobeying the laws and norms...there are atheist, there are those who preach and do some other thing, some believe in other things..."

Yet others say civilisation means "juju" worship is relegated:

"We are now in the time of civilization, oh those that worship the God almighty are more, and it is unlike before every compound has their juju, but now the worshippers of these Gods do hide to do their sacrifice to their Gods".

These various views are clear reflections of a changing society and this transformation has implications for the sustainability of some traditional norms. However, it is important to note that these changes appear to have minimal effect in the removal of the restrictions / laws imposed by the traditional belief institution on the use of the lakes investigated.

From the survey question on whether the traditional laws / restrictions should be removed, 90.5% of the total respondents answered no (see table 5.10).

5.3.5.1 Occupation

A majority within these communities has more than one occupation, as discussed in section 5.2.4. There is the principal one (primary), which generates the bulk of income for the family and several subsidiaries (secondary) which supplement their primary occupation. It is not unusual to count a majority of people doing the same type of occupation within these communities, especially amongst the different gender groups. As noted earlier, in Biseni a majority of the men are primarily fishermen, while the women are farmers. It appears from my informal discussions within these communities that their ancestors also had a primary occupation and worked on several others as the seasons changed. In most cases an individual could specialize in the trade of fishing, but also have some skills in hunting and as a forest gatherer during seasonal fruiting of needed forest plants.

As in the case of changing belief systems, the occupational pattern within these communities is also undergoing change. Examples to illustrate this are the churches and their clergy. Traditional Biseni / Osiana communities had to choose persons as priests / priestesses who attended to the shrines of the Gods, including lakes and the spiritual needs of their followers as indicated in the statement below.

“A priest attends to the lake, [I] am not in charge of that. A lot of fetish things are usually done to maintain law and order as prescribed by the lake especially close to the time of harvest (HRH Paul Abiware, traditional ruler Tungbo Sagbama)”.

In return, the priest received material tributes. The case is different today as noted, even though there are a few priests / priestesses, business is not like it was before, because of the competing force of people converting to Christianity and seeking solutions from the churches rather than the traditional oracles.

The other scenario is that of people receiving formal education who, on graduation, choose occupations commensurate with their newly acquired status, often outside the community. This point is illustrated in an interview held with an informant, who noted that:

“In those days everybody was a fisherman, but people have disobeyed the law today because the people are not here”.

His reason for why people disobeyed stipulated traditional laws was that they emigrated from the community and abandoned the traditional occupation (fishing) for other occupations outside. He concluded that the people who live outside the traditional setting have the tendency to disregard their laws when they get back into the society. But the survey results indicate that respondents' exposure to education, did not affect their attitude to stipulated customary restrictions / laws (see table 5.12).

Table 5.12 Cross tabulation of Educational Attainment and Attitude to Traditional Laws (N = 262)

Are these restrictions necessary?	Statistics	Highest Educational Level of Respondent			Total
		Primary only	At least secondary	Never been to school	
0 (Not applicable to respondent)	% within each category	4 (4.0)	8 (6.9)	2 (4.3)	14 (5.3)
	% of Total	1.5%	3.1%	.8%	5.3%
Yes	% within each category	94 (94.0)	104 (89.7)	40 (87.0)	238 (90.8)
	% of Total	35.9%	39.7%	15.3%	90.8%
No	% within each category	2 (2.0)	4 (3.4)	4 (8.7)	10 (3.8)
	% of Total	.8%	1.5%	1.5%	3.8%

Total	% within each category	100 (100.0)	116 (100.0)	46 (100.0)	262 (100.0)
	% of Total	38.2%	44.3%	17.6%	100.0%

Another change in occupational patterns is the introduction of new technologies / tools which create opportunities for other activities. In an interview held with an elder, such tools he said bring divisions amongst the brotherhood:

“Major problem is individualism, it brings freedom, formerly one man would not go to bail pond, but now because of nylon nets and personal boat, people do what they like”.

In section 5.3.4 it was proposed that there is social connectedness and a kinship spirit fostered as men go on fishing expeditions together. I imagine that the months together would create a forum to share personal challenges amongst other issues with one another and a focus for the transfer of fishing skills and, above all, would reinforce traditional beliefs. The introduction of nylon nets therefore, would mean men could set their nets and harvest the next day, which gave more time for other activities. In contrast, the traditional tool of fishing, used by men in Esiribi, is a locally woven material (called *Inobra*, see plate 5.4 below) made from the rattan plant (*Calamus* sp.), which takes a group of men (>20) several weeks to make.

Plate 5.4 Men Weaving *Inobras* for Esiribi Fishing Festival

Inobra is woven in pieces and, during the fishing expedition, several *Inobras* are joined together across the breadth of the lake, acting like a modern beach seine net. The shoal of fish is caught by pulling each end of the *Inobras* together and fish are then collected using the men's fishing baskets (called *Ado*). This traditional process is labour intensive and involves a lot of man hours, but it seems to be preferred by this traditional institution.

A third cause of change in occupations which I noted during my field work was the activities of the oil industries around these communities. Biseni, for instance, has a flow station within its location, approximately 2 kilometres from the settlement and youths within the community seem to prefer to work for the Oil Company (AGIP OIL), rather than taking to traditional occupations. A remarkable experience was the social pattern noted in one of the communities visited during the reconnaissance phase of the research. The oil company's official residence was a cluster of mobile "portakabins" erected on the outskirts of the village settlement. Close to the portakabins were groups of shacks. On enquiry I found that the shacks were built by

prostitutes who were attracted to the site by the oil workers. The field guide was quick to point out that the prostitutes were non-indigenes. This development has posed far reaching social problems for these communities and within the context of drivers of change, may act as an external influence on changing attitudes and value systems of societies such as those found within this region. The influx of different nationals into the Niger Delta searching for non-existent jobs is implicated in the rise in HIV/AIDS within the region (Udonwa *et al.*, 2004).

5.3.5.2 Population

A major consequence of population pressure within these communities is that of poaching, as noted in Lake Efi (where pilot tests of questionnaires were done, see chapter 3 and 4), where a poacher had laid fish nets overnight in the lake, with the intention of harvesting the next morning. Fortunately (for the villagers) the poacher's net was confiscated and burnt by youths who sometimes took turns to patrol the lake at night. Perhaps this experience in Sabagreia town best captures the changing pattern of people's construction of reality. The lake in question is known as a "sacred" lake with restricted access based on traditional prescripts. The question again, is what is responsible for the disregard of traditional values even when, as told, there is the remote chance of getting punished by the Gods with the affliction of some heinous disease resulting in death? The women's group in Biseni suggested:

"People have increased, crocodiles are not plenty, greedy people kill them",

while their men said that the resources are depleting because of increased fishing and hunting necessitated by the demands of an increased population.

As conceptualised by some ecologists, natural resources are depleted as populations increase, although this is not always true, as established in chapter 2, section 2.2.2.

But in societies such as Biseni and Osiamama where the population is fairly homogenous and bounded by common norms, is population increase a likely cause of the loss of traditional values? The issue with immigration and emigration in these societies is that heterogeneity introduces a dimension of change to traditional systems as different users of the system question the relevance of the system to their own identity and realities. Community members narrate that their neighbours know of their rules concerning the open and closed access to the sacred lakes but, despite this, there are known cases of people having access to these lakes. An instance was noted in Sabagreia, where nets were confiscated from the sacred lake Efi. When asked about the possible culprit(s), Chief Ebienfa gave the following narrative:

“They come in with canoes from the Polako creek linking the lake...and it is a regular occurrence”.

From the discussions held with Chief Ebienfa, the assumption was that those who violated the restrictions imposed by the society were not residents of Sabagreia, but outsiders. However, the identity of the culprits was not made clear. From the survey interviews it appears that the group implicated in resource conflicts in Biseni are their neighbours (18.9%), and in Osiamama, strangers who live in the village (27.3%, see table 5.13 below).

Table 5.13 Resource Conflicts (N = 262)

Question	Response category	Community		Total
		Biseni	Osiamama	
Do people fight over using your wetlands?	Yes	78 (42.2%)	33 (42.9%)	111 (42.4%)
	No	107 (57.8)	44 (57.1)	151 (57.6)
Who are these people?	None	107 (57.8%)	45 (58.4%)	152 (58.0%)
	Strangers who live in our	32 (17.3)	21 (27.3)	53 (20.2)

village				
Other people from neighbouring villages	35 (18.9)	11 (14.3)	46 (17.5)	
Oil company people who come to lay pipes	9 (4.9)	0 (0.0)	9 (3.4)	
The government	0 (0.0)	0 (0.0)	0 (0.0)	
Others (specify)	2 (1.1)	0 (0.0)	2 (0.8)	

5.3.5.3 Education

The clan head of Tungbo town (another village visited during the reconnaissance phase) commented about the internalisation of the formal education system by the youths in the village as follows:

“The knowledge of our tradition is dying with them (the youths), because they go to school they learn other things and not the tradition of our people”.

Education as noted within these communities (I am personally a product of such systems) introduces ideologies which are quite different from the informal tutelage of traditional protégés and suggests that newly acquired values may be adopted. These values may not necessarily be detrimental to natural systems, but belief systems such as those introduced by missionary schools, could be external drivers of change. Ideologies which question polytheism might be internalised resulting in change. As succinctly stated by the clan head of Biseni:

“Today’s world is different from yesterday world, values have changed”.

However, as shown in table 5.12 formal education is not a direct cause of changes in traditional belief systems.

5.3.5.4 Marketplace

The market place is another important agent of change within these communities. Markets bring together a mix of different people with different value systems. When asked who they sold their fish to, the elders of Erewari compound gave the following answer:

“Women come from Isoko land (Delta State). Port Harcourt (Rivers State)...; these people usually know when the festival time comes”.

While on prices of fish they remarked:

“Is determined by the type of fish it is, its quantity and quality”.

In Biseni, for instance, where the traditional society depends on fishing as their primary source of income, the network and chain of buyers (including middlemen, wholesale and retail traders) is crucial during each fishing festival. Types and yields of fish affect sales, as I noted during the last fishing expedition at Esiribi. Economically valued fish are those belonging to the class Actinopterygii (ray-finned fishes) which are well adapted to these environments. But not all fishes belonging to this class have high market value. Buyers, I noted, favoured bigger fishes within this class such as *Bagrus bayad* (local name *Sibidanwei*), *Gymnarchus niloticus* (*Ariri*), *Heterobranchus bidorsalis* (*Isichia*), *Citharinus citherus* (*Afor*), *Heterotis niloticus* (*Akor*) and Nile Perch *Lates niloticus* (*Egeda*). Of the six, the most abundant species counted in the lake was *Citharinus citherus* (*Afor*). Interestingly *Heterotis niloticus* (*Akor*) and *Lates niloticus* (*Egeda*) are known as potential pests of fresh water lakes (see www.fishbase.org) but from interactions between buyers and fishermen, I gather that these fishes attract high prices in the market because of their sizes and body length.

The relevance of this is that lakes / fishermen who can meet the demands of the market are favourably placed above others. Bigger / desired fish catches equate to more income and better status in the society. The other issue of importance within the context of markets is that of the competing factor of the introduction of newer modern technologies, discussed in section 5.3.5.1 and reiterated in the narrative of an elder from Osiana:

“After the use of Igogo, Akare and spears, Isoko people were brought for fishing, they caught a lot of fishes by fencing the small canals...Agedegu resembles a local trawler and Isagha were also used. In this present generation, they decided to use net as a fishing gear because the old methods were strange to them. The use of net in the lake is just about 60 years old. The nets were made in Amassoma and a woman called Manduku bought these nets from Amassoma to sell in Osiana”.

The problem with new technologies is that they introduce disparities among groups of people and wealth is measured by acquisition of the new technology, as indicated by the statement made by the men group in Osiana:

“The major problem we have is lack of money, most of us do not have money to purchase nets, some of us do not have canoes, and so during the fishing season we hire canoes”.

This relates to the issue mentioned above in the section on occupation as a change agent, where the clan head in Biseni highlighted one of the causes of people disobeying customary laws. It appears that with the pressure of wanting to satisfy customers, people are open to subscribing to newer ideas and innovations which should improve efficiency in their profession. It appears choices have to be made as traditional societies such as those found in Biseni and Osiana open up to their market chains; canoes and nets would definitely improve movement and yields of fishes from these lakes. Accepting to buy into newer innovations means in some cases compromises have to be made; for instance shelving the time-consuming fishing apparatus, which probably might have limited mesh openings for catching desired fish (intended for market purposes). This would mean that people would

spend less time camping and therefore there is bound to be loss of the “social connectedness” and transference of traditional sets of codes which are crucial to the perpetuation of traditional values and belief systems.

It might be useful to note that within traditional Africa, oral communication was, and in most places still is, the mechanism employed in passing information through successive generations. This raises the all important issue of information dissemination between the fishermen and their market chains. Throughout the communities visited during the field work, there appeared to be an established network for information on lakes which are to be harvested. An experience was that of meeting a particular fishmonger in three lakes visited (Lakes Samei, Esiribi and Adigbe). From our interactions, she confirmed that they get information on the dates of harvesting of any lake within the Delta through informants sent by the village chiefs. Radio messages / jingles are a new addition, adopted by the Sabagreia people (owners of Efi Lake).

5.3.5.5 Institutions

People, their history, paradigms (set of assumptions and concept) and dogmas make up institutions; institutions are bound to change as paradigm shifts occur. From all the points made above, these societies are not isolated and have experienced inflows and outflows of ideologies. The institutions that entrench traditional belief systems are not impervious systems, but also appear to be undergoing changes as indicated by the reasons given for the delay in fishing at Efi Lake by one of the village chiefs:

“The priest that has been chosen this year is a young man, who is a descendant of Okereke, it was because we had some problems internally, that is why we have not done the festival”.

In Biseni an elder reflected on what was the structure in the past:

“In the time of our forefathers it was the juju worshippers that enact rules, people believed in idolatry, anything soothsayer said they believed”

People, I was told, obeyed the juju chiefs in the past and disagreements were unknown. It therefore was interesting to learn that fishing in Efi Lake had been delayed for close to ten years because of internal disagreement (see Appendix 1, case sheet 2).

Similarly in Osiana, the Adigbe Lake fishing is a biannual event. But from information gathered on a recent field trip (February / March 2007) it transpired that both fishing events had been postponed to 2008. According to the men’s group, the reason for this was that:

“We want the fish to increase in size”

Delays such as those described above would have a resultant effect on people whose livelihoods depend on fishing of these lakes. In dire situations, fishermen are known to move to other communities to continue with their trade. It is also in situations like these that the men marry women from outside their own community, as I noted in Osiana, where I met a fisherman that had married an Efik woman as a result of the itinerant nature of his chosen livelihood.

5.3.5.6 Natural Causes

Certain occurrences considered as “new” or strange were narrated. An instance was the report of the grass *Scripus cubensis* on Lake Esiribi and the invasive water hyacinth (*Eichornia crassipes*, see plate 4.3 in chapter 4) by the fishermen:

“Water hyacinth and grasses covers a very big part of the lake, formerly it was open, no such thing, but now before harvest we have to clear the lake”. Also they said:

“Level of flood has gone down so quantity of fish is reduced”, another challenge noted by the men’s group was:

“Siltation has occurred within the lakes and ponds, fishes are not as abundant as before”.

The future of fishing in some of these lakes is uncertain, if the problems mentioned are not tackled. Esiribi, for instance, is closing up with tons of sand filling the river bed. The men attribute the cause of this to the oil exploration companies and say:

“Oil exploitation is the major problem, the road construction they do for their flow pipes leads to sand-filling of swamps”.

From the survey results (table 5.14), the primary problems of the wetland in these societies reflect the informal discussions and narratives. However, there are differences in both communities as shown in the table below. In Biseni oil pollution is ranked as the primary problem of their wetlands over water hyacinth. While the reverse is the case in Osiana, where 75% of respondents consent to the fact that water hyacinth is a major problem.

Table 5.14 Primary Problem of Wetlands

Question	Categories	Biseni	Osiana
Do you have any problem concerning your wetlands?	Poachers	14 (7.6%)	2 (2.6%)
	Increase flood level	9 (4.9)	5 (6.5)
	Water hyacinth proliferation	63 (34.1)	58 (75.3)
	Fish variation	5 (2.7)	2 (2.6)
	Lack of patronage	0 (0.0)	1 (1.3)
	Oil pollution	86 (46.5)	2 (2.6)
	Others	8 (4.3)	7 (9.1)
	Total	185	77

They were, however, silent on the deforestation activities going on around the perimeter of the lake and nearby Taylor creek forest reserve. Within these communities resides a notable group of loggers and logging appears to be a lucrative

business and, if not checked, would exacerbate the decline of the already fragile lowland rainforest zone of the region.

5.3.5.7 Summary

The analyses on the use and importance of the wetland show the dualist role it plays in the life of the two communities. The wetland is an important social focus as well as natural capital. Different groups within these communities give weight to each role. However, on the household level, it appears the most important role of the wetland is as a source of income. The prevalence of natural resource related occupations of both communities shows a high dependence on the natural system, hence rules which regulate access and use of the natural system are important for the sustainability of livelihoods. The belief structures within the two groups assume the important role of establishing and sustaining regulations. In addition, they play a key role in the valuation of the wetland and natural systems within these communities. The belief institution offers each community a system of regulations which account for constant monitoring of the resource and the application of sanctions against those that disrespect the rules of use. This is important for the sustainability of the main occupation of the citizenry, which is fishery. In addition, the commonality of shared norms and reciprocity within the different social groups reinforces social solidarity.

However, changes have occurred over time which has had an impact on communal views and responses to natural resource use. Key drivers of change in the patterns of traditional belief structures and practices as noted within these societies, include institutional changes, market development and population pressure. One lesson learnt from the field experience is that these societies are not stagnant and have interactions with other societies, and so there is a constant exchange of goods and services, and access to information beyond the immediate community etc. As a group, these

transitional societies have to grapple with the complexities of urbanisation such as population movements, food security, markets and, for societies that are dependent on natural resources, natural events such as rising flood levels and proliferation of invasive plant species. Innovative and creative ways of accommodating the needs of a varied populace have to be accommodated and this spells change.

In Biseni, these changes have had little influence on natural resource use decision making processes. It appears that the family structure of ownership of resources has succeeded in building a resilient system against some of the changes noted in the section. In Osiana, perhaps because of the weakened communal governance structure, there appear to be other influences external to the community (State government, commercial etc.) which have entered into natural resource management decision making processes.

The next section presents findings on access and control of the belief institution of natural resources, particularly the wetland area in each of the communities.

5.4 ACCESS AND CONTROL

Theme 2:

Do the tenets of the belief systems which regulate access and control as expressed in the norms of taboos and customary laws, prevent overexploitation and lead to loss of biodiversity?

5.4.1 Introduction

In the management of natural resources, particularly common pool resources such as those of Biseni and Osiama, the rights to access and control are the most important operational levels (Ostrom and Schlager, 1996). In this regard, based on Ostrom and Schlager's definition of access, this section focuses its analyses and discussion on the right to enter into the defined area of the resource base and the rights of use.

5.4.2 Access to Resources

Two dominant forms of resource ownership are found within this study area: family ownership and community ownership. The former was noted by elders of Sabagreia:

"The Kalama family is the owner of the lake and it is this family which produces the paramount ruler".

And at Ikibiri town:

"The Asabu family of Ikibiri own Lake Obgbulokalado; the CDC chairman is a member of this family",

Community ownership was noted by the men's group in Osiama:

"Adigbe Lake is owned by Osiama community".

Also, the village head of Tungbo town stated that:

"The two lakes are owned by the entire Tungbo clan, a priest attends to the lake, am not in charge of that".

For each form of ownership, permission to enter into the area of the resource must be obtained from an appropriate person, for instance in family ownership, permission is sought from the eldest man, as shown by the women's group in Biseni:

"Resources in our community are not own by everybody but by families, so decision taking is for the eldest man within each family".

While for the community-owned resources as in Osiamama, the men's group noted that it is the:

"CDC, youth and compound chiefs enforces the laws".

There is a third type of ownership right, joint ownership, which is not so common within the region. However, this form of ownership is known in two adjacent communities and was noted in Igbedi and shown in the following statement made by the youths interviewed there:

"The Igbedi community and Funtu community own Akakotokoto".

Typically within the region, fishing rights were restricted to either members of the family (as in the family ownership pattern) or to members of the community (community ownership) as noted from the interviews held with elders of the Erewari compound in Biseni:

"... [Is fishing open to everyone?] No, strictly for the family, no other people are allowed to fish in this water"

And elders in Osiamama community, also had this to say about fishing rights in Osiamama:

"...no outsider is allowed to fish, only indigenes fish, Osiamama is made up of four communities, and these communities are the ones who legally can fish in Lake Adigbe".

Similarly the Odions in Uzere said:

"...no [to question on fishing rights]... fishing right is not automatic; you must have either your father or mother as an indigene of Uzere"

However an exception to the rule is as found in Sabagreia which allows non-indigenes to fish:

"...everyone [is allowed to fish in Lake Efi], we announce to our neighbours and beyond when the date for fishing is approaching, it is an open affair, even you can fish, what we do is charge per canoe for those interested in fishing, they know our rules and they stick to it"

Inheritance rights within these communities are patrilineal; and males dominate the sphere of decisions as regards resources. In addition, the elders of these communities play roles in the history of traditional institutions, as noted by the male group of one of the communities visited during the reconnaissance field work:

"It is the elders who can tell you these laws".

This may be traceable to traditional times when overall leadership of these communities was by the eldest men, the *amaokwens* (see section below on governance structure). Other places such as the river are treated differently as shown by the women's group in Biseni:

"River is free to fish and do anything".

From my interaction within the community, it appears that even though this area is free (i.e. it is not owned by any family) there is still some control regarding what is permissible within these areas as noted by the women:

"If it is a place that the whole community oversees, then some selected people will make sure you are punished".

As regards access and control, it also appears that there has been a change which conforms to the present transitional setting of these societies. Reiterating the point

made by an elder in Biseni in a previous section, in the times of their forefathers, the juju worshippers were those who enacted the rules of the society. This was evident from the interview held with another elder from Osiana, who remarked that the current priest to the God of the Adigbe Lake had relinquished his authority to the present day government:

“The present priest does not have power or authority to decide for the lake. This time around, it is the community government that do decide the fishing date and time. In the past the priest and his people will do rituals in the lake for about seven days after which they would ask the quarter people whose daughters were lost in the lake to do fishing for three days, then after the whole community was asked to do the fishing”.

Who controls access to resources needed for livelihood sustenance is important and institutions which are directly involved in the control of access to resources are important for any sustainable management strategy within these societies.

Pre- and post-colonial times saw resources controlled by the owners of the resources. There has not been any change in Biseni as institutions that control wetland resources are still owners of the resources as shown in the question asked in the survey of who gives access to wetland resources (table 5.15). However in Osiana, the structured interviews (table 5.15) confirm that access to the wetland is given by the council of chiefs. Interestingly, as indicated in the table below, traditional rulers in these societies appear not to have powers to grant access to these resources.

Table 5.15 Access Provider

Question	Categories	Biseni	Osiana
Who grants permission/licence for use of these resources?	Elders of the owners of the resources	174 (94.1%)	11 (14.3%)
	Traditional ruler	0 (0.0)	2 (2.6)
	Council of chiefs	2 (1.1)	52 (67.5)
	CDC	0 (0.0)	2 (2.6)
	Egbesu	0 (0.0)	0 (0.0)
	Others (specify)	9 (4.9)	10 (13.0)
	Total		185

5.4.3 Enforcement of Regulations

The traditional system of belief attests to the potency of its Gods, as noted by some elders of these communities and offenders are punished at the instance of these Gods.

In some instances, the intruders are afflicted with diseases or are made to pay some penalties to defray the anger of the Gods, as noted below from the narrative of the Odions (Kingmakers) of Uzere town:

"The Eni God is powerful enough to deal with intruders and poachers by itself...anytime we have problems the Eni God would punish the offenders either through sickness or death".

The elders in Biseni noted that punishment varies depending on the dictates of the traditional institution:

"you must appease the God of the water by doing sacrifice, the demand...depends on the dictate of the shrine...any institution has its own rules, [the] penalty of defiling this area and its laws is carried out according to the instructions given by the deity to the priest of the lake...certain things are done to appease the lake if the rules are violated and you must also not do certain things".

Additionally when it involves people from outside the community, the governing council of each community would have to meet for a consensual decision as noted by the men's group in Biseni who had a problem with a member of a neighbouring community, or in some cases the police are brought in:

"... [Have you ever had problems with other communities over your resources?]. yes, from the Joinkrama community,[what happened] the two clans met and the matter was resolved and the people were asked not to come into our community area again...normally offenders are made to pay fine and sometimes it becomes police matter".

The women's group acknowledge that these laws are instilled into them from their youth. However, people still disobey these laws. For known cases that disobey the laws, offenders are punished through social sanctions as shown in their remarks:

"Yes, we know these laws from small...people still enter the lake, if they are caught; the fish would be tied around the person's neck. For instance if they killed a crocodile, they would have to replace the dead with a live one".

Yet, there is the other level of punishment, which is attributed to the direct punishment of the Gods. Offenders are perceived to either be killed by the God or are afflicted as shown in the remark below by the women's group:

"Last year a woman died in the bush, [why?] she went to pick snails... [Didn't she know the rules?] She knew she was a Christian".

Certain practices reinforce the history of traditional belief systems and seek to set boundaries for successive generations as shown in the narrative above. Lessons which may be useful prescriptions for the global community and which offer conservation parallels are enshrined in the custom of replacing dead animals with living ones of the same species in the same resource area, for example, where dead crocodiles are replaced with living ones.

5.5 SUMMARY

The natural resource practices of the Biseni and Osiana people have been shown to be tied closely to their world views and belief systems. Beliefs seem to be the basis for the formulation and articulation of customary laws and restrictions as regards natural resources and biodiversity in general. The institutions regulating access and control in the two communities are important in the governance and use of natural resources within these areas. The culturally derived rules and the organised form of fishing guarantee the sustainability of fishing and appear to reduce conflicts between users of the common resources. However, changes have occurred within these traditional societies, making them vulnerable. But it appears some resilience exists within the system that over the years has aided the performance of natural systems and the solidarity of the different groups. It has been shown that despite the differences in religion and educational level, natives of these communities respect and maintain traditional restraints on natural resource use and perceive the livelihood benefits they derive from this observance. Indigenous beliefs form a system of

environmental ethics which are beneficial to the society and are also beneficial to biodiversity. For instance, the setting aside of one day in the week where members of the society do not go to the forest or use any part of the wetland, implies a stewardship principle. Though these laws do not affect natural processes such as invasion of water hyacinth and rising flood tides, they appear to regulate the society's behaviour and are important for the sustainability of each community's management of natural resources. The results and relevance of the belief structure to conservation and natural resource practices are further presented in the next chapter.

CHAPTER 6

RESULTS II: THE AQUATIC RESOURCES AND COMMUNITY PROTECTION

6.1 INTRODUCTION

In the previous chapter, discussion focused on the traditional belief structure in the Niger Delta and how beliefs influence natural resource practices and relationships between different social groups. This chapter continues this discussion, in examining the wetland system and the influence of belief on aquatic resources. The chapter is organised in two sections, 6.2 and 6.3, which correspond to the last two thematic areas of the research (see chapter 5, section 5.1). Details of the impact of belief on the aquatic resources, with reference to fishery systems are discussed.

The two study communities and others from the reconnaissance have managed the wetlands for over 100 years through their knowledge and daily interactions with the natural systems, as detailed in chapter 5 (see also the case studies in Appendices 1 and 2). It is clear from these narratives that the indigenous people within these regions have a good knowledge of the species of fish within different wetland types. For instance at Lake Esiribi and Lake Samei, fishermen were eager to describe the behavioural patterns of certain species of fish. They knew the breeding season of these fishes and areas of the lake where their eggs could be found. In addition, they recounted observing certain unusual occurrences within the wetland systems, for instance the appearance of a 'strange grass' which previously was absent from Lake Esiribi (see examples in chapter 5, section 5.3.5.6). From the various narratives there is a body of evidence that shows the importance of indigenous knowledge in the management of the fishery resources and wetland systems. The obvious gap is the

global and regional knowledge of changes in weather patterns, including emergent issues such as climate change and effects of greenhouse gas emissions on natural resources. The indigenous knowledge system and its impact on the fishery is therefore an important consideration of this chapter. Comparisons between lakes with a closed access season as practiced by these communities and those lakes which are fished year round are examined in relation to fish abundance and diversity. .

The relevance of the physical nature of the aquatic resource base comes to the fore in the interpretation of the productivity of the wetland and the effectiveness of the indigenous management of the area. Physiochemical parameters, as discussed later in this chapter, are indicative of the health of any wetland system and are key pointers to the type of biodiversity, including aquatic flora, present within the wetland. These parameters are able to reveal what is going on within the water body, including identifying areas with high nutrient load, indicative of pollution. Comparison is made between areas of expected high fish diversity (on the basis of the physiochemical results) with the assessments obtained from the people. In this regard, results of the physiochemical tests and fish species diversity estimates in the lakes examined, including observations of the lake macrophytes (plants which grow in lakes, providing oxygen, food and shelter for fish community), are presented in sections 6.4 and 6.5. Within these sections, comparative analyses of the physical tests carried out within the lakes and their influence on fish species diversity are discussed. The chapter ends with a summary of key findings in section 6.6

6.2 BELIEF AND FISHERY SYSTEMS

Theme 3:

How have changes in belief affected the presence and abundance of biodiversity, especially the fishery resources of this resource base? How does this change affect the community?

6.2.1 Introduction

The Niger Delta has been described as Africa's largest delta, also one of the wettest land masses in the world, and the third largest mangrove forest (Odukoya, 2006). In addition, from interview narratives outlined in preceding chapters, it was established that wetlands play a key role in the everyday life of its citizenry. In the results presented in this section, comparisons are made between the two communities based on the methods and timing of harvesting fish from the wetlands, their association with traditional beliefs and the factors bringing about change. The description of the important economic fish species and other classes of aquatic resources is followed by discussion of the changes which might challenge the continuity of these fisheries practices.

6.2.2 Fishing Practices and Technologies

Fishing in the lakes by traditional societies involves several rituals and customary observances tied to the traditional belief system, particularly in lakes considered as sacred, as described by one of the elders in the fishing camp at Lake Samei of Akumoni-Okordia community:

"We have to observe certain things, example is killing a goat. But first to start killing fish from the lake we must kill goat. We also have our shrine set up as you can see in front of the lake and the priest makes sure he offers sacrifice to the god of the water to bless our fishing. The demand of the god includes alligator pepper, groundnut, biscuit, cola nut, coconut, Fanta, gin, sugar and a fowl [chicken] tied at the centre of the lake. After finishing fishing, we usually sacrifice one live cow for thanksgiving to the god".

The narrative above was common amongst most of the communities visited during the reconnaissance; therefore for traditional societies, getting a good harvest is perceived as being dependent on the sacrifices done by the priest of the lake and also on the benevolence of the god of the lake as testified in the statement below.

“The god owns the lake and he gives his resources as he wants. Sometimes harvest could be plenty, sometimes it can be small. Sometimes during the fishing harvest the god carries the fish to the river and during this period fishermen on the river would kill plenty (elder Lucas, Bomadi-Ekpetiama)”.

Changes in the cosmology and belief pattern affect not only the society, but also the management of the wetland that provides the bulk of these societies’ economic activities and general well-being. The effect of these changes is examined within the following context: fishing methods and materials used in fishing, and type and status (whether endangered or vulnerable) of fishery resources harvested from the wetland.

Traditional fishing materials seen were made out of fibres processed from the rattan plant (*Calamus* sp.) harvested from the surrounding forest. Different social groups within the social structure used different materials for fishing. In Tungbo (a town visited during reconnaissance field work) for instance, the women’s fishing basket is distinct from that of the men, as indicated in the statement made by the village head:

“Fishing is done using two types of materials, the women’s basket Zuyei and the men’s basket, Agala...mostly materials and traps made from cane rope, cane rope called Akpou, people can also use machetes and simple spears”.

In some other communities visited, for instance at Sabagreia and Osiamia there has been a gradual evolution from using some of these traditional materials of fishing to using modern implements. In Sabagreia, the men tell of using:

“... Floating nets only, but outside the fishing season members of the community are allowed to catch a fish or two, using spear / hook”.

Nowadays only nets are used in fishing at Lake Adigbe. It is clear that changes have occurred in the type of materials used in fishing and it is likely that in the next

decade more changes will be made. The traditional instruments of fishing appear not to relate to belief systems, but rather it appears that traditional fishing implements were fashioned within the context of availability of local materials within the reach of the people. From my observation, these traditional implements are non-intrusive and are built to trap specific organisms; for instance the traps woven by the women group in Biseni for crayfish fishing, are designed to trap just crayfish (and sometimes small fishes). Similarly the recent introduction of nets, which in Osiana is only about 60 years old (see quote in chapter 5 section 5.3.5.4), also has the advantage of selective fishing. Mesh sizes noted within these communities varied from 35mm to a maximum size of 115mm. However for lakes which were *aweýe / toun*, the traditional institutions proscribed certain practices, in Osiana, for instance, as noted by a fisherman:

“None of the fishing nets carries lead... [Why?]...Because lead is forbidden to touch the bottom of the lake”

Harvesting of fish from lakes within these communities is highly regulated and has a periodical cycle as shown in excerpts of interviews with different groups (see also table 6.2 in section 6.2.4). While the men group in Biseni as regards Lake Esiribi say:

“Yes we carry out normal fishing [referring to the fact that they are allowed to harvest fish], but after three years that is when we fish this lake”

The Osiana men group said fishing is done:

“Twice in a year, May to June (rainy season fishing), November to December (dry season fishing)”.

Others interviewed during the reconnaissance field work waited as long as four years to fish and then it was a joint venture between two communities:

“Fishing is conducted every four years, jointly done between Okordia and Ogba people but we later withdrew (elders, Akumoni-Okordia).”

Social codes based on the potency of the Gods of the lakes appear to regulate these fishing practices and cycles of fishing. For instance in Bomadi-Ekpetiama, violators were said to risk death as shown in the quote below:

“Before the fishing time if anyone fish in the lake the penalty is death, except such person confessed and do certain prescribed rites (elder Lucas, Bomadi-Ekpetiama)”.

Given that the minimum doubling time of the populations of most of the fishes found within these lakes is between 1.4 to 4.4 years (see www.fishbase.org), it appears that these traditional institutions, through experiential knowledge, have fixed the times of fishing for maximum yields. Human population increases appear to have brought on some changes in the organisation of fishing, for instance in Esiribi as noted by the clan head:

“Population has increased so all the person can not go there at a time. This situation makes them go in groups and to avoid conflicts and troubles they decide to share it”.

From subsequent interviews, I learnt also of the recent change in the frequency of fishing in Lake Esiribi, from every three years to every two years. This was also attributed to the demands of the increasing population.

Also, it appears that some people violate some of these regulations, as reported by the men group in Biseni:

“Certain individuals use dynamite for fishing”.

This practice is in defiance of the set traditional norms and has grave implications for fishery resources and the ecosystem in general.

6.2.3 Economic Importance of Fish Resources

Fish is the primary resource obtained from the wetlands as noted throughout the field work. The men’s group in Biseni noted that:

“Afor [Citharinus citherus] is more in the lake and it gives us more money than any other fish”.

Likewise the men's group in Osiana said:

"...*Apede*, [synonymous to *afor*] *it makes more money*"

The results from the household surveys showed that *Citharinus citherus* contributes substantially to household earnings, as respondents ranked it higher than *Gymnarchus niloticus* (table 6.1). Ranking of both species as major contributors of fish earnings in Biseni and Osiana are similar in both communities, as there is no significance difference between the two categorical results (see calculated X^2 value in table 6.1). However, as stated in the previous chapter, the commercial value of *Gymnarchus* seems to be higher than that of *Citharinus*. The fact that *Citharinus* is considered to be an important economic species might be related to its being the most abundant species found in the waters within these areas, as related by the men's group in Biseni quoted above. Also, the results of the relative numbers of different fish species in these lakes demonstrated the dominance of *Citharinus citherus*. In Lake Adigbe for instance, *Citharinus* totalled 58.17% of the fish species sampled from the lake (See section 6.5).

Table 6.1 Important Economic Species (N = 253)

Question	Response category	<u>Community</u>		X^2	P
		Biseni*	Osiana		
Please rank these fishes according to their importance in contributing to your household earnings	<i>Aba (Gymnarchus niloticus)</i>	36 (20.5%)	19 (24.7%)	0.5605	P<0.05
	<i>Apede, Afor (Citharinus citherus)</i>	140 (79.5%)	58 (75.3%)		

Notes (*) Analyses based on highest number of respondents

Interviews with an elder in Osiana suggested reasons for some changes in the type of fish species found in Adigbe:

"...The people do not satisfy the requirements of the Gods, the fish catch is low and some fish species are extinct such as Okoi which looks like Abe"

Another in the Bomadi-Ekpetiama community (reconnaissance field work) noted a different reason:

"In the olden days the creek was like a river, but now it is blocked [what is the cause of the blockage] water hyacinth is plenty in the water, because of this the priest can no longer go by canoe to the lake to perform his sacrifice before the fishing festival, he now has to go by land, because of the blocked creek, the fish is not plenty".

Changes which have occurred within the human system have had impacts on the resource base as noted above. Mention was made by the elder in Osiana of particular species which are rare or almost non-existent; the reason being, he stated, was the change in belief system. Some say the changes in yield of fishes are caused by external parties visiting their wetlands, such as the activities of the oil companies, while others imply natural causes. These changes have been highlighted and discussed in chapter 5 section 5.3.5.

There are other functions of the wetland in the daily life of the people. For instance the forest perimeter around Lake Esiribi is a rattan forest and as stated by one of the elders:

"It is a source of cane ropes which we sell to people... also (we) pick firewood, people are allowed to cultivate around lake and to dig worm for fishing in other places".

During the flood season, members of the family harvest fish from ponds around the perimeter of the lake that they had dug during the previous dry season. This suggests that Lake Esiribi seeds the surrounding swamp forest during the flood season. This might well be a very important function of such lakes that are seasonally fished. Swamp fishing is another important source of livelihood for fisherfolk within this region.

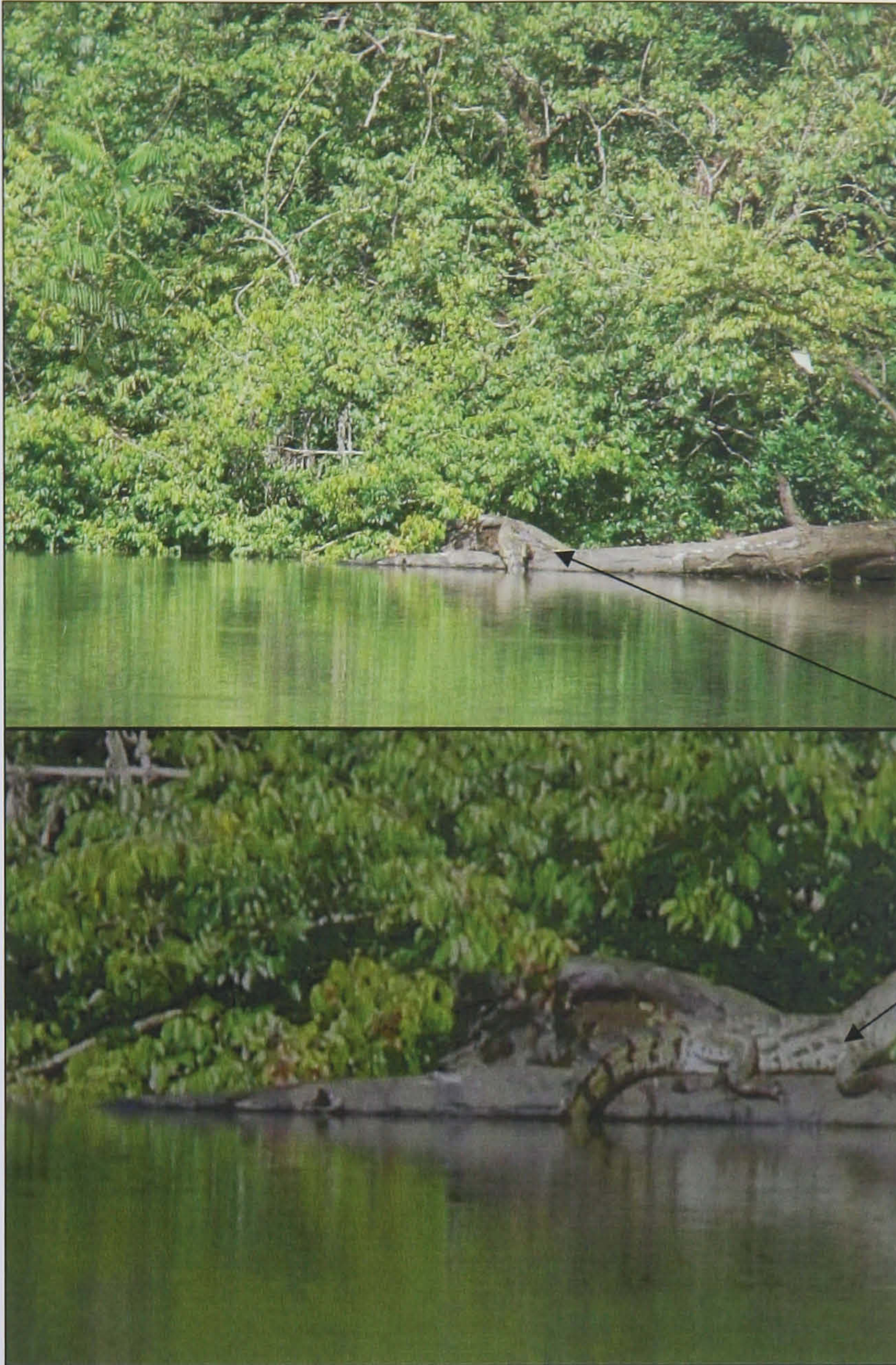
6.2.4 Other Aquatic Resources

The other resources within some of these lakes which are not harvested are the very important crocodile species the West African Dwarf Crocodile (*Osteolaemus tetraspis*) and the Nile Crocodile (*Crocodylus niloticus*). *O. tetraspis* is known generally as a nationally threatened species and also has a “vulnerable status” on the red data list (IUCN, 1996; 2007), while its relative *C. niloticus* is categorised on the same data list as a lower risk species. Esiribi teems with an unknown number of these crocodiles, but in comparison to other areas, the men group in Biseni noted:

“...crocodiles are protected in this lake and they still are abundant”

Visual observation of some of the reptiles was made during field trips at the lake side (see plate 6.1 below, possibly *Osteolaemus tetraspis*?).

Plate 6.1 Picture of an emerging crocodile basking on the trunk of a tree in Lake Efi.



Head & Tail
of Emerging
Crocodile

For instance in Esiribi, a monitor lizard (*Varanus niloticus*) was sighted as it came close to the fish camp to feed on fish entrails (also see notes on Case 3, Appendix 1). However, confirmatory sightings of type of crocodile species present in these lakes were based on information received from the fishermen and villagers. For instance the fishermen from the Erewari family (owners of the lake) pointed out the type of species found in the lake:

“[Have you seen the type of crocodiles in this lake?] Yes, there are two types; the pointed mouth with long body and short mouth with short body”

The crocodile protection is seen as a direct result of the cosmology of the traditional systems as indicated by the women group in Biseni:

“Esiribi is different from the others because of the laws placed by the family; well our forefathers protected these crocodiles, so we also must do same, in those days they use to worship these crocodiles, the crocodiles are plenty there since nobody kills them.”

While their men note some specific lakes where the crocodiles are protected:

“Yes we protect crocodiles, when we kill it there is death in the community, more so the crocodiles do not harm us; it is only in Esiribi and Asa where animals are protected, [which animal?], the crocodile”.

Table 6.2 below lists the aquatic resources of conservation importance which are protected by indigenous communities within the delta. Discussions on the protection of aquatic resources by indigenous communities within the study area were included in chapter 5 and earlier sections of this chapter, for examples see sections 5.3.2.4, 5.3.4.3. The table shown below shows the protection of specific fauna in certain lakes, the regulatory measures employed in each community for the protection of such species and also includes the timing of group fishing activities in these lakes. The months when group fishing is carried out in Biseni and Osiana are specified in the table. In two of the lakes shown in table 6.2, all flora and fauna are protected as the community excludes any known activity on the lakes. This is primarily based on their beliefs about the degree of sacredness of the lake. For instance in Lake Akakotokoto, the youths of the community refer to the lake as a mysterious lake. This is based on the social interpretation of strange deaths which have occurred when people disobeyed the rules (see discussions in chapter 5 section 5.3.4.3, also Appendix 1, case 4). Notably, members of these communities have kept these laws, however there are known cases of violations. Consequences as outlined in chapter 5 include social sanctions and apparent deaths. Also relevant is the recent reference to the use of penal codes for resolving conflicts by taking trespassers within these lakes

to the state police (see section 5.4.3). However, the prevalent practice, which presumably is the most powerful, is the enforcement of social sanctions.

Table 6.2 Conservation Practices in Study Area Communities

Name of community (name of lake)	Group Fishing Period	Local Government Area	State	Ownership	Restrictions	Protected species
Osiama (Adigbe)	Twice in a year: Dry Season Fishing, May to June Rainy Season Fishing, November to December	Sagbama	Bayelsa	Community	Open and closed season for fishing, restricted gears, Open only to Osiama citizens, no sexual activity allowed within lake area, women are not allowed inside lake.	Crocodiles
Igbedi (Akakotoko)	None	Kolokuma/Opokuma	Bayelsa	Community	No activity allowed	All aquatic resources within lake
Tungbo (Akpolakia)	Once in Two years	Sagbama	Bayelsa	Community	Restricted fishing, no sexual activity allowed within lake area, women not allowed inside lake.	Crocodiles
Sabagreia (Efi)	Once in Five years	Kolokuma/Opokuma	Bayelsa	Family	Open and closed season for fishing, restricted fishing gear, open to the public including women, no sexual activity allowed within lake area.	None

Uzere (Eni)	None	Warri South	Delta	Community	No activity allowed, except for annual sacrifice to deity.	All aquatic resources within restricted area of lake
Biseni (Esiribi)	Once in Two years: Rainy Season, May to June	Yenagoa	Bayelsa	Family	Open and closed season for fishing, restricted fishing gear, no sexual activity allowed within lake area, women are not allowed inside lake, fishing restricted to owners of the lake	Crocodiles and monitor lizards
Ikiribi (Obgbulokado)	Twice in a year	Kolokuma/Opokuma	Bayelsa	Family	Seasonal fishing, set aside for fish regeneration.	None
Bomadi-Ekpetiama (Opuan)	As prescribed by Chief Priest of the Lake	Yenagoa	Bayelsa	Family	Restricted fishing, no sexual activity allowed within lake area, women are not allowed inside lake	Crocodiles
Akumoni-Okordia (Samei)	Once in Two years	Yenagoa	Bayelsa	Family	Open and closed season fishing, no sexual activity allowed within lake area, conflicts between fishing mates disallowed, women are not allowed inside lake	None

6.2.5 Summary

The methods of harvesting fish from the wetlands in the two communities are associated with traditional regulations stipulated by the belief institution. Regulated measures are employed by each community to ensure maximum, sustainable, yields from the system. For instance in Osiana, fishing nets do not carry lead weights, and in Biseni people do not kill crocodiles based on the laws passed on by their ancestors. Also, it appears that the close relationship and indigenous knowledge of the wetland systems allows for a constant information and feedback on the state and exploitation of the natural capital. This is particularly obvious in Biseni, where the fisherfolk within the family-owned Lake Esiribi have been divided into two groups and a rota devised for different fishing seasons (see also chapter 5). This reduces conflicts amongst all resource users and the reciprocity among the groups in maintaining these regulations leads to a better managed wetland in the long run.

Fishing methods vary within the two communities and in other communities within the region as noted during the reconnaissance. Controlled harvesting periods contribute to maximising yields from the wetland as reflected in the open and closed season's system. Osiana's lake Adigbe is fished twice a year, with the open season occurring within the dry and wet seasons. The fisherfolk interviewed noted the difference in fish diversity in the two seasons. In contrast, Biseni's open season is once in two years. The open and closed seasons of these lakes, as practiced within both communities, is important for the fisheries as it allows for the regeneration of fish and accounts for the increased yields during the harvest periods. Ultimately, fishery resources are better managed and the small scale fishing industries within the region benefit. The next section considers the role these traditional practices play in the actual protection of the aquatic resources.

6.3 COMMUNITY PROTECTION OF THE WETLANDS

Theme 4:

What is the status of biodiversity, in this case aquatic and fishery resources, in these indigenous protected areas? How have any changes affected the presence and abundance of biodiversity, especially fishery resources? How do any changes affect the community? What lessons does this type of interaction between people and natural systems offer? Does the interaction offer any mechanism that could be adapted for wider scale biodiversity management and conservation?

Can this model of indigenous protected areas replace formal institutions in the monitoring, management and conservation of natural resources in the Niger Delta region?

6.3.1 Introduction

From the narratives in chapter 5 section 5.3.2.3, it is clear that within these communities there are areas which are selected and set apart as emblematic of the society's cosmology. In most cases observed, it is not the agenda of the community to protect / preserve biological species, but rather these protected areas / species have the benefits of protection primarily because of the people's acceptance of a common set of rules prescribed by their predecessors. As long as these rules have impact on certain groups of biodiversity, it might be useful to draw parallels and compare the usefulness of these symbolic areas to current efforts to ensure sustainability of natural ecosystems as detailed below. Comparisons between the two communities in this section are based on the following: effect of the customary regulations on fishery and communal life, household attitude towards sacred lakes and management of these lakes.

6.3.2 *Feedback on Regulations and Observance*

From the different focus group meetings it is clear that, despite the transition in the belief structure of the majority of the community's populace, there is a preference for upholding certain traditional customs of these protected areas. The women's group in Biseni, for instance, noted the usefulness of maintaining traditional laws:

"The laws are very necessary, they help us maintain order in our village to make money during those times [the] places are closed is difficult, but the laws are good, because it brings fear and also it allows the fish in the lakes to grow and be abundant".

While the men's group in Osiamia thought the restrictions were necessary because:

"...they help control the fishing methods".

The statement illustrates the sense of a society which does not mind the restrictions placed on them by traditional institutions. As long as livelihoods are enhanced and not threatened by the regulations then the regulations are good as proposed in chapter 5 section 5.3.2.4.

6.3.3 *Relationships and Networks*

In some of the communities visited there were common historical ancestral links with other related communities: their collective "set apart" lakes are not harvested at the same time and they share some common rules as noted in the statement below made by elders from the Bomadi-Ekpetiama community:

"Opuan is related to two lakes, Gbagaopuan owned by Ikolo people and Efi owned by Sabagreia people; these three lakes are not usually harvested within the same period, also during the fishing festival other communities and visitors pay a fee to fish in the lake, but Ikolo and Sabagreia people don't".

Also in Osiamia in an interview with elder Asei, it transpired that the descendants of a former native of Osiamia, who emigrated to establish his own community after a curse was placed on their family in Osiamia, can also participate in the annual Adigbe

fishing festival. This is shown below in an excerpt from the oral history of the Adigbe Lake.

"...He settled at the entrance to Korokorosei in southern Ijaw local government area, he later died leaving his two sons. One of his sons was named Kolu, who was a fisherman. The other named Keru was a hunter. Keru was a greedy man and did not share his money with his brother or his brother's children. This led to the separation of Kolu from Keru. Kolu went to settle at the sea shore and he is the founder of the Koluama community in the present Bayelsa state. In 2004, the Koluama people were invited for the festival due to their ancestral origin and they participated."

Some rules bar certain communities from fishing in a particular lake during the open fishing season as noted in the narrative of a chief from Sabagreia town:

"Opokuma and Gbarain clans are not allowed to fish during the fishing season".

When asked why he gave reasons that:

"Sometime ago somebody died and the corpse was found in the lake [and there was reason to believe that the corpse came from either Opokuma or Gbarain], due to this they are barred from fishing in the lake".

The relationship between communities such as those described above and their network of lakes fished with a rotational fishing system suggest possibilities for initiating a sustainable management plan within the region. Furthermore, benefits of protecting one community's lake can accrue to another related community, particularly if one is downstream and the other upstream.

Similarly, within a community owning several lakes such as the Biseni clan, the community devises its own rotational formula for harvesting of the lakes, as commented by an elder:

"We have other lakes apart from this one (Esiribi lake), in fact six more, these seven lakes are usually not fished at the same time, we rotate the fishing period".

For communities like Biseni with several lakes, rotational fishing reduces the overexploitation of dependence on one lake as noted in table 6.3, likewise in inter-related communities as shown in the narratives above.

Table 6.3 Responses to questions on alternative sources of fish.

Question	Categories	Biseni	Osiana
In the year that the restricted lake is closed where do you fish?	Other lakes	137 (74.1%)	8 (10.4%)
	The river	14 (7.6)	69 (89.6)
	I engage in other activities	25 (13.5)	0 (0.0)
	I move out of the community	6 (3.2)	0 (0.0)
	I wait till the next open season	0 (0.0)	0 (0.0)
	Others	3 (1.6)	0 (0.0)
	Total	185	77

Therefore, management strategies for the wetland system within this region should centre on maintaining the traditional system of rotational fishing as the time lapse between fishing encourages the rejuvenation of fishery and aquatic resources, leading to high productivity (Scott, 1966). However, in communities with very few lakes like in Osiana, the river is the alternative source for fishing (table 6.3 above), and as an open access resource it is in danger of overexploitation (Scott, 1966). Rotational and periodical fishing of these sacred lakes perhaps accounts for the high biological diversity of these lakes (Alfred-Ockiya and Otobo, 1990) and fish diversity as noted in section 6.5. Results showed that these societies consider the sacred lake to be more productive than non-sacred lakes as indicated by the Likert-type measurement scale used in the questionnaire shown in table 6.4 below. However, as indicated from the chi square (χ^2) test of difference between the two communities, there is a significant difference between the two groups in their perception of fish species diversity between sacred and non-sacred lakes.

Table 6.4 Results of surveys on productivity of sacred lakes (N = 253)

Statements	Community	Category ¹	Uncertain	Agree	X^2	df	P
		Disagree					
The sacred lake in our village is more productive than non-sacred lakes and river.	Biseni	9 (4.9%)	4 (2.2%)	172 (92.9%)	5.12	2	P<0.05
	Osiama*	0 (0.0)	0 (0.0)	68 (100)			
The sacred lake in our village is richer in fish species than non-sacred lakes.	Biseni	28 (15.1%)	25 (13.5%)	132 (71.4%)	14.76	2	P>0.05
	Osiama*	2 (2.9)	2 (2.9)	64 (94.1)			
Because of the taboo on some animals, for example crocodile in the sacred lake, people are prevented from hunting them, so we still have a lot of them.	Biseni	1 (0.5%)	2 (1.1%)	182 (98.3%)	3.15	2	P<0.05
	Osiama*	2 (2.9)	0 (0.0)	66 (97.1)			

Notes (¹) Category collapsed from original 5 scale measure comprising (5=strongly agree; 4=agree; 3=uncertain; 2=disagree and 1=strongly disagree), (*) Missing value omitted from analysis.

6.3.4 Attitudes to customary restrictions on sacred lakes

Attitudes towards keeping customary laws and benefits of the sacred lakes were also investigated in both communities. Results below (table 6.5) show that there is a significant difference in the attitude of the two project communities towards customary restrictions on the use of the lake. Compared with Biseni, in Osiama, respondents were less likely to maintain the taboos and laws if they had the choice of getting rich by disregarding them. There is also a difference in the perceived importance of sacred lakes in contributing to livelihoods. The higher level of

dependency of Osiana people on their single sacred lake (and generally fewer lake resources) may account for this response.

Table 6.5 Results of surveys on attitudes to sacred lake (N = 253)

Statements	Community	Category ¹			X ²	df	P
		Disagree	Un-certain	Agree			
If I have a choice between keeping the taboos and laws given to us by our ancestors and getting rich by disregarding the taboos and laws of our ancestors, I will definitely chose to keep the taboos and laws.	Biseni	6 (3.3%)	0 (0%)	179 (96.8%)	64.51	2	P>0.05
	Osiana*	27 (39.7)	2 (2.9)	39(57.4)			
The sacred lake is very important to my family, because it contributes a lot to our source of income.	Biseni	50 (27.0%)	7 (3.8%)	128 (69.2%)	22.97	2	P>0.05
	Osiana*	0 (0.0)	3 (4.4)	65(95.6)			

Notes (¹) Category collapsed from original 5 scale measure comprising (5=strongly agree; 4=agree; 3=uncertain; 2=disagree and 1=strongly disagree), (*) Missing value omitted from analysis

6.3.5 Management of Natural Resources (Sacred Lakes)

Management issues within the Niger Delta communities are sensitive, as declarations containing elements of government involvement or other external bodies are viewed with suspicion. An instance is the excerpt of the interview held with the women group in Biseni on how they tackled the problem of water hyacinth in their waterways:

"We remove the Abiola [local term for water hyacinth] with our hands; nobody has ever come to help us. We think the government should help to remove Abiola from

our water for us... [Q: If the government should help remove Abiola, can they or any other organisation then help with the management of these swamps, rivers or lakes?]. No, we can't share our resources with anybody".

Results from the survey (table 6.6) also show that these communities require some form of external assistance in tackling wetland problems. Government involvement was the most popular solution with respondents in Biseni (30%), with an equal amount of respondents (25.4%) suggesting the involvement of the community members and oil corporation. But in Osiana, while 31.2% asserted the need for the government in mitigating wetland problems, the same number thought the wetland problem had no known solution. The difference of opinion in the two communities might be attributed to the different wetland problem identified. While oil pollution topped the response category in Biseni, water hyacinth invasion was identified as the main problem in Osiana (see chapter 5, section 5.3.5.6). Oil exploration is generally viewed within the region as a government initiative: perhaps this explains the Biseni people's need for government intervention. Regarding participation in management of resources within the community, more respondents in Biseni (>90%) agreed with the proposition that management should be solely for owners of the resources, whereas in Osiana, half the respondents thought that management of resources could be a joint venture (table 6.7).

Table 6.6 Results of survey on solutions to wetland problems

Question	Categories	Biseni	Osiana
What can be done to solve these problems (wetland problems)?	internal management	47 (25.4%)	20 (26.0%)
	government involvement	56 (30.0)	24 (31.2)
	oil corporation involvement	47 (25.4)	2 (2.6)
	external assistance	7 (3.8)	7 (9.1)
	no solution	28 (15.1)	24 (31.2)
	Total	185	77

Table 6.7 Results of surveys on management of sacred lakes

Statements	Community	Category Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
Management of our resources, including our sacred lake should be left for only the owners of the resources.	Biseni	6 (3.2%)	4 (2.2%)	1 (0.5%)	14 (7.6%)	160 (86.5%)
	Osiama*	14 (18.2)	14 (18.2)	3 (3.9)	4 (5.2)	33 (44.9)
Management of resources should be a joint venture between the owners of the resources and other interested parties.	Biseni	117 (63.2%)	36 (19.5%)	0 (0.0%)	6 (3.2%)	26 (14.1%)
	Osiama*	18 (23.4)	9 (11.7)	2 (2.6)	22 (28.6)	17 (22.1)

Notes (*) Missing value omitted from analysis

6.3.6 Summary

This section has shown the importance of the rules and regimes used in the management of fishery and aquatic resources from the wetland. It is clear that the regime practiced within the two communities is traditionally constructed and based on a combination of socially shared beliefs and indigenous knowledge of the ecological environment. The rules of use of the wetland system, particularly the sacred lakes therefore allow for a constant feedback between natural capital and social relationships in the two communities. This is important as it gives needed information on the conditions of the fishery and other aquatic resources exploited by the people and allows adjustments to be made. The next section explores some aspects of the physical nature of the four lakes within these communities and compares results of the fish diversity studies with the predictions made by fisherfolk from the two communities. Section 6.4 addresses the physio-chemical characteristics

of the lakes and 6.5 describes the fish community of each lake and the type of aquatic
macrophytes within the lake system

6.4 PHYSIO-CHEMICAL CHARACTERISTICS OF LAKES

6.4.1 Introduction

Sustainable livelihoods are derived from practices which do not compromise the natural resource base (Chambers and Conway, 1991). In essence, effective management of natural resources can be described as sustainable, when the ecological integrity of the resource is not compromised both in the short and long terms. Environmental changes are due to natural causes or human activity (Amarasinghe and Welcomme, 2002), therefore data on the physio-chemical characteristics of the lakes are important if useful inferences are to be derived from the current situations of these lakes and management practices of the people in the study area. Comparisons of results on the physical characteristics of the four lakes, based on the following parameters: pH, turbidity, temperature and lake depth, are presented in this section.

6.4.2 pH of lakes

Data on the pH character of the lakes, like those for other physical characteristics, enable the interpretation of hydrological processes within the watershed's river courses (Thomas *et al.*, 2005). In essence, pH levels are indicative of the acidity or alkalinity of a water body (pH values of 1 to 6 indicate that the water is acidic, with pH 1 being very acidic; pH7 indicates a neutral solution and pH values of 8 to 11 indicate that the water is alkaline, with pH11 being very alkaline) and is a good indicator of water pollution, as high nutrient levels will be reflected in high pH levels. More so, fish species richness is a function of optimum pH levels (most organisms prefer conditions with a neutral pH) in conjunction with other physical factors (Amarasinghe and Welcomme, 2002, also see www.fishbase.org). In this regard, pH levels of each of the four lakes were tested as described in the methods chapter. Table 6.8 below shows results obtained for each of the four lakes. Results show a

variation across spatial location. Lake Adigbe had a near neutral pH of 7.23, while Ameneduno (its non-sacred counterpart) had a slightly acidic pH of 4.95. Both Esiribi and Obaa were similar with pH values of about 6. The near neutral pH lakes should yield a greater diversity of fish species than the acidic lake, as acidic lakes are known to increase toxicity in fish (Dillion *et al.*, 1987).

The variation observed might be due to the geographical location and physical character of each lake's primary water body, as floodplains and delta lakes are strongly influenced by their associated rivers (Welcomme, 1985; Nevers and Whitman, 2004). For instance, Esiribi and Obaa receive flood water directly from the river Niger, while Adigbe and Ameneduno are fed by the Osiana creek. In addition, Ameneduno from observations and GPS readings (Longitude 4^o51.009'N, Latitude 5^o59.795'E with elevations 17.98 metres) is on a higher plane than Adigbe (Longitude 4^o53.168'N, Latitude 6^o2.453'E at elevations 4.88 metres). Thus, Adigbe receives its waters directly from the adjoining creek, while Ameneduno receives less water due to its location.

Table 6.8 pH values of Lakes

Name of Lake	Sampling points	pH value
Adigbe	1	7.29
	2	7.30
	3	7.10
Sampling Time	14:48 to 15:50hrs	
Ameneduno	1	5.21
	2	4.76
	3	4.87
Sampling Time	12:10 to 14:12hrs	
Esiribi	1	6.28
	2	7.42

	3	6.91
Sampling Time	13:00 to 14: 10hrs	
Obaa	1	6.05
	2	6.11
	3	6.33
Sampling Time	6:43 to 7:29hrs	

6.4.3 Turbidity of lakes

The turbidity of lakes is indicative of the level of suspended sediments and organic matter necessary for the growth of macrophytes which fish and other aquatic organisms depend on. During flooding, there is a high concentration of suspended sediments; coloured dissolved organic matter and nutrients (Squires *et al.*, 2002). This means that lakes which have frequent flood water are expected to be more turbid than those with less flood water. The results of the turbidity of the four lakes are presented below in table 6.9 below.

Table 6.9 Turbidity values of Lakes

Name of Lake	Sampling points	Turbidity (Metres)
Adigbe	1	0.43
	2	0.20
	3	0.58
Ameneduno	1	*NP
	2	NP
	3	NP
Esiribi	1	0.79
	2	0.67
	3	0.64
Obaa	1	0.67
	2	1.00
	3	0.96

Notes *NP- Area Completely Covered By *Pistia stratiotes*.. Higher values is indicative of a more turbid lake

Based on the Secci Disk transparency level (Carlson, 1977; Cooke *et al.*, 1993; LaPerriere and Edmundson, 2000; Amarasinghe and Welcomme, 2002), as indicated in table 6.9 above, Lake Adigbe is a clear lake and can be characterised as an oligotrophic lake (characterized by its low accumulation of plant nutrients which supports a sparse growth of algae and other organisms). But this characterization is inconclusive, as current levels of nitrates and phosphorous were not obtained. However, submergents and floating water plants are known to support the benthos, which includes phytoplankton and zooplankton (Brendonck *et al.*, 2003) and macro-invertebrates (Olson *et al.*, 1994) and act as shelters from predation for vulnerable fish species (Batzer, 1998). Water hyacinth for instance, shows a strong influence on nutrient concentration of lakes, which in turn affects turbidity levels (Brendonck *et al.*, 2003). Again, plankton also can be responsible for causing large variations in water transparency and light penetration in lakes (LaPerriere and Edmundson, 2000). Visual estimates showed a sparse growth of macrophytes (about 20% see table 6.23) on Lake Adigbe. Esiribi and Obaa on the other hand are turbid lakes and may be characterized as eutrophic lakes, owing to the abundant accumulation of nutrients. Lake Obaa also has a similar profile with an abundance of macrophytic flora; emergent, *Scripus cubensis* (60%) and submergent, *Ceratophyllum species* (20%). In addition aside from the macrophyte population, lakes which receive flood water have a higher concentration of suspended sediments and nutrients that alter the transparency of such lakes (Doyle, 1991; Engle & Melack, 1993; Bertoli, 1996; Lesack *et al.*, 1998; Squires *et al.*, 2002). These factors probably explain the high turbidity values of Lakes Esiribi and Obaa which receive flood water directly from the river Niger (Oyegun, 1999).

6.4.4 Temperature

Illumination of the lake (by light from the sun) is a fundamental requirement for the development of littoral vegetation (Hutchinson, 1975). Increases in the temperature of water bodies is influenced by the amount of heat derived from the sun. Hence, temperature is an important aspect in the development of aquatic species' populations, for instance zooplankton species richness, invariably influencing fish species diversity (Hessen *et al.*, 2007). Temperature readings of the lakes as shown in table 6.10 below also varied between locations. Variation can be attributed to the different timings of the tests. As some readings were taken early in the morning, while others were taken close to mid-day. Where possible, for instance in Lake Obaa, readings were taken at dawn. However, because of the nature of the research which was based on participatory models the physiochemical test had to be done in agreement with local customary rules. The highest temperature value was recorded from Lake Esiribi, the lowest from Lake Ameneduno. Both lakes from the visual estimation of lake surface macrophytes detailed in section 6.4.6 had the highest coverage of emergent flora.

Table 6.10 Temperature values of Lakes

Name of Lake	Sampling points	Temperature ($^{\circ}\text{C}$)
Adigbe	1	32.1
	2	32.5
	3	31.6
Ameneduno	1	26.5
	2	26.7
	3	26.6
Esiribi	1	34.0
	2	34.2
	3	33.9
Obaa	1	28.7
	2	28.1

	3	27.8
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6.4.5 Depth

The depth of lakes also influences the type of fish species and aquatic resources found within a water body. Depth values determined for the four lakes shown in table 6.11 below also varied between lakes. Average readings show that Lake Adigbe was deepest with a depth of 2.29 metres.

Table 6.11 Depth values of Lakes

Name of Lake	Sampling points	Depth (Metres)
Adigbe	1	0.97
	2	3.84
	3	2.06
Ameneduno	1	0.48
	2	*NP
	3	NP
Esiribi	1	2.17
	2	1.95
	3	1.84
Obaa	1	1.32
	2	1.25
	3	1.39

Notes *NP- AREA COMPLETELY COVERED BY *Pistia stratiotes*

Average readings for the physiochemical parameters in the two project communities are summarised below in Table 6.12 below. Overall readings show that Esiribi and Adigbe have some similar characteristics. This perhaps accounts for the high diversity noted in both lakes in comparison to lakes Obaa and Ameneduno.

Table 6.12 Average Readings of Physio-chemical Parameters In The Different Lakes

Lake	Parameters				
	Temperature (°C)	pH	Turbidity (metres)	Depth (metres)	Altitude (metres)
Esiribi	34.03	6.87	0.7	1.99	6.61
Obaa	28.2	6.16	0.8	1.32	5.18
Adigbe	32.07	7.23	0.40	2.29	5.89
Ameneduno	26.6	4.95	*NP	0.48	19.37

Notes (*NP) - Area completely covered by *Pistia stratiotes*

The next section presents the type of macrophyte population necessary for a healthy food chain for the fish diversity found in each of the lakes.

6.4.6 Aquatic Macrophytes of Lakes

Macrophytes provide substrates for growth and reproduction of fish species, as they provide substrates for epiphytes which form a large fraction of the diets of fishes (Batzer and Wissinger, 1996). Macrophytes depend on the amount of suspended materials and nutrients delivered by the periodic inundation of floodplains, such as found within the communities of the Niger Delta (Squires et al., 2002). Fish diversity and other aquatic resources should be greater in lakes with a well developed macrophyte population (Olson *et al.*, 1994). From visual estimation and observation of the four lakes, Lake Esiribi and Obaa have a good macrophyte population as shown in table 6.13. This is perhaps one of the factors responsible for the diverse fish species in Esiribi. However, the introduction of non-native species as discussed in the next section appears to limit optimum fish growth and yields.

The introduction of *Eichhornia crassipes* (Water hyacinth) in these lakes as noted in most of the communities is an issue of consideration, particularly mentioned as a primary problem of the waterways in Osiana and Biseni (see quotes in chapter 5, section 5.2.4.6). In Lake Esiribi, for instance, water hyacinth has almost completely colonised the water way, in some areas masking the growth of other macrophytes (see background picture chapter 4, section 4.4.3.1). In Lake Obaa (non-sacred lake in Biseni), the submergent *Ceratophyllum* sp. was very visible, whereas it was scarce in Lake Esiribi. A similar observation was made in Lake Chivero, Zimbabwe, where due to the presence of water hyacinth submergents were absent (Brendonck *et al.*, 2003). In addition to its ability to block sunlight getting onto the benthic floor, water hyacinth is implicated in damage to fisheries and also enhances siltation rates (Giesen 1994; Nontji 1994). Siltation was particularly mentioned by the youths in Biseni. Diminishing fish yields also may be attributed to depleted oxygen levels caused by this plant as posited by Ootobo and Alagoa (1990). However, since oxygen levels of these lakes were not measured, evidence of the plants' effects on oxygen levels of the lakes analysed is inconclusive.

Table 6.13 Aquatic Macrophyte Coverage of Project Lakes

NAME OF SITE	LIST OF COMMON MACROPHYTE	DOMINANT SPECIES FOUND	ESTIMATES OF PERCENT COVERAGE (%)
Lake Esiribi	<i>Panicum</i> sp. <i>Ludwigia</i> sp. <i>Scirpus cubensis</i> <i>Salvinia nymphellul</i> , <i>Azolla africana</i> <i>Pistia stratiotes</i> <i>Ipomoea aquatica</i> <i>Ceratopteris cornuta</i>	<i>Eichhornia crassipes</i> <i>Panicum</i> sp.	80 5
Lake Obaa	<i>Eichhornia crassipes</i> <i>Ceratopteris cornuta</i> <i>Ludwigia</i> sp. <i>Azolla africana</i> <i>Salvinia nymphellula</i> <i>Ipomoea aquatica</i> <i>Ceratophyllum</i> sp. <i>Pistia stratiotes</i>	<i>Scirpus cubensis</i> <i>Ceratophyllum</i> sp. <i>Ceratopteris cornuta</i>	60 20 5
Lake Adigbe	<i>Ceratopteris cornuta</i> <i>Panicum</i> sp. <i>Nymphaea lotus</i>	<i>Eichhornia crassipes</i>	20
Lake Ameneduno	<i>Ceratopteris cornuta</i> <i>Azolla africana</i>	<i>Pistia stratiotes</i>	80

6.4.7 Summary

The results presented in this section have illustrated the between-lake variability. The two sacred lakes are deep lakes, while the non-sacred lakes are shallow. Interestingly in several of the focus group meetings (see for instance discussions in chapter 5, section 5.3.2.4) the depth and width of these lakes was mentioned as one of the

attributes distinguishing one lake from the other (see chapter 5). However, because of the pre-selection criteria for the research communities conclusions cannot be made on the evidence available that all sacred lakes are deeper than non-sacred lakes. The reduced level and duration of flooding of these lakes and surrounding wetland was an important wetland problem which featured both in focus group meetings and as a variable in the household interviews (see discussions in chapter 5, section 5.3.5.6). One group commented on the fact that fishery resources had reduced because of the reduced level of flooding. As shown in section 6.4.3 above, turbidity is indicative of the level of suspended sediments and organic matter required for fish growth. This means that increased flooding will deliver needed sediments and organic matter for macrophyte growth; conversely, reduced flooding amounts to a reduction in lake sediments. This has implication for the small scale fishery in these communities. Therefore in future assessment and monitoring of change patterns within these lakes, turbidity measurement is important for monitoring the frequency and duration of flooding of these lakes. In addition, physiochemical results obtained from the present study begins to fill the data gaps of the physiochemical character of lakes within the Niger Delta. Although physical measurements were limited, the results pointed to the fact that these communities are aware of what is going on within the ecological environment. The next section deals with the type of fish species found in each of these lakes.

6.5 THE FISH DIVERSITY OF LAKES

6.5.1 Introduction

The previous sections outlined the different physical characteristics of the four lakes and their relationship with fish diversity. This is important because fish diversity of lakes cannot be considered in isolation of the physical and chemical nature of the water body. Diversity indices, and particularly species richness, are sensitive to sample size, pH, latitude, heterogeneity and lake area (Rørslett, 1991; Keller & Conlon, 1994). The fish species diversity and richness in these lakes is important in describing the different lake types within the region. Also, it can serve as a baseline for measuring future changes in the fish population structure to assess the study area's management strategies (Amarasinghe and Welcomme, 2002).

Species inventories are usually a requirement for comparative assessments between different habitats. There are different approaches in estimating the species number in a particular habitat or locality. The method preferred depends on the quality of the data, sampling effort and the objectives of the study (see reviews in Southwood, 1978; Krebs, 1999; Southwood and Henderson, 2000). The fishery in the lakes surveyed was determined by assessing the relative abundance of the fish species from each study community's sacred lake in comparison to that of a non-sacred lake. This was important to measure how species vary in each location, as an indicator of the factors that create or destroy it (Southwood and Henderson, 2000); for instance, the presence of a potential pest such as *Lates niloticus* (Nile perch) in a water body. Fish species diversity of the four lakes was calculated using Simpson's index of diversity (Simpson, 1949), and the Shannon-Weiner function (Southwood, 1978; Krebs, 1999), to show the relationship between the species numbers and the abundance of individuals. In both indexes of diversity measurement, higher index

value implies greater diversity within the habitat. Also the Berger-Parker Dominance Index (Southwood, 1978) was determined for each site visited, to show the proportion of the total catch that is due to the dominant species.

6.5.2 Fish Diversity in Biseni Area

Tables 6.14 to 6.21 show the calculations of the three indexes used in measuring the diversity between the lakes (see formula in chapter 4).

1. Lake Esiribi

Table 6.14 Numbers (Nos) and proportions of the total (Pi) of different fish species recorded in Lake Esibiri, and calculations from them used to derive the Shannon-Weiner species diversity index (H) for Lake Esiribi.

S/N	Species	Nos	Pi	Ln(Pi)	Pi * Ln Pi
1	<i>Schilbe mystus</i>	1	0.004329	-5.44242	-0.02356
2	<i>Labeo sp</i>	12	0.051948	-2.95751	-0.15364
3	<i>Synodontis membranaceous</i>	63	0.272727	-1.29928	-0.35435
4	<i>Citharinus citherus)</i>	56	0.242424	-1.41707	-0.34353
5	<i>Gymnarchus niloticus</i>	2	0.008658	-4.74927	-0.04112
6	<i>Tilapia zilli</i>	3	0.012987	-4.34381	-0.05641
7	<i>Tilapia niloticus</i>	15	0.064935	-2.73437	-0.17756
8	<i>Synodontis clarias</i>	4	0.017316	-4.05612	-0.07024
9	<i>Aletes macrolepidotus</i>	2	0.008658	-4.74927	-0.04112
10	<i>Hepsetus odoe</i>	2	0.008658	-4.74927	-0.04112
11	<i>Lates niloticus</i>	15	0.064935	-2.73437	-0.17756
12	<i>Distichodus rostratus</i>	1	0.004329	-5.44242	-0.02356
13	<i>Channa obscura</i>	2	0.008658	-4.74927	-0.04112
14	<i>Bagrus bayad</i>	5	0.021645	-3.83298	-0.08296
15	<i>Synodontis schall</i>	16	0.069264	-2.66983	-0.18492
16	<i>Heterobranchus bidorsalis</i>	1	0.004329	-5.44242	-0.02356
17	<i>Papyrocranus afer</i>	4	0.017316	-4.05612	-0.07024
18	<i>Auchenoglanis occidentalis</i>	2	0.008658	-4.74927	-0.04112
19	<i>Tetraodon lineatus</i>	1	0.004329	-5.44242	-0.02356
20	<i>Synodontis nigrita</i>	1	0.004329	-5.44242	-0.02356
21	<i>Mormyrid</i>	12	0.051948	-2.95751	-0.15364
22	<i>Chrysichthys auratus</i>	9	0.038961	-3.24519	-0.12644
23	<i>Heterotis niloticus</i>	1	0.004329	-5.44242	-0.02356
24	<i>Hydrocynus forskalii</i>	1	0.004329	-5.44242	-0.02356

Total		231			-2.32199
S-W Index					2.32199

Table 6.15 Calculations of The Simpson Diversity Index (1-*D*) and the Berger-Parker Dominance (*d*) Index for fish at Lake Esiribi. For identities of species numbers see Table 6.14.

Species	Nos	$n_i(n_i-1)$	$n_t(n_t-1)$	$n_i(n_i-1)/n_t(n_t-1)$
1	1	0	53130	0
2	12	132		0.002484472
3	63	3906		0.073517787
4	56	3080		0.057971014
5	2	2		3.76435E-05
6	3	6		0.000112931
7	15	210		0.003952569
8	4	12		0.000225861
9	2	2		3.76435E-05
10	2	2		3.76435E-05
11	15	210		0.003952569
12	1	0		0
13	2	2		3.76435E-05
14	5	20		0.000376435
15	16	240		0.004517222
16	1	0		0
17	4	12		0.000225861
18	2	2		3.76435E-05
19	1	0		0
20	1	0		0
21	12	132		0.002484472
22	9	72		0.001355167
23	1	0		0
24	1	0		0
Total	231			0.151364577
Berger-Parker Dominance (<i>d</i>) Index				
	0.272727			
Simpson Index 1-D				
	0.848635			

2 Lake Obaa

Table 6.16 Numbers (Nos) and proportions of the total (Pi) of different fish species recorded in Lake Obaa, and calculations from them used to derive the Shannon-Weiner species diversity index (H) for Lake Obaa.

S/N	Species	Nos	Pi	Ln(pi)	Pi * Ln Pi
1	<i>Tilapia zilli</i>	16	0.842105	-0.17185	-0.14472
2	<i>Tilapia niloticus</i>	2	0.105263	-2.25129	-0.23698
3	<i>Synodontis sp.</i>	1	0.052632	-2.94444	-0.15497
Total		19			-0.53666
S-W Index					0.53666

Table 6.17 Calculations of The Simpson Diversity Index ($1-D$) and the Berger-Parker Dominance (d) Index for fish at Lake Obaa. For identities of species numbers see Table 6.16.

Species	Nos	$n_i(n_i-1)$	$n_t(n_t-1)$	$n_i(n_i-1)/n_t(n_t-1)$
1	16	240	342	0.701754386
2	2	2		0.005847953
3	1	0		0
Total	19			0.707602339
Berger-Parker Dominance (d) Index				
0.842105				
Simpson Index $1-D$				
0.292398				

6.5.3 Fish Diversity in Osiana Area

3. Lake Adigbe

Table 6.18 Numbers (Nos) and proportions of the total (Pi) of different fish species recorded in Lake Adigbe, and calculations from them used to derive the Shannon-Weiner species diversity index (H) for Lake Adigbe.

S/N	Species	Nos	Pi	Ln(pi)	Pi * Ln Pi
1	<i>Elops lacerta</i>	2	0.004808	-5.33754	-0.02566
2	<i>Citharinus citharus</i>	242	0.581731	-0.54175	-0.31515
3	<i>Hemisynodontis membranaceus</i>	75	0.180288	-1.7132	-0.30887
4	<i>Chrysichthys nigrodigitatus</i>	33	0.079327	-2.53418	-0.20103
5	<i>Oreochromis niloticus</i>	3	0.007212	-4.93207	-0.03557
6	<i>Brycinus nurse</i>	41	0.098558	-2.31711	-0.22837
7	<i>Gymnarchus niloticus</i>	1	0.002404	-6.03069	-0.0145
8	<i>Alestes baremoze</i>	5	0.012019	-4.42125	-0.05314
9	<i>Distichodus rostratus</i>	2	0.004808	-5.33754	-0.02566
10	<i>Brycinus macrolepidotus</i>	3	0.007212	-4.93207	-0.03557
11	<i>Schilbe mystus</i>	2	0.004808	-5.33754	-0.02566
12	<i>Cyprinoids</i>	2	0.004808	-5.33754	-0.02566
13	<i>Labeo coubie</i>	1	0.002404	-6.03069	-0.0145
14	<i>Hepsetus odoe</i>	1	0.002404	-6.03069	-0.0145
15	<i>Hemichromis fasciatus</i>	1	0.002404	-6.03069	-0.0145
16	<i>Papyrocranus afer</i>	1	0.002404	-6.03069	-0.0145
17	<i>Hyperopisus bebe</i>	1	0.002404	-6.03069	-0.0145
Total		416			-1.36732
S-W Index					1.36732

Table 6.19 Calculations of The Simpson Diversity Index (1-*D*) and the Berger-Parker Dominance (*d*) Index for fish at Lake Adigbe. For identities of species numbers see Table 6.18.

Species	Nos	ni(ni-1)	nt(nt-1)	ni(ni-1)/nt(nt-1)
1	2	2	172640	1.15848E-05
2	242	58322		0.337824374
3	75	5550		0.032147822
4	33	1056		0.006116775
5	3	6		3.47544E-05
6	41	1640		0.009499537
7	1	0		0
8	5	20		0.000115848
9	2	2		1.15848E-05
10	3	6		3.47544E-05
11	2	2		1.15848E-05
12	2	2		1.15848E-05
13	1	0		0
14	1	0		0
15	1	0		0
16	1	0		0
17	1	0		0
Total	416			0.385820204
Berger-Parker Dominance (d) Index				
	0.581731			
Simpson Index 1-D				
	0.614179796			

4. Lake Ameneduno

Only one species of fish was found in Lake Ameneduno, therefore no species diversity indices were calculated for this lake.

6.5.4 Fish Diversity Sabagreia Area

5. Lake Efi

Table 6.20 Numbers (Nos) and proportions of the total (Pi) of different fish species recorded in Lake Efi, and calculations from them used to derive the Shannon-Weiner species diversity index (H) for Lake Efi

S/N	Species	Nos	Pi	ln(pi)	Pi * Ln Pi
1	<i>Citharinus citherus</i>	383	0.555878	-0.58721	-0.32642
2	<i>Heterotis niloticus</i>	3	0.004354	-5.43663	-0.02367
3	<i>Gymnarchus niloticus</i>	4	0.005806	-5.14895	-0.02989
4	<i>Hydrocynus</i>	4	0.005806	-5.14895	-0.02989
5	<i>Hemisynodontis membranaceous</i>	276	0.400581	-0.91484	-0.36647
6	<i>Distichodus</i>	2	0.002903	-5.84209	-0.01696
7	<i>Auchenoglanis sp</i>	1	0.001451	-6.53524	-0.00949
8	<i>Chrysichthys nigrodigitatus</i>	3	0.004354	-5.43663	-0.02367
9	<i>Alestes macrolepidotus</i>	5	0.007257	-4.9258	-0.03575
10	<i>Labeo coubie</i>	1	0.001451	-6.53524	-0.00949
11	<i>Bagrus bayad</i>	3	0.004354	-5.43663	-0.02367
12	<i>Labeo senegalensis</i>	1	0.001451	-6.53524	-0.00949
13	<i>Lates niloticus</i>	1	0.001451	-6.53524	-0.00949
14	<i>Alestes baremoze</i>	1	0.001451	-6.53524	-0.00949
15	<i>Tilapia niloticus</i>	1	0.001451	-6.53524	-0.00949
Total		689			-0.9333
S-W Index					0.9333

Table 6.21 Calculations of The Simpson Diversity Index (1-*D*) and the Berger-Parker Dominance (*d*) Index for fish at Lake Efi. For identities of species numbers see Table 6.20.

Species	Nos	$ni(ni-1)$	$nt(nt-1)$	$ni(ni-1)/nt(nt-1)$
1	383	146306	474032	0.308641611
2	3	6		1.26574E-05
3	4	12		2.53147E-05
4	4	12		2.53147E-05
5	276	75900		0.160115773
6	2	2		4.21912E-06
7	1	0		0
8	3	6		1.26574E-05
9	5	20		4.21912E-05
10	1	0		0
11	3	6		1.26574E-05
12	1	0		0
13	1	0		0
14	1	0		0
15	1	0		0
Total	689			0.468892395
Berger-Parker Dominance (<i>d</i>) Index				
	0.555878			
Simpson Index 1-D				
	0.531108			

Table 6.22 Fish diversity indices in different lakes

Diversity Information	Lakes Adigbe	Ameneduno	Esiribi	Obaa	Ef
Shannon-Weiner Function (<i>H</i>)	1.36732	-	2.32199	0.53666	0.93330
Simpson Diversity (1- <i>D</i>)	0.61418	-	0.84864	0.29240	0.53111
Berger-Parker Dominance (<i>d</i>)	0.58173	1.00000	0.27273	0.84211	0.55588
Total Number Enumerated (N_i)	416	4	231	19	689
Nos of Species	17	1	24	3	15

6.5.5 Comparison of Fish Diversity Across The Different Areas

In the sample from Lake Esiribi (sacred lake) there were 231 fish of 24 species from 16 families; while Lake Adigbe sample with a diversity index of 0.61418 had 416 fish of 17 species from 12 families (see distribution table 6.23 below). The fish species recorded in the highest numbers from Lake Esiribi was *Synodontis membranaceus* (Family: Mochokidae), while the most numerous fish in Lake Adigbe was *Citharinus citharus* (Family: Citharinidae). From the diversity index analysis shown in tables 6.14 to 6.23, the two sacred lakes (Esiribi and Adigbe) had a more diverse number of fish species than the two non-sacred lakes (Obaa and Ameneduno).

Several factors are responsible for the differences between the fish faunas of the lakes including the depths of the lakes and other physical factors as mentioned in the previous sections.

Qualitative evidence from the two communities, Biseni and Osiama, which is extensively discussed in previous sections and in chapter five also recognise the difference between these lakes. Interestingly, from discussions on the fish diversity of these lakes, the locals identified *Citharinus citharus* as the most abundant fish species in both Adigbe and Esiribi (section 6.2.3), confirming the fact that these communities have an in-depth knowledge of the physical environment. This knowledge is important to the sustainability of fisheries within these systems. As primary users of these resources, expert knowledge expressed by community members contributes to monitoring of needed resources. It is also important to reiterate in this context, the regulatory measure of postponing group harvest seasons within some of these lakes. In Osiama community, the biannual fishing event in Lake Adigbe was postponed in 2007 to 2008 (see chapter 5, section 5.3.5.5), because the institution involved in the

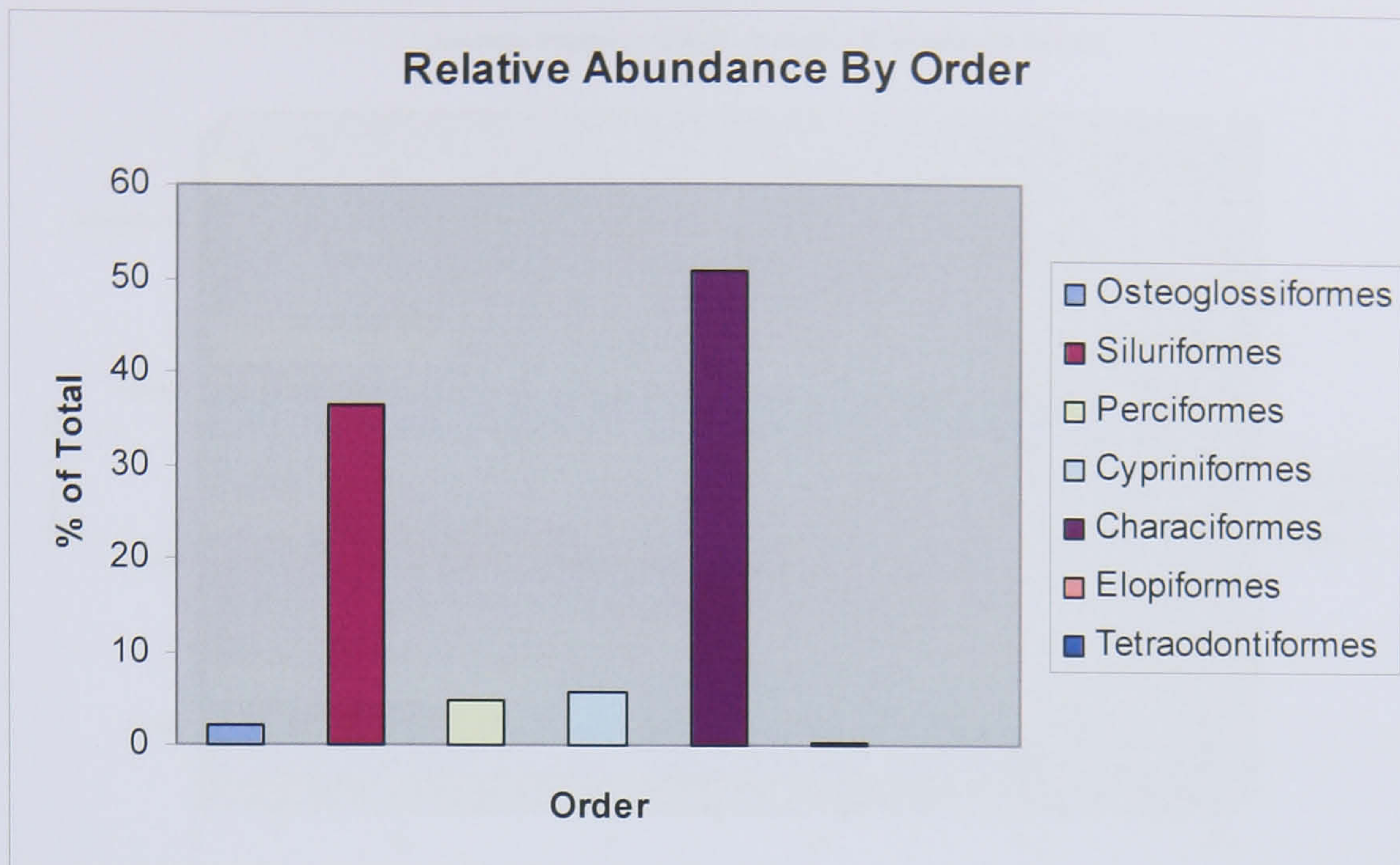
management of the lake had observed a sharp decline in fish stocks. This type of feedback underscores the socio-ecological interaction between the people and their wetland and ultimately leads to a better managed system.

Table 6.23 The Numbers Of Fish Of Different Species Recorded From Different Lakes.

ORDER FAMILY Species	ADIGBE	AMENEDUNO	ESIRIBI	OBAA	EFI	TOTAL
CHARACIFORMES (characins)						
CITHARINIDAE						
<i>Citharinus citherus</i>	242	-	56	-	383	681
<i>Distichodus rostratus</i>	2	-	1	-	2	5
HEPSETIDAE						
<i>Hepsetus odoe</i>	1	-	2	-	-	3
CYPRINIFORMES (carps)						
ALESTIDAE						
<i>Alestes baremoze</i>	5	-	-	-	1	6
<i>Aletes macrolepidotus</i>	-	-	2	-	5	7
<i>Brycinus macrolepidotus</i>	3	-	-	-	-	3
<i>Brycinus nurse</i>	41	-	-	-	-	41
<i>Hydrocynus forskalii</i>	-	-	1	-	4	5
CYPRINIDAE						
<i>Cyprinoids</i>	2	-	-	-	-	2
<i>Labeo coubie</i>	1	-	-	-	1	2
<i>Labeo senegalensis</i>	-	-	-	-	1	1
<i>Labeo sp</i>	-	-	12	-	-	12
ELOPIFORMES (tarpons)						
ELOPIDAE						
<i>Elops lacerta</i>	2	-	-	-	-	2
OSTEOGLOSSIFORMES (bony-tongue)						
ARAPAIMIDAE						
<i>Heterotis niloticus</i>	-	-	1	-	3	4
GYMNARCHIDAE						
<i>Gymnarchus niloticus</i>	1	-	2	-	4	7
MORMYRIDAE						
<i>Hyperopisus bebe</i>	1	-	-	-	-	1
<i>Mormyrid</i>	-	-	12	-	-	12
NOTOPTERIDAE						

<i>Papyrocranus afer</i>	1	-	4	-	-	5
PERCIFORMES (perch-like)						
CHANNIDAE						
<i>Channa obscura</i>	-	4	2	-	-	6
CICHLIDAE						
<i>Hemichromis fasciatus</i>	1	-	-	-	-	1
<i>Oreochromis niloticus</i>	3	-	-	-	-	3
<i>Tilapia niloticus</i>	-	-	15	2	1	18
<i>Tilapia zilli</i>	-	-	3	16	-	19
LATIDAE						
<i>Lates niloticus</i>	-	-	15	-	1	16
SILURIFORMES (catfish)						
CLARIDAE						
<i>Heterobranchus bidorsalis</i>	-	-	1	-	-	1
BAGRIDAE						
<i>Auchenoglanis occidentalis</i>	-	-	2	-	-	2
<i>Auchenoglanis sp.</i>	-	-	-	-	1	1
<i>Bagrus bayad</i>	-	-	5	-	3	8
<i>Chrysichthys auratus</i>	-	-	9	-	-	9
<i>Chrysichthys nigrodigitatus</i>	33	-	-	-	3	36
MOCHOKIDAE						
<i>Hemisynodontis membranaceous</i>	75	-	-	-	276	351
<i>Synodontis clarias</i>	-	-	4	-	-	4
<i>Synodontis membranaceous</i>	-	-	63	-	-	63
<i>Synodontis nigrita</i>	-	-	1	-	-	1
<i>Synodontis schall</i>	-	-	16	-	-	16
<i>Synodontis sp.</i>	-	-	-	1	-	1
SCHILBEIDAE						
<i>Schilbe mystus</i>	2	-	1	-	-	3
TETRAODONTIFORMES (puffers)						
TETRAODONTIDAE						
<i>Tetraodon lineatus</i>	-	-	1	-	-	1
TOTAL	416	4	231	19	689	1359

Figure 6.1 Relative Abundance By Order Of All Fish Recorded



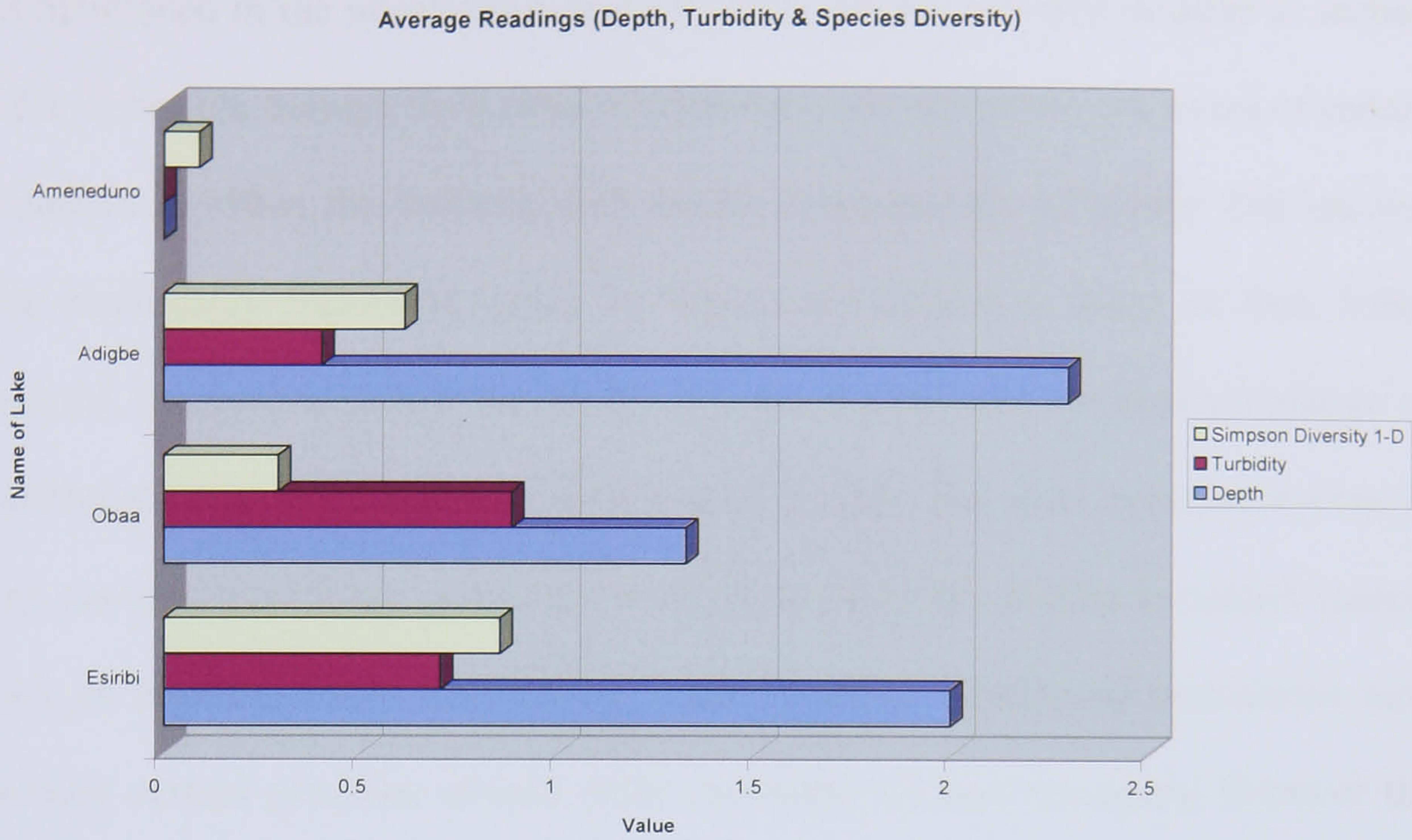
Discussions in the next section are centred on the influence of the physiochemical parameters on fish diversity.

6.5.6 Comparative Analysis of Physio-Chemical Parameters and Species Diversity

Fish species diversity appears to be positively associated with the depth of the lake as indicated in figure 6.2 below. The shallow lakes (i.e. Obaa and Ameneduno) have a lower diversity index while the deeper lakes (Esiribi and Adigbe) have a greater diversity. This is in agreement with the works of Amarasinghe and Welcomme (2002) and Jeppesen *et al.* (2000). Interestingly, Lake Adigbe's transparency value was the lowest of the four lakes, which suggest a low level of sediments and organic matter (see discussion in section 6.4.3), however, its fish species index as discussed in section 6.5 shows a slightly lower value than Lake Esiribi which maybe attributed to its depth.

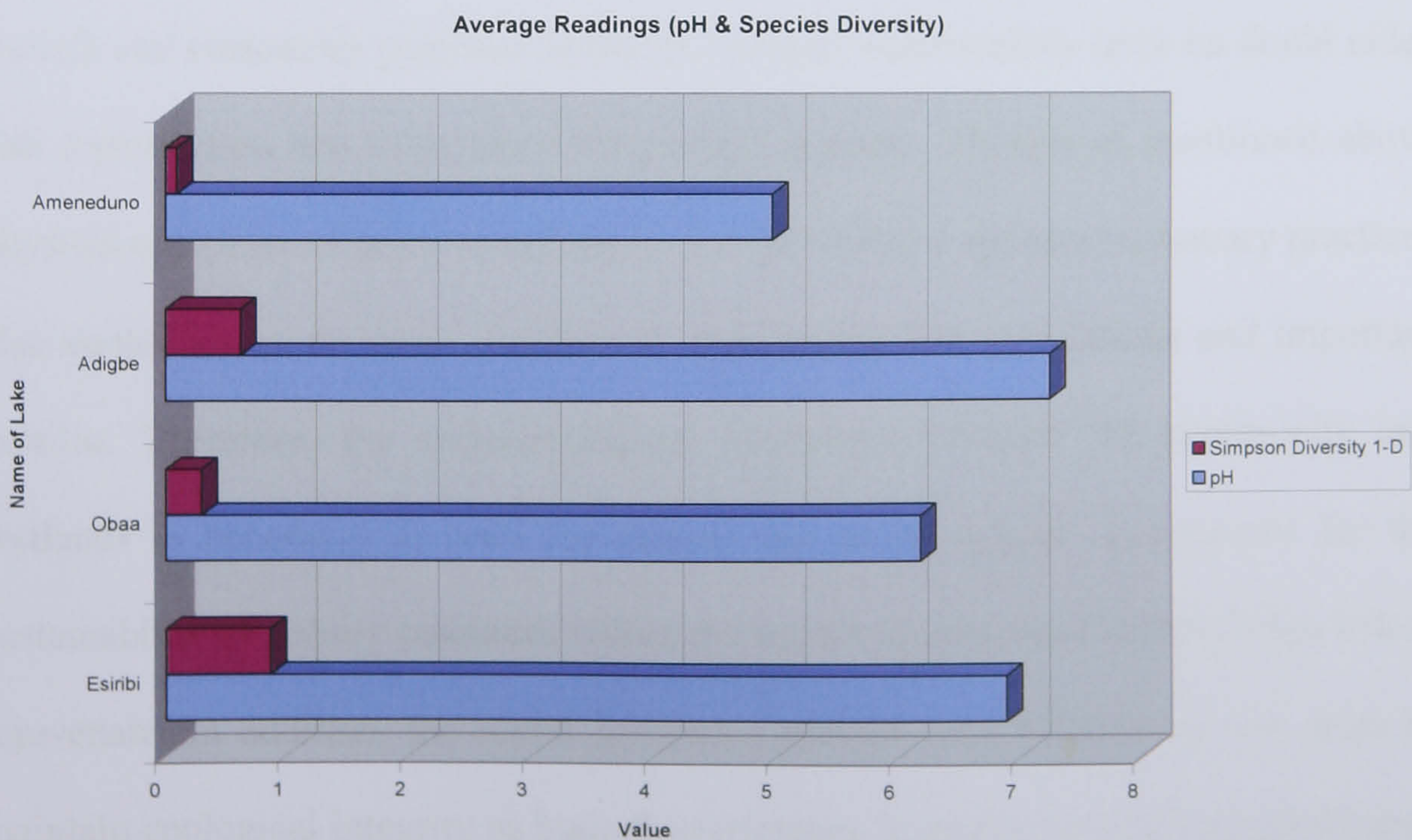
It is instructive to note that in the narratives from the various focus groups, the depths and size are mentioned as peculiar features of the two sacred lakes, Adigbe and Esiribi. By inference from the various narratives, the ancestral laws, coupled with the size of these lakes make them valued resources of the community.

Figure 6.2 Relationship between Depth, Turbidity and Diversity Index



Temperature and pH also appear to have an influence on fish diversity (figure 6.3). Lake Ameneduno with the lowest temperature and pH level had the lowest fish species diversity index, perhaps as a result of acidification, as suggested by Dillion *et al.* (1987) for lakes in the United States and Canada where it has a negative effect on fish species.

Figure 6.3 Relationship Between pH and Diversity Index



6.6 SUMMARY

As mentioned in the introductory section of the chapter and also detailed in section 6.2.3, fisherfolk through their close relationship with the system are aware of certain occurrences within the wetland, such as the disappearance of certain fish species. The explanatory framework given by these communities is based on their belief systems, as many associate the decline of fish species with the non-compliance to traditional edicts and mandatory service to their Gods. But some associate decline in fish stocks to population pressure, yet others attribute the decline to natural causes, such as blocked creeks covered by water hyacinth. Traditional restrictions may prohibit certain practices around these important wetland resources; however the physical characteristics of the wetlands themselves play important roles in determining the nature and conditions of aquatic resources in them. Due to the differences in the physical characteristics of these lakes, it is difficult to compare each of the lakes and perhaps each lake should be considered as a specific site. In this regard, the results of the fish diversity assessment can also be considered as site-specific.

Beliefs and customary practices in the two project communities have no doubt aided fish regeneration and maintained the natural system. Though as mentioned above physical attributes of lakes contribute to fish diversity, it appears customary practices also contribute in no small measure to maintaining fish populations and important reptiles. Therefore, the socio-ecological interaction between the community and wetlands is beneficial to both the natural and social system. It accounts for the sustainability of fishery resources within the region as periodical fishing helps fish to rejuvenate. In addition, the social consensus around rules of resource use helps to maintain ecological integrity as human interference is limited to periods agreed upon

by community members. Reciprocity noted in the maintenance of these regulatory measures increases social cohesion and reduces conflicts amongst resource users.

One important practice within these communities is the relationship between kindred communities leading to maintenance of periodic fishing of several lakes. The continuation of this practice could well be necessary to permit continued fish abundance and diversity in the Niger Delta.

CHAPTER 7

GENERAL DISCUSSION

7.1 INTRODUCTION

The previous two chapters have presented findings on the interaction between the Niger Delta communities and the wetland system that they live in. This chapter highlights the important social practices found within the study area and their relevance to conservation and natural resource management. Further research is needed for testing some of the theories which emerged from the interactions with the communities and suggestions for this are presented following the recommendations.

7.2 DISCUSSION OF THE MAIN FINDINGS OF THE RESEARCH

7.2.1 *Fish Diversity and Physical Characteristics of Lakes*

Fish diversity is an important component of overall biological diversity in the lakes and is also important for the social system. The more diverse the system, the greater the chances of increases in individual and communal sales as noted in Esiribi fishing, where the last but one fishing season yielded sales worth N4, 000, 000 [~£18, 217 Great Britain Pound (GBP): 1Nigerian Naira (N) equates to 0.0046GBP, see case 3, Appendix 1]. Until this study there was little information available on fish species composition of the Niger Delta ecoregion and there remains a paucity of data on other groups. Wildlife surveys in the delta were not conducted until the late 1980s (Oates 1989; Were, 1991; Powell, 1995). Therefore, it is difficult to compare results obtained from this survey with previous findings from the area. However, Ezealor *et al.* (2004) recorded 113 fish species from 65 genera and 30 families in Lake Esiribi. Various factors might account for the difference in results, including mesh size used and time of sampling. Their report did not give details of the fish sampling technique

used and so caution is needed in the comparison of the two results. However their observation that the two most diverse families were the Alesteidae and the Cichlidae agrees with findings of this research. Lake Adigbe was found to be deeper than Lake Esiribi and so would be expected to have a more diverse fish fauna than that of Lake Esiribi, as depth correlates positively with fish diversity (Barbour and Brown, 1974; Jeppesen *et al.*, 2000; Amarasinghe and Welcomme, 2002). Perhaps the higher species richness in Esiribi is in line with the suggestion of Dobson (1992), who found that species richness was higher in areas rich in lakes than in those with very few lakes, as noted in Biseni. However, several other factors are interrelated in predicting species richness and diversity including the size and nature of the habitats (Decher, 1997; Triantis *et al.*, 2006). Lakes Esiribi and Adigbe have high fish species diversity in comparison to other lakes assessed within this study with four dominant families of fish species, Mochokidae, Citharinidae, Cichlidae and Channidae (see chapter 6, section 6.5). Fish species from the two lakes have high economic value within the region and attract retailers from several communities within and outside the State. Socially within these communities, as observed during one of the fishing events, the fame of the fisherman who gets the biggest fish from the lake is widely acclaimed within the fishing communities. For instance, in the last fishing event at Lake Efi in Sabagreia community within the study region, there was a prize for the fisherman who had caught the biggest fish. Also, bigger fishes attract a better income and more customers. But this introduces a level of vulnerability for those species, such as *Gymnarchus niloticus*, which are targeted because of their size and market value. *G. niloticus* (locally called *Aba*) is highly priced within the region and for this reason it is a target species by fishermen within the region (see discussion in chapter 5, section 5.2.4.4). However, in Biseni *Gymnarchus* are protected in Lake Asa, which serves as a sanctuary for them. Also, in the flood season, members of the two communities

affirmed that they harvest fish from ponds around the perimeter of the lake that they had dug during the previous dry season. This suggests that Lake Esiribi and Adigbe seed the surrounding swamp forest during the flood season. This might well be a very important function of such lakes that are seasonally fished as swamp fishing is an important source of livelihood for fisherfolk within this region.

The results presented in previous chapters, particularly in chapter 6, show that indigenous knowledge has played a key role in the maintenance and sustainability of fishery and aquatic resources within the study communities. Through indigenous knowledge of the wetland systems, communities know which of their lakes have a greater diversity. As discussed in chapters 5 and 6, during field trips prior to ecological sampling of these lakes, various fisherfolk gave precise details of the fish diversity of each lake. Experimental sampling of the lakes confirmed this. In addition, they had a classification method for the fishes according to similarities in shape. Indigenous knowledge within these communities also revealed that some fish species have disappeared (see chapter 6, section 6.2.3). Various natural resource practices related to fishing and associated with the belief system of these communities were identified. Practices include operating a well structured pattern of open and closed fishing seasons; using simple and non-intrusive fishing implements. Hence, harvesting of fish from lakes within these communities is highly regulated and the periodical cycle, as noted during interviews with different groups, benefits the aquatic resource base (see discussion in chapter 6, section 6.2.2). Also, in most communities within the region, including Osicama and Biseni, there are restrictions on the people allowed to fish within their lakes. In most cases, fishing rights were exclusive to natives of the community. This confirms that artisanal fishing within these areas is conducted entirely by local residents (ARD Inc., 2002), and is

important in building institutional networks within the region. From observations made during the field surveys, the traditional implements used for fishing are selective and are built to trap specific organisms; for instance, the traps woven by the women's group in Biseni for crayfish fishing are designed to trap just crayfish (and sometimes small fishes). This fishing gear together with the restricted fishing season aids in the regeneration of fish species as noted in a similar traditional setting in Lake Chilwa, Malawi (Kalanda-Sabola *et al.*, 2007). Hence, traditional tools as those used in Biseni and regulations stated above, coupled with the fixed time of fishing ensure sustained yields. This is particularly important in these areas as the main livelihood of the people within these communities depends on small-scale fishing. However, caution should be applied in inferring that the restrictions practiced by these indigenous systems increase fish richness and diversity of freshwater lakes, as results obtained from the physiochemical tests were limited to four basic characteristics. But some of the rules and codes put in place in line with the cosmology of these communities maintain the ecological integrity of these sacred lakes. For instance, sources of pollution are reduced by the practices of not defecating near the lake and of prohibiting menstruating women from entering the lakes (Chapter 5, section 5.3.2.4). These practices (i.e. not defecating near the lake etc.) help to reduce direct pollution of these lakes and improve water quality and the ecological integrity of these freshwater lakes.

As detailed in chapter six, it is not necessarily the primary objective of these communities to promote the ideas of conservation, but rather through their cosmology and connection to the biosphere their practices serve to conserve biodiversity. In the view of traditional Niger Delta communities, both humans and non human species are part of the whole, as seen in the treatment of the crocodile in

Biseni. Although *Osteolamus tetrapis* is commonly found within the region, it is threatened and it is particularly hunted for meat and for its skin within the country (see, Hekkala *et al.*, 2000; www.flmnh.ufl.edu/natsci/herpetology/newsletter/news183b.htm). Crocodiles are a vital component within the food chain and their presence helps to maintain aquatic biodiversity. Thus, areas such as Lakes Esiribi and Adigbe, where crocodiles are protected culturally, are important for biodiversity conservation and for the sustainability of these wetland systems

However, some factors have introduced a level of vulnerability in the use of natural systems within these communities which could affect the sustainability of the natural resource practices within these areas in the long term. For instance, human population increases appear to have brought on some changes in the regularity of fishing as noted in an interview with the clan head of Biseni. Other factors influencing events include institutional changes such as government interest in Lake Adigbe (see chapter 5, section 5.3.5.5), immigration of people (chapter 5, section 5.3.5.1), market chain pressure (Chapter 5, section 5.3.5.4), natural changes in hydrological functions and the emergence of invasive plants that are competing with the native flora (chapter 5, section 5.3.5.6). In addition, certain individuals are known to use dynamite in fishing other lakes within Biseni. These issues have implications for the management of these areas and act as threats to sustainable natural resource management practices within these communities as highlighted in the framework for sustainable development of the region in chapter 2 section 2.4.1. However, introducing environmental training within institutional networks as described in section 7.3 will aid the efforts of these institutions in maintaining their practices and excluding exogenous practices detrimental to the wetlands. Also, building on the

social cohesion between communities is an important strategy for ensuring long term sustainability of these important wetland types.

7.2.2 Biseni and Osiana as Exemplars of Common Property Resource Systems

The regulatory practices demonstrated in Biseni and Osiana ultimately support the sustainable management of wetlands and do not allow the emergence of 'the tragedy of the commons' as posited by Hardin (1968). It is instructive that within the two communities there exist regulations which preclude open access to natural systems, even in areas considered as belonging to all the members of the community. In general, access to resources is determined by given institutions within the society. For instance in Biseni, Lake Esiribi is still a family owned resource and only family members are entitled to fish within the lakes. Benefits (including easy access to the fish catch) accrue to the wider social group as other families reciprocate in terms of maintaining the rules of family ownership. For example the Erewari family that own the Esiribi lake adhere to the rules set by other families within the community as regards access and use of other natural systems within the community.

These norms are also reflected in practices in Osiana. In contrast to Biseni, Lake Adigbe is community owned and issues of access and control are as prescribed by a group of community leaders. Although the Osiana structure allows for wider group participation, there is a respect for, and reciprocity in maintaining rules of access to the common resource base. The protection of family user's rights and participation of other potential users where access is granted is important in the maintenance of common resource systems in both communities and in the entire Niger Delta region. The acceptance of the legitimacy of these rules and social sanctions which clearly define access to resources within these communities, help to reduce conflicts. It also encourages accountability, as different users of the natural resource base are made

aware of the penalty of breaching these rules, as detailed in chapter 5. In addition, analyses of the narratives from the study area reveal an institutional structure which has developed culturally derived rules which are easily understood and respected by members of each community.

The socio-ecological interaction evident within these communities based on their unique beliefs and world view, gives room for the long term collective management of their common pool resources. The constant observation of the physical environment made by traditional resource users allows for 'feedback' in the form of their responses and regulatory measures to meet the challenges of changes in the natural system. This form of communal management increases participation of the collective group and stands a greater chance of effective governance of the commons than state regulated areas as outlined in chapter 2.

7.2.2.1 Social Capital and Social Cohesion

The focus group discussions showed a strong social connectedness within the communities, which served as a bond between members and also served the purpose of sustaining their natural resource practices (see discussion in chapter 5, section 5.3.4.2). The beliefs and resultant regulations create a common set of norms and values which reinforce the common culture and practices that show resilience to interference. For instance, social sanctions are applied to people who break certain natural resource related rules and in some areas they are made to replace dead animal species with live ones in the same resource base. This practice exemplifies the stewardship role of humans over natural resources and non-human species, rather than the prevalent world view where humans dominate all other species. The stewardship role exemplified in these communities reflects a better ecological view (Berkes, 2001), rather than the utilitarian use of natural systems, mentioned in

chapter 2 section 2.2.. Also important is the setting aside of days when no natural resource is exploited, e.g. the observance of the *Akinma* day in Biseni (chapter 5, section 5.3.2.4). The observance of resting from exploiting natural resources exemplifies the Sabbath principle, articulated by DeWitt (1995), which encourages rejuvenation of natural systems. The beliefs, norms and regulations observed by these communities help to maintain natural resource practices as seen from survey results, with 58% of respondents indicating that no conflicts with respect to maintaining traditional restrictions exist within the community. Interestingly, in both Biseni and Osiana, over 70% of respondents indicated that the difference between the sacred and non-sacred lakes within their community was because the former (the sacred lake) is set apart for fish regeneration (Chapter 5, section 5.3.3). The result is not surprising as the majority of respondents (84.4%) are Christians. The dominance and social acceptance of the Christian religion in these communities influences the responses given to questions which touch on traditional practices dictated by indigenous beliefs (see discussions in Chapter 5, sections 5.3.2.2 and 5.3.5). However, results from the in-depth interviews and focus group discussions showed that the difference in behaviour in relation to different types of lake stems from their traditional beliefs and the symbolic relationship with the natural system. Despite the apparent difference in opinions, (ranging from firm adherents of traditional beliefs and values, to those who have eclectic beliefs, to those who embrace Christian beliefs), 90.8% of these respondents said that the regulations and customary laws were necessary and should not be removed (see Chapter 5, section 5.3.2.4 and Table 5.10). A majority (66.4%) indicated that the laws guaranteed continued fish supplies as commodities for selling and consumption. Hence, although there are differences in beliefs, the community maintains the customary laws set by traditional belief institutions. It appears that community members recognise that their collective norms

and practices ensure the sustainability of the community's interaction with their natural resource base and hence the sustainability of their livelihoods. This suggests that the collective prosperity of the people is prioritised over individual prosperity.

In addition, the social ties noticed from personal observations and interactions amongst the different social groups are also important in reinforcing traditional norms. For instance, during the fishing festival periods at Adigbe and Esiribi, natives who reside outside the community returned home to participate in the events. Reciprocity within these communities meant that both natives and visitors were sure of a good diet of fish during the period, because of the abundant harvest from these lakes. Interestingly, emblematic fauna (i.e. crocodiles in Esiribi) do not hold for all, yet the general populace respects the laws and restrictions imposed by the family as mentioned in the preceding section. Social ties are not limited to a particular community's geographical boundaries but can extend across other communities. In-depth interviews showed that some of these communities are connected to each other by common ancestry (see chapter 6, section 6.3.3). As a result, these communities have shared rules and rotate periodical fishing of their collective lakes. This relationship between communities and their network of lakes fished with a rotational fishing system suggest possibilities for initiating a sustainable management plan within the region. Furthermore, benefits of protecting one community's lake accrue to a related community, particularly if one is downstream and the other upstream. This could well act as a good platform for networking the sacred lakes within the region and could increase chances of institutionalising community-conserved areas within the region.

Apparently, strict adherence to former ethical codes passed down by founding fathers to the present day people of these societies is under strain. Some current practices,

such as using dynamite in fishing, are in defiance of the set traditional norms and have grave implications for fishery resources and the ecosystem in general. Cases of violations of regulated practices are recorded, as shown in the focus group results. The survey results provide insights into how the communities perceive the identities of the people involved (see Chapter 5 section 5.3.5.2). The main source of conflicts are attributed to ‘outsiders’; either strangers who live in their villages or people from neighbouring villages, implying that a social group alien to the belief system of these communities was responsible for any violations. Because of the nature of community beliefs and values which are embedded in their culture and ancestry, it is likely that by definition a person who violates these norms is assumed to be an outsider. Interviews did not include neighbouring communities adjacent to project communities so opinions of neighbours were not sampled and there is no official recording of identities of known culprits to confirm or refute the views expressed within the communities. However, violations of the rules appear to be more prevalent in areas where there is easy accessibility to the resource base, as noted during reconnaissance to Sabagreia (Lake Efi).

A further threat lies in the engagement of community members with livelihood opportunities derived from a different value system – such as opportunities arising from investment of private companies or government interests, i.e. as found in Osiana where the government is interested in making Lake Adigbe a tourist attraction. This would be more likely in circumstances where traditional leadership is weak and give opportunities for power and influence to other social or political groups. This could threaten the collective community norms and have severe repercussions on the natural systems.

7.2.2.2 *Inter-relationship of Lakes*

An essential target of freshwater conservation planning is maintaining connectivity, particularly in data poor regions such as those of the Niger Delta (Thieme *et al.*, 2006). In areas like the Niger Delta where little is known about the biodiversity of the area, the precautionary principle is applicable, where ecosystems suspected to be important to ecological functions are maintained to ensure the survival of threatened forms (Adams, 2004). Sacred lakes and groves tend to be fragmented ecosystems as they are usually small habitat remnants preserved by indigenous people (Decher, 1977). Fragmented ecosystems influence viability of biological species, particularly animal populations that require large home ranges and could create what is referred to as an “island-effect” on biodiversity (cf. Mills, 1995; Decher, 1997; Triantis *et al.*, 2006). To combat this effect and increase species biodiversity, Decher (1997) recommended the preservation of a network of groves and forest remnants, including thickets, riverine forest and hedgerows as biological corridors. Decher’s suggestion might find relevance in the network of sacred lakes found in the Delta, as described in the preceding section. Although these freshwater systems are not contiguous because of the meandering nature of the waterway, they could facilitate the coordinated implementation of conservation principles.

7.2.2.3 *Management of Sacred Lakes*

Management issues within the Niger Delta communities are sensitive, as declarations containing elements of government involvement or other external bodies are viewed with suspicion. Survey results show that villagers might be willing to allow the government to help in situations that are outside their capacity to manage. In terms of management of the lakes, in Biseni 86.5% of respondents said they preferred that management of the community resources should be solely internal, whereas in Osiana, 44.9% were in support of this type of management (see chapter 6, section

6.3.5). But 30.0% of Biseni respondents suggested that they might be willing to allow the government to help in situations that are outside their capacity to manage. However, they still wanted ownership rights and control over their resources. A similar observation was made by Decher (1997) based on work in Ghana, where representatives of the village of Adumanya, refused to allow their sacred groves to become part of the national reserve system as this would have meant losing control over their groves. They rather preferred government authorization for restricting outsiders' access to the groves and signs demarcating grove boundaries and government interventions to assist with intractable problems. For instance, Water hyacinth (*Eichhornia crassipes*) is a major problem in some of these freshwater lakes and, as recommended by these communities, government intervention is needed to tackle problems associated with the invasion. Sustainable management of these freshwater ecosystems will be premised on the community's ownership of resources within their locality, which increases the chances of responsible stewardship over natural resources.

There is a significant difference between the two communities' (Biseni and Osiana) attitudes towards the customary restrictions on the use of the sacred lake (see chapter 6, section 6.3.4). This is particularly important for the sustainability of traditional management of these lakes. It seems that the difference is premised on two key factors; the number of lakes within the community and secondly the primary occupation of the people. Results showed that 49.7% of respondents in Biseni were fisherfolk, whereas in Osiana, 53.2% were farmers. Also in Biseni, there are six more lakes apart from Lake Esiribi which are fished periodically, whereas Osiana has just two lakes. During closed fishing seasons in Lake Esiribi, 74.1% of the

respondents indicated that they resort to fishing in other lakes. whereas in Osiana, 89.6% of the respondents said that they fish in the river (chapter 6, section 6.3.3).

Based on the findings outlined above the following recommendations are proposed for the sustainability of the sacred lakes within the Niger Delta region.

7.3 RECOMMENDATIONS

The Niger Delta freshwater systems and indeed wetlands worldwide have been overlooked by conservationists and development planners for years. In Nigeria, in particular, these resource bases produce the bulk of the fisheries, as stated in chapter 3 (see also Sikoko and Otobotekere, 1999). Therefore for sustainable management of this important resource, the following measures are proposed:

1. Integrated wetland management

An integrated wetland management strategy for this region is needed which strongly emphasises indigenous environmental ethics via the belief and social practices of the local people. In other words, for wetland management strategies to be successful, serious consideration should be given to local perceptions of their environments and their associated practices. Indigenous people have lived in and maintained natural systems for millennia and are therefore conversant with their physical environment as seen in Osiana and Biseni. Given the current challenges of climate change and the effects of green house gas emissions, people who use natural systems constantly should be involved in decision-making processes. Indigenous knowledge of natural systems and involvement of the people are important to the wider debate and understanding of current ecological issues and biodiversity loss. Also, within the framework of Article 8j of the Convention on Biological Diversity, which Nigeria ratified in 1994 (see Chapter 3); this knowledge and associated innovations should be preserved. This gives recognition to the people and the ecosystems then benefit. Management strategies for the wetland system within this region should centre on maintaining the traditional system of rotational fishing as the time lapse between fishing events encourages the rejuvenation of fishery and aquatic resources, leading

to high productivity (Scott, 1966). and perhaps accounts for the high biological diversity of these lakes (Alfred-Ockiya and Otobo, 1990).

2. Legal Instruments

From field observations, it is clear that the federal government's repertoire of legislation (highlighted in chapter 3) which defines access to and control of the region's natural resources is not reflected in these communities. Rather the rules of natural resource use developed by these communities have been responsible for the regulation of fishing and other related activities. Therefore, it is imperative that the government give recognition to these practices. It is an unfortunate fact that despite their role as repositories of indigenous flora and fauna, sacred ecosystems' contribution to conservation has been largely overlooked and undervalued by state and conservation agencies (Oviedo *et al.*, 2005), in contrast to open access areas and state managed reserves (Oates *et al.*, 1992; Byers *et al.*, 2001; Mgumia and Oba, 2003), especially in Nigeria.

Indigenous beliefs and natural resource practices have just recently been acknowledged in Nigeria as a potential conservation measure for the protection of biodiversity outside state protected areas (Ezealor, 2002). However there are gaps in national legislation on the involvement of indigenous communities in conservation (see discussion in chapter 3). Policy reforms and legal instruments which recognise and legitimise these indigenous protected areas are important in the issue of sustainability as indicated in chapter 2. Therefore, instruments should be built into state and national laws that seek to legitimise indigenous groups for effective management of freshwater systems in the Niger Delta. The government and other relevant bodies should indeed go beyond the perfunctory nod of recognising

indigenous efforts of protecting / conserving biodiversity to providing a concomitant legal instrument that protects the rights of indigenous groups within the Delta over their resources.

3. Institutional Networking and Capacity building

Capacity building of indigenous institutional groups within the region will aid conservation. A recommendation is made for training of social groups with shared norms and values for wetland resource management. This should build on the detailed understanding of local beliefs, knowledge and practices and strengthen capacity for sustained utilisation of natural resources, particularly among the younger generation. A caveat, however, is that care should be taken to avoid marginalisation of other groups. However, this study found that a greater percentage (80%) of indigenous livelihoods in the study area depend on the natural system (see chapter 5, section 5.3.5.1). Therefore group training can be stratified to accommodate all resource users.

Building and forming useful networks both internally and externally is also important in the management of these freshwater systems. In most of the communities in the Delta, there are village institutions (e.g. community development committees) which could act as linkages for entry into the community and for knowledge sharing.

4. Early Warning Systems

Results of the physical characteristics of the four lakes show that three of the lakes (Adigbe, Esiribi, and Obaa) had near neutral pH, while the pH value recorded for Lake Ameneduno was slightly acidic. Also, There are differences in other physical parameters of the four lakes examined (see chapter 6, section 6.4). These physical

characteristics for instance the pH affects fish species richness (Amarasinghe and Welcomme, 2002), as observed in Lake Ameneduno where at the time of sampling only one fish species was recorded. For future monitoring and assessment of changes within these traditional managed freshwater lakes, results obtained from this study could act as a comparative baseline data for assessing changes in fish species diversity and the ecological integrity of these lakes (Larson, *et al.*, 1999; Dalkiran *et al.*, 2006). Therefore, early warning systems should be built into current monitoring systems for the Niger Delta floodplains with particular attention paid to the physiochemical characteristics of the wetlands and fish diversity within the region. In addition, the pervasive influence of invasive plants necessitates a system of continued assessment and monitoring of these lakes and similar lakes within the region. In developing early warning systems, the involvement of indigenous communities within the framework is important for sustainability.

7.4 CONCLUSION

In conclusion, this research has shown that communities in the Niger Delta have a close affinity with the surrounding wetlands through their symbolic interaction with non-human species and the invisible realm. Humans, in the view of traditional Niger Delta communities, are part of the whole as well as the spirit world and non-human species, as seen in the treatment of the crocodile in Biseni. The communities' symbolic interactions in relation to their management of sacred lakes allows for the regeneration of fish populations and other protected species, thereby preserving gene pools. Based on their understood rules, some special categories of biodiversity are given strict protection within certain locations. Therefore, respect given to non-human species, eliminates / reduces overexploitation, as seen in Lakes Adigbe and Esiribi. This interaction contains social codes, rules and conservation ethics which have had impacts on both the human community and aquatic resources, particularly protecting threatened biodiversity. In contrast to formal protected area management which excludes human interaction from nature, institutions such as those found in the Niger Delta with shared norms and values appear to have a better chance of successful natural resource management and conservation in the long term.

The necessarily limited scope and coverage of this PhD research programme (see Chapter 1 section 1.5) meant that not all related issues could be included in the field work, for instance assessing other lakes within the region. Also, findings of this research open up grounds for future research work, outlined in the next section.

7.5 FUTURE RESEARCH

- I. As mentioned in the recommendations, developing early warning signs for monitoring the ecological conditions of lakes within the Niger Delta is important for continued fish productivity. Therefore, developing a comprehensive database on both sacred and non-sacred lakes within the region is envisaged. Predictive modelling of fish species richness across the region, using field observations and GIS will be paramount in building this database. This could help to fill the gaps in knowledge and data management within the region and could provide information that conservationists can use in their interaction with communities and in their advisory role.
- II. Receiving lakes and streams are affected by the character of their source of water and future research is needed to assess the physiochemical characteristics of the upper water bodies. For instance, Lake Esiribi receives water directly from the River Niger, so it would be useful to study the physiochemical characteristics of parts of this river and its fish diversity and to compare them with those of the lakes.
- III. Fish diversity sampling during this research was limited to the time of the fishing festival, or in some cases based on convenient timing of the village administration. For a comprehensive database as envisaged in recommendation number I, future research will involve fish sampling in both rainy and dry seasons.
- IV. Findings from this research have generated the theory of a relationship between the sustainability of indigenous practices of community natural resource management and livelihood benefits at community and individual levels. These ideas need further testing and future research should cover more

communities than the present studies did to investigate whether or not this is true for the general populace within the region.

- V. Finally, more ethnographic studies are envisaged in the future, particularly covering other areas with sacred and non-sacred lakes as stated in recommendation number I.

REFERENCES

- Aaron, K. K. (2005) Perspective: big oil, rural poverty, and environmental degradation in the Niger Delta region of Nigeria. *Journal of Agricultural Safety and Health* **11**:127-134.
- Abell, R. (2002) Conservation biology for the biodiversity crisis: a freshwater follow-up. *Conservation Biology* **16**:1435–1437.
- Adams, W. M. (2004) *Against Extinction: the story of conservation*. Earthscan, London.
- Adams, W. M. and Hulme, D. (2001) If community conservation is the answer in Africa, what is the question? *Oryx* **35**:193-200.
- Adger, W. N., Brooks, N., Bentham, G., Agnew, M. and Eriksen, S. (2004) New indicators of vulnerability and adaptive capacity. Technical Paper No. 7. Tyndall Centre for Climate Change Research, University of East Anglia, Norwich, U.K.
- Adler, P. A. and Adler, P. (1994) Observational techniques. In N. K. Denzin and Y. S. Lincoln (eds.), *Handbook of qualitative research*, Sage, Thousand Oaks, California.
- Agar, M. H. (1980) *The professional stranger: an informal introduction to ethnography*. Academic Press, New York.
- Agrawal, A. (1995) Indigenous and scientific knowledge: some critical comments. *Indigenous Knowledge and Development Monitor* **3**: 3-5.

- Agrawal, A., and Gibson, C. C. (1999) Enchantment and disenchantment: the role of community in natural resource conservation. *World Development* **27**: 629–649.
- Ajetomobi, J. O., Olarinde, L. O., Ajao, A. O. and Ladipo, V. O. (2001) Potential of extension in fisheries development of Nigeria. *Journal of Extension Systems* **17**:82-91.
- Akpokodje, E. G. (1987) Engineering geological characteristics and classification of the superficial soils of the Niger Delta. *Engineering Geology* **23**:193-211.
- Alagoa, E. J. (1999) *The Land and People of Bayelsa State: central Niger Delta*. Onyoma Research Publications, Choba, Port Harcourt.
- Alcorn, J. B. (1993) Indigenous people and conservation. *Conservation Biology*, **7**: 424-426.
- Alfred-Ockiya, J.F and Otobotekere, A.J.T., (1990) Biological studies of Ofonitorubuo Lake in the fresh water swamps of the Niger Delta, Rivers State, Nigeria. *Journal of Aquatic Sciences* **5**:77-82.
- Allison, E. H. and Horemans, B. (2006) Putting the principles of the Sustainable Livelihoods Approach into fisheries development policy and practice. *Marine Policy* **30**:757-766.

Amadi, A. (2000) Wetlands of the Federal Republic of Nigeria-a country report. A report submitted to the Centre for African Wetlands, Community Conservation and Development Initiatives 2000.

Amarasinghe, U. S. and Welcomme, R. L. (2002) An analysis of species richness in natural lakes. *Environmental Biology of Fishes* **65**:327-339.

Amidu, S. (2007) The Shariah conundrum in Nigeria and the Zamfara model: the role of Nigerian Muslim youth in the historical context. *Journal of Muslim Minority Affairs* **27**:117-132.

Aminu-Kano, M. (2001) The State of Nigeria's forests and biodiversity. Presented at National summit of the Nigerian environment, 18th to 20th September, 2001, Abuja, Nigeria.

Aminu-Kano, M. and Marguba, L.B. (2002) History of Conservation in Nigeria. In Ezealor, A. U. (Ed.), *Critical Sites for Biodiversity Conservation in Nigeria*, Nigerian Conservation Foundation, Lagos Nigeria.

Anderson, D. M., Salick, J., Moseley, R. K. and Xiaokun, O. (2005) Conserving the sacred medicine mountains: a vegetation analysis of Tibetan sacred sites in Northwest Yunnan. *Biodiversity and Conservation* **14**:3065-3091.

Anderson, E. N. (1996) *Ecologies of the heart: emotion, belief and the environment*. Oxford University press, New York.

Angrosino, M. V. and Mays de Pérez, K. A. (2003) Rethinking Observation, from method to context. In *K. N. Denzin and Y. S. Lincoln (eds.), Collecting and interpreting qualitative materials*. 2nd Edition, Sage Publications, Thousand Oaks, California, U.S.A.

Anttonen, V. (2000) Toward a cognitive theory of the sacred: an ethnographic approach. *Folklore* **14**: 41-48.

Appiah-Opoku, S. and Hyma, B. (1999) Indigenous Institutions and Resource Management in Ghana. *Indigenous Knowledge and Development monitor*. **7**: 15-17.

ARD Inc. (2002) Nigeria environmental analysis. Final report submitted to USAID, Biodiversity and Sustainable Forestry (BIOGOR), Indefinite Quantity Contract (IQC), No. LAG-1-00-99-00013-00, Submitted by ARD, Inc., Burlington, Vermont, U.S.A.

Arikawe, A. (2001) Nigeria and the Highly Indebted Poor Countries (HIPC) Initiative. Background paper for Joint UNITAR/WAIFEM Sub-regional workshop on Debt Negotiation and Renegotiation for West African Nations, 2001, Banjul, Gambia.

Arizpe, L. (1996) Culture and environment. *Nature and Resources*, **32**:1.

Arora, V. (2006) The forest of symbols embodied in the Tholung sacred landscape of North Sikkim, India. *Conservation and Society* **4**: 55-83.

- Ashton-Jones, N., Arnott, S. and Douglas, O. (1998) *The Human Ecosystems of the Niger Delta-An ERA Handbook*. Environmental rights Action. Benin City, Nigeria.
- Attfield, R. (1983) *The Ethics of Environmental Concern*. Blackwell, Oxford.
- Attwell, C. A. M. and Cotterill, F. P. D. (2000) Postmodernism and African conservation science. *Biodiversity and Conservation* 9:559-577.
- Aylward, B. (1991) The Economic value of Ecosystems: 3-Biological Diversity. Gatekeeper Series No. LEEC GK 91-03. International Institute for Environment and Development, IIED, London.
- Babbie, E. (1997) *Survey methods*. 2nd edition, Wadsworth, California, U.S.A.
- Bailey, R. C. (1996) Promoting biodiversity and empowering local people in central African forests. In *L. E. Sponsel, T. N. Headland and R. C. Bailey (Eds.) Tropical Deforestation: The Human Dimension*, Columbia University Press, New York.
- Bakus, J. G. (1990) *Quantitative Ecology and Marine Biology*. Aquasense, Amsterdam.
- Banuri, T. (1999) Sustainable Development and Climate Change. Policy Matters No.4, Newsletter of the IUCN Commission on Environmental, Economic and Social Policy, CEESP Secretariat, IIED, London.

- Barbour, C. D. and Brown, J. H. (1974) Fish species diversity in lakes. *The American Naturalist* **108**:473-489.
- Barrera-Bassols, N., Zinck, J. A., and Ranst, E. V. (2006) Symbolism, knowledge and management of soil and land resources in indigenous communities: ethnopedology at global, regional and local scales. *Catena* **65**: 118-137.
- Barrett, C. B. and Arcese, P. (1995) Are integrated conservation-development projects (ICDPs) sustainable on the conservation of large mammals in Sub-Saharan Africa. *World Development* **23**:1073-1084.
- Barrio, D. C., Gutierrez, H., Hoyos, O., Barrios, A. and Meulen, K. V. D. (1999) The use of semi structured interviews and qualitative methods for the study of peer bullying, a report of the working party in nature and prevention of bullying. available online, <http://www.gold.ac.uk/tmr/reprts/aim2_madrid1.html> [accessed November, 2005].
- Bass, S. Hughes, C. and Hawthorne, W. (2002) Forests, Biodiversity and Livelihoods: Linking Policy and Practice. In *I. Koziell, and J. Saunders (Eds.), Living off Biodiversity, Exploring Livelihoods and Biodiversity Issues in Natural Resources Management*, Natural resources Institute and IIED, U.K.
- Bassey, A. E. and Oates, J. F. (2001) Proceedings of the International Workshop and Conference on the conservation of the Cross River Gorillas, 6th to 9th April. 2001, Calabar, Nigeria.

- Batzer, D. P. (1998) Trophic interactions among detritus, benthic midges and predatory fish in a freshwater marsh. *Ecology* **79**:1688-1698.
- Batzer, D. P. and Wissinger, S. A. (1996) Ecology of insect communities in non-tidal wetlands. *Annual Review of Entomology* **41**:75-100.
- Bawa, K.S., Seidler, R. and Raven, P.H. (2004) Reconciling conservation paradigms. *Conservation Biology* **18**: 859-860.
- Beak Consultants Limited, Geomatics International Incorporated and Geomatics Nigeria Limited (1998) Nigeria Forest Resources Study: review of forestry legislation in Nigeria. A report submitted to the Forestry Management, Evaluation and Coordinating Unit of the Federal Department of Forestry, Nigeria.
- Beebe, J. (1995) Basic concepts and Techniques of Rapid Appraisal. *Human Organization* **54**:42-51
- Behar, R. (1996) *The vulnerable observer: anthropology that breaks your heart*. Beacon, Boston.
- Beltrán, J. (Ed.) (2000) *Indigenous and Traditional peoples and protected areas: Principles, guidelines and case studies*. IUCN, Gland, Switzerland and Cambridge, U.K. and WWF International, Gland, Switzerland.
- Berkes, F. (1999) Role and significance of 'tradition' in indigenous knowledge. *Indigenous Knowledge and Development Monitor* **7**:19.

- Berkes, F. (2001) Religious Traditions and Biodiversity. *Encyclopaedia of Biodiversity*, **5**: 109-119.
- Berkes, F. (2004), Rethinking community-based conservation. *Conservation Biology* **18**:621-630.
- Berkes, F. C., Folke, C. and Gadgil, M. (1995) Traditional ecological knowledge, biodiversity, resilience and sustainability In C. Perrings, K. G. Maler, C. Folke, C. S. Holling and B. O. Jansson (Eds.) *Biodiversity Conservation*, Kluwer Academic Publishers, Dordrecht, Netherlands.
- Berkes, F., and Davidson-Hunt, I. J. (2006) Biodiversity, traditional management systems, and cultural landscapes: examples from the boreal forest of Canada. UNESCO, 35-47.
- Berkes, F., and Folke, C. (Eds.) (1998) *Linking social and ecological systems: Management practices and social mechanisms for building resilience*. Cambridge University Press, Cambridge, U.K.
- Berkes, F., Colding, J. and Folke, C. (2000) Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications* **10**:1251-1262.
- Berkes, F., Colding, J. and Folke, C. (eds.) (1998a) *Linking social and ecological systems: management practices and social mechanisms for building resilience*. Cambridge University Press, Cambridge, United Kingdom.

- Berkes, F., Colding, J. and Folke, C. (Eds.) (2003) *Navigating social-ecological systems: building resilience for complexity and change*. Cambridge University Press. Cambridge, U. K.
- Berkes, F., Kislalioglu, M., Folke, C. and Gadgil, M. (1998b) Exploring the Basic Ecological Unit: ecosystem-like Concepts in Traditional Societies. *Ecosystem* **1**: 409-415.
- Bertoli G.C. (1996) Aquatic macrophyte vegetation of the Orinoco River Delta (Venezuela). An Overview. *Hydrobiologia*, **340**: 109–113.
- Bhagwat, S., Kushalappa, C. P., Williams, P. and Brown, N. (2005) The role of informal protected areas in maintaining biodiversity in the Western Ghats of India. *Ecology and Society* **10**:8, available online, <<http://www.ecologyandsociety.org/vol10/iss1/art8/>>.
- Biernacki, P. and Waldorf, D. (1981) Snowball sampling: problems and techniques of chain referral sampling. *Sociological Methods and Research* **10**:141-163.
- Bisht, S. and Ghildiyal, J. C. (2007) Sacred groves for biodiversity conservation in Uttarakhand Himalaya. *Current Science* **92**:711-712.
- Black, M. M. and Ricardo, I. B. (1994) Drug use, drug trafficking and weapon carrying among low-income, African-American, early adolescent boys. *Pediatrics* **93**:1065-1072.

Blann, K., Light, S. and Musumeci, J. A. (2003) Facing the adaptive challenge: practitioners insights from negotiating resource crisis in Minnesota. In *F. Berkes, J. Colding and C. Folke (Eds.), Navigating the dynamics of socio-ecological systems*, Cambridge University Press, Cambridge, U.K.

Borrini-Feyerabend, G. (2005) Understanding and optimising governance: a quiet revolution for protected areas? CBD News, Special edition, protected areas achieving biodiversity targets, CBD secretariat.

Bradburn, N. M. (1983) Response effects. In *P. H. Rossi, J. D. Wright and A. B. Anderson (Eds.), Handbook of survey research*, Academic Press, New York.

Brandon, K., Redford, K. H. and Sanderson, S. E. (Eds.) (1998) *Parks in peril: People, politics, and protected areas*. Island Press, Washington, D.C.

Brannen, J. (1992) Combining qualitative and quantitative approaches: an overview. In *J. Brannen (Ed.), Mixing methods: qualitative and quantitative research*, Avebury, Aldershot, U. K.

Brendonck, L., Maes, J., Rommens, W., Dekeza, N., Nhiwatiwa, T., Barson, M., Callebaut, V., Phiri, C., Moreau, K., Gratwicke, B., Stevens, M., Alyn, N., Holsters, E., Ollevier, F., and Marshall, B. (2003) The impact of water hyacinth (*Eichhornia crassipes*) in a eutrophic subtropical impoundment (Lake Chivero, Zimbabwe). II. Species diversity. *Archiv Fur Hydrobiologie* 158:389-405.

- Brewer, J. and Hunter, A. (1989) *Multimethod research: A synthesis of styles*. Sage, Newbury Park, California, U.S.A.
- Brieger, W. R., McCorry, Jr. J. J., Onibokun, A. G., Jeje, L. K., Nnoli, O., Ndekwu, E. C., Achike, A. I., Uwakwe, C. and Adebayo, A. A. (contributors) (2003) Strategic analysis of development constraints and priorities for action in Southern Nigeria. Report by Management Systems International, Washington, D.C. U.S.A. Evaluation services IQC Contract No. AEP-1-00-00-00024-00, USAID and Centre for African Settlement Studies and Development, African Institute for Applied Economics, Nigeria.
- Brislin, R. W. and Holwill, F. (1979) Indigenous views of the writings of behavioural/social scientists: towards increasing cross-cultural understanding. In K. Kumar (Ed.), *Bonds without bondage*, East-West Centre Honolulu.
- Brockington, D. (2002) *Fortress Conservation: the preservation of the Mkomazi game reserve*. *Tanzania African Issues*. James Currey Ltd., Oxford, U.K.
- Brockington, D. (2004) Community conservation, inequality and injustice: myths of power in protected area management. *Conservation and Society* **2**:411-432.
- Bronmark, C. and Hanson, L-A. (2002) Environmental issue in Lakes and Ponds: current state and Perspectives. *Environmental Conservation* **29**: 290-306.

- Brosius, J. P., Lowenhaupt T. A., and Zerner, C. (1998) Representing communities: histories and politics of community-based natural resource management. *Society and Natural Resources* **11**: 157–168.
- Brown, J. H. and Lomolino, M. V. (1998) *Biogeography*. 2nd edition, Sinauer Press. Sunderland, Massachusetts.
- Brown, K. (1992) Medicinal plants, indigenous medicine and conservation of biodiversity in Ghana. CSERGE Working Paper GEC 92-36.
- Brown, K. (2003) Three challenges for a real people-centred conservation. *Global Ecology and Biogeography* **12**: 89-92.
- Browne, K. (2007) Snowball sampling: using social networks to research non-heterosexual women. *International Journal of Social Research Methodology* **8**:47-60.
- Bryman, A. (1992) Quantitative and qualitative research: further reflections on their integration. In J. Brannen (Ed.), *Mixing methods: qualitative and quantitative research*, Avebury, Aldershot, U. K.
- Byers, B.A., Cunliffe, R.N. and Hudak, A.T. (2001) Linking the conservation of culture and nature: a case study of Sacred Forests in Zimbabwe. *Human Ecology* **29**:187-218.

- Cairns, J. Jr. (1999) An epic struggle: Sustainability and the emergence of a new contract. *The Social Contract Summer 1999*:211-218.
- Calhoun, J. B. (1991) The plight of the IK. In *P. C. West and S. R. Brechin, Resident peoples and National Parks*. University of Arizona Press, Tucson.
- Campbell, B. and Shackleton, S. (2001) The organizational structures for community-based natural resources management in southern Africa. *African Studies Quarterly*, available online, <<http://www.web.africa.ufl.edu/asq/v5/v5i3a6.htm>>.
- Campbell, D. J., Gichohli, H., Mwangi, A. and Chege, L. (2000) Land use conflict in Kajiado District, Kenya. *Land Use Policy* **17**:337-348.
- Campbell, D. T. and Fiske, D. (1959) Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin* **56**: 81-105.
- Campbell, M. O'N. (2005) Sacred groves for forest conservation in Ghana's coastal savannas: assessing ecological and social dimensions. *Singapore Journal of Tropical Geography*, **26**: 151-169.
- Capra, F. (1996) *The web of life*. Anchor books, New York, New York, USA.
- Carlson, R. E. (1977) A trophic state for lakes. *Limnology and Oceanography* **22**:361-373.

- Carlsson, L., Angelstam, P. and Lazdinus, M. (2004) Institutional frameworks for sustainability? A comparative study of Russia and Latvia. *Ambio* **33**: 366-370.
- Carter, N. (2004) *The politics of the environment; ideas, activism, policy*. 3rd edition, Cambridge University Press, Cambridge, U.K.
- Castro P. (1990) Sacred groves and social change in Kirinyaga, Kenya. In *M. S. Chaiken and A. K. Fleuret (Eds.), Social Change and Applied Anthropology: Essays in Honour of David W. Brokensha*, Westview Press, Boulder, Colorado.
- Castro, A. P. (1991) Njukiine forest: transformation of a common property resource. *Forest and Conservation History* **35**: 160-168.
- Central Intelligence Agency, CIA, World fact book (2007) Nigeria. Available online, <<https://www.cia.gov/library/publications/the-world-factbook/geos/ni.html>>.
- Cernea, M. M. (2006) Re-examining 'Displacement': a redefinition of concepts in development and conservation policies. *Social Change*, **36**: 8-35.
- Chambers, R. (1983) *Rural Development: putting the last first*. Longman, London.
- Chambers, R. (1994) Participatory Rural Appraisal, analysis of experience. *World Development*, **9**:1253-1268.
- Chambers, R. (1997) *Whose Reality Counts: putting the First Last*. Intermediate Technology Publications, London.

- Chambers, R. and Conway, G. R. (1991) Sustainable rural livelihoods: practical concepts for the 21st century. IDS Discussion paper 296.
- Chandran, M. D. S. and Gadgil, M. (1998) Sacred Groves and Sacred Trees of Uttara Kannada, New Delhi. Indira Gandhi National centre for the arts.
- Chandrashekara, U.M., and Sankar, S. (1998) Ecology and management of sacred groves in Kerala, India. *Forest Ecology and Management* **112**: 165-177.
- Chape, S., Blyth, S., Fish, L., Fox, P. and Spalding, M. (compilers) (2003) *2003 United Nations List of Protected Areas*. Gland, Switzerland and Cambridge, U.K and UNEP-WCMC, Cambridge, U.K.
- Chape, S., Harrison, J. and Lysenko, I (2005) Measuring the extent and effectiveness of protected areas as an indicator for meeting global biodiversity targets. *Philosophical Transactions of the Royal Society Biological Sciences* **360**:443-455.
- Cheke, R. A. (1987) Onchocerciasis transmission-not by bugs. *Antenna* **11**:91.
- Chesson, P. (2000) Mechanisms of maintenance of species diversity. *Annual Reviews of Ecology and Systematics* **31**: 343-366.
- Child, G. (1996) The role of community-based wild resource management in Zimbabwe. *Biodiversity and Conservation* **5**:355-367.

- Christie, I. (2002) Sustainability and spiritual renewal: The challenge of creating a politics of reverence. *Conservation Biology* **16**:1466-1468.
- Cinner, J. E., Marnane, M. J., McClanahan, T. R., Clark, T. H. and Ben, J. (2005) Trade, tenure, and tradition: influence of sociocultural factors on resource use in Melanesia. *Conservation Biology* **19**:1469–1477.
- Cocker, M. (2000) African birds in traditional magico-medicinal use—a preliminary survey. *Bulletin of the African Bird Club* **7**:60-66.
- Cocks, M., Dold, A. and Grundy, I. (2001) Challenges facing a community structure to implement CBNRM in the Eastern Cape, South Africa, *African Studies Quarterly* **5**, available online, <<http://www.africa.ufl.edu/asq/v5/v5i3a4.htm>>.
- Coggins, G. C. (1998) Of Californicators, quislings and crazies: some perils of devolved collaboration. *Chronicle of Community* **2**: 27-33.
- Colchester, (1994) Salvaging nature: indigenous peoples, protected areas and biodiversity conservation. Discussion papers no 55, *UNRISD*, Geneva.
- Colchester, M. (1996) Beyond “participation”: indigenous peoples, biological diversity conservation and protected area management. *Unasylva, Forest Dependent People*, **47**: 165-189.
- Colchester, M. (1997) Salvaging nature: indigenous peoples and protected areas’. In *K. B. Ghimire and M. P. Pimbert (eds.), Social change and conservation.*

Environmental politics and impacts of National parks and protected areas.

Earthscan, London.

Colchester, M. (2000) Self-determination or environmental determinism for indigenous peoples in tropical forest conservation. *Conservation Biology* **14**: 1365-1367.

Colding, F. and Folke, C. (1997) The relations among threatened species, their protection and taboos. *Conservation Ecology (online)* **1**:6, available online <<http://www.consecol.org/vol1/iss1/art6>> [Accessed, October, 2005].

Constanza, R. (Ed.) (1991) *Ecological economics, the science and management of sustainability*. Columbia University Press, New York.

Constitution of the Federal Republic of Nigeria (1999) Available online, <www.nigeria-law.org/ConstitutionOfThefederalRepublicOfNigeria.htm>.

Convention on Biological Diversity (2004) Sustaining Life on Earth. Convention on Biodiversity, United Nations Environmental Programme. Available online, <<http://www.biodiv.org/terms.shtml>> [Accessed, December, 2004].

Cooke, G. D., Welch, E. B., Peterson, S. A., and Newroth. P. R. (1993) Restoration and management of lakes and reservoirs, 2. Lewis Publishers, Ann Arbor, Michigan.

- Crabtree, B. F., Yanoshik, M. K., Miller, W. L. and O'Connor, P.J. (1993) Selecting individual or group interviews. In *D. L. Morgan (Ed.), Successful focus groups. advancing the art*, Sage Publications, Newbury Park, California.
- Creswell, J. W. and Plano Clark, V. L. (2007) *Designing and Conducting Mixed Methods Research*. Sage, Thousand Oaks, California.
- Creswell, J. W., Fetters, M. D. and Ivankova, N. V. (2004) Designing a mixed methods study in primary care. *Annals of Family Medicine* 2:7-12.
- Creswell, J.W. (2003) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 2nd edition, Sage Publications, Thousand Oaks, California.
- Crotty, M. (1998) *The foundations of social research: Meaning and perspective in the research process*. Sage Publications, London.
- Cudworth, E. (2003) *Environment and Society*. Routledge, London, U.K.
- Curtin, C. G., Sayre, N.F. and Lane, B. D. (2002), Transformations of the Chihuahua borderlands: grazing, fragmentation and biodiversity conservation in desert grasslands. *Environmental science and policy* 5: 55-68.
- Cusick, L. and Kimber, J. (2007) Public perceptions of public drug use in four UK urban sites. *International Journal of Drug Policy* 18:10-17.

- Dalkiran, N., Karacaolu, D., Dere, Ş., Şentürk, E., and Torunolu, T.. (2006) Factors affecting the current status of a eutrophic shallow lake (Lake Uluabat, Turkey): relationships between water physical and chemical variables, *Chemistry and Ecology* **22**:279 – 298.
- D’Andrade, R. G. (1995) *The development of cognitive anthropology*. Cambridge University Press, Cambridge.
- David, B. (2000) *Community-Based Resource Management: a Framework for Action*. Working paper #1, Oxfam America.
- De Vaus, D. (2002) *Surveys in social research*. 5th edition, Allen and Unwin, St. Leonards NSW, Australia.
- Decher, J. (1997) Conservation, small mammals, and the future of sacred groves in West Africa. *Biodiversity and Conservation* **6**: 1007-1026.
- Dei, G. F. S. (1993) Indigenous African Knowledge systems: local traditions of sustainable forestry. *Singapore Journal of Tropical Geography* **14**:28-41.
- Denevan, W. M. (1992) The pristine myth: The landscape of the Americas in 1492. *Annals of the Association of American Geographers* **82**:369-385.
- Denzin, N. K. (1989a) *Interpretive interactionism*. Sage, Newbury Park, California, U.S.A.

- Denzin, N. K. (1989b) *The research act: a theoretical introduction to sociological methods*. 3rd edition, Prentice Hall, Englewood Cliffs, NJ, U.S.A.
- Denzin, N. K. and Lincoln, Y. S. (Eds.) (2003) *Collecting and interpreting qualitative materials*. 2nd Edition, Sage Publications. Thousand Oaks, California, U.S.A.
- DeWITT, C. B. (1995) Ecology and ethics: relation of religious belief to ecological practice in the Biblical tradition. *Biodiversity and Conservation* **4**: 838-848.
- Department for International Development, DFID, (1999) Sustainable Livelihoods Guidance Sheets, Numbers 1-8, London: Department for International Development, U.K.
- Dickens, P. (1992) *Society and nature, towards a green social theory*. Harvester Wheatsheaf, Hertfordshire, U.K.
- Dietz, T., Ostrom, E., and Stern, P. (2003) The struggle to govern the Commons. *Science* **302**:1907–1912.
- Dillon, P. J., Reid, R. A., and DeGrosbois, E. (1987) The rate of acidification of aquatic ecosystems in Ontario, Canada. *Nature* **329**:45-48.
- Djoghla, A. (2007) Biological diversity and cultural diversity or the components of life on Earth. Address by Dr. Ahmed Djoghla, Executive Secretary of the

Convention on Biological Diversity, 47th Annual general meeting of the Canadian Commission for UNESCO, 16th March, 2007, Westin Hotel, Ottawa.

Dobson, S. L. (1992) Predicting crustacean zooplankton species richness. *Limnology and Oceanography* **37**:848-856.

Dobson, A. (2000) *Green political thought*. 3rd edition, Routledge, London.

Doremus, H. (1991) Protecting the ark: improving legal protection of biological diversity. *Ecology Law Quarterly* **18**:265-333.

Dorm-Adzobu, C., Ampadu-Agyei, O. and Veit, P. (1991) Religious Beliefs and Environmental Protection: The Malshegu Grove in Northern Ghana, From the Ground up. Case Study Series No 4, Nairobi: African Centre for Technology Studies (ACTS), and World Resources Institute.

Douglas, M. (Ed.) (1973) *Rules and Meanings*. Penguin Education, Middlesex, U.K.

Douglas, M. (1992) *Purity and Danger: an analysis of the concepts of pollution and taboo*. Mackays of Chatham PLC, Chatham, Kent.

Doyle R.D. (1991) Primary Production and Nitrogen Cycling within the Periphyton Community Associated with Emergent Aquatic Macrophytes in an Amazon Floodplain Lake. Dissertation, University of Maryland, Cambridge, MD, USA

- Drew, J. A. (2005) Use of traditional ecological knowledge in marine conservation. *Conservation Biology* **19**:1286-1293.
- Durkheim, E. (1915) *The elementary forms of the religious life*. George Allen and Unwin Ltd., London.
- Dunlap, W and Catton, R. (1980) A new ecological paradigm for post-exuberant sociology. *American Behavioural scientist* **24**:15-47.
- Durning, A. (1992) Guardians of the Land: indigenous peoples and the health of the earth. Worldwatch Paper 112, Worldwatch Institute, Washington. D.C.
- Eagles, P. F. J., McCool, S. F. and Haynes, C. D. A. (2002) *Sustainable Tourism in protected areas: guidelines for planning and management*. IUCN Gland, Switzerland and Cambridge, U. K.
- EarthTrends (2003) Biodiversity and Protected Areas-Nigeria. EarthTrends Country Profiles. World Resources Institute, Washington, D.C.
- Eckersley, R. (1992) *Environmentalism and political theory*. University College London Press, London.
- Efere, E. E., and Williamson, K. (1999) Languages. In *E.J. Alagoa, The land and people of Bayelsa state: central Niger Delta*. Onyoma Research Publications, Choba. Port Harcourt.

- Ehrenfeld, D. (2005) Sustainability: living with the imperfections. *Conservation Biology* **19**:33-35.
- Ehrlich, P and Ehrlich, A. (1991) *The population explosion*. Hutchinson, London.
- Engel J.R. (1985) Biosphere reserves as sacred places. *Orion Nature Quarterly* **4**: 53–59.
- Engle D.L. & Melack J.M. (1993) Consequences of riverine flooding for seston and the periphyton of floating meadows in an Amazon floodplain lake. *Limnology and Oceanography*, **38**: 1500–1520.
- Ervin, J. (2003) Protected area assessments in perspective. *Bioscience* **53**:819-822.
- Etter, J-F. and Perneger, T. V. (2000) Snowball sampling by mail: application to a survey of smokers in the general population. *International Journal of Epidemiology* **29**:43-48.
- Evans-Pritchard, E. E. (1965) *Theories of Primitive Religion*. Oxford University Press, London.
- Ezealor, A. U. (2001) Nigeria. In L. D. C. Fishpool and M. I. Evans (Ed.) *Important Bird Areas in Africa and Associated Islands: priority sites for conservation*. Pisces Publications and BirdLife International, Newbury and Cambridge. Pp.673-692.

Ezealor, A. U. (Ed.) (2002) *Critical Sites for Biodiversity Conservation in Nigeria*.

Nigerian Conservation Foundation, Lagos Nigeria.

Ezealor, A.U., King, R.P., Chindah, A., and Adeleke, A.. (2004) Survey of the Niger Delta wetlands for potential Ramsar site. A report submitted to The Nigerian Conservation Foundation.

Fabricius, C. (1999) Evaluating Eden: Who are the winners and losers in community wildlife management? In D. Eldridge and D. Freudenberger (Eds.), *People and rangelands: building the future*, Proceedings of VI International Rangeland Congress, CSIRO, Canberra, 1999.

Fabricius, C., Scholes, B. and Cundill, G. (2004) Mobilising knowledge for ecosystem assessments. Paper for conference on Bridging Scales and Epistemologies, Alexandria, Egypt, March, 2004.

Fairhead, J., and Leach, M. (1996) *Misreading the African landscape: society and Ecology in a forest-savanna mosaic*. Cambridge University Press, Cambridge, U.K.

Falconer, J. (1990) The major significance of 'minor' forest products: the local use and value of forest in the West African humid zone. Report for FAO, Rome.

Falconer, J. (1999) Non-timber forest products in Southern Ghana: traditional and cultural forest values. In *D. A. Posey (ed.) Cultural and spiritual values of biodiversity*, UNEP, Nairobi.

Faugier, J. (1996) Looking for business: a descriptive study of drug using female prostitutes, their clients and their health care needs. Unpublished PhD thesis, Manchester University, Manchester.

Faugier, J. and Sargeant, M. (1997) Sampling hard to reach population. *Journal of Advanced Nursing* **26**:790-797.

Federal Ministry of Environment, FME (2001) National Action Programme to Combat Desertification. Submitted to the UN Convention to Combat Desertification. Federal Ministry of Environment, Abuja, Nigeria.

Federal Ministry of Environment, FME (2006) Nigeria First National Biodiversity Report. Federal Ministry of Environment, Abuja, Nigeria.

Few, R. (2000) Conservation, Participation, and Power: Protected-Area planning in the coastal zone of Belize. *Journal of Planning Education and Research* **19**:401-408.

Field, J. (2000) Researching lifelong learning through focus groups. *Journal of Further and Higher Education* **24**:323-335.

Finke, J. (2006) *The rough guide to Tanzania*. Rough guides, New York, London and Delhi.

Fisher, B. (1993) Creating space; Development agencies and local institutions by natural resources management. *Peoples, Trees and Forests Newsletter* **22**:4-10.

- Folke, C. (2006) The Economic Perspective: Conservation against Development versus Conservation for Development. *Conservation Biology* **20**:686–688.
- Folke, C., Perrings, C., McNeely, J. A., and Myers, N. (1993) Biodiversity Conservation with a Human Face: Ecology, Economics and Policy. *Ambio*, **22**: 62-63.
- Fontana, A. and Frey, J. H. (2003) The interview: from Structured questions to negotiated text. In *K. N. Denzin and Y. S. Lincoln (eds.), Collecting and interpreting qualitative materials*. 2nd Edition, Sage Publications, Thousand Oaks, California, U.S.A.
- Freeman, D. (1983) *Margaret Mead and Samoa: the making and unmaking of an anthropological myth*. Harvard University Press, Cambridge, Massachusetts, U.S.A.
- Freeman, J. F. (1994) Forest conservancy in the Alps of Dauphine, 1287-1870. *Forest and Conservation History* **38**: 171-180.
- Gadgil, M. (1992) Conserving Biodiversity as if people matter: a case study from India. *Ambio*, **21**: 226-270.
- Gadgil, M. and Vartak, V. D. (1976) Sacred groves of Western Ghats of India. *Economic Botany* **30**: 152-160.

- Gadgil, M. and Vartak, V. D. (1981) Sacred groves of Maharashtra: an inventory. In *S. K. Jain (Ed.), Glimpses of Indian Ethnobotany*. IBH Publishing Company, New Dehli and Oxford.
- Gadgil, M., Berkes, F., and Folke, C. (1993) Indigenous knowledge for biodiversity conservation. *Ambio* **22**:266-270.
- Galetti, M. (2001) Indians within conservation units: lessons from the Atlantic forests. *Conservation Biology* **15**: 798-799.
- Gallet, R., Alizon, S., Comte, P.-A., Gutierrez, A., Depaulis, F., van Baalen, M., Michel, E. & Müller-Graf, C.D.M. (2007) Predation and disturbance interact to shape species diversity. *American Naturalist* **170**: 143-154.
- Ganter, E. (1996) Indigenous participation in coastal management in the Northern Territory, Australia: issues and options. *Ocean and Coastal Management* **33**: 193-212.
- Garner, A. (2003) Spirituality and Sustainability. *Conservation Biology*, **17**:946-947.
- Gerard, C. (2002) Sacred groves in History: pathways to the social shaping of forest landscapes in coastal Ghana in Science and policy process: Perspectives from the forest. *IDS Bulletin* **33**: 39-4.

- Getz, W. M., Fortmann, L., Cumming, D., Du Toit, J., Hilty, J., Martin, R., Murphree, M., Owen-Smith, N., Starfield, A. M., and Westphal, M. I. (1999) Sustaining natural and human capital: villagers and scientists. *Science* **283**: 1855-1856.
- Ghimire, K. B. and Pimbert, M. P. (1997) Social change and conservation: an overview of issues and concepts. In *K. B. Ghimire and M. P. Pimbert (eds.), Social change and conservation, Environmental politics and impacts of National parks and protected areas*, Earthscan, London.
- Gibson, C. C., McKean, M. A. and Ostum, F. (Eds.) (1999) *People and Forests: communities, institutions and the governance of forests*. MIT press, Cambridge, Massachusetts, U.S.A.
- Giesen W (1994) Indonesia's major freshwater lakes: a review of our current knowledge, development processes and threats. *Mitt Internat Verein Limnol* **24**:115-128.
- Githinji, M., Perrings, C. (1993) Social and ecological sustainability in the use of biotic resources in sub-Saharan Africa. *Ambio* **22**:110-116.
- Gluck, S. B., and Patai, D. (Eds.) (1991) *Women's words: the feminist practice of oral history*. Routledge, New York.
- Golubiewski, N. (2007) Western Africa and forests and woodlands. In *Cutler J. Cleveland, Environmental Information Coalition, National Council for Science and*

the Environment (eds.), *Encyclopaedia of Earth*, available online

<http://www.eoearth.org/article/Western_Africa_and_forests_and_woodlands>

[accessed July, 2007].

Gómez-Pompa, A., and Kaus, A. (1992) Taming the wilderness myth. *Bioscience* **42**:271-279.

Gonese, C. (1999) The three worlds. *Compas Newsletter*, February 1999, **1**.

Goody, J. R. (1961) Religion and Ritual: The Definitional problem. *British Journal of Sociology* **12**: 142-164.

Grbich, C. (1999) *Qualitative research in health: An introduction*. Sage, London.

Greene, J. C. and Caracelli, V. J. (2003) Making paradigmatic sense of mixed methods practice. In A. Tashakkori and C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioural research*, Sage, Thousand Oaks, California.

Greider, T., and Garkovich, L. (1994) Landscapes: the social construction of nature and the environment. *Rural sociology* **59**: 1-23.

Griaule, M. (1970) *Conversations with Ogotemeli: an introduction to Dogon religious ideas*. Oxford University Press, Oxford.

Grimble, R. (1996) Carrying Capacity: sustainable use and demographic determinants of natural habitats and ecosystems management. Environment Department Papers, World Bank, Washington, D. C.

Grimble, R. and Laidlaw, M. (2002) Biodiversity Management in Rural Development: an overview. In R. Grimble (ed.), *Biodiversity Management in Rural Development*, Natural Resources Institute and DFID, Chatham, UK.

Grumbine, R.E. (1994) What Is Ecosystem Management? *Conservation Biology* **8**: 27-38.

Gunderson, L. H., and Holling, C. S. (eds.) (2002) Panarchy: understanding transformations in human and natural systems. Island Press, Washington, D.C.

Haines, A. L. (1996) The Yellowstone Story: a history of our first National Park, The University Press, Colorado, Niwot, Colorado.

Hamadina, M. K., Otobotekere, D. and Anyanwu, D. I. (2007) Impact assessment and biodiversity considerations in Nigeria: a case study of Niger Delta University campus project on wildlife in Nun River Forest Reserve. *Management of Environmental Quality* **18**:179-197.

Hannah, L. (1992) *African people, African parks. An evaluation of development initiatives as a means of improving protected area conservation in Africa*. USAID Biodiversity Support Programme and Conservation International, Washington, D.C.

- Hardin, G. (1968) The tragedy of the commons. *Science* **162**:1243-1248.
- Hargreaves, S. (2001), Rising tensions: Sharia law in Nigeria. *The Lancet* **358**:1900-1901.
- Harris, R. (1965) The political organization of the Mbembe, Nigeria. Overseas Research Publication no. 10, Ministry of Overseas Development, London.
- Harrison, J. MacGibbon, L. and Morton, M. (2001) Regimes of trustworthiness in qualitative research: The rigors of reciprocity. *Qualitative inquiry* **7**: 323-345.
- Hekkala, E., Fergusson, R. and Paulin, J. (2000) Crocodile Specialist Group Newsletter, October – December **19**:6-11. Available online.
<<http://www.flmnh.ufl.edu/natsci/HERPETOLOGY/NEWSLETTER/news194p6-11.htm>>.
- Hendricks, V. M. and Blanken, P. (1992) Snowball sampling: theoretical and practical considerations. In *V. M. Hendricks, P. Blanken and N. Adriaans (Eds.), Snowball sampling: A pilot study on cocaine use*. IVO, Rotterdam.
- Hessen, D. O., Bakkestuen, V., and Walseng, B. (2007) Energy input and zooplankton species richness. *Ecography* **30**:749-758.
- Hertz, R. (1997) Introduction: reflexivity and voice. In *R. Hertz (Ed.), reflexivity and voice*, Sage, Thousand Oaks, California, U.S.A.

- Hilton-Taylor, C. (compiler) (2000) 2000 IUCN Red List of Threatened Species. IUCN, Gland, Switzerland and Cambridge, U.K.
- Holling, C. S. (1986) The resilience of terrestrial ecosystems: local surprise and global change. In *W. C. Clark and R. E. Munn (eds.), Sustainable development of the biosphere*, Cambridge University Press, London, U.K.
- Holling, C. S. (2000), Theories for Sustainable Futures. *Conservation Ecology* **4**:7. available online, <<http://www.consecol.org/vol4/iss2/art7/>>.
- Horowitz, H. M. and Painter, T. (Eds.) (1986) *Anthropology and Rural Development in West Africa*. Westview Press, Boulder, Colorado.
- Hough, J. L. (1988) Obstacles to effective management of conflicts between national parks and surrounding human communities in developing countries. *Environmental Conservation* **15**:129-136.
- Howe, K. R. (1992) Getting over the quantitative-qualitative debate. *American Journal of Education* **100**:236-256.
- Hughes, C. E. (1998) *Leucaena, A genetic resources Handbook*, Tropical Forestry Paper, No. 37, Oxford Forestry Institute, Oxford.
- Hulme, D., and Murphree, M. (1999) Communities, wildlife and 'new conservation' in Africa. *Journal of International Development*, **11**: 277-285.

- Hutchinson, G. E. (1975) *A treatise on Limnology*. Limnological Botany, volume 3. John Wiley and Sons, Toronto.
- Ibeanu, O. (2000) Oiling the Friction: environmental conflict management in the Niger Delta, Nigeria. *Environmental Change and Security Project Report*, 6: 19-32.
- IIED (1994) *Whose Eden: an overview of community approaches to wildlife management*. International Institute for Environment and Development, Overseas Development Administration, London, U.K.
- Ikein, A. A. (1990) *The Impact of oil in a developing country: The case of Nigeria*. Praeger, New York, U.S.A.
- Infield, M. (2001) Cultural values: a forgotten strategy for building community support for protected areas in Africa. *Conservation Biology* 15: 800-801.
- Ingold, T. (1992) Culture and the perception of the environment. In E. Croll, and D. Parkin (Eds.), *Bush base: farm forest, culture, environment and development* Routledge, London.
- Ita, E. O. (1993) Inland fishery resources of Nigeria. CIFA Occasional Paper No. 20, FAO, Rome.
- Ita, E. O. (1994) Aquatic plants and wetland wildlife resources in Nigeria. FAO, Rome.

Ite, U. and Adams, W. (2000) Expectations, impacts and attitudes: conservation and development in Cross River National Park, Nigeria. *Journal of International Development*, **12**: 325-342.

IUCN (1994) *Guidelines for Protected Area Management Categories*. IUCN, Gland, Switzerland and Cambridge, UK.

IUCN (1996) 1996 IUCN red list of threatened animals. World Conservation Monitoring Centre (IUCN), Gland and Cambridge

IUCN (2004) Freshwater Biodiversity assessment programme. IUCN, SSC. Available online, <<http://www.iucn.org/themes/ssc/programs/freshwater/index.htm>>.

IUCN (2006) 2006 IUCN Red List of Threatened Species. Available online, <www.iucnredlist.org> [accessed August, 2007].

IUCN (2007) 2007 IUCN Red List of Threatened Species. Available online, <www.iucnredlist.org> [accessed June, 2007].

IUCN/UNEP/WWF (1980) *The World Conservation Strategy: Living Resource Conservation for Sustainable Development*. International Union for Conservation Nature, United Nations Environment Programme and World wide Fund for Nature. Gland, Switzerland.

IUCN/WWF/UNEP (1991) *Caring for the Earth: A Strategy for Sustainable Living*. The World Conservation Union, Worldwide Fund for Nature and United Nations Environment Programme, Gland, Switzerland.

Iwuchukwu, M. C. (2003) Democracy in multireligious and cultural setting. *World Futures* **59**:381-390.

Jain, A., Rai, S. C., Pal, J., and Sharma, E. (1999) Hydrology and nutrient dynamics of a sacred lake in Sikkim Himalaya. *Hydrobiologia* **416**: 13-22.

Jeppesen, E., Jensen, J.P., Søndergaard, M., Lauridsen, T. and Landkildehus, F.. (2000) Trophic structure, species richness and biodiversity in Danish lakes: changes along a phosphorus gradient, *Freshwater Biology* **45**: 201–218.

Jepson, P. and Whittaker, R. J. (2000) Histories of Protected Areas: internationalism of conservationist values and their adoption in the Netherlands Indies (Indonesia). *Environment and History*, **8**: 129-172.

Jianchu, X., Erzi, M., Duojie, T., Yongshou, F., Zhi, L. and Melick, D. (2004) Integrating sacred knowledge for conservation: Cultures and landscapes in SW China. Conference proceedings of conference on Millennium assessment, Bridging Scales and Epistemologies: linking local knowledge with global science in multi-scale assessments, Alexandria, Egypt, March 17-20, 2004.

Junger, S. (2007) Crude awakening. *The Observer Magazine*, 15th April, 2007. United Kingdom.

- Kajembe, G. C., E. J. Luoga, M. S. Kijazi, and C. S. Mwaipopo. (2003) The role of traditional institutions in the conservation of forest resources in East Usambara, Tanzania. *International Journal of Sustainable Development and World Ecology* **10**:101-107.
- Kalanda-Sabola, M. D., Henry, E. M. T., Kayambazinthu, E., and Wilson, J. (2007) Use of indigenous knowledge and traditional practices in fisheries management: a case of Chisi Island, Lake Chilwa, Zomba. *Malawi Journal of Science and Technology* **8**:009-029.
- Kangalawe, R. Y. M. and Liwenga, E. T. (2005) Livelihoods in the wetlands of Kilombero valley in Tanzania: Opportunities and challenges to integrated water resource management. *Physics and Chemistry of the Earth* **30**:968-975.
- Kawanabe, H. (2003) Cultural associations in an ancient lake: Gods of water in Lake Biwa and the River Yodo basin, Japan. *Hydrobiologia* **500**:213-216.
- Keller W. & Conlon M. (1994) Crustacean zooplankton communities and Lake Morphometry in Precambrian shield lakes. *Canadian Journal of Fisheries and Aquatic Sciences*, **51**: 2424–2434.
- Kemp, E. (2001) Observing practice as participant observation-linking theory to practice. *Social Work Education* **20**:527-538.
- Keay, R. W. J., Onochie, C. F. A., and Stanfield, D. P. (1964) *Nigerian Trees, Volume I and II*. Department of Forest Research, Ibadan, Nigeria.

- Kenny, J. (1996) Sharia and Christianity in Nigeria: Islam and a 'Secular' State. *Journal of Religion in Africa* **26**:338-364.
- Khumbongmayum, A. D., Khan, M. L. and Tripathi, R.S. (2005) Sacred groves of Manipur, Northeast India: Biodiversity value, status and strategies for their conservation. *Biodiversity and Conservation* **14**: 1541-1582.
- Kideghesho, J. R., Roskaft, E. and Kaltenborn, B. P. (2007) Factors influencing conservation attitudes of local people in Western Serengeti, Tanzania. *Biodiversity Conservation* **16**:2213-2230.
- Kinzig, A., Starrett, D., Arrow, K., Aniyar, S., Bolin, B., Dasgupta, P., Ehrlich, P., Folke, C., Hanemann, M., Heal, G., Hoel, M., Jansson, A., Jansson, B-O., Kautsky, N., Levin, S., Lubchenco, J., Maler, K-G., Pacala, S. W., Schneider, S. H., Siniscalco, D. and Walker, B. (2003) Coping with uncertainty: A call for a new science-policy forum. *Ambio* **32**:330-335.
- Kolawole, O. D. (2001) Local knowledge utilization and sustainable rural development in the 21st century. *Indigenous Knowledge and Development Monitor*, **9**: 13-15.
- Koranteng, K. A., Ofori – Damson, P. K. and Entsua – Mensah, M. (2000) Fish and fisheries of the Muni lagoon in Ghana, West Africa, *Biodiversity and Conservation*, **9**: 487 – 499, Kluwer academic publications, Netherlands.

- Koziell, I., and Saunders, J. (eds.) (2000) *Living off Biodiversity; exploring livelihoods and Biodiversity issues in natural resources management*. Natural Resources Institute and International Institute for Environment and development, United Kingdom.
- Krebs, C. J. (2001) *Ecology: the experimental analysis of distribution and abundance*. 5th ed., Benjamin Cummings, San Francisco, California.
- Kremen, C., Razafimahatratra, V., Guillery, R. P., Rakotomalala, J., Weiss, A. and Ratsisompatrarivo, J-S. (1999) Designing the Masoala National Park in Madagascar Based on Biological and Socioeconomic Data. *Conservation Biology* **13**:1055–1068.
- Kumar, C. (2005) Revisiting ‘community’ in community-based natural resource management. *Community Development Journal*, **40**: 275-285.
- Kutner, J. S., Steiner, J. F., Corbett, K. K., Jahnigen, D. W. and Barton, P. L. (1999) Information needs in terminal illness. *Social science and medicine* **48**:1341-1352.
- LaPerriere, J.D., and Edmundson, J. A. (2000) Limnology of two lake systems of Katmai National Park and Preserve, Alaska: Part II. Light penetration and Secchi depth. *Hydrobiologia* **418**: 209–216.
- LaRochelle, S. and Berkes, F. (2003) Traditional ecological knowledge and practice for edible wild plants: biodiversity use by the Raramuri in the Sierra Tarahumara, Mexico. *International Journal of Sustainable Development and World Ecology* **10**: 361-375.

Larson, P., Freudenberger, M. and Wyckoff-Baird, B. (1996) Lesson from the field, a review of world wildlife fund's experience with integrated conservation and development projects 1985-1996. Final draft report, World Wildlife Fund. Washington, D.C.

Larson, G.L., Lomnicky, G., Hoffman, R., Liss, W.J., Deimling, E., (1999) Integrating physical and chemical characteristics of lakes into the glacially influenced landscape of the northern cascade mountains. *Environmental Management* **24**: 219-228.

Leahy, E. (2006) Demographic Development: Reversing Course? Research Commentary. *Population Action International* (November 2006) **1**.

Leopold, A. (1966) *A Sand county almanac (Outdoor Essays and Reflections)*. Ballantine Books, New York.

Lesack L.F.W., Marsh, P., and Hecky, R. E. (1998) Spatial and temporal dynamics of major solute chemistry among Mackenzie Delta lakes. *Limnology and Oceanography*, **43**: 1530–1543.

Library of Congress (2006) Nigeria: Country Studies-Federal Research Division. Library of Congress, available online, <<http://memory.loc.gov/frd/cs/ngtoc.html>> [accessed August, 2007].

Lincoln, Y. S. and Guba, E. G. (1985) *Naturalistic Inquiry*. Sage, London.

- Lindsey, K. and Hirt, H. M. (1999) Use water hyacinth, Anamed, Winnenden, Germany.
- Litwin, M. S. (1995) *How to measure survey reliability and validity*. Sage, Thousand Oaks, California.
- Loflan, J. (1971) *Analyzing social settings*. Wadsworth, Belmont, California, U.S.A.
- Lofland, J. and Lofland, L. H. (1995) *Analyzing social settings*. 3rd edition, Wadsworth, Belmont, California.
- Long, S. A. (Ed.) (2004) *Livelihoods and CBNRM in Namibia: The findings of the WILD project. Final Technical Report of the Wildlife Integration for livelihood Diversification Project*, Prepared for the Directorates of Environmental Affairs and Parks and Wildlife Management, the Ministry of Environment and Tourism, the Government of the Republic of Namibia, Windhoek, March 2004.
- Lowe, R. (1992) Nigeria. In J. A. Sayer, C. S. Harcourt and N. M. Collins (Eds.), *the conservation atlas of tropical forests: Africa*, Macmillan/IUCN.
- Ludwig, D., Hilborn, R. and Walters, C. (1993) Uncertainty, resource exploitation, and conservation: lessons from history. *Science* **260**: 17, 36.
- Luiselli, L. and Akani, G. C. (2003) An indirect assessment of the effects of oil pollution on the diversity and functioning of turtle communities in the Niger Delta, Nigeria. *Animal Biodiversity and Conservation* **26**:57-65.

Lynch, O. and Talbot, K. (1995) *Balancing acts: community-based forest management and national law in Asia and Pacific*. World Resources Institute, Washington, D. C.

MacKinnon, J., MacKinnon, K., Child, G. and Thorsell, J. (1986) *Managing protected areas in the tropics*. IUCN, Gland, Switzerland.

Maltby, E. (1986) *Waterlogged Wealth*. International Institute for Environment and Development, Earthscan, London.

Manning, R. B. (1994) Unlawful hunting in England 1500-1640. *Forest Conservation and History* **38**:16-23.

Mascia, M. B., Brosius, J. P., Dobson, T. A., Forbes, B. C., Horowitz, L., McKean, M. A., and Turner, N. J. (2003) Conservation and the social sciences. *Conservation Biology*, **17**: 649-650.

May, R.M. 1994. Conceptual aspects of the quantification of the extent of biological diversity. *Philosophical Transactions of the Royal Society of London. Series B Biological Sciences* **345**: 13-20.

May, R.M. 1997. The dimensions of life on earth. In *P.H. Raven (ed.) Nature and Human Society. The Quest for a Sustainable World*. National Academy Press, Washington, DC

Mayr, E. (1996) The autonomy of biology: the position of biology among the sciences. *Quarterly Review of Biology* **71**:97-106.

McCully, P. (2007) *Before the Deluge: Coping with floods in a changing climate.* IRN Dams, Rivers and People Report 2007. International Rivers Network, Berkeley, California, U.S.A.

McDaniel, J. (2002) Spirituality and Sustainability. *Conservation Biology*, **16**: 1461-1464.

McGinley, M. (2007) Niger Delta Swamp forests. *In Cutler J. Cleveland, Environmental Information Coalition, National Council for Science and the Environment (eds.), Encyclopaedia of Earth.* Available online, <http://www.eoearth.org/article/Niger_Delta_swamp_forests> [accessed July, 2007].

McGreal, C. (2007) Blood and Money. *The Guardian*, 10th May, 2007, United Kingdom.

McNeely, J. (1995) IUCN and indigenous peoples: How to promote sustainable development. *In D. M. Warren, L. J. Slikkerveer, and D. Brokensha (eds.), the cultural dimension of development: Indigenous knowledge systems.* Intermediate Technology Publications, London.

McNeely, J. A. and Miller, K. (Ed.) (1984) *National Parks, Conservation, and Development.* Smithsonian Institution Press, Washington, D.C.

Mearns, R., Leach, M., and Scoones, I. (1998) The Institutional Dynamics of Community-Based Natural Resource Management: an entitlements approach, Presented at Crossing Boundaries. The 7th annual conference of the International

- Association for the Study of Common Property, June 10th -14th, 1998. Vancouver, British Columbia, Canada.
- Mebratu, D. (1998) Sustainability and sustainable development: Historical and conceptual review. *Environmental Impact Assessment Review* **18**:493-520.
- Meffe, G. K. and Ronald Carroll, C. (1997) *Principles of Conservation Biology*. Sinauer Associates, Massachusetts.
- Mgumia, F.H. and Oba, G. (2003) Potential role of sacred groves in biodiversity conservation in Tanzania. *Environmental Conservation* **30**: 259-265.
- Miles, M. B. and Huberman, A. M. (1984) *Qualitative data analysis: An expanded sourcebook*. Sage, Beverly Hills, California.
- Miles, M. B. and Huberman, A. M. (1994) *Qualitative data analysis: An expanded sourcebook*. 2nd edition, Sage, Thousand Oaks, California.
- Millar, D. (1993), Farmer experimentation and the Cosmovision paradigm. In *W. de Boef, K. Amanor, K. Wellard, (Eds.) with Bebbington, Cultivating knowledge: Genetic diversity, farmer experimentation, and crop research*, Intermediate Technology Publications, U.K.
- Millar, D. (2004) Interfacing two knowledge systems: Local Knowledge and Science in Africa. Paper for the Compas panel, in Conference on, Bridging Scales and

- Epistemologies: Linking Local Knowledge with Global Science in Multi-Scale Assessments, Alexandria, March 2004.
- Mills, L.S. (1995) Edge effects and isolation: red-backed voles on forest remnants. *Conservation Biology* **9**:395-403.
- Millenium Choice Technologies, (2007) Bayelsa State. Available online, <<http://www.bayelsagov.com>> [accessed June, 2007].
- Mittermeier, R. A. and Forsyth, A. B., (1997) Setting priorities for Biodiversity Conservation, one organisation's approach. In *G. K. Meffe, and C. Ronald Carroll, (eds.), Principles of Conservation Biology*, Sinauer Associates, Massachusetts.
- Moffat, D. and Linden, O. (1995) Perception and reality: Assessing priorities for sustainable development in the Niger River Delta. *Ambio* **24**:527-538.
- Moralez-Gomez, D. (1993) Knowledge, Change and the Preservation of Progress. IDRC Reports *Indigenous and Traditional Knowledge* **21**:1-2 ISSN: 0315-9981.
- Morford, S., Parker, D., Rogers, H., Salituro, C., and Waldichuk, T. (2003) Culture, worldviews, communication styles, and conflict in forest management. *Perspectives, BC Journal of Ecosystems and Management* **3**. Available online, <<http://www.forrex.org/jem/2003/vol3/no1/art2.pdf>>.
- Morgan, D. (1988) *Focus groups as qualitative research*. Sage, Newbury Park. California.

- Morgan, D. L. (1993) *Successful focus groups; Advancing the state of the art*. Sage, Newbury Park, California.
- Morgan, D. L. (1998) Practical strategies for combining qualitative and quantitative methods: Applications to health research. *Qualitative Health Research* **8**:362-376.
- Morse, J. M. (1991) Approaches to qualitative-quantitative methodological triangulation. *Nursing Research* **40**:120-123.
- Moser, C. A. and Kalton, G. (1971) *Survey methods in social investigation*. 2nd edition, Gower publications, U.K.
- Muller, S. (2003) Towards decolonisation of Australian's Protected Area Management: the Nantawarrina indigenous protected area experience. *Australian Geographical Studies*, **41**: 29-43.
- Munasinghe, M. (1992) Biodiversity Protection Policy: environmental valuation and distribution issues. *Ambio* **21**: 227-236.
- Mundkur, B. (1976) The cult of the serpent in the Americas: its Asian Background. *Current Anthropology* **17**:429-455.
- Mustapha, A. R. (2003) Ethnic minority groups in Nigeria: current situation and major problems. Paper prepared for the United Nations Commission on Human Rights, Sub-commission on promotion and protection of human rights working group on minorities, 9th session, 12th - 13th May, 2003.

Mustapha, A. R. (2006) Ethnic structure, inequality and governance of the public sector in Nigeria. Democracy, Governance and Human Rights Programme Paper Number 24, United Nations Research Institute for Social Development, Geneva, Switzerland.

Myers N., Mittermeier, R. A., Mittermeier, C. G., da Fonseca, G. A. B. and Kent, J. (2000) Biodiversity hotspots for conservation priorities. *Nature* **403**: 853-858.

Myers, N. (1993) Biodiversity and the precautionary principle. *Ambio* **22**: 74-79.

Naess, A. (1973) The shallow and the Deep, Long-range Ecology movement: a summary. *Inquiry* **16**: 95-100.

Naess, A. (1989) *Ecology, community and lifestyle*, Cambridge University Press, Cambridge, U.K.

Naess, A. (1995) Deep ecology and ecosophy. In *G. Sessions, Deep ecology for the 20th century.*, Shambhala Publications, Boston, Massachusetts.

National Economic Empowerment and Development Strategy, NEEDS, (2004) Nigeria: National Economic Empowerment and Development Strategy. NEEDS Secretariat, National Planning Commission, Federal Secretariat, Abuja.

National Minimum Wage (Amendment) Act (2000) 2000 Act Number 1, Laws of the Federation of Nigeria.

National Population Commission (1998) 1991 Population of the Federal Republic of Nigeria: Analytical Report at the National Level, National Population Commission, Abuja.

National Population Commission, NPC, Nigeria and ORC Macro (2004) Nigeria demographic and health survey 2003. National Population Commission and ORC Macro, Calverton, Maryland, U.S.A.

Naughton-Treves, L., Holland, M. B. and Brandon, K. (2005) The role of protected areas in conserving biodiversity and sustaining local livelihoods. *Annual Review of Environment and Resources* **30**:219-252.

Neefjes, K. (2000) Environments and livelihoods: Strategies for sustainability, Oxfam, Oxford.

Neiland, A. E. and Bene, C. (Eds.) (2004) Poverty and small-scale fisheries in West Africa. Kluwer, Netherlands, FAO, Rome, Italy.

Nelson, J.G. and Serafin, R. (1992) Assessing biodiversity: a human ecological approach. *Ambio* **21**:212-218.

Netherlands Engineering Consultants, NEDECO, (1961) The Niger Delta: report on an investigation. Netherlands Engineering consultants, The Hague.

Neumann, R.P. (1998) *Imposing wilderness: struggles over livelihoods and nature preservation in Africa*. University of California press, Berkeley.

- Nevers, M. B., and Whitman, R. L. (2004) Characterization and comparison of phytoplankton in selected lakes of five Great Lakes area National Parks. *Aquatic Ecosystem Health & Management* 7:515 – 528.
- Newton, J. L. and Freyfogle, E. T. (2005) Sustainability: a Dissent. *Conservation Biology* 19:23-32.
- Niger Delta Development Commission, NDDC (2006) Niger Delta Regional Development Master Plan, Popular version. South-Sea Datcomm Limited.
- Niger Delta Wetlands Centre (1995) Review of Initial Assessment of Environmental issues in the Niger Delta and Niger delta Biodiversity. Report by the Niger Delta wetlands Centre, Port-Harcourt, Nigeria.
- Nigeria Environmental Study/Action Team, NEST, (1991) *Nigeria's Threatened Environment; A National profile*. NEST Publications, Ibadan, Nigeria
- Nigeria Environmental Study/Action Team, NEST, (1992) *The challenge of Sustainable Development in Nigeria*. NEST Publications, Ibadan, Nigeria.
- Nontji A (1994) The status of limnology in Indonesia. *Mitt Internat Verein Limnologie* 24:95–113.
- Noss, R. F., and Cooperrider, A. (1994) Saving Nature's legacy: protecting and restoring biodiversity. Defenders of Wildlife and Island Press, Washington, D.C.

Ntiamoa-Baidu, Y. (1995) Indigenous versus Introduced Biodiversity Conservation Strategies: the case of protected Area Systems in Ghana. African Biodiversity Series No. 1, BSP, Washington.

Nzegbule, E. C. and Meregini, A. O. A. (1999) The cultural and symbolic importance of forest resources. *Journal of Sustainable Agriculture and the Environment* 1:95-100.

Oakley, A. (1981) Interviewing women: a contradiction in terms. In *H. Roberts (Ed.), Doing feminist research*. Routledge and Kegan Paul, London.

Oates, J.F., (1989) A survey of primates and other forest wildlife in Anambra, Imo and Rivers States, Nigeria, Report to the National Geographic Society, the Nigerian Conservation Foundation, the Nigerian Federal Department of Forestry and the governments of Anambra, Imo and Rivers States.

Oates, J. F. (1995) The dangers of conservation by rural development-a case study from the forests of Nigeria. *Oryx* 29: 115-122.

Oates, J. F. and Bergi, R. A. (2001) Biodiversity patterns and conservation in the Gulf of Guinea forests. Draft report submitted to Conservation International (Washington, D.C.) and The Wildlife Conservation Society (Bronx, New York), U.S.A.

Oates, J. F., Anadu, P. A., Gadsby, E. L. and Were, J. L. (1992) Sclater's guenon-a rare Nigerian monkey threatened by deforestation. *National Geographic Research and Exploration* **8**:476-491.

Obi, C. (1997) Globalisation and local resistance: the case of the Ogoni versus Shell. *New Political Economy* **1**:131-148.

Odukoya, A. O. (2006) Oil and Sustainable Development in Nigeria: a case of study the Niger Delta. *Journal of Human Ecology* **20**: 249-258.

Okaba, B. and Appah, S. T. K. (1999) Religious beliefs and practices. In *E. J. Alagoa (Ed.) The Land and People of Bayelsa State: central Niger Delta*, Onyoma publications, Port Harcourt.

Ola-Adams, B. A. (1977) Conservation of genetic resources of indigenous forest tree species in Nigeria; possibilities and limitations. *Forest Genetic Resources Information* **7**:1-9.

Olson, K. S. (2004) An evaluation of Niger-Congo classification. A paper of the Summer Institute of Linguistics, SIL, Dallas Texas, U.S.A.

Olson, E. J., Engstrom, E. S., Dornsgfield, M. R., and Belling, D. R. (1994) Abundance and distribution of macroinvertebrates in relation to macrophyte communities in a prairie marsh, swan lake, Minnesota. *Journal of Freshwater Ecology* **10**:325-335.

- Olsson, P. and Folke, C. (2001) Local ecological knowledge and institutional dynamics for ecosystem management: a study of Lake Racken watershed, Sweden. *Ecosystems* 4:85-104.
- Omari, C. K. (1990) Traditional African land ethics. In *J. R. Engel, and E.J. Gibb (eds.), Ethics of Environment and Development: global challenge, international response*, University of Arizona Press, Tucson.
- Omene, G. (2001) Interim Action Plan and Framework for Development of the Niger Delta Region. Position paper on the First International Conference on the Niger Delta, Port Harcourt.
- Onwuegbuzie, A. J. and Leech, N. L. (2005) On becoming a pragmatic researcher: the importance of combining quantitative and qualitative research methodologies. *International Journal of Social Research Methodology* 8:375-387.
- Orr, D.W. (2002) Four challenges of Sustainability. *Conservation Biology* 16:1457-1460.
- Osemeobo, G. J. (1994) The role of folklore in environmental conservation: evidence from Edo State, Nigeria. *International Journal of Sustainable Development and World Ecology* 1:48 -55.
- Osemeobo, G. J. (2001) Is traditional ecological knowledge relevant in environmental conservation in Nigeria? *The International Journal of Sustainable Development and World Ecology* 8:203-210.

- Ostrom, E. (1990) *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press, Cambridge, U.K.
- Ostrom, E. (1992) The rudiments of a theory of the origins, survival and performance of common property institutions. In D. Bromley (Ed.), *making the commons work*, International centre for self governance, San Francisco.
- Ostrom, E., and Schlager, E. (1996) The formation of property rights. In S. S. Hanna, C. Folke, and K. Maler (eds.), *Rights of Nature: Ecological, Economic, Cultural and Political Principles of Institutions for the Environment*, Island Press, Washington D.C.
- Osunade, M. A. A. (1988) Nomenclature and Classification of Traditional Land Use types in South-western Nigeria. *Savanna* **9**:50-63.
- Otobo, A. J. T., and Alagoa, N. C. (1990) Preliminary inventory survey of freshwater floodplain lakes and their general physical characteristics in the Niger Delta, Rivers State. Paper presented at the 5th Annual conference of the Nigerian Association of Aquatic Sciences, held in Port Harcourt, from 21st-25th October, 1990.
- Oudwater, N., and Martin, A. (2003) Methods and issues in exploring local knowledge of soils. *Geoderma* **111**: 387-401.
- Överlien, C., Aronsson, K. and Hydén, M. (2005) The Focus Group Interview as an In-depth Method? Young women talking about sexuality. *International Journal of Social Research Methodology* **8**:331-344.

Oviedo, G., Jeanrenaud, S. and Otegui, M. (2005) Protecting Sacred Natural Sites of Indigenous and Traditional Peoples: an IUCN Perspective. Gland, Switzerland, June 2005. Available online.

<<http://www.iucn.org/themes/spg/Files/sacred%20sites/protecting-sacred-natural-sites-indigenous.pdf>>.

Owonaro, S. K. (2006) *The history of Ijo (Ijaw) and her neighbouring tribes in Nigeria*. Owonaro Printing and Publishing Co., Kaima, Bayelsa, Nigeria.

Oyebande, L., Obot, E.A., Bdiliya, H.H., and Oshunsanya, C.O., (2001) An inventory of wetlands in Nigeria. A report submitted to World Conservation Union (IUCN) West African Regional office, Burkina Faso.

Oyegun, C. U. (1999) Climate, Relief and Drainage. In *E. J. Alagoa (Ed.) The Land and People of Bayelsa State: central Niger Delta*, Onyoma publications, Port Harcourt.

Padoch, C. and Sears, R. R. (2005) Conserving concepts: in praise of sustainability. *Conservation Biology* **19**:39-41.

Paehlke, R. (2005) Sustainability as a bridging concept. *Conservation Biology* **19**:36-38.

Paine, R. T., Tegner, M. J., and Johnson, E. A. (1998) Compounded perturbations yield ecological surprises. *Ecosystems* **1**:535-545.

- Pallant, J. (2006) *SPSS survival manual, a step by step guide to data analysis using SPSS for windows (version 12)*. 2nd edition, Open University Press, Berkshire, UK.
- Pandey, D. N. (2003) Cultural resources for conservation science. *Conservation Biology* 17: 633 – 635.
- Pansiri, J. (2006) Doing Tourism research using the pragmatism paradigm: an empirical example. *Tourism and Hospitality: Planning and Development* 3:223-240.
- Parkhe, A. (1993) Strategic alliance structuring: a game theoretic and transaction cost examination of interfirm cooperation. *Academy of Management Journal* 36:794-829.
- Pathak, N., Kothari, A., and Roe, D. (2005) Conservation with social justice? The role of community conserved areas in achieving the Millennium Development Goals. In T., Bigg, and D., Satterthwaite (eds.), *How to make poverty history-the central role of local organisations in meeting the MDGS*. IIED, London.
- Patton, M. Q. (1990) *Qualitative evaluation and research methods*. 2nd edition, Sage publications, California.
- Pearce, D. W. (1994) The great environmental values debate, *Environment and Planning*. A26: 1329-1338.
- Pearsall, J. and Trumble, B. (eds.) (1996), *The Oxford English Reference Dictionary*. 2nd edition, Oxford University Press, United Kingdom.

Pei, S. and Luo, P. (2000) Traditional culture and biodiversity conservation. in Yunnan. In J. Xu (Ed.), *Links Between Cultures and Biodiversity*, Proceedings of the Cultures and Biodiversity Congress 2000, 20–30 July 2000, Yunnan, China, Yunnan Science and Technology Press, Yunnan, China.

Perrings, C. A., C. Folke and K.-G. Måler (1992) The ecology and economics of biodiversity loss: the research agenda. *Ambio* 21:201–211.

Perry, C. (1998) Processes of a case study methodology for postgraduate research in marketing. *European Journal of Marketing* 32:785-802.

Piaget, J. (1947) New preface to third ed. Of *Le jugement et le raisonnement chez l'enfant* Neuchatel: Delachaux and Niestle. Spa. Trans.: *El juicio y el razonamiento en el niño*, Buenos Aires, Guadalupe, 1972.

Pimbert, M. P. and Pretty, J. N. (1997) Parks people and professionals: Putting 'participation' into protected area management. In K. B. Ghimire and M. P. Pimbert (Eds.), *Social change and conservation, Environmental politics and impacts of National parks and protected areas*, Earthscan, London.

Pojar, J. and MacKinnon, A. (1994) *Plants of the Pacific Northwest coast, lone pine*, Vancouver, BC.

Portmann, J., Biney, C., Chidilhe, A. and Zabi, S. (1989) Status of the marine environment: West and Central African region. UNEP regional seas reports and studies, No. 108.

- Posey, D. A. (ed.) (1999) *Cultural and spiritual values of biodiversity*. Intermediate Technology Publications, United Nations Environmental Programme, London.
- Powell, C. B. (1993) Sites and species of conservation interest of the central axis of the Niger Delta (Yenagoa, Sagbama, Ekeremor and Southern Ijo Local government areas). A report of recommendations to The Natural Resources Conservation Council (NARESCON), Lagos.
- Powell, C. B. (1995) Wildlife Study 1. Report to the Environmental affairs department, Shell Petroleum Development Company of Nigeria Limited, Port Harcourt, Nigeria.
- Powell, C. B. (1997) Discoveries and priorities for mammals in the freshwater forests of the Niger Delta. *Oryx* **31**:83-85.
- Powers, W. K. (1987) Cosmology and the reinvention of culture: the Lakota case. *The Canadian Journal of Native Studies* VII, **2**: 165-180.
- Pretty, J. N. (1990) Sustainable agriculture in the middle ages. *The English Manor Agriculture History Review* **30**:1-19.
- Punch, K. F. (2000) *Introduction to social research: qualitative and quantitative approaches*, Sage Publications, London.
- Ramakrishnan, P.S. (1996) Conserving the sacred: from species to landscapes. *Nature and Resources*, **32**: 11–19.

Ramakrishnan, P.S. (1998) Ecology, economics and ethics: Some key issues relevant to natural resource management in developing countries. *International Journal of Social Economics*, **25**:207-225.

Ramakrishnan, P. S. (1999) Ecology in developing countries: The emerging paradigms. *Proceedings Indian National Science Academic* **65B**:51-82.

Ramakrishnan, P.S. (2000) Sacred mountain forests and biodiversity. In *M. F. Price and N. Butt (Eds.), Forests in Sustainable Mountain Development: A State of Knowledge Report for 2000*, Cabi Publishing, Wallingford, U.K.

Ramakrishnan, P. S. (2003) The Sacred Ganga river-based cultural landscape. *Museum no. 218*, **55**: 7-17.

Ramsar (2004) Wetlands and Spiritual Life. Available online, http://www.ramsar.org/cultural_heritage_e09.pdf [accessed October, 2004]

Rangeley, R. (1994) International River Basin Organizations in Sub-Saharan Africa. Technical Paper 250, World Bank, Washington, D.C.

Rao, K., and Geisler, C. (1990) The social consequences of protected areas development for resident populations. *Society and Natural Resources* **3**:19-32.

Redford, K. H. and Sanderson. S. E. (2000) Extracting Humans from Nature. *Conservation Biology* **14**:1362-1364.

- Reinharz, S. (1992) *Feminist methods in social research*. Oxford University Press, New York.
- Riccardi, A. and Rasmussen, J.B. (1999) Extinction rates of North American Freshwater Fauna. *Conservation Biology* **13**: 1220-1222.
- Richards, A. and Dickson, A. (1990) (Eds.) *The Origins of Religion: totem and taboo, Moses and monotheism and other works, Sigmund Freud*. The Penguin Freud Library Volume 13, Penguin Books, London, U.K.
- Riesman, P. (1998) *Freedom in Fulani social life; an introspective ethnography*. The University of Chicago Press, Chicago and London.
- Rietbergen, S., Bishop, J., and Mainka (2002) Ecosystem Conservation – A neglected tool for poverty reduction, International Institute for Environment and Development. Opinion paper for World Summit on Sustainable Development.
- Robson, E. (1999) Commentaries on Eno Okoko's article, 'Women and environmental change in the Niger Delta, Nigeria: Evidence from Ibeno'. *Gender, Place and Culture* **6**:379-400.
- Rørslett B. (1991) Principal determinants of aquatic macrophyte richness in northern European lakes. *Aquatic Botany*, **39**:173–193.
- Rowe, J. S. (1997) From reductionism to holism in ecology and deep ecology. *The Ecologist* **24**: 147-151.

Ryan, G. W. and Russell Bernard, H. (2003) Data Management and Analysis methods. In *K. N. Denzin and Y. S. Lincoln (eds.), Collecting and interpreting qualitative materials*. 2nd Edition, Sage Publications, Thousand Oaks, California, U.S.A.

Salafsky, N. and Wollenberg, E. (2000) Linking livelihoods and conservation: A conceptual framework and scale for assessing the integration of human needs and biodiversity. *World Development*, **28**: 1421-1438.

Salwasser, H. (1990) Sustainability as a conservation paradigm. *Conservation Biology* **4**:213-216.

Sangree, W. H. (1970) Tribal ritual, leadership, and the mortality rate in Irigwe, northern Nigeria. *Southwestern Journal of Anthropology* **26**:32-39.

Sarfo-Mensah, P. (2001) The spirituality of forests and conservation: The dynamics of change and sustainability of sacred groves in the transitional zone of Ghana. PhD thesis submitted to Natural Resource Institute (NRI), The University of Greenwich, UK.

Saro-Wiwa, K. (1992) *Genocide in Nigeria: The Ogoni tragedy*. Saros International. Port-Harcourt, Nigeria.

Sarumi, M. B., Ladipo, D. O., Denton, L., Olapade, E. O., Baduru, K. and Ughasoro, C. (1996) Nigeria: country report to the FAO International Technical Conference on Plant Genetic Resources. 17-23 June, 1996, FAO, Leipzig, Germany.

- Savage, J. (2000) Participative Observation: standing in the shoes of others? *Qualitative Health Research* **10**:324-339.
- Schoffeleers, J. M. (1978) *Guardians of the Land: Essays on Central African Territorial cults*. Mambo Press, Harare, Zimbabwe.
- Schwartz, B. (1999) Memory and the practice of commitment. In B. Glassner and R. Hertz (Eds.), *Qualitative sociology as everyday life*. Sage, Thousand Oaks, California.
- Schwartzman, S., Moreira, A. and Nepstad, D. (2000) Rethinking Tropical Forest Conservation: Perils in Parks. *Conservation Biology* **14**: 1351-1357.
- Scott, J.S. (1966) Report on the fisheries of the Niger Delta special area. Niger Delta Development Basin.
- Sen, A. (2000) Social exclusion: concept, application, and scrutiny. Social Development Papers No.1, Manila, Philippines, Office of Environment and Social Development, Asian Development Bank.
- Sessions, G. (1995) *Deep ecology for the 20th century*. Shambhala publications, Boston, Massachusetts.
- Shimang, G. N. (2002) Issues of fisheries development in Nigeria- Constraints and prospects. A paper presented at the Sustainable Fisheries Workshop, World Bank, Washington, D.C.

- Sieber, S. D. (1973) The integration of fieldwork and survey methods. *American Journal of Sociology* **73**:1335-1359.
- Sikoki, F. D. and Otobotekere, A. J. T. (1999) Fisheries. In *Alagoa, E.J. (Ed.) The Land and People of Bayelsa State: central Niger Delta*. Onyoma publications, Port Harcourt.
- Simpson, E. H. (1949) Measurement of diversity. *Nature* **163**:688.
- Smith, G. R. (1998) Are we leaving the community out of rural community sustainability? An examination of approaches to development and implementation of indicators of rural community sustainability and related public participation. *International Journal of Sustainable Development and World Ecology* **5**:82-98.
- Smith, J. K. (1983) Quantitative versus qualitative research: an attempt to clarify the issue. *Educational Researcher* **12**:6-13.
- Solesbury, W. (2003) Sustainable livelihoods: a case study of the evolution of DFID policy. ODI working paper No. 217, Overseas Development Institute, London.
- Southwood, T.R.E. (1978) *Ecological Methods, with special reference to the study of insect populations*. 2nd edition, Chapman and Hall, London.
- Southwood, T. R. E. and Henderson, P. A. (2000) *Ecological methods*. 3rd edition, Blackwell science, Oxford.

- Spinage, C. (1998) Social change and conservation misrepresentation in Africa. *Oryx* **32**:265-276.
- Spradley, J. P. (1979) *The Ethnographic Interviews*. Holt, Rinehart and Winston, New York.
- Squires, M .M., Lesack, L. F. W., and Huebert, D. (2002) The influence of water transparency on the distribution and abundance of macrophytes among lakes of the Mackenzie Delta, Western Canadian Arctic. *Freshwater Biology* **47**: 2123–2135.
- Statistical Package for Social Sciences (2007) SPSS 15.0 for windows. SPSS, Inc., Chicago, Illinois.
- Status of Tropical Forest Management, SFM (2005) Nigeria. International Tropical Timber Organization (ITTO), Pg.112-118.
- Steckler, A., McLeroy, K. R., Goodman, R. M., Bird, S. T. and McCormick, L. (1992) Toward integrating qualitative and quantitative methods: An introduction. *Health Education Quarterly* **19**:1-8.
- Stirrat, R. L. (2004) Yet another ‘magic bullet’: the case of social capital. *Aquatic Resources Culture and Development* **1**:25-33.
- Stocking, G. W. Jr. (1983) History of anthropology: Whence / Wither. In G. W. Stocking, Jr. (Ed.), *Observers observed: essays on ethnographic fieldwork*. University of Wisconsin Press, Madison.

Stocking, M. and Perkin, S. (1992) Conservation with development: An application of the concept in the Usambara Mountains, Tanzania. *Transactions, Institute of British Geographers NS* 17:337-349.

Strayer, D. (2001) Endangered freshwater invertebrates. *Encyclopaedia of Biodiversity* 2: 425-439.

Stuart, S. N., Adams, R. J. and Jenkins, M. D. (1990) Biodiversity in Sub-Saharan Africa and its Islands: conservation, management and sustainable Use. IUCN, Gland, Switzerland.

Suski, C. D. and Cooke, S. J. (2007) Conservation of aquatic resources through the use of freshwater protected areas: opportunities and challenges. *Biodiversity Conservation* 16:2015-2029.

Tabutin, D and Schoumaker, B. (2004) The demography of Sub-Saharan Africa from the 1950s to the 2000s: a survey of changes and a statistical assessment. *Population* 59: 455-555.

Tashakkori, A. and Teddlie, C. (1998) *Mixed Methodology: combining qualitative and quantitative approaches. Applied Social Research Methods Series, Vol. 46*, Sage Publications, Thousand Oaks, California.

Teddlie, C. and Tashakkori, A. (2003) Major issues and controversies in the use of mixed methods in the social and behavioural sciences. In *A. Tashakkori and C.*

- Teddlie (Eds.), *Handbook of mixed method in social and behavioural research*, Sage, Thousand Oaks, California.
- Tersbol, B. (2004) Ethics in medical anthropological field research on reproductive health and sexuality: Promoting a reciprocal research process. Global forum for Health Research, November, 2004, Mexico City.
- Thieme, M., Lehner, B., Abell, R., Hamilton, S.K., Kelldorfer, J., Powell, G., Rivero, J.C., (2007) Freshwater conservation planning in data-poor areas: an example from a remote Amazonian basin (Madre de Dios River, Peru and Bolivia). *Biological conservation* **135**:484–501.
- Thomas, R.L., Cadham, J.C., Hassan, S., Kawass, I., Khawlie, M., Shaban, A., and Walker, J. (2005) A physicochemical characterization of the waters of the El-Kabir River and major tributaries in Syria and Lebanon. *Lakes and Reservoirs: Research and Management* **10**:103-108
- Tilman, D. (2000) Causes, consequences and ethics of biodiversity. *Nature* **405**: 208-111.
- Tiwari, B. K., Barik, S. K. and Tripathi, R. S. (1998) Biodiversity, value, status and structures for conservation of sacred groves of Meghalaya. *Ecosystem Health* **4**:20-32.
- Trask, M. B., and Pisciotta, K. (2006) Sacred sites and the promotion of the environmental sustainability in a changing world', Talking points for the UNDP-

Sacred sites and the Environment from an indigenous perspective. A side event of the fifth session of the UN permanent forum on indigenous issues, 15-26, May, 2006, United Nations Headquarters.

Triantis, K. A., Vardinoyannis, K., Tsolaki, E. P., Botsaris, I., Lika, K., and Mylonas, M. (2006) Re-approaching the small island effect. *Journal of Biogeography* 33:914-923.

Truzzi, M. (1971) *Sociology: The Classic Statements*. Oxford University Press, New York.

Udonwa, N. E., Ekpo, M., Ekanem, I. A., Inem, V. A., and Etokidem, A. (2004) Oil doom and AIDS boom in the Niger Delta region of Nigeria. *Rural and Remote Health* 4:273.

Ulin, P., Waszak, C. and Pfannenschmidt, S. (1996) Integrating qualitative and quantitative research. Paper presented at Family Health International's Women's Studies Project Technical Advisory Group Annual Meeting, Raleigh, N.C.

UNDP (1998) Nigeria Human Development Report. UNDP, Lagos, Nigeria.

UNDP (2006a), Human Development Report 2006-Country Fact Sheets-Nigeria.

Available online,

<http://hdr.undp.org/hdr2006/statistics/countries/country_fact_sheets/cty_fs_NGA.html> [accessed March, 2007].

UNDP (2006b) Niger Delta Human Development Report. UNDP, Abuja, Nigeria.

UNDP (2007) Biodiversity for Development. Available online, <<http://www.UNDP.org/biodiversity/Biodiversityfordevelopment>> [accessed March, 2007].

UNESCO (1972) *Convention concerning the protection of world cultural and natural heritage*. UNESCO, Paris.

UNESCO (2005) Osun-Osogbo Sacred grove, Osogbo, Nigeria. UNESCO World Heritage Site, 2005. Available online, <<http://www.whc.unesco.org/en/list/1118>>.

United Nations (2003) "Agenda21". Available online, <<http://www.un.org/esa/sustdev/documents/agenda21/index>> [accessed October, 2004].

Warburton, H. and Martin, A. (1999) Local People's Knowledge: Its Contribution to Natural Resource Research and Development. In *I. F. Grant and C. Sear (Eds.), Decision tools for sustainable development*, Department for International development and Natural Resources Institute, Chatham.

Warden-Fernandez, J. (2002) Indigenous communities and mineral development. International Institute for Environment and Development and World Business Council for Sustainable Development.

- Warren, D. M. (1991) Using indigenous knowledge in agricultural development. *World Bank Discussion Papers*, the World Bank, Washington, D.C.
- Warren, D. M. (1996) Reactions to Agrawal. *Indigenous Knowledge and Development Monitor* 4: 13.
- Warren, M (1992) Indigenous knowledge, biodiversity conservation and development. Keynote address at the International Conference on Conservation of Biodiversity in Africa: local initiatives and institutional roles, Nairobi, Kenya, 30 August – 3 September 1992.
- Welcomme R.L. (1985) River fisheries. FAO Fisheries Technical Paper. 262, 330p.
- Wells, M. and Brandon, K. (1992) *People and parks: linking protected area management with local communities*. World Bank, World Wildlife Fund and U.S. Agency for International Development, Washington, D.C.
- Wells, M., Brandon, K. and Hannah, L. (1992) *People and parks: linking protected area management with local communities*. The World Bank, World Wildlife Fund and U.S. Agency for International Development, Washington, D.C.
- Were, J. L. R. (1997) Ecology and conservation of the Niger Delta red Colobus. In *Niger Delta Wetlands Centre, final report: plan for a protected area system in the Niger Delta (June, 1998)*, Environmental Management Project, credit No. 2353-UNI, submitted to Federal Environment Protection Agency.

Were, J.L.R., (1991) A survey of the Taylor creek forest area, Rivers state, Nigeria, Report to the Shell Petroleum Development Company of Nigeria, LTD and the Nigerian Conservation Foundation.

Were, J.L.R., (2001) Terrestrial Eco-regions - Niger Delta Swamp Forests, (AT0122) *a peer review process document*. Available online, <http://www.worldwildlife.org/wildworld/profiles/terrestrial/at/at0122_full.html> [accessed October, 2004].

Werner, O. and Schoepfle, G. M. (1987) *Systematic fieldwork: Foundations of ethnography and interviewing, Vol.1*. Sage, Newbury Park, California.

Western, D. (1984) Amboseli National Park: Human values and the conservation of the savanna ecosystem. In *J. A. McNeely and K. R. Miller (Eds.), National parks, conservation and development*, Smithsonian Institution Press, Washington, D.C.

Western, D. (2000) Conservation in a human dominated world. *Issues in Science and Technology*. Available online, <<http://www.bob.nap.edu/issues/16.3/western.htm>>.

Western, D. and Wright, M. (1994) *Natural connections: Perspectives in community-based conservation*. Island press, Washington, D.C.

Weston, K. (1998) *Long slow burn: sexuality and social science*. Routledge, New York.

White, L. (1962) *Medieval Technology and Social Change*. Clarendon Press, Oxford.

- Whittaker, R. J., Araújo, M. B., Jepson, P., Ladle, R. J., Watson, J. E. M. and Willis, K. J. (2005) Conservation Biogeography: assessment and prospect. *Diversity and Distributions* **11**:3-23.
- Willers, B. (1994) Sustainable Development: a new world deception. *Conservation Biology* **8**:1146-1148.
- Williams, P. (1986) *Sociological Theory: explanation, paradigm and ideology*. Mayfield Publishing Company, Palo Alto, California.
- Wilshusen, P. R., Brechin, S. R., Fortwangler, C. L. and West, P. C. (2002) Reinventing a square wheel: critique of a resurgent protection paradigm in international biodiversity conservation. *Society and Natural Resources* **15**:17-40.
- Wolff, B., Knodell, J. and Sittitrai, W. (1993) Focus groups and surveys as complementary research methods, a case example. In *Morgan, D. L. (Ed.), Successful focus groups, advancing the art*, Sage Publications, Newbury Park, California.
- Worika, I. L. (2004) Environmental and related laws in Nigeria: an overview. In *A. U. Ezealor and O. A. Akinsola (Ed.), sustainable management of the Niger Delta renewable resources*, Nigerian Conservation Foundation, Lagos Nigeria.
- World Bank, (1996) *The World Bank participation sourcebook*. World Bank, Washington, D. C.

World Commission on Environment and Development (1987) Our common future. Oxford University Press, Oxford.

World Wide Fund for Nature, WWF, (1993) Conservation with people. WWF International, Gland, Switzerland.

World Wide Fund for Nature, WWF, (2006) Living Planet report. UNEP, WCMC, and RP.

Yung, L. (2000) Meaningful Community Involvement in Protected Area Issues: A Dialogue Session. In *S. F. McCool, D. N. Cole, W. T. Borrie and J. O'Loughlin (compilers) (2000), Wilderness science in a time of change conference Volume 2: Wilderness within the context of larger systems; 1999 May 23-27; Missoula, MT. Proceedings RMRS-P-15-Vol-2. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.*

APPENDICES

APPENDIX 1

TRANSCRIPTS OF THE RECONNAISSANCE SURVEY

CASE 1

Contact Details Form:

Field Phase	1
Site	Akumoni-Okordia
Type of Qualitative Data	Informal Interview
Contact Name	Elder Jonah Okah
Dates	April 22, 2005 and May 12, 2005

Amongst the group of elders met in the camp, elder Jonah Okah was the eldest and was the leader of the fishing camp. The interview script below lists the questions I asked him. The interview was conducted within the elder's arena, as described in the notes below.

Interview with Elder Jonah Okah

Q: Who owns this lake [Lake Samei]?

The owner of the lake is the Opute family who are from Akumoni-Okordia of the Yenagoa local government area in Bayelsa state.

Q: How was this lake found?

A hunter saw this lake years ago. This lake is divided into two, the mother lake and the child lake (The child lake fishing is usually the first done before the mother lake). One Bake and Akanga saw the second part of the lake, called the child lake. (From his explanation the source/beginning of the lake is termed the "mother lake", while the part of the lake which meanders northwards through a narrow strip of forest is called the child lake. Also, the child lake is sometimes referred to as the son lake). In the olden days it was general

Q: What was general?

That is we allowed everyone to join in fishing from the lake and the fishing material used then was called "Ogbudu". At a certain time, one Ogba man was invited to the lake; he was the one who introduced the crossing and throwing of net. Fishing is conducted every four years, fishing was jointly done between the Okordia and Ogba

people but we later withdrew. About 1959, the family who are the owners of the lake introduced a new fishing method. This involved using a trap woven from cane rope to gather the fish together. The whole family usually fish together, after 1959 we fished next in 1962. In some years we sell out the lake for other people to fish while in some other years the family is divided into two groups for the fishing. So for this year it is the turn of group B and I am the head of this group.

Q: What do you as a group do to fish in this lake?

We have to observe certain things, example is killing a goat. But first to start killing fish from the lake we must kill goat. We also have our shrine set up as you can see in front of the lake and the priest makes sure he offers sacrifice to the god of the water to bless our fishing. The demand of the god includes alligator pepper, groundnut, biscuit, cola nut, coconut, fanta, gin, sugar and a fowl tied at the centre of the lake. After finishing fishing, we usually sacrifice one life cow for thanksgiving to the god.

Q: What of entrance to the lake, do you have any laws?

No woman is allowed to bathe in the lake, but she can fetch the water and come into the camp to bathe. If she defaults she must present one cock with a bottle of schnapps gin. No fighting is allowed amongst members of the fishing group, also no stealing. No snails come into the camp. Sleeping with your wife is not allowed; also women are not allowed to wash their clothes in the lake. We also do not use bamboo sticks to pull our canoe in the lake. All these laws were passed on to us from our forefathers.

Q: What of animals / plants within the lake or the area of the lake, do you protect any?

We are allowed to kill crocodiles and alligators. During flood season Manatee comes into the lake. We have a lot of animals in the forest here. They include different types of monkeys. We use to see gorilla but no more. Elephants, antelopes, leopard, buffaloes, long python with torchlight on the head-I have seen one crossing the lake (**description of this species of snake fits that of the royal python**).

Q: What would you say is your major occupation as a people?

Major occupation is fishing and we also farm, planting plantain, cassava and yam. During flood seasons members of the family can come into the forest and fish.

Q: What of oil companies, government officials or outside organisations, do you have contacts with them?

Normally before any oil company carries out seismic activities it contacts the family before crossing line, however we have a case with a company called "IDSL" for trespassing our lake.

Q: What of your neighbours, do you have any boundary disputes?

No boundary disputes, no government involvement with us.

Q: What resources do you get from the lake and its surrounding forest apart from fish?

Ogbono (Bush mangoes), mahogany and Abura trees.

Q: What if the government wants to assist you in managing this lake by taking charge, would you agree?

No amount of offer of cash would be accepted from the government or any person in exchange for our lake. It is our inheritance, it is not negotiable.

Q: Who are those that come to buy your fish?

Women and men from everywhere, mostly come from Warri, Ughelli, Yenagoa and Port Harcourt (all major towns in close proximity to area).

Q: What is the average price of your fish?

Price of fish is determined by the type of fish it is, its quantity and quality. For instance when we fished the child/son lake, altogether we realised four million six hundred and forty thousand naira [equivalent in GBP = 16, 0002.56, where £1 ~ N250].

Q: How do you know you made this amount of money?

Because we record what we sell daily in the book (showing me the book of records)

Q: What affects quantity of fish?

Serious flooding would make the fish escape from the traps, so flooding determines how much fish we catch.

Observations

The field Team (Innocent Omons, Mrs Omons, Dimie Otobotekere, Okpo Zigi, Pasiya Otufu, Benson Elayo and Eno Anwana) left Igboghene-Yenagoa (GPS: N 05^o02.020', E 006^o23.945' and Elevation 12.19 metres) at about 8.50a.m on 22/04/2005. Lake Samei is said to be accessible through the East-west motorway, which is the motorway linking Bayelsa to Delta state. We rode through the motorway up to a point immediately after the Zarama Bridge, towards Ughelli town and thereafter trekked through a forest path to the lake. Lake Samei, I gathered from secondary information, is a lake fished periodically and it is owned by an individual

family within the Okordia-Zarama community. The terrain towards the lake is full of levees and the footpath was dry at this time of the year (April 2005). But this path way could get very slippery and treacherous during the rainy season, from its outlook. It took us about an hour and half to trek through the forest to the lake (from the point the car that we travelled in was parked). I could not take satellite readings throughout the trek through the forest, because of the forest canopy. From my observations, the forest vegetation show signs of secondary re-growth, particularly towards the transect foot path (large areas have been converted into farmlands). It also appears that rattan plants are harvested from this part of the forest (I saw several bundles tied up along the footpath). Worst, is the indiscriminate logging done within the perimeter of the lake. Along the trek towards the lake, we met a young boy carrying foodstuff (it was good we did, since he eventually became an informant and also helped paddle the canoe we took across the lake). The canoe ride was shaky and we were warned (I and Omon's wife, not to fall into the water). This was interesting information. When I probed further, the canoe boy narrated that women were not allowed inside the water (whether accidentally or on purpose). When asked why, in his own words he replied, 'it will affect the sacredness of the lake'. So what happens if a woman is found in the lake? He answered, 'she would pay a fine'. How much would she pay? Five thousand Naira (N5, 000) ummh! We eventually got across to the other side of the lake, which had several shift thatch structures along its bank (GPS: N 05^o08.737', E 006^o23.556', and Elevation 13.41 metres). We were taken straight to a large open space, towards the centre of the camp. This area, I later understood acted as a muster point for the camp. The thatch tents at the fringe of the muster point housed the elders of the camp. The camp had a mixed population of people, women, men, children and even babies were in the camp. From visual estimation, the population of the camp is probably about 75. We were told we had to wait for the youths to return from the day's activities before starting the meeting. The youths (seen from where I stood) were setting traps in the water. I thought probably this activity was for the fishing festival, but later on learnt that the traps were for the daily meals of the camp group.

Meeting with the Group: Introductions to the team were made by Innocent to the group of elders and campers. The eldest man in their midst (Mr Jonah Okah) chaired this seemly august occasion. It is customary in the Niger Delta to welcome and entertain visitors with drinks and cola nuts. In some places, money is offered to the

guest as part of the goodwill of the host. In the spirit of reciprocity, the visitor likewise gives drinks and money to the host in appreciation of his kindness. This ceremony is well ingrained in the Delta and it is only after this ceremony that the visitor can state his/her mission to the community. The team was familiar with this “communication” process and to the effect we had come armed with a bottle of alcoholic beverage for the elders. Innocent stated our mission to the gathered audience. Elder Jonah I noticed answered most of the questions which were directed at the community. He spoke freely and showed a lot of enthusiasm on hearing our mission. Apparently elder Jonah was no stranger to researchers, he attested to this by recounting a talk he had in 1962 with students of the “Teachers Training College (TTC) in Okordia-Zarama under the principal named Abumage. He on this occasion had the privilege of talking to the students on the history of the lake. His memory of this event is commendable. Also, from the way he spoke it showed he had some form of formal education, I decided to have a personal interview with him. The youths showed a lot of interest in knowing what our mission to the camp was about. From their responses and perhaps from past experiences within the Niger Delta region, it appears the youths have an important role in the discussion of natural resources. The elders, in most communities visited always sent for representatives of the youth group to be in attendance of meetings held with visitors, particularly meetings where natural resources are mentioned. In one of the tents I noticed a generator. From my inquiries, I understand, youths watched films and played music at nights and so needed the generator. I suspected that the generator is a modern introduction to the camp. One youth I spoke with narrated that the camp gets boring without music and films to watch at night.

I observed one of the ceremonies done during the fishing festival, after the interview held with elder Jonah. Perhaps this was done for my benefit, but the timing seemed questionable. However, I was informed by the elders, particularly the priest (who was happy for me to take his picture beside the shrine) that the *Ogele* rite precedes the fishing activities in either of the two lakes (that is the mother or child lake).

The *Ogele*, Innocent (my assistant) commented, is usually done to herald a great event. The exemplar he gave is the burial of a great person. As I watched the sequence of events, a local dynamite was ignited close to the bank (it scared me when it exploded). The explosion led to a frenzied display of dancing and drum beats. The men did the drumming, while women danced around the camp waving cut

branches from nearby trees (it really was a celebration of some sort). In addition to the land display was the water display carried out by the youths. Two dug-out canoes were draped with fresh palm frond which the youths used to row across the length of the lake, dancing and pouring alcohol into the water. I learnt from the elders that the observance of this pre-requisite rite guaranteed a bountiful harvest. When I asked about the role of the women I saw in the lake, I learnt they were involved in processing the fish brought ashore by the men and also took active parts in the sales. In essence, fishing in this lake was done strictly by men. The lake is a fresh water lake and species I noted are the common fresh water species seen in the region as noted below (Table 1.1). The main source of water for the lake appears to be the River Niger. The men I met as I checked the fish stock within the camp were quite knowledgeable on fish species. They readily offered the local names of the fish species and were quick to point out which fish tasted delicious in soups and sauces.

Table 1.1: List of Fishes Seen in Lake Samei

S/N	Ijo Names	Biological Name
1	Ofor/Afor	<i>Citharinus citharus</i>
2	Okabor	<i>Alestes</i> sp.
3	Ofin/Kukaye	<i>Tilapia</i> sp.

Contact Summary Form

Salient Points:

1. From further questions asked for clarification on access to the lake, I gathered that, though the lake is owned by a family, other people are allowed access to the resource. The family can “sell out” the lake according to elder Okah for a period. Selling out is for profit and the amount to be charged is determined by the heads of the different households which make up the Opute family (Fis-faml; Fish-sell; Own-fam).
2. There has been a progression in the fishing tools used for fishing; from Ogbudu to fishing traps (Fit-trap).
3. This group of fishers collectively sell the fish caught during the seasonal fishing, make records of inflow of income generated and at the end of sales divide overall earnings equally amongst the various households that make

up the Opute family. Hunting around the lake site is evident as a group of tortoises were caught by one of the fishermen (Son-famg: Fes-sal).

4. Some key pointers to what sacred lake mean to this community: rites to gods, sacrifice (Sac-rit: Sac-saf; Sac-priest).

Second Field Visit to Akumoni-Okordia (May 12, 2005)

Observations

This is a follow-up visit to the first field visit. The elders had promised sending for the team to witness the fishing festival of the mother lake. Since I had not heard from them, I decided it was an appropriate time to visit the camp. Also, the apprehension grew on learning from a fishmonger in Biseni, that the fishing expedition in Lake Samei had been concluded (I found that strange). However, my source claims that the fishermen had a similar experience to that of the fishermen at Lake Esiribi (heavy rainfall causing severe flooding), which meant their fishing efforts had been disrupted. I indeed confirmed my informant's story to be true as we met the camp empty. The group of campers we met narrated their experience to us. The flooding they commented led to a low catch as a result the expedition had to be cut short. A certain man we met was particularly unhappy about the situation. According to the story he told me, he had given three thousand naira (N3, 000) to one of the fishermen to purchase fish for him. He neither had seen his consignment or the fisherman, which necessitated his coming in search of the fisherman. But, like the team, he found an empty camp.

CASE 2

Contact Details Form:

Field Phase	1
Site	Sabagreia
Type of Qualitative Data	Informal Interview
Contact Name	Chief Ogrigade Ebienfa
Dates	April 28, 2005 and May 20, 2005

Sabagreia village from secondary data has a popular lake, known as the Efi Lake and I was told the lake was a family-owned lake. The Lake I understand is popular with the government, which in the past has sent missions to document the lake's history (unfortunately, these documents either are not made public or perhaps do not exist). When we got to the town we were headed for the house of the village head, but had to detour to Chief Ebienfa's house (as a referral from our local informant) because the village head was in Yenagoa.

Interview with Chief Ogrigade Ebienfa

Q: Why is the ownership of Lake Efi attributed to a particular family?

The Kalama family are the first settlers in the village. They (the Kalama family) are the owner of the lake and it is this family which produces the paramount ruler.

Q: How do you fish in this lake?

The last festival was in 1995.

Mr Agbozu (a younger member of the family adds: They should have done the festival this year (2005), but because of the construction of the road linking Sabagreia to Kaiama and Polako, we have to postpone the fishing festival till construction work is finished).

Q: Why is this lake different from the other lakes within your community?

This lake is sacred (ummh), we do not enter into the lake anyhow. Before we do certain sacrifices must be done by the priest in order for the lake to give us what we want from it. Certain things are forbidden around the lake

Q: What are these things?

No sexual intercourse is allowed in the bush. Also the demand of the shrine which services the lake is done yearly.

Q: What are the allowed methods of fishing?

Floating nets only, but outside the fishing season members of the community are allowed to catch a fish or two, not for commercial purposes but for family feeding. In such an occasion they are permitted to use a spear, hook and not nets to catch the fish for feeding their family.

Q: Who are those involved in the fishing festival?

Everyone, we announce to our neighbours and beyond when the date for fishing is approaching. At that particular time you would see people from all the communities surrounding Sabagreia, even up to Delta coming into the lake.

Q: What of all the restrictions mentioned at this time of fishing?

It is an open affair, no restriction, even you can fish (referring to me). What we do is charge per canoe for those interested in fishing. They know our rules and they stick to it. Also during the fishing period we all go through the creek called Efiororo, leading from Polako to the lake.

Q: Are women allowed into the lake?

Yes, they can come to the lake. We drink from the lake so our women go to fetch water from the lake.

Q: What of plant or animal in the lake or maybe in the surrounding forest, do you protect any?

No, we can kill crocodile at anytime and no single plant is inside that lake it is a clear lake

Q: Not even water hyacinth?

Not one water hyacinth, if they come there after sometime wind comes and blows it away. The lake is clean and we drink from it.

Q: What would you say is your major occupation?

Fishing and also farming, farming mostly for feeding family.

Q: What kind of crops do you grow?

Banga (Palm Oil trees), cassava, cocoyam, plantain (From my observation banga (Palm nuts) is not cultivated but rather harvested from the surrounding forest).

Q: What is the amount charged per canoe during the festival?

The last festival we charged about N1, 000 and we realised about N50, 000

Q: What do you do with this money?

It is for entertainment

Q: What of co-operative for the farmers, do you have any?

No

Q: Who saw or discovered the lake

His name was Okereke and he was a hunter. The priest that has been chosen this year is a young man who is a descendant of Okereke. It was because we had some problems internally, that is why we have not done the festival (this appears to be in conflict with the earlier narrative by Mr. Agbozu).

Q: What kinds of animals are common within the lake area?

Different species of monkeys, duiker, porcupine, cane rat, antelope. During flood season we see Red River hog, the antelope (Sitatunga) and manatee.

Observations

The journey to Sabagreia (GPS: N 05⁰02.099', E 006⁰14.655') was hassle-free and straight forward. The community is located on the Southwest bank of Polako (GPS: N 05⁰01.803', E 006⁰16.839') on the River Nun (the town where we hired a motor boat from). The Nun River is one of the major rivers in Bayelsa State. On arrival we asked for the paramount ruler but we were told he (Chief Bokumo Orukari) spent most of his time in Port Harcourt. We were then taken to an elder's house, a retiree of the Nigerian Army, who welcomed the team. Chief Ogrigade Ebiefa, the ex-army man, did not need an interpreter for translation; he could communicate using the English language, occasionally switching to Pidgin English (which seems to be the acceptable *lingua franca* of the Deltas). On stating our mission he asked the young man who followed the team (Mr. Ikuromo Agbozu) to invite another chief of the community to the meeting. On arrival of the invited chief (Burubai Asabase), pleasantries and exchanges of drinks were done and we had to restate our mission to the group. Interviews on the Efi Lake were conducted with Chief Ogrigade Ebiefa, with Ikuromo Agbozu filling in when the chief left out information, he (Mr. Ikuromo) thought was necessary. After the interview, we were given permission by the chief to survey the lake. Mr. Agbozu led the team to the lake. My first impression of the lake was the absence of water hyacinth as told by Chief Ebiefa. Mr. Agbozu also told the team that the cause of the blockage of the creek adjacent to the lake is due to the bridge that had been constructed up stream. It is interesting to note that the source of water feeding the lake contains a considerable population of water hyacinth, while the lake itself has no record of this plant. Unlike Lake Samei, Lake Efi (N 05⁰02.344', E 006⁰15.025' and Elevation 11.58 metres) is located close to the village. It took about five minutes to walk to the lake from Chief Ebiefa's house. The side of the lake close to the village shows highly degraded vegetation. Vegetation is composed of food crops, notably cassava plants while vegetation on the

other side of the lake is riparian. The lake seems rich with fish, intermittently we could see fishes dart from side to side. Also with the aid of a pair of binoculars we saw three crocodiles sunning themselves, with their noses barely visible above the water surface while the rest of their bodies were submerged in the water. Firewood, Mr. Agbozu comments is picked regularly from the bush around the lake. He also recounts that the crocodiles do not cause harm, even when people swim in the lake. The interview with Chief Ebienfa went smoothly, but the contradicting information on the reasons for the postponement of the fishing festival bothered me a little. Chief Ebienfa said that the festival was postponed based on internal problems while Mr. Agbozu maintains that the cause was an attribution of ongoing road construction. It appears someone is trying to hide something here. Chief Ebienfa's narrative has an element of truth (I probably would know as I interact with other people within the community). However, since the above information is coming from an elder person, Chief Ebienfa, I would presume this to be more likely the case for the postponement of the fishing festival, since it is the chief priest who fixes the date for the festival. The other thing I noticed is that Sabagreia is close to Yenagoa (45minutes) and most of the youths appear to be out in the city. Sabagreia town appears to be a changing town and with the construction of the NDDC road, might become more cosmopolitan. Within the community I counted at least two big shops; a depot for Coca-Cola products and a multi-commodity shop (a rare feature in riverine towns within this area). The building pattern within the community consisted of blockhouses alongside traditional mud houses. The newly constructed road is close to the lake and one wonders what changes might occur in the system by the road access. Road openings are known to bring an influx of visitors and immigrants that might contribute to conflicts in the use of resources, as different people with varying views settle in the community. Follow-up questions would be to have a session with the youths (to question their perception of the existing traditional beliefs and practices in the use of this wetland resource base). This could determine the strength of local management of this resource within the current dispensation. If for instance they (the youths) do not believe in the 'sacredness' of this resource, then there would likely be an opening for other users, trade-offs could easily be effected. For instance the youths could sell out to government or external interested parties in exchange for something perceived to be more beneficial to the community. However these are perceptions, more probing questions and a follow-up interview with identified opinion youth leaders might give more insights.

Contact Summary Form

Salient Points:

1. Charge for Fishing festival (Fc-fam)
2. Tools used for fishing (FT-net)
3. Ownership of lake and people allowed to fish (Own-fam, Fish-evry)
4. Sacred lake meaning (Bel-rites, Bel-sac, Bel-prit)
5. Animal and Plant Protection (Prot-nil)
6. Conflict (Con-int)

Second Field Visit to Sabagreia (May 20, 2005)

Observation

Team met with chief Ebienfa again, who appeared to be more at home with us, first thing he showed to us was a burnt fishing net in front of his compound. The burnt net, he said was seized or rather taken off the lake. Presumably a poacher had stolen into the lake at night to lay traps for some quick sales, it was the youths he said who patrol the lake at night who noticed the net and brought it in; poaching, chief Ebienfa said, is a regular occurrence on the lake.

Q: What route do they take?

They come in with canoes from the Polako creek linking the lake

Q: How long does the fishing festival take?

Three days and during these days you would not experience mosquitoes and soldier ants. Opokuma and Gbarain clans are not allowed to fish during the fishing season.

Q: Why?

Sometime ago somebody died and the corpse was found in the lake, due to this they are barred from fishing in the lake.

The current priest to the lake is a very young boy

Q: How old is he?

Less than 30years, his name is John Okoro.

After the interview we were led by our guide to the lake, also to visit the village's crocodile hunter. The crocodile hunter, Forokarah Obed, who says he traps crocodile for sales, had several pictures of the crocodiles he had hunted in the past. Forokarah, who is a civil servant and a fisherman, showed us two skulls of crocodiles that he had killed in the past, which were measured (see table 1.2 below).

Table 1.2 Crocodile Skeleton Measurements

Specimen	Length (cm)	Width, tail end (cm)	Width, tip of nose (cm)
1	51	24	9.3
2	33	21	6.3

Observations

Chief Ebienfa showed a lot of concern on the issue of poaching and wanted help from any organisation or persons and thought we could help speak to interested parties to come to their aid. One interesting thing he said was that he had heard from a source that the Efiks (he knew from earlier introductions that I was from that part of the country) were known for juju medicine. This juju medicine is reputedly used in trapping trespassers or poachers, he wondered if I could get such medicine for the community). It brings to mind questions on changes in people's attitude towards these sacred lakes. The question is what is causing the change, could it be disregard for cultural practises or are people simply desperate to get food and probably income? Regulating access to these areas, which have creeks, roads and various points of entry, might indeed be a question to be addressed. The practical incidents reported today show some limitations of these traditional institutions. The question is, are these traditional institutions capable of patrolling open places such as their lake effectively?

CASE 3

Contact Details Form:

Field Phase	1
Site	Biseni
Type of Qualitative Data	Informal Interview
Contact Name	Chief Levi Ovuro
Dates	April 29, 2005 and May 11, 2005

From secondary data obtained from Living Earth Nigeria Foundation, and from Dr. Otobotekere, the Biseni people are known within the region for their many sacred lakes. Living Earth Foundation had for three years executed a capacity building project in the area. Their project included training community members in alternative income generating schemes and in addition micro credit provisions/facilities had also been provided to some members of this community. My initial contact was Chief Festus Oputa who later on referred me to the owners of Esiribi Lake. The interview with Chief Ovuro were conducted at the fishing camp.

Interview with Chief Levi Ovuro

Q: Chief please could you kindly tell us the history of this lake and why this lake is special to you?

This water is special to us as a family because of the instructions our forefathers gave us concerning this lake. This lake was discovered by our forefathers as far back as during the Benin massacre. The person that saw this lake first was called Erewari. He was hunting when he came and saw the lake. When he slept, the god inside the water spoke to him in the dream and told him certain things, which he then told his children.

Q: What are these things?

Number 1, is that crocodiles inside the lake guard the lake and as such can not be killed. If we see a crocodile dead in the lake, we must bury it like we bury a human being.

Q: So you don't eat crocodile?

We can eat outside this lake, but not when it is killed from here. But since we cannot know where the crocodile brought into our village comes from, we are very careful

to eating crocodile. Also we are not allowed to bring the wife that we paid bride price on into the lake, but we can bring girlfriend or other women.

Q: What do you do with your catch since your wives are not here?

The ones we want to give our wives to sell or take home, we can give to our children or sometimes they (the wives) stay away from the lake (on the way to the lake I had seen some camp along the way, this gives an insight to the persons living in those camps).

Q: Who takes care of cooking and processing the fish?

Our daughters can come, so sometimes they dry the fish and sometimes we men do the drying (as observed drying is over pieces of sticks constructed across open fireplace; which is locally referred to as an altar. It seems this form of drying or processing of raw fish is common throughout the study area).

Q: What is your main occupation?

Mainly fishing and sometimes farming.

Q: Who do you sell the fish to?

Women come from Isoko land, Port Harcourt, Yenagoa and Mbiama. These people usually know when the festival time comes.

Q: How much do you make from selling these fish?

Last fishing season we made about four million naira.

Q: How do you organise the fishing?

The fishing is done in groups. The whole family is divided into three groups. Group A is to do the fishing this year and within this group are 32 persons.

Q: Do you have a fishing group co-operative?

No, we don't have co-operative. When we finish the fishing we share the money to the families.

Q: What type of tool do you use in fishing?

Only net fishing. We lay traps in the middle that is after we gather the fish into the circle (as observed, circular range is towards a part of the lake. A long raffia trap is laid across the breath of the lake, measuring according to Festus about 60 by 21 feet. Big baskets are used for harvesting of fish from the circular trap area).

Q: What other laws govern this lake?

First before the fishing period, the priest of the water does certain sacrifice for us to have harvest, including stopping the rain during that period. You can't sleep with a woman at the lake, if you do, the woman would become barren or become very sick. Women no fit enter water, can't bath in the water.

Q: What happens if these laws are disobeyed?

You must appease the god of the water by doing some sacrifice. The demand of the sacrifice depends on the dictate of the shrine. Sometimes you can present a goat or a cow or sometimes gin.

Q: Have you had any problem with any community or organisation on the use of this lake?

No problem with any community, because people know this is a sacred lake. Any person found in this lake that is not from our community would be treated as a thief. The problem I would say we have is because of the road Agip Oil Company has constructed which causes over flooding especially in February.

Q: Are they aware of this problem?

Yes, we have brought it to their notice.

Q: What kind of animals do you have in this area?

*Elephants do cross this lake, in fact one was killed sometime last year by a hunter, they cross the end of the lake. We used to see chimpanzees before, say about ten years ago. We have killed Antelope (**description, fits Sibatunga**) recently. We also have plenty monkeys, we have monitor lizards (**one was noticed feeding on fish entrails near the camp**), "Iguanas" and bushbuck. We also are forbidden to kill monitor lizards and "Iguanas" (**note: "Iguanas" do not occur in Africa, but the word is used there to denote what are presumably monitor lizards Varanus niloticus. Henceforth, the word "Iguana" as used by the Biseni and other people within the region will be reported to describe their responses whilst recognising that the term "Iguana" is technically incorrect**).*

Q: How did you learn fishing?

Our father thought us. Also when they go fishing they take us, so we watch as they do it and from there we learn.

Q: Do you protect any plants in this lake?

No

Q: What other things apart from fish do you get from the lake, including the surrounding?

*Cane rope (rattan) which we sell to people. Also we pick firewood from the forest (**logging, from my observation around the perimeter of the lake is minimal. This perhaps is due to the lake's accessibility; the terrain contains long tracks of rattan plants that form thickets in several places**).*

Q: Do other people fish in this lake?

No, it is strictly for the family. No other people are allowed to fish in this water.

Q: What if the government wants to assist you in managing this lake by taking charge, would you agree?

No

Q: Have you seen the type of crocodile in this lake?

*Yes, there are two types; the pointed mouth with long body and short mouth with short body (**Probably Crocodilus niloticus and Osteolaemus tetraspis**).*

Q: Do you have any other lakes apart from this one?

Yes, we have other lakes apart from these ones. In fact we have six more, but out of all of them, Esiribi is the greatest.

Q: How do you use them?

*Eremini (was fished this year (2005) in March); women are allowed in this one. Anyu, Bonwein (in this lake we mainly use traps to fish in this lake), Iwoh, Bierizuno and Esiribitaminukuroye (balable lake) (**balable here means, the water in the lake can be extracted using a pumping machine and then the fish left at the bottom can either be hand picked or scooped with a basket**). These seven lakes (including Esiribi) are usually not fished at the same time we rotate the fishing period (**this could well be a management strategy to ensure fish is available all year round; more probing questions along this line**).*

Q: What type of fish do you normally catch from this lake?

All kind of fish we (dey) catch from this water. The one which is more, is afor, others include Isechia, Igida, Ariri and Okpo.

Observations

The Biseni clan is divided into four villages; Egbebiri, Tein, Tuburu and Akpede. The Biseni area is renowned for lakes, called by the people sacred lakes, particularly the Esiribi Lake. Biseni clan is accessible by road through Mbiama town on the East-West road. Notably on this journey are the surface pipes seen on opposite sides of the road, particularly from Akinima to Biseni clan (the Agip Oil Company has a major flow station in Biseni-this explains the pipelines). One benefit of the presence of the oil company is the provision of electricity to the clan. We met my contact, Chief Festus Oputa, who acted as field guide/translator between our team and the community members. Festus gave some useful background information on the areas and confirmed the existence of Esiribi Lakes. Festus's presence aided our access to the elders of the community, particularly the owners of Esiribi (interestingly Festus

descends from the Erewaris). However, he doesn't take part in the fishing activities (when I asked why? says fishing is not as lucrative for him as his plantain farming. He has over a thousand plantain suckers and sells his produce at Mbiama every Tuesday). We left Festus Oputa's house on motor bikes at 10:40 a.m. and arrived at the edge of the forest at 11:05a.m. From the edge of the forest to the lake took us about 58minutes, we arrived Esiribi main lake site (where the fishing camp is situated) at 12:03 p.m. It was difficult taking satellite readings within the forest canopy. I needed a clear sky to track positions of satellites to make meaningful GPS readings. However, readings were taken of our starting point (GPS: N 05°14.693', E 006°32.113', Elevation 12.80 metres) and at Lake Esiribi (GPS: N 05°17.310', E 006°31.099', Elevation 18.59 metres). The visit to the lake roused lots of attention (since, we didn't give prior information). Also, I guess my presence (a lone woman in the company of three men) caused the stare and questioning looks I received as we greeted the people we met at the camp. However, we were warmly welcomed by the elders we met at the camp. Interestingly, as Festus later on narrated during our meeting, the Nigerian Conservation Foundation had sent some researchers to the camp for some sort of studies. Professor Oates (a primatologist of the Wildlife Conservation Society) had camped at the lake for his studies on primates of the area. All this I presumed was said to give me some type of reassurance of acceptance and willingness of the group to cooperate with me in my research (good signals, similar to the narrative of elder Okah of Akumoni-Zarama). After exchanging pleasantries and drinks we proceeded to interview the elders at the muster point. A few metres from the open accommodation, I noticed a couple of young men clearing weed from the surface of the water. Inquiring of the activity I was told that this had to be done (the clearing of the weed) before the onset of the fishing festival, scheduled for the 11th and 12th of May, 2005. The entire camp had to clear the surface of the lake of water hyacinth and some unknown weed (later on identified as *Scirpus cubensis* Poeppig & Knuth [family CYPERACEAE]). The unknown weed I'm told was first noticed January this year. These weeds (water hyacinth and *Scirpus*) are said to hinder boat navigation and do not allow the people to lay traps for the fishing. Therefore to minimise loss in fish yield they have to clear these weeds before fishing. The elders told that they have been in camp since the 24th of February and would remain in camp till June before breaking up. I thought to start the interview with a recordable cassette, unfortunately after seeking permission for its use, the recorder packed up after a few minutes into the interview. The vegetation around the lake is

typical of swamp lowland rainforest and is fairly degraded. Forest canopy is closed but opens up towards the edges. Trees are large with approximate height greater than twenty metres. Also, it appears logging within the forest is very minimal. A major problem along creeks leading to the lake and at the lake appears to be the prolific presence of water hyacinth (if fishing in these areas must continue the menace of water hyacinth might become a big problem in future). Lake Esiribi, Festus recounts is fed directly by the River Niger. This is likely the case, as Esiribi is at the northern peak of Bayelsa State, it also appears to share some similarity with Lake Samei. It seems the forest trail from Esiribi is contiguous with that of Lake Samei. Similar animal species are seen by both communities, notably elephants (probably might be the same herd that transverse Lake Samei and Lake Esiribi). Similar practice noted in Lake Samei is the role of the elders. The eldest man in the camp ensures that camp orders are obeyed and maintained. Biseni unlike Sabagreia and Samei has several lakes and fishermen rotate their fishing activities around these lakes. Seasonal calendar would reveal what these fishermen do in between months of fishing. The fishermen report that during the floods, they fish in the swamps surrounding the lake (it is likely that the sacred lakes have a role to play in the regeneration of these areas?).

Fish identified on the “altar” include; *Heterotis niloticus*, *Gymnarchus niloticus*, *Citharinus citherus*, *Alestes macrolepidotus*, *Bagrus bayad*, *Labeo coubie*, *Lates niloticus*, *Tilapia* sp., *Distichodus*, *Synodontis* sp., and *Papyrocranus afer*.

Contact Summary Form

Salient Points:

1. Fishing festival(Fc-nil; Ffes-sal)
2. Tools used for fishing (FT-net)
3. Ownership of lake and people allowed to fish (Own-fam, Fish-fam)
4. Sacred lake meaning (Bel-rites, Bel-sac, Bel-prit, Bel-laws)
5. Animal and Plant Protection (Prot-rep)
6. Totem (Tot-croc)
7. Conflict (Con-ext)

Second Field Visit to Biseni [Lake Esiribi Fishing Festival Days (11/12th May 2005)]Observations

Journey from forest edge to the fishing camp took double the time we spent on the first trip made to the lake (29th April 2005). Reason for this was the slippery terrain and footpath to the lake caused by the heavy rainfall during this period (water we had to wade through was waist deep). Towards the main camp, where the fishermen were camped we had to call for a canoe to enable us get to the lake. This experience brings to the fore the inaccessibility of this area during periods of high rainfall and flooding. On getting to the campsite, the atmosphere was charged with various activities as people moved around the camp in groups some others sat inside their camp houses with a fixed gaze on the activity ongoing at the centre of the lake. The elders and youths were deep in the lake as we arrived, towards where the traps for the fish were set. There was apprehension in the air as camp members and buyers whispered on the level of rain/flooding which had occurred the previous days. From discussions I held with elder Ovuro, it seemed the unexpected had happened, the seven days rainfall of the previous days had resulted in a shift in the early effort of traps which were put in place for the fishing. The volume of water in the lake caused by the floods had caused the fish to escape from the traps laid deep at the bottom of the lake; elder Ovuro was doubtful of a good harvest, however he still hoped the catch would be worth all the efforts camp members had put in throughout the last months at the lake. I also noticed that more shift camps or tents had been erected, children and women walked freely across the camp, while elders and men were either talking in groups or watching the men working at the centre of the lake. I had to ask permission from the elder to take some pictures and some quick video of the camp, including the activity on the water. Not much of interviews could be done today, because the camp was busy on the day's activity and as such there wasn't time to sit and talk with the team **(it was however a good time to sit and observe the various activities of the day)**. In some of the tents, the local drying kiln, called "altar" was already erected in preparation for the day's catch. Buyers we met in the camp came from neighbouring villages; some women came from Olea town in Delta state. From our discussion with these women, I learnt they were fish traders back in their various villages who supply other retailers back home. At the camp was a rectangular structure made of raffia and cut wood, above 6 feet in height that wasn't present at my first visit. When I asked what this house was for, I was told that it was the place where the fishes caught were

taken to and sorted for sales. Two hours after our arrival at the camp, nothing had been brought from the lake. The women from Delta who had hired a vehicle which was parked at the forest edge were getting apprehensive, eventually at about 4:30p.m, the first boat came in from the lake. As the boat-man pulled ashore, I noticed he wore a long face (**obviously something had gone wrong**). Subsequently the two elders present at the camp went to meet him; while we all watched, one of the two elders poured a capful of gin, made some incantations and then the boat, which had its top covered with a long woven raffia cover, was unveiled. The disappointment at the revealed catch could be seen on most faces present at the camp, the fish catch comprised mostly *Citharinus*, *Tilapia*, a few *Gymnarchus* and *Heterotis*. The Delta women grew more impatient by the time the third boat had arrived and they noted that the catch still remained the same. According to the conversation held amongst them, they had anticipated bigger fishes and that is what they came to buy and not, “small-small fishes” like what was brought in. I wonder what really went wrong, is it really the rain water level that caused the traps to be submerged or are there other factors? Around me the conversation was the same, “rain don come spoil this year harvest”. The paradox to what I saw happening is that I had earlier on been told that there was a rain maker who usually had the powers to stop the rains during these periods. In addition were the demands and sacrifices made to the water god for a bountiful harvest, so the question would be what went wrong? As the boats came in, it was the children who helped scoop the fish from each boat up to the rectangular shift for sorting. We were not allowed into this structure, but were however given the privilege of taking pictures from the openings; however my assistant with one of the boys on camp were allowed to take average measurements for each category of fish.

In total 10 different species of fish (Plate 1.1) were caught in the two days of fishing festival with *Citharinus* (Local name, *Afor*) being the most abundant specie. We were not allowed to count the total number of fishes caught and we had to respect that. *Citharinus* I gathered from the camp had a very low shelf-life and as such left-over from the day's sales had to be dried immediately, this drying was also done for other fish left over. It was also impossible to know the total amount made from the sales of the fish for the two days. Questions that come to the fore from my observation include; how prepared is this local management structure in the handling of unseen events such as was witnessed in this year's harvest? How do they make up for the shortfall in sales and how does the sale affect household earnings? Are there

alternative sources of income? Is there a reward system for children who are involved in the fishing expedition?

Plate 1.1 Showing specimens of *Heterotis niloticus* (bottom picture) and *Citharinus citharus* (top pictures)



CASE 4

Contact Details Form:

Field Phase	1
Site	Igbedi
Type of Qualitative Data	Informal Interview
Contact Name	Mr. Inemotimi Okpongan
Date	May 5, 2005

Igbedi town is amongst the recommended town with a number of lakes the people consider sacred. On arrival, we met with the youth leader (a departure from meeting with the elders)

Interview with Inemotimi Okpongan

Q: What types of lakes do you have within your community?

We have three lakes within the community that are called sacred. Lake Boutoru (which is the largest lake we have). This lake is at the border between Igbedi community and Agorobgbeni. This lake is owned by the Gbagbawari family, last year 2004 was the fishing festival.

Q: How far is it from your community?

With a speedboat, it takes about 7-10 minutes, but with the hand canoe it takes about 30minutes. The second lake is called Puipa and it is between Igbedi and Sabagreia community. It takes about 40minutes to get there and the women folk are allowed to go there. The third lake Akakotokoto (The Igbedi community and Funtu community own Akakotokoto) is a very mysterious lake. It is completely sacred and nothing can be removed from the lake, not one fish or plant. If you do something bad would happen to you and people do not go there.

Q: What are the practices observed in these lakes?

We know there are certain laws and customs that are observed concerning the lake, but it is the elders who can tell you these laws

The interview had to end abruptly, because Inemotimi Okpongan and his companions (Mr. Edu Ebisindo and Honourable Degemo B. Johnson) had to leave for Yenagoa to attend a meeting.

Observations

Igbedi town (GPS: N 05⁰ 01.342', E 006⁰ 12.110', Elevation 48 feet) is situated south of Sabagreia town; the journey from Polako took 22 minutes on a motorised boat. Igbedi appeared "sleepy" with little or no activity. The youth leader is a student at the Niger Delta University (which means he spends a considerable amount of time outside the community). I also learnt from his companions that they virtually live in the state capital, Yenagoa. Interestingly, when we inquired of the paramount ruler and CDC chairman (two strategic persons in village governance) we were told they both were out of town. Despite not meeting with the elders of the town, the youths were able to offer preliminary information on the lakes of the area. However from our discussions it appeared they were either ignorant of the rules governing these lakes or were not ardent practitioners of the stipulated rules.

Contact Summary Form

Salient Points (Not enough time spent in community, key personnel to ease passage into community were absent). However, from interview with youth leader, the following are important learning;

Fishing festival (Fc-nil; Ffes-sal)

Ownership of lake and people allowed to fish (Own-fam, Own-com)

Sacred lake meaning (Bel-laws)

CASE 5

Contact Details Form:

Field Phase	1
Site	Ikibiri
Type of Qualitative Data	Informal Interview
Contact Name	CDC chairman
Date	May 10, 2005

The CDC chairman was too busy for an interview, however, after initial talks with him he mandated a local to take us to one of the two lakes owned by the community. To aid transportation across the river we were given a dug-out canoe which we used to the edge of the forest to Lake Obgbulokalado (GPS: N 04⁰ 54.308' E 006⁰ 12.676'). From the edge of the forest we trekked through an open bush path, to the lake which took about 40 minutes to get to.

Interview held with Local guide

Q: Who owns this lake?

The Asabu family of Ikibiri owns Lake Obgbulokalado; the CDC chairman is a member of this family.

Q: How often do they fish this lake?

Fishing in this lake is done twice a year.

Q: What type of materials do they use in fishing this lake?

Hooks and nets

Q: What type of laws guide the use of this lake?

Just that group fishing is done twice a year to allow fish to grow and be plenty (appears lake is set aside for restocking). The other lake we have is Lake Laduno and it is fished once in four years.

Q: Who owns this lake?

The entire community of Ikibiri own Lake Laduno.

Observations

Ikibiri situated northwest of Yenagoa is a riverine community on the River Nun. The closest community to Ikibiri is Opuan (where the Bayelsa state vigilante Corp headquarters is situated). I learnt that the vigilante Corp was established by the state government to protect water way passengers from the activities of river pirates.

which I hear is on the increase. We left Swale jetty (Yenagoa) at 11:55a.m and arrived Ikibiri at 12: 30 p.m. On the way into Ikibiri I noticed several points where seismic activities were conducted. On getting to the community, we went straight to the chief's house, unfortunately, he had gone to the farm. We then headed for the CDC chairman's house. The aroma of the *Irvingia* plant permeated the atmosphere as several households were seen processing ripe fruits of the plant. The seed of the *Irvingia* plant, commonly called bush mango appears to have considerable value within all the communities visited during this trip. The processed seeds are sold to Ibo traders and I presume they contribute significantly to the livelihoods of households at this time of the year. My earlier observation on the presence of an oil company was right. I noticed that an oil company called CNPC was situated east of the community settlement. Notable also are the makeshift plank houses constructed by the locals to service the needs of the oil camp (which from the snigger made by our guide, houses prostitutes). Ikibiri typifies what happens in the Niger Delta communities when oil prospecting is being carried out, activities of the community automatically shifts to the oil company. One question, is what is the impact of these companies on the beliefs and customs of the community? Vegetation shows tertiary regeneration (mainly woodlots of *Elaeis guineensis* trees), with logging of trees done indiscriminately. On our way to Lake Obgbulokalado, we met an Ibo trader who had a gin (locally brewed alcohol) factory (crude instruments made out of trees) setup in the forest. On questioning him, I learnt he was leased this section of the forest by the community for his gin production. Interestingly he narrates that his payment is part cash and part drums of gin. Lake Obgbulokalado is an enclosed lake (hidden from view by a good growth of vegetation, Plate 1.2). The length of Lake Obgbulokalado is approximately about 400 metres (it does appear small) and also it has no water weed on its surface. We met a fisherman (presumably a member of the Asabu family) who had just caught some fish for the day's lunch. His catch was *Citharinus citharus* and *Tilapia* sp.

Plate 1.2 View of Lake Obgbulokalado and local guide



CASE 6

Contact Details Form:

Field Phase	1
Site	Tungbo-Sagbama
Type of Qualitative Data	Informal Interview
Contact Name	His Royal Highness Paul K. Abiware (Biekru 1 st), the Ebenanaowei of TungboEbe
Date	May 17, 2005

Sagbama area from the list of lakes in Bayelsa (obtained from the ministry of natural resources) in addition to information obtained from other secondary sources has some renowned lakes. Sagbama borders Bayelsa and Delta States and has a good area of lowland rainforest. The team was fortunate to meet the paramount ruler (who looked frail), who received the team warmly and was willing to participate in the discussion on their lakes. The paramount ruler told the team he was a retired civil servant and had worked as a forestry officer with the Federal Government of Nigeria before his retirement. After the exchange of pleasantries and customary rites I proceeded to interview him.

Interview with HRH Paul Abiware

Q: Could you please tell us some history of the Tungbo clan?

Tungbo clan is under the Sagbama local government area, the boundaries we share with Sagbama town is artificial. The Tungbo people are in fact the first settlers in the area and we speak the Izon language.

Q: We hear you have lakes within your community that are important?

Yes, we do indeed have two lakes within the Tungbo community. We have other lakes, but the two, which are prominent, are Diyain Lake and Akpolokia Lake, the Akpolokia is higher

Q: How often do you fish in these lakes?

Once every two years is the fishing season. Akpolokia was harvested last year 2004 and so the next season of fishing is February 2006.

Q: What is the catch yield like?

The take home catch is a lot. We have also registered the Akpolokia Lake with the state ministry of information and so the government is aware of this lake.

Q: Who are the owners of this lake?

The two lakes are owned by the entire Tungbo clan. Each of these lakes has their shrines and symbols.

The Akpolokia, which is the greater of the two lakes, represents our ancestry and it also represents prosperity for us as a people. The full pronunciation of the lake is "Akpolo-keyai", meaning the son (keyai) of Akpolokei. Our founder when he settled here in Sagbama came to Sagbama with the lake and since the main lake is in Delta axis, this is the offspring of that lake.

Q: Who attends to the lake and its demands?

A priest attends to the lake, am not in charge of that. A lot of fetish things are usually done to maintain law and order as prescribed by the lake especially close to the time of harvest.

Q: What are the type of rules and laws governing the lake?

Any institution has its own rules, there is a time to harvest and a time not to harvest where nobody is allowed to go and fish. Penalty of defiling this area and its laws is carried out according to the instructions given by the deity to the priest of the lake.

Q: You say you are not in charge of the lake, how is the headship of the village determined?

It is done by election, so I was elected

Q: Are women and children allowed into the lake during its harvest?

Yes women are allowed and children from 10 years of age

Q: Are there crocodiles in this lake?

Yes there are, there use to be a lot but because of shell exploration the noise frightens them so they migrate away from the lake; but during harvesting time there are a lot of them.

Q: Can we visit the lake?

An initiated person must take you there

Q: Are people allowed to harvest resources around the lake?

Yes the outside perimeter is free for harvest. Also there are catchment areas during the flood people are allowed but nothing can be picked from the lake outside the harvest.

Q: Any problems with any community/government/organisation on the use of this lake or any of your resources?

The road leading to the lake is not too accessible so it prevents people from going there. Strangers who live within the community are allowed into the lake during its harvest.

Q: What would you say is your major occupation as a community?

Wide scale fishing and farming, also logging

Q: Do you have other lakes?

Yes, so many some are free

Q: Who do you sell the products from the lake to?

We do not have any major market, the nearest to us is Patani, we sell to all kinds of people. To get into the lake certain norms must be fulfilled. Women and men must go into the lake completely naked, however you can wear underpants, but your chest must be bare. The history associated with this place is that the founder of our community Otungbo migrated from a part of the Delta, so the base of Akpolokia is in the Delta. When he came to this present location, he came with the child of Akpolo; actually Otungbo came from Otuokpoti clan in Ogbia. He followed the Otuokpoti creek out to the Nun river and initially settled where the Odi clan is located, later he left. When Otungbo was leaving Odi, he had to enact a covenant with the Odi people as a sign of ownership of the Odi land; the Orisha tree was the sign of this covenant.

Q: With the case of ethnic clashes over ownership of land, have the Tungbo people ever had problems with the Odi people over their land?

No, we have not, since no mineral has been found there, we have no problem with them and neither with any community. The Tungbo people are poor.

Q: Why do you say this?

We have no oil

Q: Does the gas turbine supply you electricity?

No gas turbine light

Q: What are the types of animals or plants seen within your community?

For animals; leopards, antelopes, bush pig and elephants, we still see the footprints of elephants

Q: When was the last time you saw one?

*10 years ago, elephants were killed in this community. Other animals include alligator lizard, "Iguanas", snakes, and the boa constrictor (**note: the mention of the boa within this region needs more investigation for confirmation of what species of snake is referred to as the boa constrictor within the area**), called Okinikeni.*

The plants we have include banga, ogbono.

Q: How much would you say you make from this lake during the fishing?

In 1991 about N50 000 to N100, 000, but it is difficult to assess since the fishing is open to all during the fishing season.

Q: Do you use plants for medicine in this community?

Yes, traditional healers depend on the curative power of herbs also certain individuals who have the knowledge of the use of these herbs

Q: Do you have a health centre?

Yes we do, but our women would first go to the traditional midwives then when there is a problem they can go to the hospital. Also the massage people use herbs.

Q: Are the youths aware of the laws of this lake?

Yes they are aware of the laws and custom of the lakes, but the knowledge of our tradition is dying with them; because as they go to school they learn other things and not the tradition of our people

Q: What do you use to harvest the fish during the fishing season?

Fishing is done using two types of materials; the women's basket called "Zuyei" (Plate 1.3) and the men's basket called "agala".

Plate 1.3 Women fishing basket-Zuyei



Q: What type of fish species do you normally catch from the lake?

Some of fish species include; torrie, emuno, akor and afor.

Q: Can I visit the lake with my team?

Yes you can, but like I said you must go with an initiated person. First of all write a letter saying you would like to visit the lake, make reference to our meeting today. I would have to seek permission on your behalf from the chief libator, but do not make your visit on Wednesday.

Q: Why?

Because Wednesday is the market day here in Tungbo and on that day nobody goes to the bush.

Observations

Tungbo town (GPS: N 05⁰07.470', E 006⁰10.025', Elevation 12.80 metres) is accessible through the East-West motorway. We left Mbiama junction at 9:19.a.m and got to Sagbama/Tungbo junction (GPS: N05⁰11.039', E 006⁰13.465', Elevation 12.50 metres) at 10:19.a.m. As we approached Tungbo town (on motor bikes) the smell of ripen "bush mango" clung to the atmosphere. Along the tarred road I saw villagers carrying filled raffia bags of bush mango heading for the village for processing. It is important to note that throughout most of the communities visited on this field trip and at this time of the year (April to June) this activity of picking bush mangoes is done. This may probably suggest that these communities do not depend on one source of livelihood for survival (diversification?). Seasonal activities from my experience so far seem to gravitate along the following lines; March to May (Fishing), May to June (Forest products gathering), June to August (?), August to October (?), October to December (?), December to March (Farming activities, building and repairs of houses). The chief took us to the Tungbo waterfront where the shrines for the two lakes are located. We noticed beside these two shrines another shrine, when we asked the chief what this other shrine was for, he called the shrine, the shrine of "Okuru" (meaning the shrine for war). The villagers, during the times of war usually consulted the god of the shrine for protection. The paramount ruler knew his domain and was willing to share information with the team. His attitude towards us might probably be because of his exposure and working experience with the government. His definition of the community's poverty or being poor is noteworthy. he defines being poor as the lack of crude oil or any mineral resources. The absence or presence of oil in the Niger Delta might be contributory to understanding natural resource conflicts of the area.

Q: Do you forbid people from killing animals within the lake?

No, you can kill any animal. In the lake there is a particular crocodile which is very long and can change itself to anything when it wants to get out of the lake.

Sometimes it takes the form of a car or plane; sometimes it can change into a white person. Some people have seen these things, this crocodile is very mysterious.

Certain things are done to appease the lake if the rules are violated and you must also not do certain things. For instance if someone's iron like hoe is lost in the water the lake would give it up for you to take to the person, if you don't bring it to the owner adverse consequences awaits the defaulter. When we fish the lake, there usually is a canoe or bag containing the sacrifice for the lake, in the middle of the lake. The gods owns the lake and he gives his resources as he wants. Sometimes harvest could be plenty, sometimes it can be small. Sometimes during the fishing harvest the gods carries the fish to the river and during this period fishermen on the river would kill plenty. Opuana is related to two lakes; Gbagaopuan owned by the Ikolo people and Efi owned by the Sabagreia people. These three lakes are not usually harvested within the same period. Also during the fishing festival other communities and visitors pay a fee to fish in the lake but Ikolo and Sabagreia people don't.

Q: How long does the fishing season last?

Fishing is done within two days, within these two days no individual from the community sleeps in the bush but visitors can sleep there.

The lake is mysteriously controlled totally at the will of the god inside the lake, if the lake wills it can give a good catch

Q: What are the other rules, which must be observed?

Certain things are not mentioned in the day of harvest, you can't call any animal by name

Q: Why?

Because during the harvest that animal might harm you. You are not allowed to brush your teeth or clean your ears, but you can bathe. You can't eat raw palm fruits.

Q: Do you see crocodiles during the harvest time?

Yes sometimes a crocodile can appear before you, when it happens you shouldn't run all you would say is "Dibie! Dibie!"-meaning sink, sink and it would immediately sink

Q: Are there any restrictions concerning women and children?

Women are allowed to fish during the harvest, however females that are menstruating are not allowed into the lake. Normally before the fishing day a message is sent round for women under menstruation to abstain from the lake. People are not permitted to fight in the lake if not they are fined. Twins are not allowed to fish in the lake it is contrary to the dictates of the lake. Women sometimes can start their menstruation at the lake in such instance such women has to appease the gods with drinks, if you do not do it the bleeding would continue

In the olden days a man called Agedebe while fishing in those days would hold crocodile with his left hand, he was a strong fisherman and everybody knew him.

Q: The finder of this lake what was his major occupation?

He was a fisherman, farmer and hunter

Q: The laws of the lake how did they come into existence?

The priest of the lake got revelation of the laws we observe for the lake directly from the god of the lake who appeared to him. Then when the priest got the laws he passed it on to the community. The caretaker is not a seer but these laws are revealed to a person within the community via dreams, before the time of harvest a seer is called to interpret the dream about the lakes

(Field notes: from his explanation the caretakers are not necessarily the priest of the lake, they are usually elected from the family that own the lake for control of access to the lake. Also revelation about the lake can be transmitted to any person from the community).

In the olden days the lake had a small creek linking to the lake. During the harvest the priest takes a canoe from the creek to the lake to do his sacrifice, as he paddles from the creek to the lake and back, his legs would not touch the water of the lake.

The creek linking the lake is from Ikolo side.

Q: Is the creek still there and do you have any problem with any community over the lake?

In the olden days the creek was like a river but now it is blocked, because of this the priest can no longer go by canoe to the lake to perform his sacrifice before the fishing festival, he now has to go by land. Also in the olden days we kill lots of fish but because of this blocked creek, the fish is not plenty; before fish use to fill our canoes but now it is smaller. We do not have any problem with any community. In the olden days six people stole into the lake via the Ikolo creek and they did not confess, all of them died and from that time till date people remember the incident and are afraid to go and fish there.

Q: Are there any NGO/oil company/government agencies operating in this community or near the lake?

None but sometimes Oil Company carries out activities (from description, probably seismic work) around the area, when they do this our rivers and lakes become polluted.

Q: Any water hyacinth on the lake surface?

Water hyacinth and grasses covers a very big part of the lake. Formerly it was open no such thing, but now before harvest we have to clear the lake (**Note: same problem as Esiribi lake**)

Q: Whom do you sell to?

No place for market, customers come from everywhere during the fishing festival to buy fish. For you to go into the lake you must first pay the entrance fee (same practise as Lake Efi in Sabagreia).

Q: What do you do with the money, do you have a cooperative?

No we do not have any cooperative or common purse, money we realise during fishing festival is for the family also some is used for the entertainment on that day.

Q: What type of instrument do you use in fishing the lake?

Mostly materials and traps made from cane rope. The cane rope trap is called "Akpou" (**similar to agala used in Sagbama**), others are "Peredenkamo (**approximately 150 centimetres long and 70 centimetres wide**) Ogiriki, people can also use machetes and simple spears.

Observations

Notes: The Lake at Bomadi-Ekpetiama according to my informant was once the property of the Tombia community, but because of its associated mystery and the lack of interest by the Tombia community in observing the demands of the lake, its holdings passed on to the Bomadi-Ekpetiama people. My perspective of this narrative is that either there might have been a shift in the belief/cultural system of the Tombia people or it could be the lack of a suitable priest/priestess for the lake, further investigation might reveal the underlying cause of this shift in inheritance. We took off from Yenagoa junction to Tombia town (GPS: N 04⁰59.836', E 006⁰15.811') and then had to trek through a bush path to Akaibiri (GPS: N 04⁰59.121', E 006⁰16.452') water side, from GPS route map, Akaibiri is Southwest of Tombia town. At Akaibiri we took a motorised boat to Bomadi-Ekpetiama (GPS: N 04⁰58.697', E 006⁰16.383'). The water hyacinth weed seems well adapted to this

waterway. Infrastructures noted included a secondary school block building, not too common a feature within riverine areas; when we asked the local who accompanied the team, he said the Niger Delta Development Commission built it. In addition was an overhead water tank, which he said was provided privately by the commissioner of special projects who happens to be a native of the community. The local guide took us to the owners of the lake: he explained that the CDC chairman was not around. From my observations in most of the communities visited, most prominent persons holding strategic positions in the community spend a considerable amount of time outside these villages; its either they live in Yenagoa or Port Harcourt or regularly visit these cities. On getting to elder Lucas Suoguai's house, he sent for another elder to be in attendance of our meeting with him. The act of receiving visitors in the presence of another witness, especially when it has to do with matters affecting the community or families seem to be a common occurrence in the communities visited. Elder Kiapendi Orumuni arrived before the interview could commence and we had to restate our mission in the village to him. As the meeting progressed, I noticed there was a guarded look on the face of both elders; I sensed their reluctance in sharing information concerning the lake with us, or probably they were not too sure of who we represented. By the time we started the interview, the apprehension on elder Lucas face had worn. He probably became comfortable with our line of questioning and might also have realised we were neither government officials nor oil companies workers. The community is relatively small, probably about 50 houses scattered along river bank. The presence of the secondary school I learnt attracts pupils from other communities and so the population is mixed. In most of the communities visited, mornings and afternoons might not be the right time for a visit or interview, because villagers are out farming or fishing. Most fishing spots are a long way from the community including farmlands.

Women are equally as active as their male counterparts. A common feature on the waterways is seeing a woman paddling a canoe having her infant strapped with a piece of cloth unto her back. Male dominance is notable in these communities, as they are the ones to speak with on managerial issues; so far the discoverers of these lakes have been men, they also act as priests to these lakes. However the women work in unison with their male counterparts; they are the major marketers of fish, they help to dry the fish to extend its shelf life and they are the home makers while their men spend months outside the home. The question though is; are women

allowed to manage these resources like men or do the cultural beliefs considered lead them to be unsuitable?

CASE 8

Contact Details Form:

Field Phase	1
Site	Osiama
Type of Qualitative Data	Informal Interview
Contact Name	Honourable Morgan Egypt (CDC chairman)
Dates	May 21-23, 2005

Towards evening at about 7:30p.m we finally had a chance to speak with the CDC chairman and also the paramount ruler on our mission to the village. The paramount ruler was pleased to meet us and he gave his blessings to carry out the research and said the person to liaise with was the CDC chairman, Honourable Morgan Egypt. We went back with the chairman to his compound, whose preoccupation at the moment was working on his own fishing net. He told the team that it was the duty of the men of each household to ensure nets were ready for the fishing festival, while their women got cooking items and food for the camp. He went further to say that the whole community would move to the camp the next day, 22nd of May, and they could be in camp for about 4 to 7 days. On the history of the lake, Honourable Egypt introduced us to elder Meschach Asei whom he said had a lot of knowledge on the history of the lake.

Interview with Elder Meschach Asei

I was educated to standard 4 (equivalent of the modern day primary 4) and had to start fishing as a profession because my father couldn't take care of me.

Q: How long have you been fishing?

Over 31 years

It was a woman who went into the bush with her seven children who found the lake. When she got to the lake, she lost all her children; it is believed that each child took a different direction that is why there are seven routes into the lake, each route represents each child.

Adigbe Lake is owned by Ossiama community

Q: How often do you fish in this lake?

Adigbe used to be fished every time of the year before but now there is a law that don't fish every year. People fish in the swamps, also at first it was for everyone but not so now. There are some laws abiding in the lake, when the lake was open some

people violated the laws that is why they made an agreement for people to fish at a certain time together (Note: at this point, elder Asei began to veer off and would not give any more information, he wanted a reward for his information so we had to go back to the CDC chairman).

From the CDC chairman we gathered that fishing is done twice a year and at each time different fish species are caught; first period of fishing is between May to August while the second period is November to December. The only tool used in harvesting is fishing net.

Observations

We departed Swale water front (GPS: N 04⁰54.994', E 006⁰15.904') at 11:58 a.m., passing through Otuan town we arrived Osiana (GPS: N 04⁰52.480', E 006⁰02.366') at 1:39 p.m. On arrival at Osiana, the atmosphere was that of festivity and funfair, music blares from a drugstore near the jetty, men weaving fishing nets and people generally moving from one end of the town to the other chatting. The CDC chairman was with the paramount ruler and so we had to proceed to the ruler's house. From the banner hoisted on a pole we gathered the governor was being expected for the annual festival celebrations. On getting to the paramount ruler's compound, we noticed heavy presence of armed policemen, television crew and some other visitors; the ruler who wore ceremonial regalia was being interviewed. We were introduced but the ruler thought we were part of the visitors who were visiting the community for the festival. It was a good opportunity to witness what goes on during this period. In the midst of the gaiety locals still managed to go about their business, local food vendors sold rice in transparent nylon bag to hungry visitors and villagers. Also was the bush mango processing seen outside most households, bush mango was everywhere (Plate 1.4). It was more than I had noticed in any of the other communities visited. We asked the amount a measure of processed bush mango was being sold for, we were told N2, 000 for a bag weighing 25kilograms.

Plate 1.4: Showing Banner hoisted towards entrance of Lake Adigbe (Top picture), Split Bush mangoes and seeds dried in the sun (Bottom picture)



I had a chat with the youths and men who were weaving their nets, who informed me that the nets had to be woven two days before the fishing festival. Their mesh size when measured ranged from 50.8 to 121.9 millimetres. The expected government officials arrived two hours after we had got to the village. A short ceremony was held in honour of these guests; the governor was represented by a senior cabinet member, also in his entourage was the chairman of Bayelsa council of traditional rulers, Chief Joshua Egbagara. After the ceremony we all tramped to the lake (GPS: N 04⁰53.147', E 006⁰02.635', Elevation 11.58 metres) for the opening ceremony of the fishing festival. The guest of honour (representative of the governor) performed the first act of fishing; his catch was *Citharinus*, the Afor fish. On declaring the festival open, which signifies the opening of the lake for the three day fishing, the government official and his entourage went back to the village square to continue the opening ceremony celebrations. In the village I noticed a woman who had on a white wrapper walking and making some sort of incantations into the sky; on enquiries about who she was I was told the rain priestess whose assignment was to prevent rains throughout the fishing festival month.

Observations at Adigbe Lake

My first impression is the width of the lake, this probably is the widest lake I have seen out of all the lakes visited. The lake is an open lake with a good forest support on the opposite side of the village settlement. However the forest is threatened by the annual fishing festival by villagers cutting of trees for drying their fish and erection of fishing camps during this period. Water hyacinth incursion is minimal but might pose a challenge in the future if not checked. Bird life here is very rich; Dimie Otobotekere identified birds sighted along pathway to the lake from village settlement and calls heard.

Observations of Events on May 22, 2005

In the morning villagers were seen migrating to their camps on the bank of the lake, they would remain in their various camp tents until 3:00a.m when they are allowed into the water for fishing. We met a young lady called Patience who greeted us with a lot of enthusiasm and familiarity; from our interaction with her, she said she recognised us from Esiribi Lake. Patience travels around the riverine areas of Bayelsa state buying fish for retail she however permanently resides in Obuoloma, Taylor creek. An Urhobo, from Delta State, she confirmed that buyers like her knew the period lakes around the Delta were harvested through notices/information sent by the community prior to the time of fishing. (This confirms the story of the people from Efi, this type of network/information dissemination might be important for the marketing of this perishable product).

Men were seen today casting their nets in the open river, when we asked why they did this instead of concentrating on moving to the camp; we were told nets prepared for the festival had to be tested in the open river to ensure their suitability for the lake.

Interview with Honourable Egypt

Q: Who are the people who buy your fish?

Buyers include Isoko women, Urhobos and people from other communities in Bayelsa State.

Q: Are these people allowed to fish in your lake?

No outsider is allowed to fish, only indigenes fish. Osiana is made up of 4 communities; Egbopuloughbene, Awegbene, Ogbengbene and Osiana. These 4 communities are the ones who legally can fish in Lake Adiegbe.

Q: Do women fish too in Adigbe?

No, women are not allowed to fish in Adigbe Lake but they are allowed to help pull the shoal of fish ashore.

Q: Apart from this task, what else are women allowed in the camp?

They mainly dry the catch, cook for their men and attend to the camp

Q: Are they allowed to fish elsewhere?

Yes in open lakes and rivers

Q: Who are the owners of the lake?

The Osicama community

Q: Can you tell us more on the lake?

Fishing is done twice in the year of fishing; we fish in the rainy season starting May to June and the dry season from November to December 24th. In the eastern part of the lake there is a sacred forest that no person steps on it, only the priest and his team that steps there during the time when they are doing their rituals. This is usually before the formal opening of the lake. None of the fishing nets carries lead

Q: Why?

Because lead is forbidden to touch the bottom of the lake

Observations of Events on May 23, 2005

Activities at the lake between the hours of 3:00 to 11:00a.m intensified as fishermen went into the lake while the women ensured the local drying kiln were ready for the day's catch. Fishing started immediately after 3:00a.m, by 10:00a.m canoes filled with fishes were brought ashore. Women, youths, men kept busy removing the fishes from the canoe. A record of 26 fish species was made (Table 1.3); *Citharinus citherus* was the dominant specie while *Synodontis membranaceus* ranked second in abundance.

Table 1.3: Fish species seen and Measurements

Local Name	Scientific name	Body length (cm)	Total length (cm)	Width (cm)
Epede	<i>Citharinus citherus</i>	16	19	8
Opowei	<i>Synodontis membranaceus</i>	12.5	15	6
Ugulu	<i>Chrysichthys nigrodigitatus</i>	10.5	12.5	2.5
Pomi	<i>Papyrocranus afer</i>	26	Partly damaged	6

Elei	<i>Alestes macrolepidotus</i>	9.5	11	2.5
Kabi	<i>Hydrocynus viltatus</i>	24	28	8
Kobiyo	<i>Labeo senegalensis</i>	16	18	3
Kobiyo	<i>Labeo coubie</i>	15	17.3	2.5
Agbiki	<i>Tilapia nilotica</i>	9	11	7
Agbiki	<i>Tilapia zilli</i>	10	12	7
Aba	<i>Gymnarchus niloticus</i>	40	44.5	6
Ikpidi	<i>Synodontis nigrita</i>	Not allowed to measure		
Ikolokolo	<i>Alestes nurse</i>	5	6	1.5
Oja	<i>Alestes baremose</i>	7	8	1
Imunu	<i>Clarias lazera</i>	Buyers haggling price		
Eweri	<i>Distichodus rostratus</i>	Buyers haggling price		
Ekewu	<i>Heterotis niloticus</i>	30	32	6.5
Oboro	<i>Bagrus bayad</i>	Buyers haggling price		
Ugbala	<i>Hyperopisus bebe</i>	16	18	5
Usau	<i>Hepsetus odoe</i>	9	11	1.5
Yeseiwei	<i>Phago locicatus</i>	3	3.8	0.2
Liyeliyeikp idi	<i>Auchenoglanis occidentalis</i>	13	15	3
Toriye	<i>Heterobranchus sp</i>	26	30	6
Ayi	<i>Eutropius niloticus</i>	7.5	9.5	2
Abiyou	<i>Ichthyborus besse</i>	Buyers haggling price		
Bura	<i>Clarotes laticeps</i>	15	17	4

Contact Summary

Osiama Lake is large and would make a good case study. Although an interior community it's been brought into the limelight by the government's interest in its lake.

A gap in secondary data gathered for most of the lakes visited is in the dimensions of the lake. Measuring the depth of these lakes, including the area dimension might give scientific insight on the likely fish species and other biodiversity to be found in the area.

Productivity of these lakes might be important for comparison studies and analysis. The Adigbe Lake like the Efi Lake has several entrances to its waters; the question again is the effectiveness of traditional control over these areas.

A similar problem on Lake Surface is the incursion of water hyacinth from river inlets and most of the species encountered are the same throughout the region.

The other question is on the usefulness of the open and close season to biodiversity abundance and longevity.

CASE 9

Contact Details Form:

Field Phase	1
Site	Uzere
Type of Qualitative Data	Informal Interview
Contact Name	Prince Stephen Ogrih (Senior Odion of emuzo)
Date	May 24, 2005

The Uzere kingdom from secondary data is a community of about 100,000 inhabitants and is one of the 17 clans in the Isoko north and south local government area of Delta state. Uzere area was considered on this trip because of its popular lake Eni. We were met at the palace (GPS: N 05⁰20.560', E 006⁰13.767') by the senior "Odion of emuzo", Prince Stephen Ogrih, who took us to his house. After exchanging pleasantries and stating our mission, he sent for another person to be present in our meeting. It was these two Odions (king makers) with a palace guard who gave us most of the information on the Eni lake. The two king makers were Prince Stephen Ekpebe Ogrih and Prince James Omodunefe Eyeyere and the palace guard's name is Chief Gabriel Emonena Egbe.

Interview Session

Q: We have heard of the Eni Lake, can you please tell us more on this lake?

The Uzere people who are descendants of the founder of the clan called Uzei are well known for the Eni festival. We descended from ancient Benin kingdom called Aka. The eni god is a benevolent god having a long suffering nature; it exposes thieves, witches and can fish out people who are evil perpetrators within the community. If you no have clean hands when you get to eni it would expose you, because of this people fear eni. The Uzere people belief in eni is based on the story of the calabash and the native stone; the community people in those days wanted to know which of the two items had an evil intention. Both items (the calabash and the native stone) was put into water dramatically it was the native stone which floated while the calabash sank to the bottom of the water. Since that time our people believe strongly in the power of the eni god. The Ovie is the chief priest of eni and recently he sacrificed a cow at the eni festival. Eni can't be captured on film.

Q: Do you people fish in the Eni Lake?

No, fishing is only allowed at the three entry points leading into the eni sacred waters; there is no restriction at these points.

Q: How does the lake look and do you take anything either from the lake or the surrounding forest?

Nothing can be taken from Eni, if you do so you might die or run mad, the lake is clear and the forest there is close

Q: What type of animal do you see there?

Lake contain Manatee which is usually seen about July, also crocodiles are in the water.

Q: What type of law do you have which governs people from entering the lake?

Women on their menstruation are not allowed near the lake and its secondary forest. For women who had recently delivered seven days cleansing period must elapse before such women are allowed near the lake. No defecation is permitted around the lake.

Q: What happens if people violate these laws?

For women who are under menstruation the bleeding never ceases except sacrifice to the eni god is done, also for those who defecate near the water they must also do sacrifice. Rituals or sacrifice to the eni god is performed by the Ovie assisted by the chief odion every market day

Q: How did these laws come into existence?

The eni god speaks through a seer sometimes it visits certain individuals through dreams especially visitors who unknowingly violate any of its laws.

Q: Do you have any problems with any community or organisation over this lake?

The eni god is powerful enough to deal with intruders and poachers by itself. In time past we have had problems with the Igbudu people and some other communities near us, but anytime we have problems the eni god would punish the offenders either through sickness or death.

Q: Is the government or any company involved with the people on matters concerning the lake?

The state government has made several pronouncements on making the Eni Lake a tourist centre but up till date nothing has come out of the several visits made by the government

Q: How often is the Eni celebration?

The Eni festival can be celebrated at any time, but like I said sacrifice to the Eni god must be done every market day

Q: What would you say is your community's major occupation?

The Uzere community have two main occupations; fishing and farming

Q: What type of crops do you grow?

Cassava, water yam and groundnuts

Q: Do you have other lakes that you fish in?

Yes we have two big lakes, Aze and Oruo

Q: Who owns these lakes?

The community people

Q: Is it open to everybody?

No, fishing right is not automatic; you must have either your father or mother as an indigene of Uzere

Q: What are the tools used in fishing these lakes?

We fish from our canoes using nets, also small hooks and during the flood we use clay sand in the swamps to make barricades. Inside this barricade we have fish traps called "Ugeh" embedded in them, as the fish swims it is trapped inside. The men use "Uvwe" (a conical woven net tied to a conical shaped stake, this is a type of scoop net apparatus) while the women use "Ayarho" (a basket type fishing apparatus).

Q: What time of the year do you fish?

Fishing is done between April to October and it is done mainly by men. During the dry season, November to March, we engage in farming, but farming is mainly women.

Q: Do you sell your farm products to outsiders?

Mostly for food for the house, women grow groundnuts, cassava for tapioca (a by-product of cassava), okra, fresh pepper, tomatoes and sweet potatoes. The men grow mainly yams, harvest palm nuts and also grow cassava.

Observations

Eni according to historical data is the deity of the Uzere kingdom and was considered in time past to be a very powerful god. As narrated by the kingmakers we met, people came from all over the then southeast region to consult with the Eni chief priest with cases of people possessed by witchcraft spirit. In our interview with the king makers they said, the act of exonerating the innocent from the guilty was done by throwing the two persons accused of witchcraft into the Eni lake. The victim that drowns in the water is the person said to be with the witchcraft spirit, while the innocent person would not drown when thrown into the water. The colonial masters

eventually outlawed this practice in 1903. In addition to its Eni history, Uzere has a vast bank of crude oil in the Eni Lake and because of the sacredness of the lake the Uzere people have refused Shell petroleum access into the lake even after being offered substantial amount of money. The Eni Lake is a typical example of what a secondary source termed completely sacred lake and it might be necessary to study the relationship of the people with this wetland. Unfortunately no kind of biodiversity is harvested from the lake; however there are points of entry into the lake where seasonal fishing is allowed. Uzere unlike communities visited in Bayelsa State, has a structured form of government fashioned after the Benin kingdom kingship. Their paramount ruler is addressed as king (Ovie) and access to the king is very formal strictly on invitation. The kingmakers here act as the spokesmen of the kingdom and are the ones who present cases/matters before the king. Therefore, bureaucracy is long and time consuming unlike communities in Bayelsa state where access to the paramount ruler is simpler. The kingmakers were initially suspicious of our visit and asked all sorts of questions. It appeared they needed some sort of gratification especially when they learnt I was studying abroad. Similar welcome traditions were observed like those obtained in Bayelsa state. They offered us drinks, cola nuts were blessed traditionally and shared and money was an addition to the gifts presented. The money I learnt is supposed to compensate for the inadequacy of the gifts presented and also help pay for the transportation of the visitors. We had to reciprocate by doing same. The whole ceremony of presentation of gifts and response takes time, but I have learnt this process cannot be rushed. It is a necessary prologue to acceptance, friendship and good dialogue between both parties. From discussions of the Eni Lake, it might prove an uphill task trying to convince the community for us to visit the lake. Uzere community like the Bayelsa communities depends on seasons. Different livelihood activities are carried out in each season, livelihood activities tend to be based on traditional skills like fishing and forest gathering.

Contact Summary Form

Salient Points

Sacrifices are done (Sac-saf)

Have open and close seasons, but not for fishing, particularly the part where the deity is said to reside (Fir-nil)

Ownership, community owned (Own-com)

Management based on spiritual beliefs (Man-godP)

Memo on Reconnaissance Survey

World views and Practices

Some relationship is mutually beneficial to both biodiversity and man based on traditional tenets but current practises seem to be deviating from the past. An instance is the Igbedi youths, who relegate traditional practises and laws to elders and do appear not to know the traditional laws that govern these sacred areas. From interviews held within these communities, some scenarios can be created; Indigenous beliefs does contribute to the sustainable use and conservation of fragile ecosystems through protecting biodiversity. Indigenous beliefs contribute to sustainable livelihoods since livelihood support systems are maintained.

Categories of Lakes

Three different categories of lake seem to emerge from the interviews held within this region: those that are completely sacred and none of the resources within its perimeter are utilized or touched. In some case these areas are inhabited by a resident deity which is revered, example is the Eni Lake, those which protect certain species of reptiles such as crocodiles and “Iguana”s, which are totems and symbolise a form of worship, these animals, are protected through inherited ancestral laws, Enforcement of the laws is at the instance of traditional institution mainly elders of the owners of the resources and the priest in charge of sacrifice and worship of the god of these waters. This category of lake has an open and close season. The open season is marked by some ceremony with sacrifices offered to the god in charge of the water. Management of this category of lake is the prerogative of the males, either in the family that own the resource or in the community. Females do not feature in ownership or management of this lake. However the women have the important role of processing the fish when they are caught, they also buy and sell acting as middle men between the fishermen and down line marketers. Example of this lake category is Esiribi and Akpolokia in Bayelsa State, whose totem or symbol of worship is the crocodile. the third categories of lakes are those which have evolved through the years and are set aside for seasonal fishing for various reasons, sometimes they are set aside based on initial spiritual prescriptions or in some cases due to dwindling stocks. This category of lake from my investigation is still called a sacred lake because it is set apart from others, but unlike category two, it doesn't have a totem animal, which is revered and protected. People during the open fishing season can fish and kill reptiles or other animals where permitted like the Ifi lake.

Biodiversity

In the areas visited not much emphasis is given to plants aside its usefulness in construction or logging, it appears attention in this riverine areas centres on their lakes, rivers and swamps. The trend therefore in plant biodiversity in these areas might be in their use value, this could also be because of the time of the year. at this time concentration is more on fishing. Communities of the Delta appear highly dependent on seasonal patterns for their livelihood and sustenance, earnings from the processes and sales of biodiversity appear important for these communities. The assumption that variation and changes in the abundance or scarcity of certain plant or animal species could affect livelihood of people within this area might be valid; therefore the state of biodiversity within this areas is a major issue of consideration in this research.

Vegetation

Most of the lakes visited had a good forest support, but with increase in population and activities of these fishermen, the vegetation around the lakes face clearing and probably loss of some undiscovered biodiversity. During each open season, forest trails are cleared, to make room for the camps to be erected for the period; also woods are cut to make altars for drying the fish and for cooking needs of the camp. A major problem, which seems to elude local effort of control, is the prolific growth of invasive waterweeds. The flag species is the water hyacinth, which was seen in most of the lakes visited causes a lot of wasted man-hours, as these fishermen have to spend weeks clearing this obnoxious weed before fishing. With the heavy growth seen on these lakes, eutrophic levels might be a question for future investigation.

Fish Species

Preference by buyers in terms of fish specie seems to be for the bigger fish specie, examples include *Gymnarchus*, *Bagrus* and *Clarias*. Most abundant specie however in most of these fresh water lakes was *Citharinus citherus*. Main preservation done to prevent post harvest loss is kiln drying usually done traditionally, on rafters laid on sticks across open flame.

Forest paths to Sites

Accessibility (in terms of the foot path to the lake area) is a major consideration on which of the sites is to be considered as a site for future research. Some of these

lakes are located in very treacherous terrain with heavy thickets of rattan plants, making footpaths thorny and hazardous also during the rainy season these paths become slippery and trekking is laborious. In some of the communities access to the lake is granted unconditional whereas in some communities some necessary observances must be done, an instance is that of the Eni Lake.

The People

In all the communities visited we ensured we had a local contact person, who was taken as a member of the team. This strategy paved way for us in communicating with the community, the team was welcomed in all the communities visited. Mutual respect meant we listened and respected the views of the community and because of this we had more information on the subject. In my interactions with communities visited it appears visitors to some of these communities are viewed as “redeemers”, community people appear to want to hear you say, “we have come with a relief package” to the prevailing circumstance of poverty or deprivation. In such instance I had to consciously state that I wasn’t there to make promises or to provide infrastructures or to give money. However, in some communities monetary gratification was necessary to pave way for discussions.

Ownership Issues

Two types of ownership of resource base exist in this region; family ownership and community ownership. In the consideration of indigenous institutions of management in this region, these two ownership structures must be considered.

Management

Management of lake is fundamentally based on the potency of the god in charge / resident in the lake. In some cases the youths of either the family or community act as patrol guards (but this is when the resource base is close to the community, for instance Lake Efi).

Gender

The role women play in natural resource use is seen throughout the communities visited. The needs of women might be an important issue of consideration. Women do not seem to be a major voice in decision making in these communities and are therefore not included in the management structure. However there are certain key

roles noted; they are major marketers of natural resource products, such as the fish and bush mango harvested from these areas. They are partners with their husbands/men in contributing to household livelihoods as seen in the communities visited, where women take care of the home while their husbands/men are away in fishing camps during fishing season, which sometimes last up to three months. The question to explore would be finding out how the male dominated institutional arrangement of these communities caters for the needs of the women groups.

Semi-structured Script Used During Interviews

Oral History

Settlement history

Language

Market

Natural Resource Use

Classification of wetland areas

Ownership patterns

Type and classes of resources harvested

Sacred lakes and the community

Why sacred or set apart

Species of conservation interest

Tools used in harvesting lakes

Customary laws, customs, taboos upheld

Role of gender in the use of lake

General issues

Major and secondary sources of livelihood

Market and income patterns

Conflict issues and relationship of community with external institutions

APPENDIX 2

TRANSCRIPT OF FOCUS GROUPS INTERVIEWS

CASE 10

Contact Details Form:

Field Phase	2
Site	Biseni
Type of Qualitative Data	Focus Group Interviews
Group Name	Female Youth Group 2
Date	March, 2006

Group Interactions

Question 1: Cosmology / worldview / Belief systems which influences choices made

Person 1: Important thing for me is money and how to make it. With money I can take care of myself, build a house, marry and have children.

Person 2: Work is important for me or to be in school and for me I plan my life as I go along.

Person 3: My believe in God is most important, it teaches me to love my fellows, I know there is a creator, I can't believe in juju

Question 2: what is your understanding of natural Resources, what are the differences, what boundaries / restrictions exist?

Names of natural resources are given by the person who uses it

Natural resources include our lakes called "biou", forest "mbe", the swamps "elela" and the river "turodan". For us the river is more important because we drink from it and we wash there.

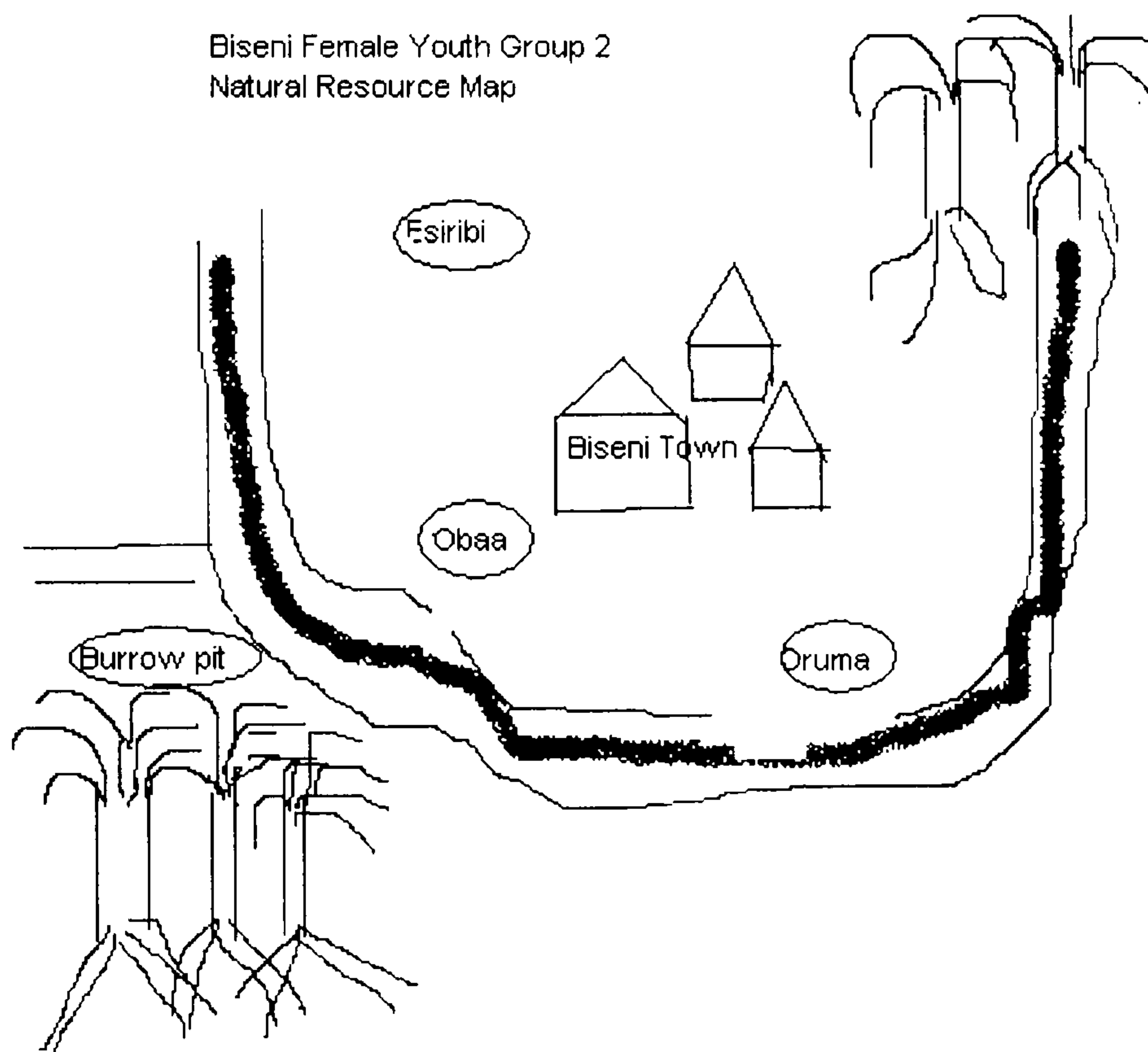
Person 1: We value fishing more (why?) Because fishing was what our parents brought us up with. So I would say for us (who?) The Biseni person fishing is our main occupation.

First Exercise (Natural Resource mapping)Observations

The young women at first were shy it seemed no one wanted to take the initiative of leading the process of drawing, I had to facilitate by first representing the position of Biseni at the centre of the drawing paper. Joy agreed to drawing as consultations

went on. From map and interactions, Taylor creek was drawn around the clan. Resources located included palm trees, Bush mango trees (ogbono), lakes (Obaa, Oruma, Esiribi) {**confusion/argument on how frequent these lakes were fished, some said yearly, others said once every two years.**} I had to ask the Question: Are they fished at the same time? No, they replied in unison. They have knowledge about neighbours as depicted by the boundary demarcation drawn between Biseni and Joinkrama community. Other natural resources depicted on the map included pipelines, indicative of crude oil. Also was burrow pit (pits from which sand are excavated for building and other construction purposes)

Figure 2.1 Graphical representation of original Natural Resource Map, drawn by the youths.



Group Interactions

Q: Why do you put burrow pits as a natural resource?

Burrow pits are important natural resources because we fish there after the flood season.

Q: Who are the users of these resources?

Both man and women, but for the lakes you would have to ask the owners.

Second Exercise (Seasonal Calendar)

Q: How many seasons do you have?

Person 1 & 5: rainy season starting March to September

Person 1: August break

Person 6: Flood time starting May to October

Dry season starting November to February

Q: What is your primary occupation?

(Observations: Arguments, some say fishing, others say farming).

Person 1: Fishing is what our forefathers passed on to us

Q: Is it everyone who fish?

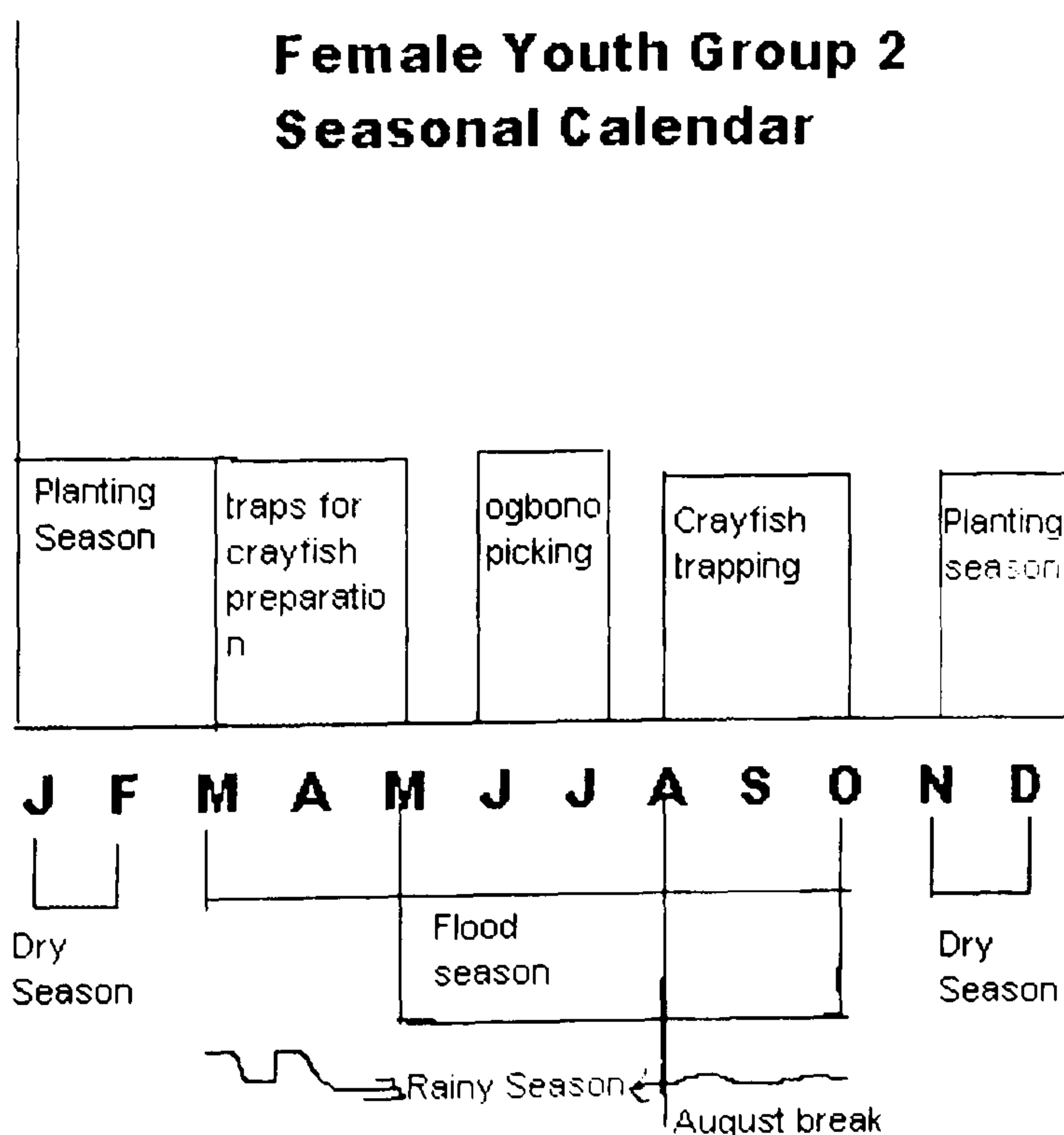
Yes both men and women

Q: What of visitors?

Yes, visitors are allowed to fish and farm but must ask permission from the owners of the areas. But to pick snails they don't need to ask for permission.

Q: So can we represent what we do as work, during these seasons mentioned i.e. rainy, dry and flood time.

Figure 2.2 Graphical representation of original Seasonal Calendar, drawn by the youths.



Person 6: Dry season, October to December, fishing done mainly by men in ponds (they bail the ponds)

Q: What do you as women do?

From October to February we burn our land and plant.

Q: What do you plant?

Okra, garden egg and corn, we also search for snails. March to May, we prepare traps for crayfish

Q: When do you do the actual crayfish trapping?

August to October, we go to River Niger, camp there and sell our crayfish

Q: What do you do between these months?

May to October, we pick Ogbono, but it is more June to July

Q: Is it only women who pick it?

No, both men and women

Q: So when does rainy season really start?

From March to October and then it breaks in August

Q: So let me get you right, can you say the activities only women do here?

Just the crayfish trapping, it is strictly for women. First we prepare the traps, then we go to fish for them. We normally stay away from the village for about three months.

Q: You say women also fish, what materials is use for fishing?

Nylon net, we set it across the rivers or the side of the lakes. Fishing in the lake are done mostly by men,

Q: So when do women fish?

January to December, you can set those nylon nets at anytime when you want to catch fish for the family to eat. But for the fishing of the lakes, the men use a net called "Mu" made out of cane rope.

Q: Are there any restrictions in the use of these natural resources?

Yes, what are they?

Ogbono season: the bush is closed at times and no body can enter except on accepted days of picking, if you go you would pay a fine.

Our lakes: These ones also have closed and open seasons.

Q: Who placed these restrictions?

Our forefathers

Q: Does everybody know these laws?

Yes, we know these laws from small, so everybody knows

Q: Who enforces these laws?

Person 1: when you default, you are made to pay a stipulated fine

Person 2: If the area has juju, something can happen to you

Q: Which people really make sure these laws are adhered to?

If the place is owned by a particular family, then it would be the family boys who would talk to that person, if it is a place that the whole community oversees, some selected people will make sure you are punished

Q: What do you think, do you think these restrictions are necessary; doesn't it disturb you making money?

Yes, to make money during those times these places are closed is difficult but the laws are good.

Q: Why?

Because it brings fear and also it allows the fish in the lakes to grow and be abundant.

Q: Do you have cases of people who have defaulted?

Person 4: Last year a woman died in the bush, she went to pick snails

Q: Didn't she know the laws?

She knew, she was a Christian. Also our parents told us that in Esiribi, they have animal which are not killed. If you kill this animal, you would do burial with white cloth, you must bury the animal as a human being and do some sacrifice. If you refuse to do it you would die or someone in your family would die.

(Observations: Obviously from the switch into Biseni dialect, there had been a case related to such incidence (a family name was mentioned) while some other participant listened in amazement).

Q: In this clan who are those involved in taking decisions that affect your use of these natural resources mentioned?

Bush is not owned by whole community, so land is by family inheritance. So if you want to do something on that land, you need to go ask the family who owns the land. Even our lakes for instance Obaa, Oruma, Esiribi are owned by different families.

Question 3: Wetland Management and Conservation

Q: Can you put a value on the areas of land where you have water; Elela, Turodar?

We can't price our lakes, rivers and swamps, no monetary value can be put on them, as for us we can't exist without water.

Q: Do you still have fish and other things as much as you use to have?

Not as much

Q: What could possibly be happening?

Nowadays we kill fish almost yearly; also the oil companies have destroyed our water.

Q: Do people fight over use of these areas?

Yes, people inside and outside the village do fight over these places.

Even though we have juju guarding these places, yet people still enter the lakes without permission. Normally if they are caught, the fish would be tied around the person's neck or he/she would be made to pay a fine.

Q: What problems would you say you have concerning these areas?

Oil companies are the main problem; they have spoilt our water with the chemicals they use

Q: What do you think can be done to solve this problem?

Since it is the oil companies, we want them to pay us compensation for spoiling our water and they should also dig boreholes for us to drink from.

Q: In terms of management of these areas, who should manage them?

Families who own the lakes and forest should continue to manage them.

Question 4: Sacred Lakes and Conservation

Q: In these wetlands, that is the rivers, lakes, burrow pit and ponds are there any difference in the way you use them?

Yes, we have differences, particularly in our lakes. For instance we have Esiribi, where we have certain laws governing the place for instance; don't kill crocodiles, women married into the family owners can't go to the lake. Whereas in a lake called Asa, we can kill crocodiles, there women can go to this lake.

Q: For this lake, Esiribi which you have mentioned do you know who determines when fishing is done there?

Yes, the eldest male in the family

Q: Do you know why crocodiles are protected in Esiribi?

Yes, because the crocodile "mininema" is the goddess that they libate to and during the fishing season after this libation all the crocodiles come to the shore.

Q: Do you know whether the crocodiles are still there?

They are plenty there since nobody kills them

Q: What type of fish do you get from such a lake as Esiribi?

Ari, Eni, Akor, Ariri, Egeda, Okwo, Afor, Igburo, Isigha, Olomo, Azar, Imuro.

Q: Which one really yields money for you?

Ariri, Igburo, Afor, Isigha, Imuro

Q: One last question on this lake, if the government or any other organisation wants to take over the management of your lakes would you allow them?

No

Table 2.1 List of Attendees

S/N	AGE GROUP	SEX	NAME	VILLAGE
1	Y	F	Bina Ebi	Akpede
2	Y	F	Asoye Ebi	Akpede
3	Y	F	Joy Akpanah	Tein
4	Y	F	Beweoru Trakiini	Tuburu
5	Y	F	Blessing Okoro	Atat (Imo State)
6	Y	F	Beauty Adulphus	Tuburu
7	Y	F	Patience Oweifah	Egbebiri

Summary Form

Attendees were mostly students, some school leavers, others waiting to get into tertiary institutions

Had knowledge on general issues and were aware of traditional laws (such as those of the lakes; killing of crocodiles)

From conversation on cosmology, a lot of influence of Christian religion appears to underline responses made however, most important for most of them was not their believe of the Christian God, but rather money and how to make lots of it

Seasons meant something to this group, but from body language and discussion, they were not quite sure of when some activities really started (probably because of their school involvement)

Resources within Biseni clan are family own, so boundaries are set by these families. Families may play important role in management protocols, it seems from our discussions that resources had ownership labels with the exception of the river which is a common resource and has free access

Main source of water is the Taylor creek; same creek has a problem of the invasive plant, *Eicchornia crassipes*.

CASE 11

Contact Details Form:

Field Phase	2
Site	Biseni
Type of Qualitative Data	Focus Group Interviews
Group Name	Women Group 3
Date	March, 2006

Group Interactions

Question 1: Cosmology / worldview

Q: What is your view about the world, including things you see and those which you don't see?

Person 1: God created all things for us to live on this planet, so I believe there is a creator

Person 2: Juju is there which we do not see, but they are not on the level of God

Person 3: The person who created the world is God and we know there is a living king called Jesus, God and Jesus is the greatest

Q: God that you call and talk about what is his name?

We call the Almighty creator God "Sebezaro"; meaning "the person that rescues our life"

Q: You say there is juju, which is not on the level of Sebezaro, please can you tell us more on this juju?

All jujus are bad

Q: Do these jujus like Sebezaro have names?

Yes, their name is plenty depending on what they do

Esiribi; juju in charge of the lake, you carry drink to it before you fish there

Bizeniacri; juju of our land Biseni, during the flood season we carry drink to it

Igbazo; juju that protects the community

Senamera; juju that is in charge of those people who are from our community but they live outside. If you want your child or relative or any person who originates from Biseni to come back home, you go and sacrifice to this juju

Opudo; juju in charge of dry season, before we women plant our yam, we pour libation to this juju

Okurafo; juju like Senamera

Q: So you have god of the lake Esiribi?

Yes, Esiribi is the god of the lake; it takes care of the lake

Q: These jujus are they in charge of all these places?

Yes, if you want fish plenty, you have to sacrifice to the juju in charge of the fishing place, if you want good yam harvest; you have to pour drink to the juju in charge of the planting season.

First Exercise (Natural Resource Mapping)

Question 2: Natural resources Use

Note: Process was led by the teacher (**consensus amongst the women, since as they said, she was used to writing**).

Q: What are the natural resources you can identify around your community?

Ogbono trees, swamps where we get raffia sticks we use to making crayfish traps called "isusu". We also get a plant called "Kenyari" to sell

Q: What is Kenyari use for?

It can be used as chewing stick and it also has some medicinal properties when you cook it with other plants

Q: What are the other natural resources?

Taylor creek, lakes, River Niger, Burrow pits

Q: I notice you talk more on the swamps and rivers, but I hear you have lakes are they not important?

Farming is more important for us than fishing

Q: Why?

Women are not allowed to fish in the lakes

Q: Any particular reason?

Because lake work is tedious, but we can set nets (made from nylon) to catch small fish

Q: What are these nets called?

Arerikoye

(Notes: The natural resource important to the women seemed to be those used as food for the family and for livelihood purposes).

Q: You have shown your ogbono trees, River Niger, is there any other natural resources?

Cane rope, animals in the forest, birds and crude oil

Q: You said the swamps and forest is important for you as women why?

In the swamps we get food and we can farm in parts of the forest.

The creeks also important for transportation and to catch crayfish (Lobsters)

Q: Is it everyone who can use these natural resources?

Yes, all people including children.

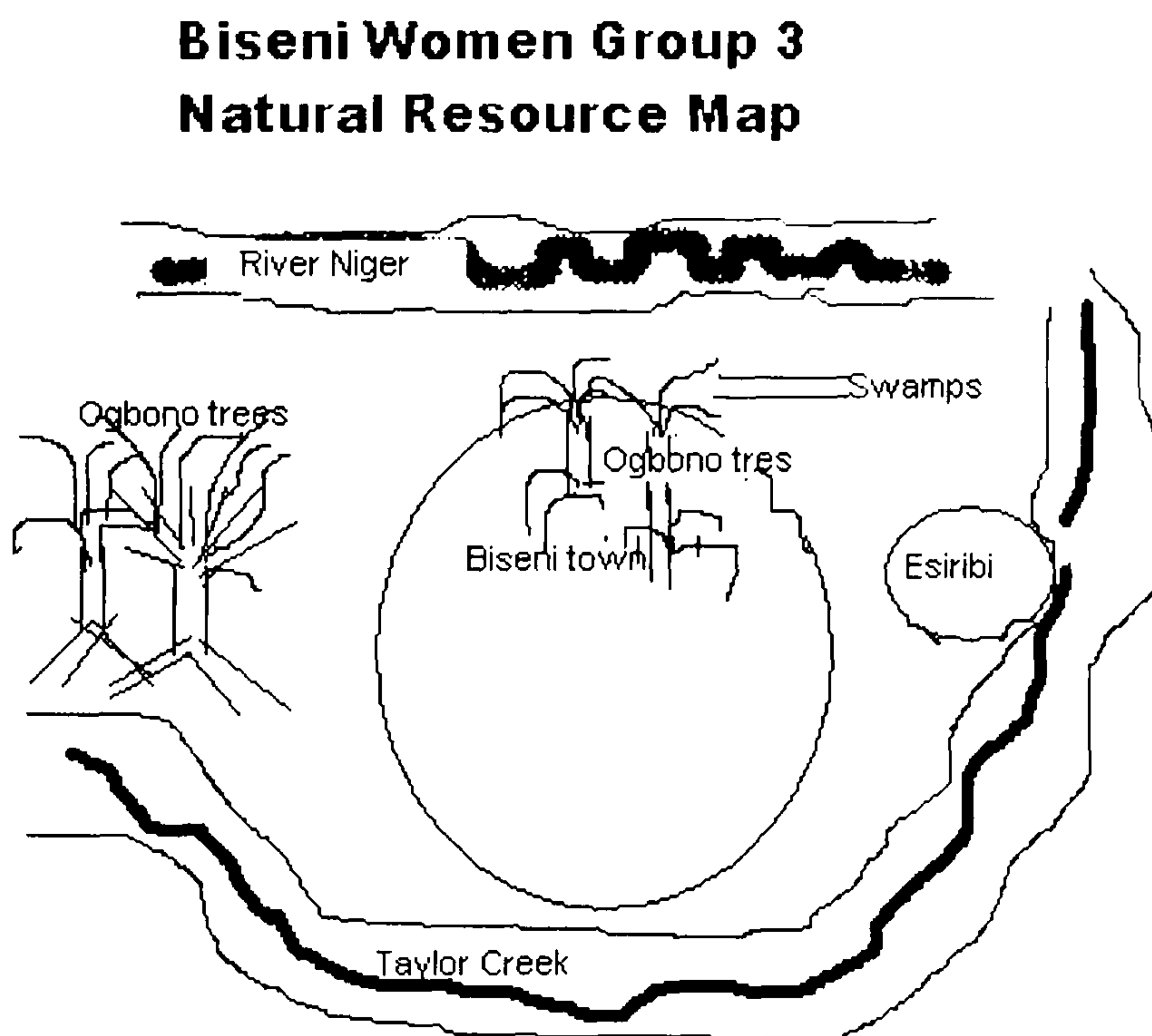
Q: What of strangers?

Yes, they can use the resources, but they are not allowed to trap crayfish.

Q: Any particular reason?

Because they do not know the art.

Figure 2.3 Graphical representation of original Natural Resource Map, drawn by the women.



Q: So from what you are saying what is the primary occupation of the women in this community?

Farming

Q: What other things do you do?

We pick ogbono, snail and trap crayfish

Second Exercise (Seasonal Calendar)

Q: All these things you do please can we represent them on this chart and show the particular time these activities are carried out. Let's start by knowing how many seasons you have and at what month these seasons start and end

Dry season starts December and ends April we farm and pick snails during this time.

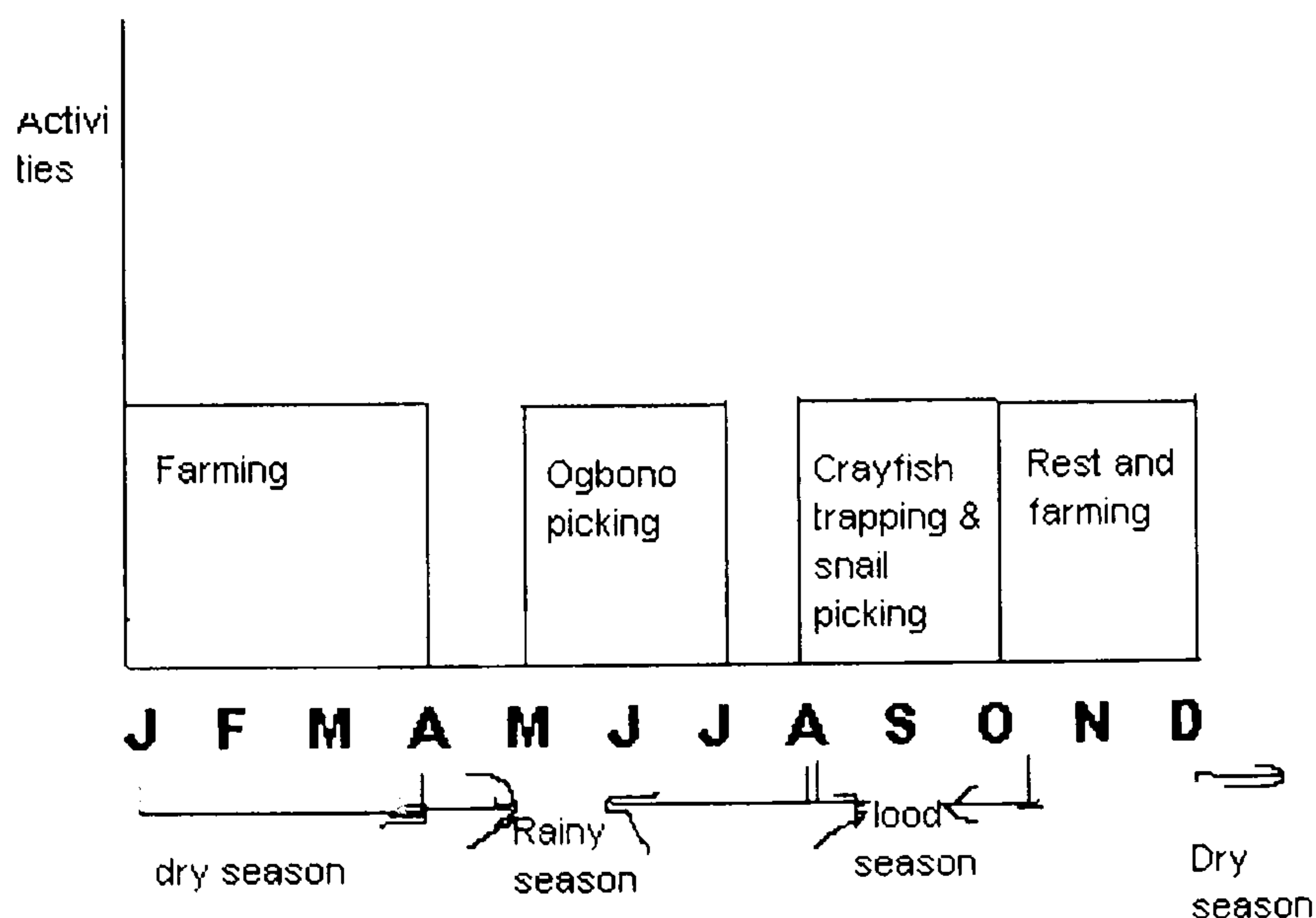
Q: What type of crops do you grow?

Sugar cane, groundnuts, okra, cassava, yam, cocoyam, plantain and sweet potatoes.

Rainy season starts in April and ends in October. The rainy season from April to August is ogbono season but mainly it is from May to July. From August to October we do crayfish trapping and also pick snails. The Flood period is from August to October (Q: What do you then do during the flood season?) October to November we rest and do some planting.

Figure 2.4 Graphical representation of original Seasonal Calendar, drawn by the women.

**Biseni Women Group 3
Seasonal Calendar**



Q: Are there any restrictions/laws placed on the uses of these resources?

Yes, you can not go into another family's land to pick ogbono or to farm or some lakes to fish. You have to seek permission from the family owners before you can go

to their property to use or take anything from it. But like the river everybody is free to fish and do anything there.

*Q: Are people aware of these? For instance as women do you all know these laws
Yes, everyone is aware of these restrictions*

Q: Do you think they are necessary?

The laws and restrictions are very necessary; they help us maintain order in our village

Q: Has any person ever violated these restrictions?

Yes, amongst us people have disobeyed

Q: What was done to them?

They were fined, some fish thieves had to carry the fish on their heads, some the juju either disfigured or killed them.

Q: Who makes decision on community's use of natural resources?

The family owners of the resources, resources in our community are not own by everybody, but by families. So decision taking is for the eldest man within each family.

Question 3: Wetlands Management and Conservation

Q: The fish, crayfish, ogbono and other things you take from these swamps, lakes and rivers are they still as abundant as before?

No, these things are not as abundant as before

Q: What is responsible for this situation?

People have increased

Crocodiles are not plenty as before, because greedy people kill them

The oil companies have spoilt our water

Q: Do people fight over who owns or when to use these places?

Yes, it has happened before within the community

Q: What was done in such a situation?

They were fined, for instance if they killed a crocodile, they would have to replace the dead one with a life one. Also those who were not caught in the act had one form of sickness or they are tormented in their dreams until they confess their sins.

Q: Are there still such cases of people violating these restrictions?

Except new offenders, if not stealing has reduced from the area

Q: But you can't rule out people trespassing on these far away lakes or areas, so what measures have you put in place so that no one goes there?

Wife of a family member of the owners of Esiribi Lake: These laws which exist today has been in existence and passed on from generation to generation, no man is able to look after the lake but the juju knows how he protects its lake

Q: What is the major problem apart from people stealing which you have concerning these your swamps, rivers and lakes?

Abiola (water hyacinth) plenty for the water, also the lake is not as deep as before, so fish is not killed as before. Abiola doesn't allow us to row our boats

(Note: Siltation of lake maybe the plausible explanation for low flood reduction from upstream river as noted by the women above “the lake is not as deep as before”)

Q: Have the community done anything to solve this problem?

We remove the Abiola with our hands; nobody has ever come to help us. We think the government should help to remove Abiola from our water for us

Q: If you say the government should help remove Abiola, can they or any other organisation then help with the management of these swamps, rivers or lakes?

No, we can't share our resources with any body

Question 4: Sacred Lakes and Conservation

Q: Do you have amongst your lakes, those which are set apart from others?

Yes, all our lakes have time of fishing, and you can only fish them during those times. The biggest out of all of them is Esiribi, others are: Asa, Oruma, Olu, Obaa, Ebibi, Egbeta.

(Note: from discussion apparently, lakes in Biseni have one form of restriction or the other, common reason is on wanting the juveniles to mature before harvesting).

Q: Let's take Esiribi as our reference, why is Esiribi different from the others, is it because of its size?

No, because of the laws placed by the family. (Q: What are these laws?)

Women that are married to the family can't go there for instance. Crocodiles are not to be killed in the lake. Women can not wash their bodies there. Menstruating women can't wash or get into the water. Women can't put their privates inside the water.

Q: Who are those in charge of ensuring these restrictions are kept?

The family members.

Q: What type of fishing is done in Esiribi and how often is this lake fished?

Every three flood season, the lake is open for fishing. During the fishing season, different materials are used. Mainly a woven crossed material made out of cane rope called "Puo". Also we can use nylon nets, "Syarade" (hooks) and "Igbo" (cast net)

Q: What type of fish is caught from Esiribi?

All type including; Afor, Arere, Isicha, Enie, Igeda, Opuor, Oweri, Sybidanwei, Ayei, Ogbuogbe, Esiri, Otuon, Akor, Ekpuro

Q: Which of these fish is most important?

These fishes are important for us, Arere, Mburo, Isicha, Imuro, Egeda. (Q: Why?)
Because we sell them and make money.

Q: From what you have said, in Esiribi you do not kill crocodiles, is there any particular reason?

Well our forefathers protected these crocodiles, so we also must do same, in those days they use to worship these crocodiles

Q: Do you still have as many as before?

No.

Table 2.2 List of Attendees

S/N	AGE GROUP	SEX	NAME	VILLAGE
1	E	F	Theresa Omada	Egbebiri
2	E	F	Easter Osakwe	Egbebiri
3	E	F	Helen Ochogu	Tein
4	E	F	Dorah Amoye	Tuburu
5	E	F	Fustina Kowe	Tuburu
6	E	F	Snowwhite Osakwe	Egbebiri
7	E	F	Beiya Agbaow	Tein
8	E	F	Feiya Atapo	Egbebiri
9	E	F	Ayama-ere Osakwe	Egbebiri

Summary Form

Women shy away from discussing traditional practices in particular the worship, belief and ordinances of the past.

The Biseni people appear religious and many seem to have embraced the Christian faith. Most responses during the discussion appear to have Christian underpinnings. An instance is the heated argument with person 2, who when she started to talk about juju worship, the women went into some form of argument to shut her up.

Most seem to want to be seen as Christians, not associating with juju or traditional worship system. But through out the discussion, it was obvious that the practice of keeping to the traditional laws and regulation of treating places like Esiribi as special was still obtained even though libation and other practices were restricted to the family who had the ownership right to the lake

Women had a lot to say about fishing and its activities, but in reality they were mainly farmers.

Fishing they said especially of their lakes was a male affair, however they could fish along the creeks, rivers and sometimes at the edge of the lakes.

An exclusive occupation of the women was the lobster fishing. Women go into camps, live away from home for about three months for this lucrative trade. As I enquired on whom they marketed their products to, their customers they replied included the Ibos, mainly from Onitsha and Asaba (this is explainable, because this is the dominant tribe close to the area of lobster fishing)

From the discussion, men head households in Biseni and they are regarded as the decision-makers except in cases of widowhood. In such cases the widow in question lives on her own and her children are away from home, then she can take and make certain decisions that concern only her immediate family.

CASE 12

Contact Details Form:

Field Phase	2
Site	Biseni
Type of Qualitative Data	Focus Group Interviews
Group Name	Male Youth Group 1
Date	March, 2006

Group Interactions*Question 1: Cosmology / Belief System*

The world can be categorised into two; the one we see and the one we can't see.

Visible things (the ones we can see) are made of living and non-living things.

Living things are men like you and me, things that can move and walk. We refer to things which are living as "iyouseiyamini" while the non-living things (that can't move) as "iyouseiyayemini".

Invisible things such as the air we breathe and some spirits can be dangerous.

Although we serve them, they still can kill us, especially if we don't serve them properly, but these are the bad spirit

Q: Can you give some examples of these bad spirits?

Opukeme (seiteme), marine spirits

Q: Do you have some of these bad and good spirits in you land?

Yes.

Q: Please can you mention them?

Isinamara, Okurafor, Esiribi, Isemu. These are some of the gods, some people believe in them but not all of us

First Exercise (Natural Resource Map)*Question 2: Natural Resource Use*

Q: What's your understanding of natural resources?

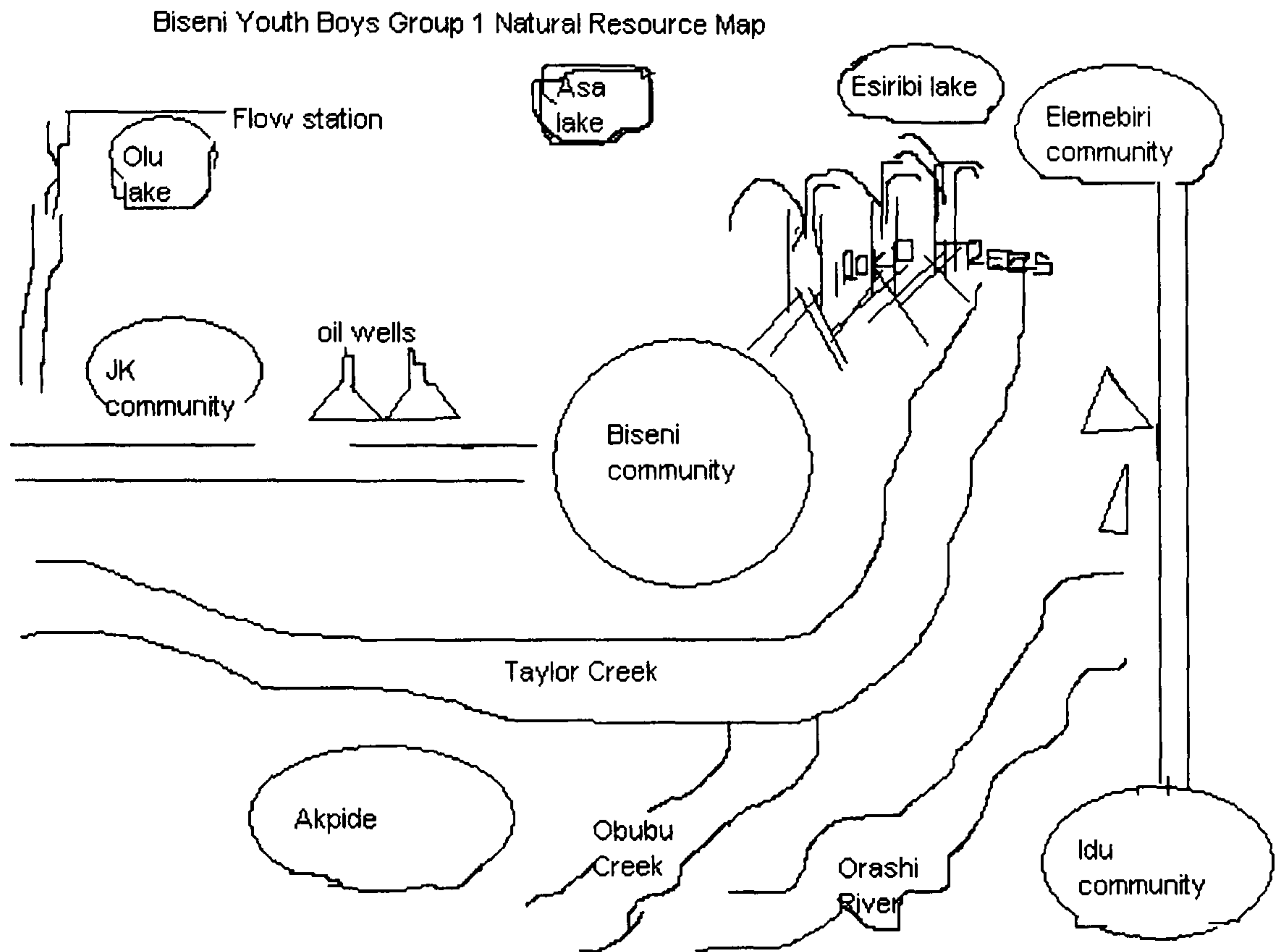
These are things created by God, that we make use of; they are the wealth of the clan

Q: Can we represent some of this wealth on the map?

Observation

Natural Resources noted included oil wells, lakes, creeks, river, Economic trees such as Iroko and palm trees. Youths knew the location of flow stations, lakes and their neighbouring communities.

Figure 2.5 Graphical representation of original Natural Resource Map, drawn by male youths.



Our forest contains important timber like Iroko, Abura which gives us money. Also we fish in the lakes while the money made from oil is for the whole Nigeria. We also have a lot of palm trees where we cut palm kernels for oil production.

Q: Who uses these resources?

Men, women, everyone is allowed to use these resources

Q: What of visitors?

Yes, visitors are allowed to work in our land

Q: These resources, is it throughout the year you have them?

Yes, but we have seasons when you can get some resources in abundance

Q: How many seasons are there then?

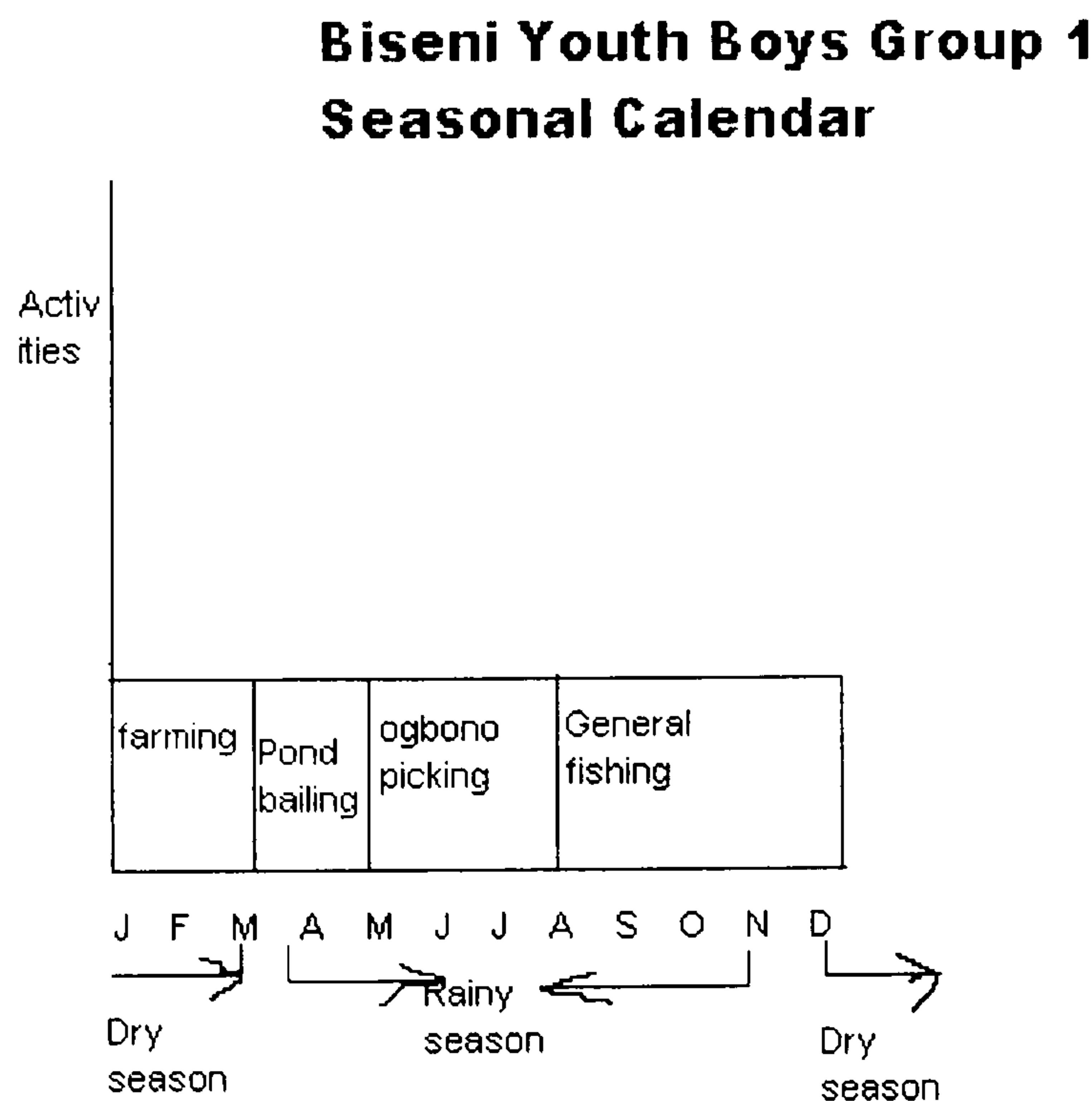
We have two seasons, Dry and rainy season

Second Exercise (Seasonal Calendar)

Q: Can you illustrate when these seasons start and in particular what you do during each season

Dry season begins December ends in March, while the rainy season starts in April and ends in November. (Q: What type of activities do you carry out in each of these seasons?) The dry season which starts from December through March is the farming season and we mostly cut palm and do logging. Also around February to April we fish in the pond by bailing the water out of the pond. In some of our lakes also we fish around February lasting to July. May to August is Ogbono picking while general fishing takes place from July to December time. Timber and logging is done in both seasons. But, this activity is mostly done by visitors employed by community members.

Figure 2.6 Graphical representation of original Seasonal Calendar, drawn by male youths.



Q: So what would you say is your primary occupation?

We are fishermen and we also do a little bit of farming, Biseni land is more of swamps and lakes that is why we are fishermen.

Q: What of your women folk what is their occupation?

While men engage in fishing and cutting of trees and palm cutting, women engage in farming, ogbono picking and crayfish trapping.

Q: Are you saying your women don't fish?

They do, using nylon nets, also they sometimes do bail ponds for fish harvesting.

Q: Are there any restrictions/laws placed on the use of these resources?

Yes we have laws restricting people in our area

Q: What are these laws?

Stealing is prohibited in the lake. You can't go into any lake to fish without seeing the owners of the lake. In some of our lakes, for example Esiribi, crocodiles and monitor lizards are protected. So if you kill them, you are to bury the animal as you would a human being. Also when it is time for fishing this lake, all the men have to go into the water at the same time, if not you would pay a fine.

Q: These laws who made them?

The owners of the lake.

Q: Are people aware of these laws and who enforces these laws?

Yes, everyone is aware and generally the whole community keeps these laws and ensure people adhere to them.

Q: Do you think these laws should be removed?

These restrictions are very necessary they help control the fishing methods.

Q: Don't you have cases of people disobeying these laws?

We have, but they are mostly our neighbours from Omoku, Aghere, Idu and Joinkrama.

Q: What action has been taken to prevent this situation?

Normally offenders are made to pay a fine and sometimes it becomes a police matter.

Question 3: Wetland Management and Conservation

Q: The areas of your land which are covered by water what do you call them?

We have different names for different places, "Ilila" are swamps while "Ovu" are seasonal swamps.

Q: Your fish, plants and other things you get from these places are they still in abundance as before?

No they are not.

Q: Why?

Oil exploitation is the major problem, the road construction they do for their flow pipes leads to sand- filling of swamps, also some of the fishing methods used these days.

Q: What would you say is the main problem of your wetland?

Flooding, over flooding during the fishing season which spoils our nets and traps

Question 4: Sacred lakes and conservation

Q: Do you have lakes which are set apart from other lakes?

Yes

Q: Why are they so?

They are so because we want to preserve our fishes, so that they would always be there for us.

Q: Please which of your lakes fall into this category of set apart?

Esiribi, Asa, Oruma, Obaa, Akpide and Ikuludoni

While those we fish all the time are, Kunuzuno, Egbegidi, Ebibi, Egbeda, Puro.

Q: What are the fish species you get from these set apart lakes?

They include; Afor, Eni, Okuwor, Igberu, Isegah, Oturu, Igidah, Esiri, Kobiyo, Olumor, Imuru, Anye, Sibidaowei, Ako.

Q: Which of these are important?

Most important is Afor and it's because of the money we get from its sales

Q: Do you protect any animal/plant in these lakes

It is only in Esiribi and Asa where animals are protected; the crocodile.

Q: Are they still as abundant as before?

No

Table 2.3 List of Participants

S/N	AGE GROUP	SEX	NAME	VILLAGE
1	Y	M	Godday Basil Oweifah	Egbebiri
2	Y	M	Obireke A Binaye	Tuburu
3	Y	M	Omadi Iworukumo	Tuburu
4	Y	M	Nyinama Ovuro	Akpide
5	Y	M	Akpo-ebi Ebiowe	Akpide

CASE 13

Contact Details Form:

Field Phase	2
Site	Biseni
Type of Qualitative Data	Focus Group Interviews
Group Name	Men Group 4
Date	March, 2006

Group Interactions

Question 1: Cosmology/Belief System

The world is of two divisions, the one we see and the one we don not see. Both worlds are real

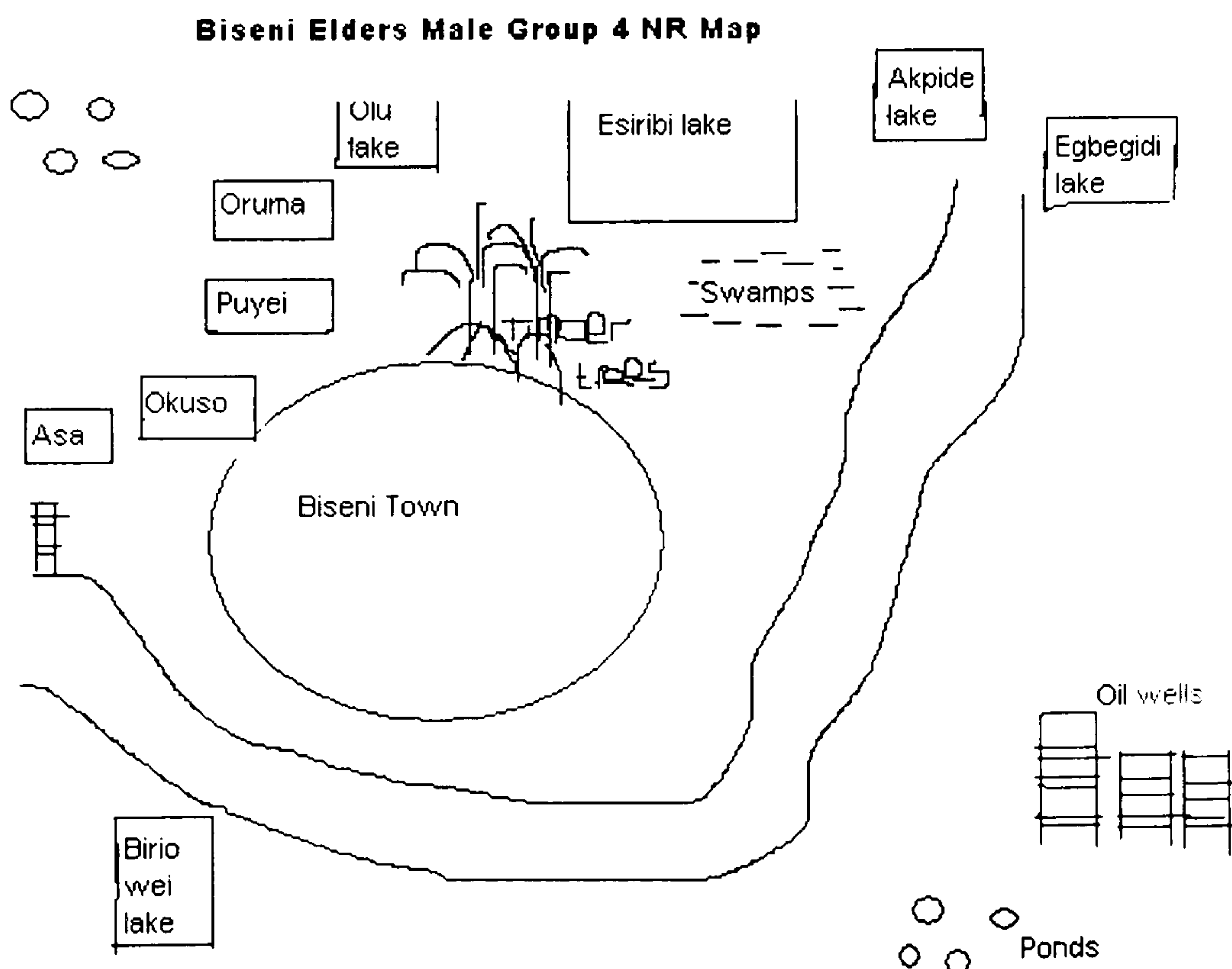
First Exercise (Natural Resource Mapping)

Question 2: Natural Resource Use

Q: What are the natural resources you have around you?

The natural resources we have include palm trees, land, lakes and swamps

Figure 2.7 Graphical representation of original Natural Resource Map, drawn by men group.



These resources are important for our livelihoods, we depend on them for every day living.

Q: What are the different types of wetland you have?

Swamps – ilila

Lakes – Zunor

Seasonal swamps – Ovu

Second Exercise (Seasonal Calendar)

Figure 2.8 Graphical representation of original Seasonal Calendar, drawn by men group.

**Biseni Elders Men Group 4
Seasonal Calendar**

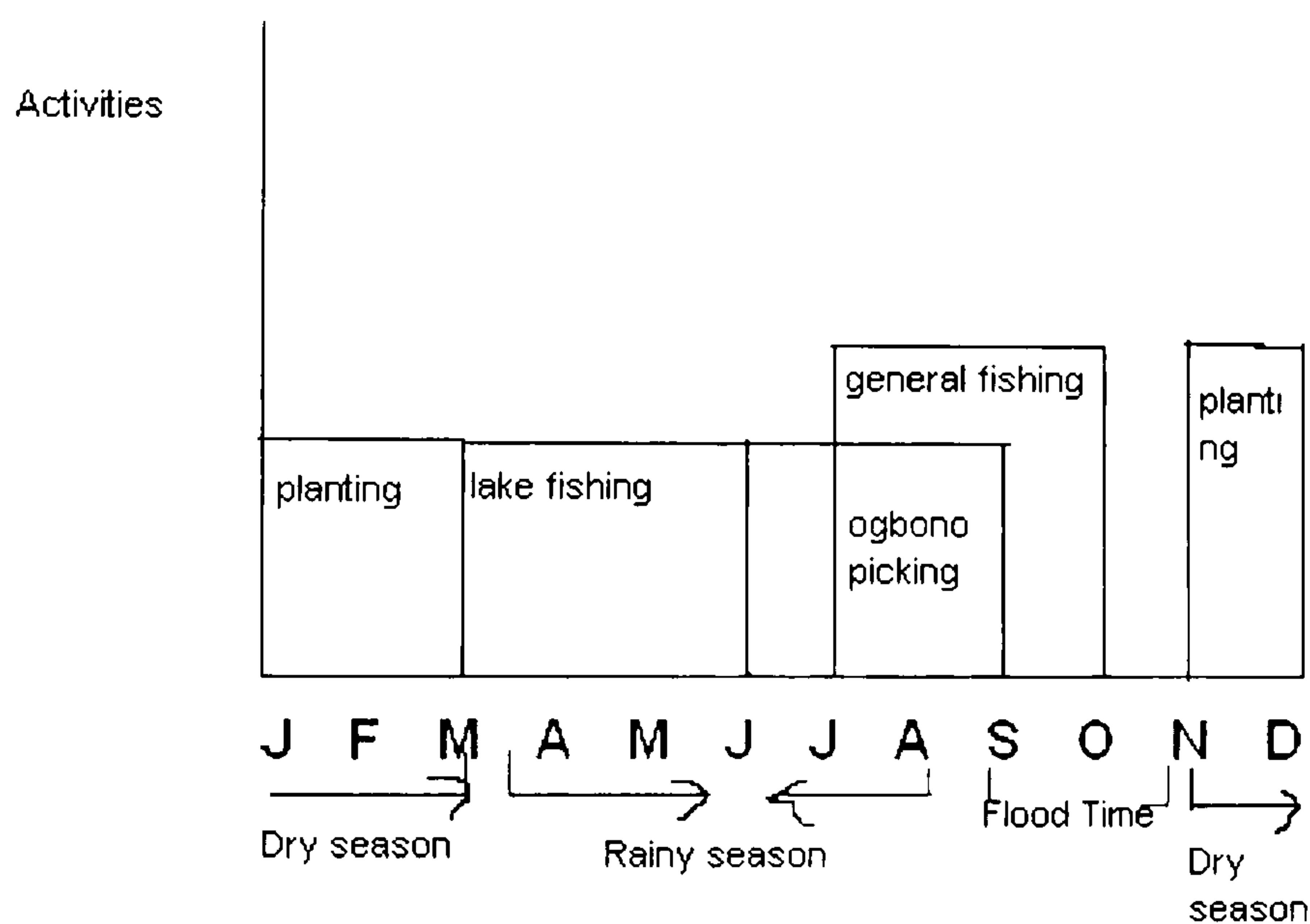


Table 2.4 Summary of Seasonal Activities Discussed

Activities	Month of the Year
Creek Bailing	December to February
Pond bailing	February to March
Lake fishing	April to June
Fencing of creek	July to September
General fishing	July to October
Covering of creeks with traps	November to December

Farming (yams, cassava, plantain)	November to March; May to June
Harvesting of crops	August to October
Cutting of cane rope	January to December (all seasons)
Ogbono picking	July to September
Hunting	January to December (all season)

Q: What activities are for men?

Drawing from lakes, pond bailing, hunting and plantain farming.

Q: What of those for women and visitors?

Women are involved in planting cassava, yam, groundnut, and crayfish trapping (isusu). While visitors mainly tap palm wine, are loggers and carvers of canoes.

Q: Are women not involved in fishing?

They do general fishing.

Q: Are there restrictions/laws governing the use of these lakes?

Yes

Q: What are they?

You can not go into the lakes when the family don't give you permission to. No one is allowed to use chemicals in the lake. No land can be used as farmland without permission from the owners.

Q: Who are those involved in making decisions?

Elders of the owners of the lake

Question 3: Wetland Management and Conservation

Q: Are the produce you get from the wetland still as abundant as before?

No

Q: Why?

Because of oil spillage from the oil companies. Also too much noise nowadays, it affects the animals in the forest. For instance these days there are no elephants in the forest. Also siltation has occurred within the lakes and the ponds.

Q: Have you ever had a case of poaching within the wetland?

Yes, from the Joinkrama community

Q: What was done in this incidence?

The two clans met that is Biseni and Joinkrama and the matter was resolved. The people were asked not to come into our community area again.

Q: What have you done to prevent people from going into these areas?

We have gone to our neighbours and announcements have been made to the effect that defaulters would have to pay a fine.

Q: What would you say is the major problem in these areas?

Fishes are not as abundant as before, mainly caused by siltation of our lakes.

Q: What have you done to solve this problem?

We have appealed both to the government and the oil companies but have not received any favourable response.

Q: How do you think the wetland should be managed?

We want the government and oil companies to help in managing these areas for us. Laws should also be put in place for instance trees that are too small should not be allowed to be cut; farmlands should lie fallow for some time, before farming there again.

Question 4: Sacred lakes and conservation

Q: Do you have lakes which are set apart from other lakes in this community?

Yes, like Esiribi

Q: What's the importance of this lake and why does this difference exist?

Esiribi is a very big lake and we have set it apart so we can make money from it.

Q: Do you carry normal fishing in this lake?

Yes, but after 3 years that is when we fish this lake

Q: Who determines when you fish in this lake?

The family owners and all decisions about the lake is made by them.

Q: What type of fish specie is present in this lake?

Afor, Ariri, Akor, Isija, Imurun, Igida, Eni, Anye, Lugbe, Oweri, Oboin, Aza, Saa, Okuwo, Okpo, Kobiyo, Iguru.

Q: Which is the most important?

Afor is more in the lake (Q: Why?) it gives us more money than any other fish.

Q: Are there any animals or plants protected in this lake?

*Yes, crocodiles are protected in this lake (Q: are they still as abundant as before) they still are abundant. Also in some other lakes like Lake Asa,, *Gymnarchus* and snails are protected.*

Table 2.5 List of Participants

S/N	AGE GROUP	SEX	NAME	VILLAGE
1	E	M	Chief Godfrey N Ekeme	Tein
2	E	M	Chief John Kowei	Tuburu
3	E	M	Omadi Sergeant	Tuburu

CASE 14

Contact Details Form:

Field Phase	2
Site	Osiama
Type of Qualitative Data	Focus Group Interviews
Group Name	Male Youth group
Date	April, 2006

Group Interactions*Question 1: Cosmology*

Q: What's your view about the world around you?

I relate with living things, they move, they talk, they feel. But non-living things are static without feelings. The visible is real things I can touch like human beings, the invisible is mysterious such as witches and things I can not explain to me are invisible, for instance on our lake there is place if you get on you would die, this is a mystery.

The invisible like the air we breathe in can not be touched like humans but it is real. So I know the invisible even though a mystery or a puzzle is real.

First Exercise (Natural Resource Mapping)*Question 2: Natural Resource Use*

Q: What do you understand by Natural Resources?

They are free gift of nature and they are things which I can feed on and make money from.

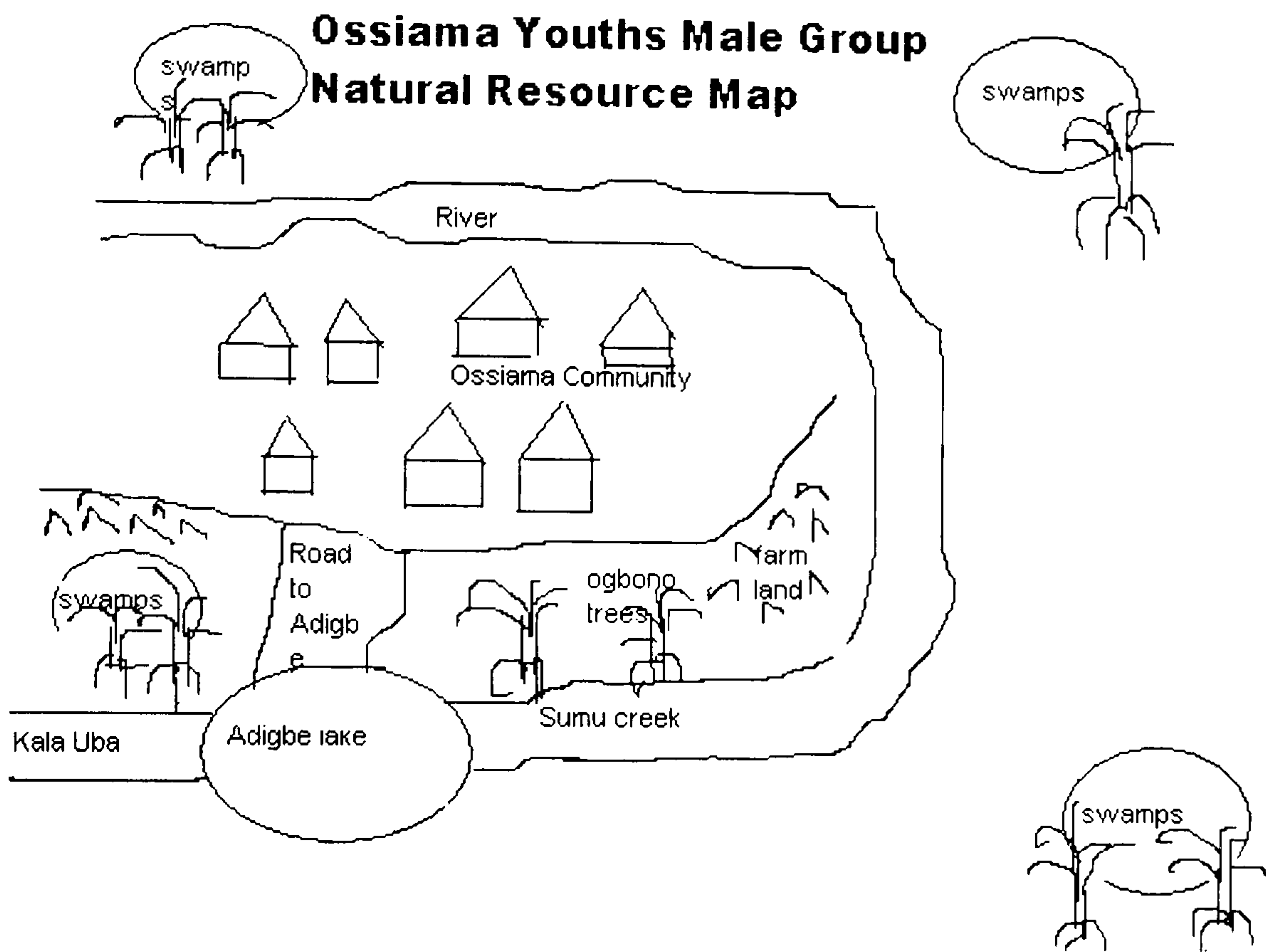
Q: What are the natural resources within your community?

They include our Lakes, ogbono and palm trees, raphia trees, ponds, timber and snails.

Q: Are there differences in the wetland use in your community?

Yes, in the river everybody is allowed to freely fish whereas in the lake we have a law which binds everybody not to do fishing until the time permitted. Swamps are free for all, ponds are personal.

Figure 2.9 Graphical representation of original Natural Resource Map, drawn by male youths.



Second Exercise (Seasonal Calendar)

Also in the swamp during the flood period we do timber work and when the water recedes we fish there also.

Q: So what would you say is the primary occupation of your people?

Farming, Farming makes money for us than fishing

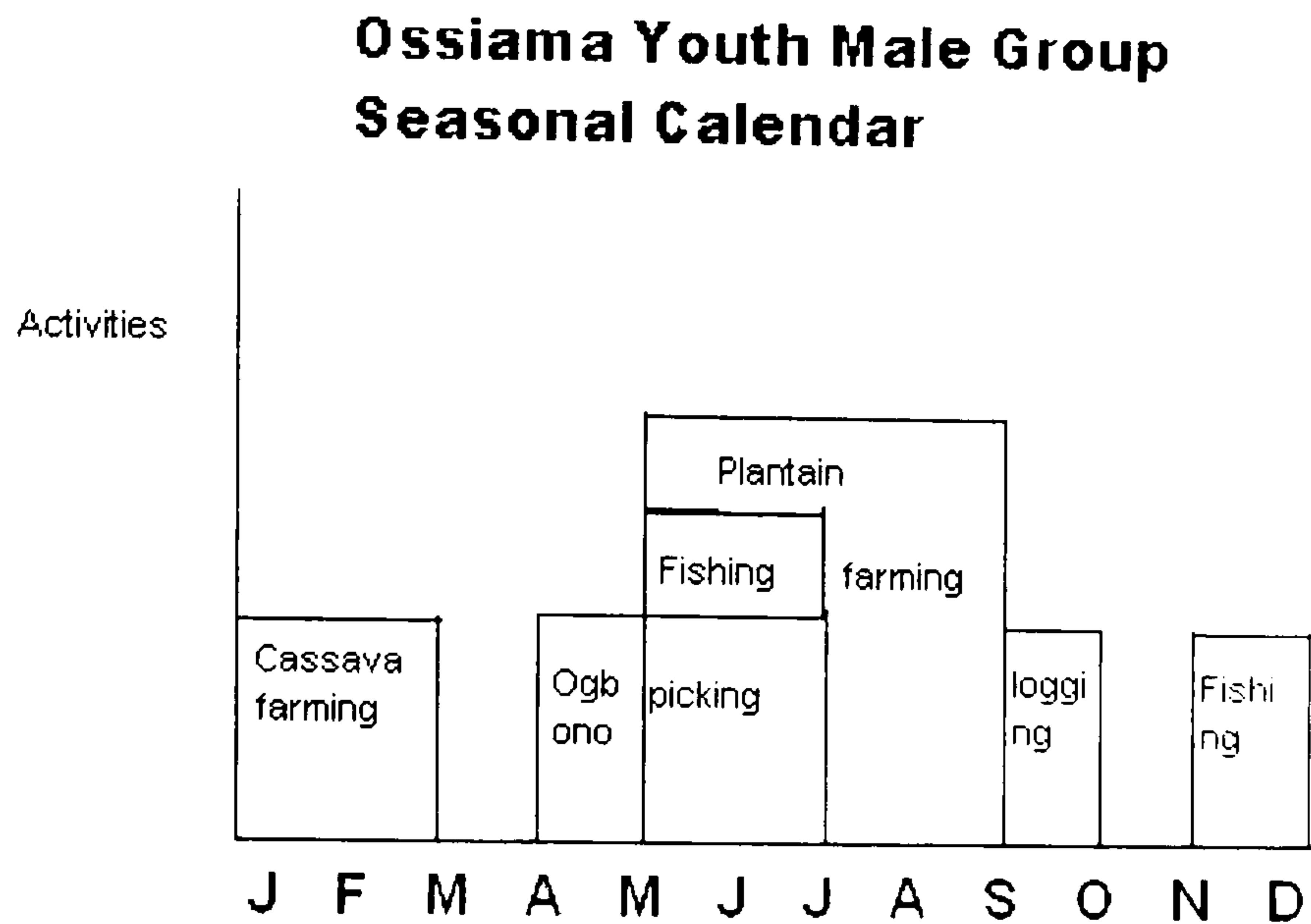
Q: What do you do to supplement farming?

Fishing

Q: Which activity is done only by men?

Palm cutting, Raffia tapping and canoe carving.

Figure 2.10 Graphical representation of original Seasonal Calendar, drawn by male youths.



Q: What of women?

Cray fish trapping

Q: What of visitors?

Raffia tapping and palm cutting

Q: Do your women also fish?

Yes and also they farm

Q: Are there restrictions/laws placed on the uses of the forest and wetland within this community?

Yes, there are laws

Q: What are they?

If you are caught stealing plantain from another person's farm the community leaders would discipline you. There are certain trees e.g. Iroko, mahogany, you are not allowed to cut from another person's farmland. In the swamps where we have raffia palm, owners could employ outsiders to tap them.

Q: Who placed these laws?

It is the community and everyone is aware of these laws

Q: Do you think these laws are necessary?

Yes, because of these laws there is no stealing

Q: Who are the people within the community who are involved in decisions that affect the use of these natural resources?

The CDC, youth and compound chiefs

Q: How did they get into this position?

They were nominated

Question 3: Wetland management and conservation

Q: Are the produce you harvest still as abundant as they use to be?

No

Q: Why?

The population of these things have reduced because of increase fishing and hunting activities.

Q: What would you say is the main problem concerning your wetlands?

Water hyacinth, high flood and dynamite used by some people in fishing.

Q: What have you done to solve these problems?

In terms of water hyacinth, we normally clear them with our hands, but we need the help of the government.

Question 4: Sacred lakes and conservation

Q: Do you have lakes which are set apart from other lakes in this community?

Yes, Adigbe and Sumu Lake

Q: What is the importance of this lake and why is it different from the rest?

We occasionally fish these lakes and because of this we have a high yield of fishes.

Q: Is this lake owned by all the members of the community or by a few members of the community?

The whole community

Q: Do you have restrictions/laws governing these lakes?

Yes

Q: Who determines when this lake is fished?

The whole community determines the time of fishing.

Q: Who ensures these laws are adhered to?

It's the CDC who enforces the law.

Q: When do you fish in this lake?

Twice in a year, May to July and November to December.

Q: What is the fish species found in this lake?

Apede, Agbeki, Iyoro, Aba, Toriye, Ongolo, Ogbola, Pome, Imono, Kabi, Aloma, Opowei, Esu.

Q: Which out of the lot is most important?

Apede (Q: why?) it makes more money

Q: Are there any animals/plants protected in these lakes?

Yes, we protect crocodiles because when we kill it there is death in the community and more so the crocodiles do not harm us.

Q: Are they still as abundant as they use to be?

Yes

Table 2.6 List of Participants

S/N	AGE GROUP	SEX	NAME	VILLAGE
1	Y	M	Guru Albert	Osiama
2	Y	M	Ampepou Genius	Osiama
3	Y	M	Mathew Maxwell	Osiama
4	Y	M	Igirigi Oyakemeagbagha	Osiama
5	Y	M	Pleasure Dorgu	Osiama
6	Y	M	Timilami Francis	Osiama

TRANSCRIPTS OF PERSONAL INTERVIEW SESSIONS WITH IDENTIFIED
KEY INFORMANTS

CASE 15

Contact Details Form:

Field Phase	2
Site	Biseni
Type of Qualitative Data	In-depth Interviews
Contact Name	His Royal Highness Luckson Obireke (Ibidaowei II of Biseni, the clan head of Biseni)
Dates	March 15, 2006 and March 6, 2007

Interview Session

Question 1: What in your opinion is the world view of the Biseni People?

There are two worlds; the physical world we call Kiri and the spirit world which is invisible we call Teme. The spirit world is as real as the physical world, however, spirits can see beyond what the human eye can see. They (the spirits) can direct and prevent ills. The spirit world is made up of the highest being called Sibizaro.

Q: What is the meaning of Sibizaro?

Sibizaro is the owner of the white sky above all and he is the father of all. The saviour of our head, Sibizaro is represented by femaleness

Q: Why?

It is because only women who can bring forth children.

Q: But it doesn't appear women are allowed any say in this society?

When I was a child women were quite powerful. Juju worship was done by women. They had shrine and regalia and when enveloped by the spirit they talk mystically. The power that was exhibited made people believe that they were powerful beings and made people believe in spirits. I remember a strange experience on a boat at Omoku. Some strange spirit passed while we were on the river. It caused our boat to spin around creating great fear amongst us (The passengers in the boat). I would not forget that experience it gave me fever. The early man it is the world around, that is what you see. You can't talk about what you don't see. The early Biseni man, the world was what he saw in his vicinity. For example the equatorial forest, the large expanse of lakes, rivers and creeks and swamps. In addition to these the animals in the forest, snakes and all sort of creature found in the forest in his vicinity, i.e. the

visible world around him. The invisible world around him were mentally created or imagined beings or spirits he believed that lived in the same vicinity in the water and on the land. Because of this he started to worship strange things he saw or found either in the water or land. When he saw a very big tree he feels that the tree has some power, when he sees a crooked stick he feels that the crooked stick symbolizes some power and so he worshipped such inanimate objects. In the water and partly on land following the same system, occasionally he believed that the buffalo appeared to be equivalent to humans. So when he kills a buffalo he makes a funeral ceremony, if he kills a leopard he buries it like a human being with full ceremony. If he kills an elephant and a hippopotamus in the water he does similar rituals. Additionally he believes that there are unseen beings in the water and on the land and so he has what we call forbidden bush. There is a place somewhere near the beach (reference to the Taylor creek water shed near the village); suddenly you go you would see a lake. But the next day you might not see the lake. When they go to war and when the gods are told about the warfare, no bullet would penetrate the human beings. The gods of the area were called as human beings. The first level of classification was the gods of the water called Mini-opukeme. The second level of classification was the gods of the land. The other type of gods are Ziridiri, characterized by man made shrine composed of human, animal bones and some concoction of leaves. The third level of classification is the ancestors called Krosuogu. Krosuogu are a mixed of good Andeogu or bad Andeogu. The Krosuogus are people who have left the physical world to the spirit world. In Biseni, before now when someone wants to die he would eat and prepare. A rope comes from the sky to pick the person, if people cry enough, due to their love for that person then the person would not die, because the rope would be taken back. But if they cry less, the person would climb the rope when it comes and would die. There was this incidence at Egbebiri, where a man was to die. When the rope came down and he began to climb, his family members and other people cried so much that the rope was cut from the sky and became a tree; I saw the tree when I was a little boy. People lived in fear of aggression from neighbouring communities that was why they had defence and juju shrine and war juju shrines. When they had a reason to fear that their neighbouring communities would attack them they evoke the war juju. This war juju will appear and go to war with them. The priest of juju was usually selected by the so called spirits. In Biseni the chief priest of the shrines are selected by the god itself.

Q: Can you compare how the Biseni people are today to that of the Biseni you use to know?

In terms of environmental sanitation/personal hygiene, the society appears to be better organised but in terms of actual satisfaction it was better in those days.

Q: Why do you say so?

Because of the fear of the ancestors that they would kill us if we do those things that was forbidden. So in those days, they were able to live together because of the juju. In those days everybody was a fisherman. Everybody lived more together, so mobilisation of people was organised. But people have disobeyed the law today because the people are not here (they don't live here). Social conditions have changed because of the economy, so people can not obey the laws.

Q: What do you mean by social conditions have changed?

Social because people are now government officials, some people because of education they do not consider themselves fit to go to the lake.

Q: What about Esiribi and the method of fishing?

Population has increased so all the person can not go there at a time. This situation makes them go in groups and to avoid conflicts and troubles they decide to share it.

Q: What of your environment generally, what changes would you say have occurred and why?

Today's world is different from yesterday world, values have changed. Level of flood has gone down so quantity of fish is reduced. Esiribi is still very rich in fish, but because of catches seen elsewhere (in comparison to other lakes outside Biseni) and the increase of fishermen we feel the fishes have reduced.

Q: What would you say is the cause of all these problems or changes?

The major problem is individualism; it brings a freedom that makes the people feel very free. Formally one man would not go to bail a pond. All the family members would go with him. But now because of nylon nets and personal boat, people do what they like. So the previous way of life has given way to this modern way of life and thinking. This way of life has bred a lot of evil, people steal, disobey laws, they cause social injustice. When society says this is a taboo, people don't care. In those days individual life was limited but today it is not so. Freedom of action and expression is causing a lot of problems, this is caused by westernization.

Q: Do you think it is possible for us to go back to the way it use to be "A world devoid of Individualism"?

The myriad of choices in the society would not make everyone go back to what it used to be.

Q: Why?

Because we have varying degree of belief in God. Some believe in God, have the fear of God in them and would desist from disobeying the laws and norms. Also there are atheists amongst us. There are those who preach and do some other thing. Some believe in other things.

Q: Would you recommend co-management as a way to good management of your resources?

If circumstances do not prevail the answer is No

Q: What do you mean?

In family ownership that we practice, people are descendants of one father. Also if in one family they had slaves, the slaves can become co-owners of the property. If there is a case and the family won the case in the court of law, then the property belongs to them legally. In a war situation, ownership of property arises as people conquer a territory. In that conquest all the people who participated in the war which they won become co-owners of the property. Also, if you are married to a woman from another family and your wife's father had no son, he could out of his own free will give his property to the children of his daughter. That property belongs to the son of his daughter and the children of the son would own it as a property. Also, ownership can be claimed forcefully or by adoption after war. For instance, if there is a war between Biseni and Okordia and Okordia wins the war. One of the reasons of ending the war might be that of Biseni giving right to Okordia people to some of their resources.

Second Meeting with Clan Head (March, 6, 2007)

Q: Who are the Opukemes?

*Sibizaro is the highest being; followed by the group of spirit beings we call Opukeme. Opukeme, means strong men and they are higher than the ordinary person. Also the opukemes are of two types. We have the man-made Opukeme, like the clan level and family gods (example Biseniamacri, Ibazoo and Opudo). The second type of Opukeme is spirit beings which dwell in certain locations and they have the ability to possess a human being without such persons consent. Example of the spirit type of opukemes includes the water-spirits-known as mini-opukeme and forest-spirits-known as beh-opukeme. **[As explained by the clan head, mini and***

beh opukeme exhibit themselves through the possessed human beings speaking in “strange tongues” which are not understood by other human beings. As regards the man made opukeme, “Man made opukemes he says are fashioned in images/forms which are usually kept in designated areas]. *These images have human beings who are its priest/priestess. The human priest / priestess carries out the dictates of these images. Ziri is another thing present in the spirit world. Ziri is medicine which a man can invoke to harm another human being. The sand can be used as ziri or even water. Words are power, you can speak to the sand and mention a particular name for the sand to attack and it would do as you have spoken. We have seen such cases in the time past. [From his explanation it appears for objects to become ziri means some words of incantations invoking a bad / vengeful spirit are said over the object].*

Q: What of the Andeogus?

The people that first settled in Biseni and thereafter who are dead are classified as an ancestral unit called Andeogu. So, the ancestral unit is made up of our fathers, grandfathers, great grandfathers. Usually Andeogu are powerful head of households (men ancestors) who have passed on to the spirit world

Q: How did Biseni come here?

There have been different version of the history of Biseni people, I disagree with the fact that we came from Benin and also with the version that we came from Nembe. I believe that the Biseni people have been on their present site for a very long time. I also disagree that the founding fathers of Biseni clan-that's the original ten sons, were from the same father. On the fateful day when something happened in the Benin Empire, Biseni left Benin taking their journey eastwards. First site of settlement is Agadabou, then to Nembe, through Bonny and finally settling at their present site.

(Note: However even though the clan head has misgivings on the Benin migration, he however states in the origination of Biseni a migratory path from Benin). *Biseni share similarities with the Opokuma people*

Q: Why do you say so?

Reason is that they have a similar juju, which is worshipped and they share some common words. Biseni has been here for over 700 years. When Biseni arrived there were no other villages or settlers in the vicinity, which gave them the advantage of gaining large territory. Biseni's boundary extends to Okordia and Engeni people in the south. It also extends as far as Egbema and Ndoni in the north. The two main rivers, is river Niger in the west and Orashi river in the east. Tuburu was a very

large community, they moved to Brama, Oruma, Utochi because of internal conflicts. All the villages along the River Niger were inhabited by Biseni people. Ijo people moved from place to place and so has our people settled in these places, other people joined them. Tuburu, Egbebiri and Tein are children of the same father. Akpede people came into present Biseni enticed by a sweet fruit (Ikorukoru) offered to him by a hunter from Biseni who later became a friend of Akpede.

Q: How would you describe your system of governance?

Biseni used to be under a monarch known as pere (meaning kingship). Kingship was by inheritance and a particular compound produced the king. The king had an inner council called barabo. Members were involved in executing decisions taken by the king and members of his inner council. In addition were the legislators called awatas; they passed laws. Awatas were powerful; their meeting was not attended by young men or women. Next to the awata were the compounds and next to the compounds were the families.

Q: How would you describe the livelihoods of your people?

Farming is mainly cassava and yam, but since about 1960 we took to farming plantain, cassava is our major source of food. The first festival was done during the dry season, between the months of March and April. The second festival was done during the flood/rainy season, which is usually around October. These celebrations began and ended the fishing season. Flood festival was an intercession, while the dry season was done in thanksgiving. The Biseni people have the tradition of calling taboos, Aweyé. Berikiri (Dry season) which is about December to June is a difficult period. It is characterised by sowing. Boma (flood season) is however, a period of abundance. We have lots of fish, lots of flood and rain. After every four days is Ingruba. Akinma is a day of rest (native Sunday) and most activities are forbidden.

CASE 16

Contact Details Form:

Field Phase	2
Site	Biseni
Type of Qualitative Data	In-depth Interviews
Contact Name	Chief Ishmael Oku Osakwe
Dates	May, 2006 and March, 2007

Interview Session

Q: Please sir what is your name?

My name is Chief Ishmael Oku Osakwe

Q: When did Biseni people come to settle here?

It has been a long time the people of Biseni came to settle in this land

Q: Sir where did the people come from?

Biseni people migrated from the Benin kingdom. Biseni had ten sons and later each of them become a town and formed ten large towns. Presently it is now remaining three towns; namely Tuburu, Egbebiri and Tein. This was as a result of intertribal wars they fought with their neighbouring communities (enemies). The inhabitants of the other seven towns have either fled their towns or mixed with the three existing ones.

Q: Sir could you please say something about the religious orientation of the people of Biseni?

Yes, long time ago in the time of our forefathers, the Biseni people were idol worshippers, they had no knowledge of the almighty God.

Q: Sir what is the name of the almighty God in Biseni language?

Sibizaro

Q: What is the meaning of Sibizaro?

It means he that saves

Q: Sir what did the people call juju?

My people call them Opukeme, meaning mighty men. There are many gods in Biseni that the people worshipped; such as Ibazoo, Asepele, and Isugbu etc. These are the great gods that the people worshipped. There was no church in Biseni as at that time. The church came into Biseni in the year 1910.

Q: Sir, can you mention some of these gods the people worshipped?

Just like I have said earlier, Ibazoo

Q: Sir what role did Ibazo play in Biseni land?

This very god Ibazo is the god of war. Occasionally the Biseni people returning from a victorious war will come and lay human heads taken out from the stained body of the enemies at the shrine of Ibazo as an appreciation to the god.

Q: You say that has been the practice of the Biseni people are they still doing that?
No, no, they are not doing that anymore. We are now in the time of civilization; you cannot kill somebody and go free.

Q: Sir in your own assessment the worshippers of the almighty God and idol worshippers which of these groups have the greater number now?

Oh those that worship the God almighty are more, it is unlike before every compound has their juju but now the worshippers of these gods do hide to do their sacrifice to their gods.

Q: Sir, what really convince the majority in Biseni to turn to the worship of the almighty God?

What convinced them are the advent of the missionaries and the spread of the gospel of Jesus Christ

Q: Sir what category or age of the people that are involved in this act of juju worship?

The time when juju worship was the order of the day, the man, his wife and children were involved.

Q: Sir, was there conflicts between the juju worshippers and worshippers of God?
Yes, there was great fight and opposition against the coming of Christianity in Biseni.

Q: Sir, who brought Christianity to Biseni, is it the black man or white man?

It was the white man, the missionaries; the missionaries first reached Joinkrama a nearby community to Biseni. The man that brought church to Biseni land is one Mr. Ochiogu of Tein community in the year 1910, it then came into Egbebiri community in 1912.

Q: Sir, the first time when people began to practice Christianity, don't you think that they may have mixed beliefs?

Yes, they do even now some people are still doing that especially people who do not have strong believe in God almighty.

Q: Sir who takes decisions and enforces laws?

In the time of our forefathers, it was the juju worshippers that enacts rules, regulations and enforces them. The people as of that time believed in idolatry that anything the soothsayer or fortune-tellers said they believed.

Q: Sir are there lakes in Biseni?

Yes, there are so many lakes in Biseni land

Q: Sir do these lakes have a particular god?

Yes, every lake has a god, which is the god of the lake.

Q: How would you describe the governance in your community?

Clanship started since 1960, each village head (i.e. Egbebiri, Akpede, Tein and Tuburu) and clan head are elected. In the olden days, every community had the eldest man of that community as the head of the community. Hence rulership was by age. These people were referred to as Amaokwen. Any matter concerning his village, the amaokwen gathers the entire community together. Nowadays the village heads election is not necessarily by age. The clan head is a second class chief addressed as Ibidaowei of Biseni.

Q: How would you describe the household in Biseni?

Households are formed by the man, his wife, children and relations. The man is solely responsible for feeding these people. In the olden days each person who earned money were suppose to give account and remit money earned to the head of the family. Inheritance is via sons and not daughters.

Second Meeting with Chief Osakwe March 05, 2007

Q: What were some of the practices of the Biseni people in terms of the gods they worshipped?

Households had individual household shrines which were manned by the head of the family. The wife in some households might have a separate shrine which is outside the main one. But in general the family is identified by one shrine. Example of a household god is Dienfiefowei (meaning the one that eats at night). On the compound level there can be one god, which is worshipped by the cluster of households that make up the family compound.

Q: Who are the Andeogus?

The Andeogus are dead people or ancestors who have the ability to inflict people of their household. There are special people who can diagnose if a particular problem is caused by an Andeogu. Shrines are erected for Andeogu, for instance if I want to go to the bush, I would call on my Andeogu to lead me. Andeogu are dead, but they

are still around us and have power to bless and curse. Also we have things that are forbidden (Aweyé) and those things which are not forbidden (Aweaya).

Q: How do you know those things which are Aweyé and Aweaya?

By experiential knowledge, through direct observation of the incidence that occurred when you do these things.

Q: How would you describe the Biseni people's livelihoods?

The main livelihood for men is fishing, which is done throughout from January to December. In three months, fishing can fetch about N20, 000. Any farming done is on a subsistence basis. To supplement fishing some carve canoes, others are civil servants who earn monthly wages. In all of this, fish is where our men make money from, so fishing is purely for money taken to the market. Cassava is our major food source. In the olden days, market days were every four days, but these days markets are held once a week. Days of the week was four cycle. They include; Ingruba (Day 1 Market day), Ingrubadeinwa (Day 2 after the market day), (Akinma, Day 3 Rest day), Akinmadeinwa (Day 4).

Q: What has changed in the fishing industry?

Pollution of our lakes with oil has led to lesser varieties and also a reduced fish catch. Also there is increase in population that is why the fishing is shared.

CASE 17

Contact Details Form:

Field Phase	2
Site	Biseni
Type of Qualitative Data	In-depth Interviews
Contact Name	Chief Bethuel Akpana
Dates	May, 2006 and March 7, 2007

Interview Session

Q: Papa what is your name?

My name is Chief Bethuel Akpana

Q: Papa is your village Tein?

Yes, I am from Oyelalubo compound

Q: Papa how do you view the world now?

Now we are living a modern life. In the time of our forefathers, we have gods which we serve. Every year after New Year celebrations, the people will bring down their idols from where they kept them; because of the flood idols are kept in the areas where water will not touch them. When the grounds are properly dried the people will bring down their idols. The time of our forefathers there was no proper ways of reading the yearly calendar, so the year was calculated by days of the week which is called Akinma day-known as eke day. Akinma day is sacred and it was the day that is set aside by the people to arrange and decorate their juju shrines for the idols to be brought into the shrines. In that Akinma day, people will come to pay the vow they made in the past year; this is then followed by fixing the days of their yearly festivals by predictions and sighting their gods spiritually by the juju priest or priestess. When the gods are sighted an announcement is made concerning their appearance then no body was allowed to go to the forest or river to do anything. The people will be allowed to go to the forest or river only when formal proclamation is made throughout the Biseni land, this will be immediately followed by the choosing the day for the flood festival. The man (juju priest) that normally announced the day of the festival is called Mr. Oduah, the juju priest, who is from Tuburu town in Biseni. The festival was observed in a sequence according to the order of seniority of the sons of Biseni. First Tuburu followed by Egbebiri and lastly Tein.

Q: Papa you said whenever it was announced that these gods has been sighted, no one was allowed to go to the forest or river, what do you think can happen to the person?

You see that time people are very much afraid; the people so believed in these gods that nobody can ever think of faulting the rules and regulations. I don't know what will happen to the person, but they believed that a mysterious thing will happen to the person.

Q: Papa during the festival period did the church people participate in the celebrations?

Yes, they do, both the idol worshippers and the church people took part in the celebrations

Q: Papa did the people; especially the idol worshippers understand the personality of the God almighty?

Yes, they do, to tell you that they understand is that on Christmas day, the idol worshippers also came to the church to give their thanksgiving offerings. There was co-existence of juju worshippers and the church people in Biseni land. Even the time of annual harvest thanksgiving services, invitation are given to the idol worshippers and they will happily welcome the invitation letters and attend the service and even make vow and redeem the vow they have made before.

Q: Papa where did the Biseni people come from?

We are told they come from Benin in South West of Nigeria. They first settled along the east bank of the Niger River near Elemebiri, to Isara down to Samabiri to Agbere in the Nun River. From there the people of Biseni discovered lakes and forest and later came and settled at Biseni their present settlement. The people of Biseni are so blessed with lakes and forest

Q: Papa, what did the people of Biseni call God?

We call him Sebizaro

Q: Papa, what is the name the idol worshippers call?

They call him Watumoro

Q: Papa could you mention some of those gods that the Biseni people worshipped?

Yes, they are Isubu, Ibazoo, Okoroafor, Senama-ereh, and Okpotu. Ibazoo and Isubu are gods of war. The people of Biseni are war-like people, every family has their own god they worshipped or depended upon in time of conflict or war. Ibazoo and Isubu are the main gods of war in Biseni land. At the time of our forefathers there was no road as it is now, the only route used to launch attack on enemies' towns is through

waterways, so canoes are used for such purposes. Each canoe had its family god; the canoe that carried the Isubu god takes the lead of all the other canoes. The Isubu canoe must be in the front. The family that was asked to look after the Ibazoo god was the Egbelubo compound in Tuburu and the Owewariogwu compound was asked to look after Isubu god.

Q: Papa, we heard that the communities that made up Biseni clan are many before, not only the present three?

Yes, it is true there were ten of them, I met some of them example Yenegelele town, Bra-ama etc. Now they have joined themselves to the three existing ones.

Q: Papa can you name them?

Yes, they are Tuburu, Egbebiri, Tein, Isein, Ebila, Bra-ama, Kela-enika, and Yenegelele. I saw some of the Yenegelele people, even their settlements; these are the ones I remember.

Q: Papa, how did the traditional administration of the Biseni people come about? It was done by selection. Elders are selected from Tuburu, Egbebiri and Tein. Tuburu who was the first born of Biseni was chosen as the venue to host the assemblies of the elders of thoughts to take decisions, but now modern set-up of administrative methods has replaced the former by appointing chiefs to represent each community.

Q: Papa, so there was nothing like chiefs?

Yes, but in Biseni the chieftaincy institution has been for a long time. The first chiefs to be appointed are Chief Oputa, Chief Kosigha.

Q: Papa, are there lakes in Biseni?

Yes, there are many lakes in Biseni

Q: Papa did these lakes have gods in them?

Yes, these lakes have gods, each of these lakes has the way the gods are been served or appeased. For example, Wa-abaa, our lake, if I go to fish I must first set the shrine in order and then libate and make some incantations. There is this thing that we do, call, Mini-bile-achiye (meaning, taking the first water or fish from the lake to land) somebody will use the calabash to fetch water and put into a clay pot in the shrine. The first fish that was caught and taken out of the lake, the man that fetched the water and poured into the pot will take a stick and hit the fish three times; each knock will be responded with a greeting from the fishermen present. That particular fish belong to the man that hit and fetched water into the pot that is in the shrine that is the way we appease the god of our lake, others have different ways.

Q: Papa, if one did not follow these processes what will happen?

Sometimes if one did not follow these processes, the person will have a poor catch. You see Lake Isemu; one time I bought it and when I failed to follow the normal rules and regulations guiding the fishing processes in the lake, I lost all my money that I spent for buying the lake.

Second Meeting March 7, 2007

Q: How did our forefathers count the yearly calendar?

Our forefathers did not count the yearly calendar as we count it now. They used the days of the week to do that. They count Akinma (i.e. Akinma day), Akinmadawan (i.e. a day after Akinma day), Igwuruba (i.e. Igwuruba day), Igwurubadawan (i.e. a day after Igwuruba day). After every four days is Ingruba, while Akinma is a rest day; fishing, farming and going into the bush was forbidden. They also used festival periods to calculate the yearly calendar and months of the year, there was nothing like December, October, and November.

Q: Can we know of some practices the Biseni people do?

We had two festival periods, the fishing festival and the farming festival. These festivals were celebration time to thank the gods for the supply of fish and yams. Tuburu being the eldest and having custody of the gods of our land led most times in the worship of these gods. Oduah in those days was the man who declared the time of festival. Once he received the sign, he would take banga (palm fruits) to the river to produce palm oil. Subsequently he would make a feast inviting every one to dinner; this act heralds the fishing festival. After Tuburu's celebration, Egbebiri and the other remaining villages of the then ten villages would subsequently declare festivals. We have different gods for different places and in the olden days our people had Asiepepe (the fear of the gods). Though times have changed, people still worship Ibazoo gods along with Christian gods, especially in the times of war. After all it is Sibizaro who gave Opukeme power to perform. Through certain encounters in the dream and some strange deaths within the village when one uses a particular resource; certain areas and resources become Aweyé (forbidden to us) while others are not forbidden (Aweaya) An instance are forest places that people do not go- (awe-beh) .[As explained by Chief Bethuel, some times a particular family could have murdered a man in the bush, most probably a portion of farm land, the judgement in most cases is the accused and his successive generations are

barred from going into the area/farmland where the act was committed. That portion of land becomes to that family “awe-beh”).

Q: How would you describe the Biseni people’s livelihoods?

Our men engage in fishing from January to December and if rich enough can buy lakes for a certain period or they go in groups. Farming is subsistent; fishing is what brings money into the family. We have two seasons, Berikiri and Boma. Berikiri is a difficult period, it is the dry season, starts from January to June. Fishing during this period is from January to April. While men during this period bail ponds and burrow pits for fish harvest, women plant cassava and yams. After the first rains we pick snails. Boma is the period of abundance, starts from July to December. Men fish, the women set traps for crayfish.

Q: Who fixes fishing time in your lakes?

Periodic fishing of our lakes is usually fixed by the family not because of the words of the gods but it is due to the experience of leaving the area for sometime.

CASE 18

Contact Details Form:

Field Phase	2
Site	Osiama
Type of Qualitative Data	In-depth Interviews
Contact Name	Mr. Meshach Asei
Date	May, 2006

Interview Session

Q: Sir Can you tell us how Osiama came here?

I was told by my forefathers that Osiama-oweï came from Ebeni in Ebeni-Oyiakiri clan, in the course of wars they departed to different areas for settlement. Initially, Osiama-oweï settled in Apoi creek which stretches from Sumu to Ananabogbene. Osiama-oweï had six children; Akordi, Kuro, Boyi, Abiyia, Tanyi and Kpakala. Ossi, their father worshipped Adigbe has his god. He used to sacrifice black male sheep to the god in the ancient time. Christianity was not known so the children too were serving this god. When he was about to die, he handed over the god and everything to his eldest son Akordi and advised him to take care of the worship requirement of his god. He also made him to understand that it was the god that had made him have the six sons. But the children did not carry out their father's advice. After his death, none of them worshipped the god. Akordi, Ossi's first son had five children, three sons and two girls. Their names were Ogi, Atai, Azaringha, Atoikoseirigha and Otorubo. Apart from these children, he had a second wife called Keke, who traditionally was called Bere-ere (woman whose big dowry is paid). She (Keke) had seven daughters for Akordi; these seven children are the founders of Adigbe Lake. Akordi shared his lands and properties among his children and the present Adigbe area was shared to his last wife Keke. It was a swampy area and since the woman's occupation was mainly fishing she always went fishing with her seven children. Due to her persistent fishing, her husband's brothers and sisters nicknamed her Sama (meaning swamp) which later changed to Sumu. The Adigbe god was a very powerful and strong god. But nobody worshipped it after the death of Ossi, It began to cause havoc in the family. Because of the lack of a priest to service this god, Akordi's last wife (Keke) lost all her children. It all happened when the woman with her seven children went fishing. In the course of fishing there was an earthquake which caused the place they were standing to shake. As they attempted to

run for safety, they (the seven children) got lost. Their mother was able to run to Apoi creek where she fell by the river side. Before she died she narrated the story of the event to her family people. The family decided to go in search of the children. On getting to the swamp it was discovered that a big lake had formed with seven outlets (canals). These canals they said represents the seven dead children and the canals exist till date. The present Sumu in those days was a foot road leading to the swamp. Also it is told how in the lake there were a lot of fishes and crocodiles brought on by strong waves. Eagles and human beings who tried to pick up the fishes were threatened by the crocodiles. Because of the death of Keke and her children who were said to be killed by Adigbe, the lake which emerged from the spot where they died was then named after the Adigbe god.

Q: Please could you tell us on the subsequent fishing in the Lake?

The aggressive nature of the crocodiles did not let the people engage in fishing of the lake. This led to two persons from Kurobiri and Tanyin compound namely Ilebira from Kurobiri and Araperegha from Tanyin. These two went to consult with a deity at Warri on the best way to shut the mouths of the crocodiles in the lake. Ilebira was accompanied on the journey by his brother Ileke. Their journey was successful; they came back with three gods, namely Okoroso (husband god), Amene (wife) and Obubuferi (the son god). The three people, who went for consultations in Warri proceeded to the bush, did the necessary rituals and subsequently the crocodiles became calm and normal fishing activities started. The two persons, who went to Warri, shared the gods they brought back. While Ilebira from Kurobiri compound took Okoroso and Obubuferi, Araperegha took Amene and till date these gods are in these two respective families. In the beginning we had no blacksmith and no net. I was told that in the ancient time, the fishing gear used was called Igogo. It was a type of weaving trap. The other fishing gear was called Igbege. Bait is usually put inside this trap (Igbege). Other fishing gear was Aru and Akare. After that generation then came the blacksmiths with spears called Akayin/daye (hooks) for fishing. A lot of fishes were killed in those days. Ate was also used as a fishing gear and the women also made use of an instrument called Akare. After the use of Igogo, Akare and spears, Isoko people were brought for fishing. They caught a lot of fishes by fencing the small canals, which is believed as representing the routes the seven daughters of Keke took in an attempt to escape. Agedegu resembling a local trawler and Isagha were also used. The use of this local trawler (Agedegu) in the lake was abolished because it used to injure children leading to lots of death in the village. In

this present generation, they decided to use net as a fishing gear because the old methods were strange to them. The use of net in the lake is just about 60 years old. The nets were made in Amassoma and a woman called Manduku bought these nets from Amassoma to sell in Osiama. Presently because of Christianity and the changes in the belief system, the fish catch is very low and some fish species are extinct such as Okoi. Sala and Ogborokabi are very few. Okoi looks like Abe while Sala resemble Eweri ice fish. In the ancient time I was told a man who was a blacksmith came out from the Adigbe Lake to repair bad axes and cutlasses free of charge for the people, his name was Igbetuwei. There was another person who also came out from the bush, but in his case he was a branded thief called Izakpaki. As the days went by, people from Abiyabiri compound envied the job of the blacksmith and they decided to spy on him. One fateful day nine of them went to the lake to spy on the blacksmith. As he emerged from the lake with his two children, the nine of them beat the man and his two children up. The man and his two children managed to escape back into the lake, but not without placing a curse of premature death on the Abiyabiri compound. As a result of this curse the Abiyabiri compound began to diminish in number. This led to the migration of one of the men of the compound who left with his two sons. He settled at the entrance to Korokorosei in southern Ijaw local government area, he later died leaving his two sons. One of his sons was named Kolu, who was a fisherman. The other named Keru was a hunter. Keru was a greedy man and did not share his money with his brother or his brother's children. This led to the separation of Kolu from Keru. Kolu went to settle at the sea shore and he is the founder of the Koluama community in the present Bayelsa state. In 2004, the Koluama people were invited for the festival due to their ancestral origin and they participated. After the death of Akordi's wife and his seven daughters, he (Akordi) called all his brothers and he decided that Boyi (the third son of his father) would serve Adigbe. This automatically made them (Boyi and his descendants) the owners of Adigbe. Initially it was Akordi who was asked to take control of everything. Since he (Akordi) was Ossi's first son and therefore the head of the family the kingship of the town was bestowed to Akordi. Till date the Akordi compound produces the king of the town.

Q: Sir you said in the initial time when they used spears, hooks, Igogo etc, they caught so many fishes but now that nets are been used the fish catch is low, what do you think has contributed to the low catch?

I can say is due to the present belief system of Christianity. The people do not satisfy the requirements of the gods. The lake has a deity who was appeased regularly but it is not so. The most common fish caught now is Apedo (Citharinus)

Q: Don't you think as they changed the gear types, that is why they catch the type of species they have these days?

No, the change of gear did not affect the fish catch. If it did then we should still have caught the juveniles of the known ones.

Q: When did Christianity come to Osiama?

Christianity came to Osiama in 1914 when C.M.S. was founded. During that period our belief system changed. This led to a case between the traditional believers and the Christians during that period. Well since 1914 our belief system has drastically reduced in this community. After that, in 1927 the Roman Catholic Church was established in the community.

Q: What are the laws governing the lake?

Twins are not allowed to reach the lake. Those women who had just given birth or buried a child up to three days before the festival day were not allowed to enter the lake. If she mistakenly reached the lake, she is not allowed to cross the lake directly. She will have to follow the corners of the lake. Her legs were not to touch the water and she was not to bail water from the canoe, likewise she could not spit into the lake.

Q: Papa can you tell us whether the present priest still believes the way their forefathers believed in appeasing the gods before the fishing festival takes place?

I can say that the ancient belief system is no longer in existence. The present priest does not have power or authority to decide for the lake. This time around, it is the community government that do decide the fishing date and time. In the past the priest and his people will do rituals in the lake for about seven days after which they would ask the quarter people whose daughters were lost in the lake to do fishing for three days. Thereafter the whole community was asked to do the fishing.

Q: How do you see the belief system between our forefathers and the present day belief system?

In the ancient time, because of what they believe they caught more fishes than this day. But in this present generation people say that we are more populated so the fish is low. I disagree with them and if it is so why we have not killed all the fish species today

Q: Can you please compare the behavioural pattern of today with yesterday?

In the past people were so magnanimous, sharing what they have. This present day due to the monetary value people tend not to share things again

Q: What of the use of the wetland areas how do you compare then and now?

In the ancient times people hold firmly on what they believe than this present day. In today's generation, due to population increase some persons secretly violated what they agree upon.

Q: Do you recommend that we should go back to the traditional management of our wetlands or that the government should contribute to the management of these areas?

In my own opinion due to the constant changing of government in the community, I would prefer the government to manage our wetland areas

Q: What is the major problem of the fishing industry in Osiana Kingdom?

The major problem we have is lack of money; most of us do not have money to purchase nets. Another problem is canoe. Some of us do not have canoes so during the fishing season we hire canoes. Finally our fishing areas have been covered by water hyacinth so it is difficult to set nets.

CASE 19

Contact Details Form:

Field Phase	3
Site	Biseni
Type of Qualitative Data	In-depth Interviews
Contact Name	Madam Okwin Igodoma
Date	March, 2007

Interview Session

Q: Where did Biseni come from?

Biseni didn't migrate from anywhere. Biseni controlled a vast land, including the present area where Joinkrama 4 is located. But when our population increased, we had to move to our current location. Among the people in the Taylor creek, Biseni was the first settlers before any place. Idu area was also part of Biseni. Biseni had 10 villages, when there was a festival they all came together. Women took the social part of the festival. They were the group that danced.

Q: Can you tell us what the belief was like in the past?

Biseni believed in opukeme in the olden days (argument between my interpreter and interviewee. While Okwin used the word Abalaro to depict the olden days, Interpreter used the word Eberaro). People then could see far and prophesy. Belief in those days was only in Opukeme. When our people want to go to the bush and water, they speak to the Opukeme for safety. When they come back they come to drop drinks for appreciation. During war women supported the men by speaking words into the air for their safe return.

Q: What of Sibizaro?

Sibizaro in the olden days helped our people.

Q: What has changed between then and now?

There is progress in today's world, but people envy one another

Q: How do children inherit property in Biseni?

Inheritance is for male child and children bear their father's name

Q: What of family that has no male child?

No family that do not have male child.

Q: What is the women's source of livelihood?

Main source of getting money is fishing. We also set Isusu for killing crayfish and small fish. During dry season after first rain, we pick Aprapa (snails). We also farm yam and cassava (mainly to make fufu).

FOLLOW-UP FOCUS GROUP INTERVIEWS

CASE 20

Contact Details Form:

Field Phase	3
Site	Biseni
Type of Qualitative Data	Focus Group Interview
Group	Elders of Erewari Compound [namely, Akha (the eldest man in Erewari's compound) Kaima Ogodi, Levi Ovuro, and Simeon Oputa]
Date	March, 2007

Group Interaction

Q: How did Biseni come here?

Biseni migrated from Benin, they were lots of people. Biseni were ten sons who resided in different places to form their own families. When they left Benin they were many. Biseni resided up to Joinkrama 4, having other people has neighbours. In those days, there was land dispute and during the war some of the initial (ten villages) of Biseni were wiped off, while others escaped as far as Omoku (neighbouring village across the Taylor creek) and to other places. Eventually the initial ten villages (composed of the families of the ten sons who left Benin) were reduced to three. Presently however Biseni clan is made up of four main villages. But these four villages are dividing to reform the former ten villages.

Q: How did the fourth village become part of Biseni?

Akpede (the fourth village of the clan) and Biseni are brothers, who both left Benin. While Biseni went from Benin to Nembe, Akpede first settled in Isara, from there to Akpedetoru eventually locating Biseni (who had left Nembe for the Taylor creek area). Akpede in his search for Biseni, found many lakes, including Esiribi (this is why Akpede people have a lot of lakes in Biseni).

Q: How was the clan governed?

There was a central government. The head was the king; he came from Egbebiri village from the Ikubiri family. After the last king called Ingukpakimi died, the pere stool was abolished, because of the atrocities of the kings. There after the community was governed by the Amaokwens, who settled disputes. 1960 was when clan headship came about through election. All the villages that make up the clan were

involved. First clan head was F. F. Igaran from Tein village, while the current clan head is from Tuburu. The clan head works hand in hand with the chiefs, he (the clan head) can not work alone.

Q: The gods in Biseni how do they relate with one another?

Sibizaro-baden is the biggest thing that exists, while Isubu, Ibazoo, Biseniamacri are gods of war. Ibazoo and Biseniamacri gods are clan gods which are kept within certain families in Tuburu village. Isubu and Ibazoo gods were originally in Benin. These gods give Biseni victory in times of war by appearing to the serving priest/priestess to give direction on how the war would be conducted. Sibizaro-baden does not react immediately in matters which affects the people. For instance during war our people want to know ahead how to prepare for the war and what the outcome would be. Biseni fought a lot of wars and so needed to have protection against her neighbours. Isubu and Ibazoo had a person servicing them, so people will go to that person. This person will talk to the god, so the god appears to the person and immediately answer comes. Our ancestors act as spirits which fight within family level. These ancestors are always with us and accompany us every where we go. The head of the family is usually buried within the family and we go to where they are buried to talk with them regularly. Andeogu, Ibazoo and Isubu are all spirits and they have power. They communicate with each other, so you see the spirit world is as real as the physical world. Sometimes in the dream you encounter spirits who tell you things that when you do it works. Like some of the Aweyé things came through the dream. The Aweyé of not killing crocodile is your life.

Q: What is the difference between the former days and today?

In the former times, people obeyed rules of gods but now people do not love their neighbours and the young ones do not know god. Western Education has changed a lot of things too.

CASE 21

Contact Details Form:

Field Phase	3
Site	Biseni
Type of Qualitative Data	Focus Group Interview
Group	Clan Head, Village Head of Tein, Chief Osakwe, One Female
Date	March, 2007

Group Interaction

Q: What were the names of the ten sons who made up the Biseni clan?

The former ten villages that constituted the Biseni clan comprised the following: Tuburu, Egbebiri, Tein, Kalandika, Brama, Nyinigilege, Ebila, Inanima, Isein and Okunwa. Of the ten, Tuburu was the eldest, followed by Egbebiri and then Tein. Currently we have some villages, reconstituted from the present villages; Tuburu, Egbebiri 1, Egbebiri 2, Tein, Kalama, Akpede, Kalandika, Akudonu, Oturuama, Aleibiri, Tambiri 1, Tambiri 2, and Akpedetoroma.

Q: What have been the changes in your system of governance?

The first system was operated under a monarch referred to as "the pere". The pere office was abolished in 1942 and was replaced by the "Amaokwens" (elders). Subsequently the "Ibidaowei" office was instituted after the Amaokwens leadership from 1960 and is the system in operation of the current dispensation. The present system of government is a democratic one, unlike the former two systems which was either determined through inheritance as in the pere system or by right of age/seniority as in the Amaokwen system. From 1943 to 1960, the elders-known as Amaokwen formed the central government of the clan (clan head); Present day leadership is made up of a central government govern by a council of chiefs, headed by the clan head (Ibidaowei) and elected village heads (amadaowei).

Q: What are the differences between Sibizaro and other gods known in Biseni?

Sibizaro is the almighty God. The Opukemes are equally powerful and they usually have their shrines. In the service of the different gods our forefathers did not leave any formula. When the priest/priestess died the spirit elects another person through a soothsayer. The spirit made god disappears when you go to church but the gods in the shrine do not disappear. They still exist in Biseni, although not as popular as the

days of our ancestors. However, Sibizaro is the highest being operating both in "Kiri" and "Teme".

Q: What of the Andeogus?

The Andeogus are an invisible dead force around which surround their living family members. The Andeogus would punish a family member who disobeys or violates a stipulated family law and on the other hand reward those who adhere to family laws and observances. No shrine is erected for Andeogus, but rather you speak to them as you would speak to a fellow human being. They are addresses in most family occasions and gatherings (It appears from what I gathered that the Andeogus act as guardian spirits).

The clan head in his description of this group of spirits says; Usually in Biseni when the oldest man of the family dies he is buried in his sitting room. When an Andeogu is called it is usually the past head of the family unit. Andeogu can appear to a man sometimes in the dream and by doing what the Andeogu says and seeing the positive results our system of belief is strengthened.

Q: What of Kroseogu?

Every one who has died is called Kroseogu (meaning ghost)

Q: What of Ziri?

Ziri is medicine, unlike the opukeme's one can understand the language of ziri.

Observations

Between the clan head and the village head of Tein, the argument of classifying all opukemes as ziri, meant that the two words opukeme (strong men) and Ziri (medicine) were sometimes used interchangeably. This brings to fore the issue of multiple interpretations of realities even within a reasonable accepted homogenous society. In invoking spirits on objects it is clear the initiator calls upon the aid of a spirit being, but whether all spirit beings, aside from Sibizaro and clan gods(which are revered and are resorted to on very serious occasions involving the whole community) can be invoked for vengeful acts is not clearly understood from my interactions with the people. However it appears as explained by the role of the "Andeogus" and family gods that this probably is the level of spirit beings which are invoked on objects, transforming such objects into Ziri. The Andeogus-simply known as dead ancestors also are citizens of the spirit world. This class of spirit beings are men and women who lived once as human beings and at death have been translated from the physical world into spirits.

14/03/2007

Biseni has just one motorway leading from Mbiama through other villages. Yesterday (13/03/07) there was an incident at Joinkrama 4, a young man was killed (he had accompanied his friend to the village to assist in moving his property to another village). From the information I received apparently JK 4 had serious internal conflicts amongst some political groups. Several people had lost their houses and properties and the destruction was still on. As of the time I entered into Biseni, I saw people from JK 4 moving properties out of the village to nearby villages, including to Biseni. I learnt the innocent youth was from Nembe and people feared a reprisal from the Nembes. Interestingly people in Biseni seemed unperturbed about the incidence. In my own mind I wondered how they were going to manage if there was a full blown conflict, since the motorway was the major access into Biseni.

15/03/2007

Increasingly my presence in Biseni is no longer an issue. I noticed as I move across the villages that I'm treated as a confirmed family member of my host (Chief Osakwe). People, even ask if chief Osakwe is at home. I wake up most morning and I'm greeted as a Biseni daughter (Soruwa (Have you woken up?)) is the greeting thrown at me, rather than the greeting in pidgin). Apparently also, my effort at learning the morning salutations has paid off. Soruwa Eno, chief Osakwe greets me this morning. Ihe Soro (Yes I have woken up) I replied and in response to his salutation, I ask Akpa Sorowa (Have you also woken up?). Interestingly, the Biseni people take a minute or two to salute one another. Nikasionwa (How are you?), chief Osakwe ask, Ebision (Am alright and well), I replied. I wake up each morning these days to hearing people greet me in this fashion (a big departure to previous visits). My presence also at the River where women take a wash is as normal as any other woman in Biseni. Biseni man wakes up in the morning, greets members of his household, has a wash, eats some breakfast and goes to his farm or paid job (however, this is not strictly the order. Some mornings, chief Osakwe is indoors till noon). Chief Osakwe has a fish farm beside his house and spends a considerable amount of time at the fish farm. This morning, Mrs Osakwe offers to make me breakfast, but I declined. Tienama, her daughter, who serves me, is away with her husband at one of the ponds. Pond bailing is a good source of income at this time I hear. Tienama and her husband would be away for one month. However, as narrated by Mrs Osakwe, each market day (every Monday), one of the two (either Tienama or

her husband) would bring fish to sell. Tienama and her husband went away on Thursday (8th of March) and came out Sunday night (11th of March) to sell some of the fish stock. I noticed that she gave some of the fish she came with to her mother to cook for the family. Tienama's four children stay with her parents at the moment. Tienama's last child cries a lot and refuses to stay at home with any other person. Therefore his grandmother takes him to her farm across the Taylor creek. Mrs Osakwe says this is the period to plant cassava. She virtually goes to the farm everyday (I noticed most women are busy at this time on their farms).

CASE 22

Contact Details Form:

Field Phase	3
Site	Osiama
Type of Qualitative Data	Focus Group Interviews
Group	Two Male elders, One Female (Mr. Asei's elder sister) and a young man
Date	March 19, 2007

Interestingly first thing I am told on this trip is that the fishing for this year has been suspended. When I asked my assistant why, the response was that this measure was taken to increase the yield.

Group Interaction

Q: Where did the Osiama people come from?

The Osiama people have lots of similarities with the Koluama people and we migrated from that area. Osiama is part of the Oyakiri clan and the head of the clan is Torulbeni (the first son). The former settlement was originally made up of ten villages, but now they are thirteen; Akede, Aleibiri, Anyama, BolouAdagbabiri, Eriama, Ibeni, Isampou, Isonu, Kunou, Lalagbene, Ogbosuowari, Osiama and Tietiegbene.

Q: What is the difference in governance today?

Before 1969, governance of the clan was by the oldest man in the community, known as Amaokosuwei. The Amaokosuwei was the spiritual head of the community; he was chief priest to the gods of the community. The Amaokosuwei ruled his village with a group (Amananaowei), made up of the oldest male of each compound unit/division (similar to Biseni). Also in those days, land and other resources were owned by individual families. But presently with the inception of the CDC group, land is owned by the community.

Q: What was the belief in those days?

Our fathers believed in Oyin, who is the almighty. Next to Oyin are other gods (Oru), example Okoroso and Adigbe, Beni-Kurukuru, Borokama. They believed that it was Oyin who gave these Oru power to serve. Before they called Oru, Oyin is first acknowledged. They also have individual shrines where messages can be received from

these gods. If you travel and you encounter any problem, when you call Okoroso he would save you. Okoroso is celebrated after seven years and the celebration is normally performed at the back of the Adigbe Lake. Also sacrifice is done at the forbidden forest at the right side of the lake.

Q: What's the source of livelihoods in Osiana?

Plantain farming is our steady source of income, followed by cassava and water yam. Bowa is the flood season which is usually from June to October, while Bara is the dry season. Bara (by observing the phases of the moon and when the level of water in the river is low, you know you have entered Bara) is our planting season and it last from November through to June. General planting is done November, December, January and February. In March we plant at the water side, while cassava is planted any time, but mainly upland. November is a bad month, we call it Saiyeagunuwa (Q: Why?) Because nothing is planted in the ground and the juju people do not come out.

Memo

Meetings in the last two field trips to Osiana have not yielded as much qualitative data as that experienced in Biseni. Perhaps Osiana people still do not understand my role in the community. The community appear to be suspicious of visitors, I wonder why. In the two field trips made, I was referred to the same person – a Mr. Meshach Asei (who appears to be the only person in Osiana who carries the wealth of knowledge on the community, this might not be true). But again language and probably the fact that I'm accorded the status of a researcher means am treated as an outsider. On all three occasions, information was given in demand for monetary compensation. The money exchange seems to be the incentive for information, sometimes I wonder if information given is equal to the amount paid. The atmosphere at the moment is that of insecurity, exacerbated by the warring political oppositions for the forth-coming election. Fortunately Mr. Asei was away from the village (attending the burial of his brother-in-law) strangely his absence caused some other indigenes to interact with me freely.

APPENDIX 3

PROCESS OF ANALYSES OF QUALITATIVE DATA

1. Coding

Codes were developed for easy retrieval for context analysis of interviews transcription.

Examples of codes developed are presented below:

THREATS TO RESOURCES

Access Routes

Access route to resource-close to village (Acr-clos)

Access routes to resources-difficult terrain (Acr-dif)

Pressure on Resources

Pressure on resources-change in belief (Prs-chbe)

Pressure on resources-intensification of livelihoods (Prs-pint)

Pressure on resources-market (Prs-mrkt)

Pressure on resources-poachers (Prs-poac)

Pressure on resources-population (Prs-pop)

COMMUNITY OWNERSHIP AND CONTROL

Access

Access-open (Acc-open)

Access-restricted (Acc-rest)

Management of lake-local patrol (Man-lopl)

Pond-restricted (Pon-rest)

Swamp is open (Swa-open)

River-open to everyone (Riv-evry)

Ownership

Ownership-community (Own-com)

Ownership-family (Own-faml)

Ownership-joint (Own-joit)

Laws and Regulations

Laws-given by ancestors (Lir-ance)

Resource valuation-inheritance from father (Rev-inht)

Enforcement of Laws and Regulations

Enforcement of regulations-defaulters pay fines (Enf-fine)

Enforcement of regulations-exclusion (Enf-excl)

Enforcement of regulations-meeting between offending parties (Enf-meet)

Enforcement-disgraced (Enf-disg)

Enforcement-fine (Enf-fine)

Enforcement-replacement (Enf-repl)

Exclusion from resources-sins of fathers (Exc-sins)

2. Case Matrix

Each case made up the unit of analysis. For comparison between and within case, each case was presented in the example given below:

Line	Codes	Text	Themes
1		CASE 1	
2		Amongst the group of elders met in the camp, elder Jonah Okah I learnt	
3		was the eldest and was the leader of the fishing camp. The interview	
4		script below captures the questions I asked to understand what was going	
5		on in this natural setting. Interview was done within the elder's arena as	
6		described in the notes below.	
7		Interview with Elder Jonah Okah	
8		Q: Who owns this lake?	
9	Own-fam	<i>The owner of the lake is the Opute family who are from Akumoni-Okordia</i>	Ownership
10		<i>of the Yenagoa local government area in Bayelsa state.</i>	
11		Q: How was this lake found?	
12		<i>A hunter saw this lake years' ago. This lake is divided into two, the</i>	
13		<i>mother lake and the child lake (The child lake fishing is usually the first</i>	
14		<i>done before the mother lake). One Bake and Akanga saw the second part</i>	
15		<i>of the lake, called the child lake. (From his explanation the</i>	
16		<i>source/beginning of the lake is termed the "mother lake", while the part</i>	
17		<i>of the lake which meanders northwards through a narrow strip of forest</i>	
18		<i>is called the child lake. Also, the child lake is sometimes referred to as</i>	
19		<i>the son lake). In the olden days it was general (Q: what was general?)</i>	
20	Fis-any	<i>That is we allowed everyone to join in fishing from the lake and the</i>	Change in fishing methods
21		<i>fishing material used then was called "Ogbudu". At a certain time, one</i>	
22	Fit-trap	<i>Ogba man was invited to the lake; he was the one who introduced the</i>	Social Network
23	Fit-net	<i>crossing and throwing of net. Fishing is conducted every four years,</i>	
24	Fir-peul	<i>fishing was jointly done between the Okordia and Ogba people but we</i>	
25		<i>later withdrew. About 1959, the family who are the owners of the lake</i>	
26		<i>introduced a new fishing method. This involved using a trap woven from</i>	
27		<i>cane rope to gather the fish together. The whole family usually fish</i>	
28		<i>together, after 1959 we fished next in 1962. In some years we sell out the</i>	
29	Son-faml	<i>lake for other people to fish while in some other years the family is</i>	
30	Fis-sell	<i>divided into two groups for the fishing. So for this year it is the turn of</i>	
31		<i>group B and I am the head of this group.</i>	
32	Fis-faml	Q: What do you as a group do to fish in this lake?	Belief
33		<i>We have to observe certain things, example is killing a goat. But first to</i>	
34		<i>start killing fish from the lake we must kill goat. We also have our shrine</i>	
35	Bel-obsv	<i>set up as you can see in front of the lake and the priest makes sure he</i>	
36		<i>offers sacrifice to the god of the water to bless our fishing. The demand of</i>	
37	Bel-shri	<i>the god includes alligator pepper, groundnut, biscuit, cola nut, coconut,</i>	
38	Bel-prit	<i>fanta, gin, sugar and a fowl tied at the centre of the lake. After finishing</i>	
39	Bel-god	<i>fishing, we usually sacrifice one life cow for thanksgiving to the god.</i>	
40	Bel-gode	Q: What of entrance to the lake, do you have any laws?	Regulations
41		<i>No woman is allowed to bathe in the lake, but she can fetch the water and</i>	
42		<i>come into the camp to bathe. If she defaults she must present one cock</i>	
43		<i>with a bottle of schnapps gin. No fighting is allowed amongst members of</i>	
44	Fil-genx	<i>the fishing group, also no stealing. No snails come into the camp.</i>	Sacredness
45	Fil-aprit	<i>Sleeping with your wife is not allowed; also women are not allowed to</i>	
46		<i>wash their clothes in the lake. We also do not use bamboo sticks to pull</i>	
47	Las-nise	<i>our canoe in the lake. All these laws were passed on to us from our</i>	
48	Las-fine	<i>forefathers.</i>	
49	Las-wod	Q: What of animal/plant within the lake or the area of the lake, do you	
50		protect any?	
51		<i>We are allowed to kill crocodiles and alligators. During flood season</i>	
52	Lir-ance	<i>Manatee comes into the lake. We have a lot of animals in the forest here.</i>	
53		<i>They include different types of monkeys. We use to see gorilla but no</i>	
54		<i>more. Elephants, antelopes, leopard, buffaloes, long python with</i>	
55	Bip-nil	<i>torchlight on the head-I have seen one crossing the lake (description of</i>	Biodiversity Protection
56		<i>this specie of snake fit that of the royal python).</i>	

57		Q: What would you say is your major occupation as a people?	
58		<u>Major occupation is fishing and we also farm, planting plantain, cassava</u>	
59		<u>and yam. During flood seasons members of the family can come into the</u>	
60		<u>forest and fish.</u>	
61		Q: What of oil companies, government officials or outside organisations,	
62		do you have contacts with them?	
63	Liv-fis1	<u>Normally before any oil company carries out seismic activities it contacts</u>	Livelihoods
64	Liv-far2	<u>the family before crossing line, however we have a case with a company</u>	
65		<u>called "IDSL" for trespassing our lake.</u>	
66		Q: What of with your neighbours, do you have any boundary disputes?	
67		<u>No boundary disputes, no government involvement with us.</u>	
68		Q: What resources do you get from the lake and its surrounding forest	
69	Con-ext	apart from fish?	Conflict
70	Cos-oilc	<u>Ogbono (Bush mangoes), mahogany and Abura trees.</u>	
71		Q: What if the government wants to assist you in managing this lake by	
72		taking charge, would you agree?	
73		<u>No amount of offer of cash would be accepted from the government or</u>	
74		<u>any person in exchange for our lake. It is our inheritance, it is not</u>	
75		<u>negotiable.</u>	
76	Wet-tim	Q: Who are those that come to buy your fish?	Wetland
77	Wet-ntfp	<u>Women and men from everywhere, mostly come from Warri, Ughelli,</u>	Resources
78		<u>Yenagoa and Port Harcourt (all major towns in close proximity to area).</u>	
79		Q: What is the average price of your fish?	
80		<u>Price of fish is determined by the type of fish it is, its quantity and quality.</u>	
81	Rev-inht	<u>For instance when we fished the child/son lake, altogether we realised</u>	Value of
82		<u>four million six hundred and forty thousand naira.</u>	Resource
83	Mrt-lak	Q: How do you know you made this amount of money?	
84	Mrk-itin	<u>Because we record what we sell daily in the book (showing me the book of</u>	Market chain
85		<u>records)</u>	
86		Q: What affects quantity of fish?	
87	Mrv-type	<u>Serious flooding would make the fish escape from the traps, so flooding</u>	
88		<u>determines how much fish we catch.</u>	
89		Observations	
90		The field Team (Innocent Omons, Mrs Omons, Dimie Otobotekere, Okpo	
91		Zigi, Pasiya Otufu, Benson Elayo and Eno Anwana) left Igboghene-	
92		Yenagoa (GPS: N 05°02.020', E 006°23.945' and Elevation 12.19metres)	
93	Fac-flod	at about 8.50a.m. Lake Samei am told is accessible through the East-west	Vulnerability
94		motorway, which is the motorway linking Bayelsa to Delta state. <u>We rode</u>	
95	Nad-flod	<u>through the motorway up to a point immediately after the Zarama Bridge,</u>	
96		<u>towards Ughelli town and thereafter trekked through a forest path to the</u>	
97		<u>lake. Lake Samei I gathered from secondary information is a lake fished</u>	
98		<u>periodically and it's owned by an individual family within the Okordia-</u>	
99		<u>Zarama community. The terrain towards the lake is full of levees and</u>	
100		<u>footpath appeared dried at this time of the year (April 2005). But, this</u>	
101		<u>path way could get very slippery and treacherous during the rainy season,</u>	
102		<u>from its outlook. It took us about an hour and half to trek through the</u>	
103		<u>forest to the lake (from the point the car, we travelled in was parked). I</u>	Access Routes
104	Acr-far	couldn't take satellite readings throughout the trek through the forest,	
105	Acr-dif	because of the forest canopy. From my observations, <u>the forest vegetation</u>	
106		<u>show signs of secondary re-growth, particularly towards the transect foot</u>	
107		<u>path (large areas have been converted into farmlands). It also appears that</u>	
108		<u>rattan plants are harvested from this part of the forest (I saw several</u>	
109	Acr-dif	<u>bundles tied up along the footpath). Worst, is the indiscriminate logging</u>	
110		<u>done within the perimeter of the lake. Along the trek towards the lake, we</u>	
111		<u>met a young boy carrying foodstuff (it was good we did, since he</u>	
112		<u>eventually became an informant and also helped paddle the canoe we took</u>	
113		<u>across the lake). The canoe ride was shaky and we were warned (I and</u>	
114	Res-sefo	<u>Omon's wife, not to fall into the water). This was an interesting</u>	Resource Use
115		<u>information, when I probed further, the canoe boy narrated that women</u>	
116	Res-fam	<u>were not allowed inside the water (whether accidentally or on purpose).</u>	
117		<u>When asked why, in his own words he replied, 'it will affect the</u>	
118		<u>sacredness of the lake'. So what happens if a woman is found in the lake?</u>	
119	Res-logl	He answered, <u>'she would pay a fine'. How much would she pay? Five</u>	
120		<u>thousand Naira (N5, 000) ummh! We eventually got across to the other</u>	
121		<u>side of the lake, which had several made shift thatch structure along the</u>	

122		bank of the lake (GPS: N 05°08.737', E 006°23.556', and Elevation	
123		13.41metres). We were taken straight to a large open space, towards the	
124		centre of the camp. This area, I later understood acted as a muster point	
125	Las-wod	for the camp. The thatch tents at the fringe of the muster point housed the	Sacredness
126		elders of the camp. The camp I noticed had a mixed population of people,	
127		women, men, children and even babies were in the camp. From visual	
128		estimation, population of the camp is probably about 75. We were told we	
129	Las-fine	had to wait for the youths to return from the day's activities before	
130		starting the meeting. <u>The youths (seen from where I stood) were setting</u>	
131		<u>traps in the water.</u> I thought probably this activity was for the fishing	
132		festival, but later on learnt that the traps were for the daily meals of the	
133		camp group.	
134		Meeting with the Group: Introductions of the team was made by Innocent	
135		to the group of elders and campers. <u>The eldest man in their midst (Mr</u>	
136		<u>Jonah Okah) chaired this seemly August occasion.</u> It is customary in the	
137		Niger Delta to welcome and entertain visitors with drinks and cola nuts.	
138		In some places, money is offered to the guest as part of the goodwill of	
139		the host. In the spirit of reciprocity, the visitor likewise gives drinks and	
140		money to the host in appreciation of his kindness. This ceremony is well	Gender Role
141	Gen-youm	ingrained in the Delta and it is only after this ceremony that the visitor can	
142		state his/her mission to the community. The team was familiar with this	
143		"communication" process and to the effect we had come harmed with a	
144		bottle of alcoholic beverage for the elders. Innocent, stated our mission to	Gender Role
145		the gathered audience, elder Jonah I noticed answered most of the	
146	Gen-eldr	questions directed at the community. He spoke freely and showed a lot of	
147		enthusiasm on hearing our mission. Apparently elder Jonah was no	
148		stranger to researchers, he attested to this by recounting a talk he had in	
149		1962 with students of the "Teachers Training College (TTC) in Okordia-	
150		Zarama under the principal named Abumage. He on this occasion had the	
151		privilege of talking to the students on the history of the lake. His memory	
152		of this event is commendable. Also, from the way he spoke it showed he	
153		had some form of formal education, I decided to have a personal	
154		interview with him. <u>The youths showed a lot of interest in knowing what</u>	
155		<u>our mission to the camp was about. From their responses and perhaps</u>	
156		<u>from past experiences within the Niger Delta region, it appears the youths</u>	
157		<u>have an important role in the discussion of natural resources.</u> The elders,	
158		in most communities visited always sent for representatives of the youth	
159		group to be in attendance of meetings held with visitors, particularly	
160		meetings where natural resources are mentioned. <u>In one of the tents I</u>	
161		<u>noticed a generator.</u> From my inquiries, I understand, youths watched	
162		films and played music at nights and so needed the generator. My hunch	
163		is that the generator is a modern introduction to the camp. <u>One youth I</u>	
164		<u>spoke with narrated that the camp gets boring without music and films to</u>	Gender Role
165		<u>watch at night.</u>	
166		I observed one of the ceremonies (Exhibit A) done during the fishing	
167		festival, after the interview held with elder Jonah. Perhaps this was done	
168	Gen-youm	for my benefits (I would not know) but the timing seemed questionable.	
169		However, I was informed by the elders, particularly the priest (who was	
170		happy for me to take his pictures beside the shrine) <u>that the Ogele rite</u>	
171		<u>precedes the fishing activities in either of the lake (that is the mother or</u>	
172		<u>child lake).</u> The <i>Ogele</i> , Innocent (my assistant) commented, is usually	
173		done to herald a great event. The exemplar he gave is the burial of a great	
174	Mod-sty	person. As I watched the sequence of events, a local dynamite was ignited	Modernity
175		close to the bank (scared me when it exploded). The explosion led to a	
176		frenzied display of dancing and drums beats. The men did the drumming,	
177		while women danced around the camp waving cut branches from nearby	
178		trees (it really was a celebration of some sort). In addition to the land	
179		display was the water display carried out by the youths. Two dug-out	
180		canoes were draped with fresh palm frond which the youth used to row	
181		across the length of the lake, dancing and pouring alcohol into the water. <u>I</u>	Belief
182		<u>leant from the elders that the observance of this pre-requisite rite</u>	
183		<u>guaranteed a bountiful harvest.</u> <u>When I asked on the role of the women I</u>	
184		<u>saw in the lake, I leant they were involved in processing the fish brought</u>	
185	Bel-obs	<u>ashore by the men and also took active part in the sales.</u> In essence,	
186		<u>fishing in this lake was done strictly by men.</u> The lake is a fresh water	

187		lake and species I noted are the common fresh water species seen in the	
188		region as noted below (exhibit B). The main source of water into the lake	
189		appears to be the River Niger. The men I met has I checked the fish stock	
190		within the camp were quite knowledgeable on fish species. They readily	
191		offered the local names of the fish species and were quick to point out	
192		which fish tasted delicious in soups and sauces.	
193		Second Field Visit to Akumoni-Okordia (May 12, 2005)	Belief &
194		Observations	Practice
195		This is a follow-up visit to the first field visit. The elders had promised	
196		sending for the group to witness the fishing festival of the mother lake.	Gender Role
197	Pra-boha	Since I had not heard from them, I decided it was an appropriate time to	Gender Role
198		visit the camp. Also, the apprehension grew on learning from a	
199		fishmonger in Biseni, that the fishing expedition in Lake Samei had been	
200	Gen-wom	concluded (found that strange). However, my source claims that the fisher	
201		men had similar experience to that of Lake Esiribi (heavy rainfall causing	
202	Gen-men	severe flooding), which meant their fishing efforts had been disrupted. I	
203		indeed confirmed my informant's story to be true as we met the camp	Vulnerability
204		empty. The group of campers we met narrated their experience to us. <u>The</u>	
205	Nad-floed	<u>flooding they commented led to a low catch as a result the expedition had</u>	Factors that
206		<u>to be cut short.</u> A certain man we met was particularly unhappy about the	affect fishing
207	Fac-floed	situation. According to the story he told me, he had given three thousand	
208		naira (N3, 000) to one of the fishermen to purchase fish for him. He	
209		neither had seen his consignment or the fisherman, which necessitated his	
210		coming in search of the fisherman. But, like the team he met an empty	
211		camp.	
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229		CASE 2	
230		Sabagreia village from secondary data has a popular lake, known as the	
231		Efi Lake. This Lake I understand is popular with the government, who in	
232		the past has sent missions on a documentary of the lake history	
233		(unfortunately, these documents either are not made public or perhaps do	
234		not exist). When we got to the town we were headed for the house of the	
235		village head, but had to detour to Chief Ebiensa's house (as a referral	
236		from our local informant) because the village head was in Yenagoa.	
237		Interview with Chief Ogrigade Ebiensa	
238	Own-fam	<i>Q: Why is the ownership of Lake Efi attributed to a particular family?</i>	Ownership
239	Gon-Fis	<i><u>The Kalama family are the first settlers in the village. They (the Kalama</u></i>	Governance &
240	Gon-ownr	<i><u>family) are the owner of the lake and it is this family which produces the</u></i>	Nat. Resource
241		<i><u>paramount ruler.</u></i>	
242	Laf-fest	<i>Q: How do you fish in this lake?</i>	Lake fishing
243		<i><u>The last festival was in 1995.</u></i>	
244		<i>Mr Agbozu (a younger member of the family adds: <u>They should have done</u></i>	Festival
245		<i><u>the festival this year (2005), but because of the construction of the road</u></i>	Postponed
246		<i><u>linking Sabagreia to Kaiama and Polako, we have to postpone the fishing</u></i>	
247		<i><u>festival till construction work is finished.</u></i>	
248		<i>Q: Why is this lake different from the other lakes within your</i>	
249		<i>community?</i>	
250	Sac-rites	<i><u>This lake is sacred (ummh), we do not enter into the lake anyhow. Before</u></i>	Sacredness
251	Sac-saf	<i><u>we do certain sacrifices must be done by the priest in order for the lake to</u></i>	Belief

252	Sac-prit	<p><u>give us what we want from it. Certain things are forbidden around the lake (Q: What are these things?) No sexual intercourse is allowed in the bush. Also the demand of the shrine which services the lake is done yearly.</u></p> <p>Q: What are the allowed methods of fishing?</p> <p><u>Floating nets only, but outside the fishing season members of the community are allowed to catch a fish or two, not for commercial purposes but for family feeding. In such an occasion they are permitted to use a spear/hook and not nets to catch the fish for feeding their family.</u></p> <p>Q: Who are those involved in the fishing festival?</p> <p><u>Everyone, we announce to our neighbours and beyond when the date for fishing is approaching. At that particular time you would see people from all the communities surrounding Sabagreia, even up to Delta coming into the lake.</u></p> <p>Q: What of all the restrictions mentioned at this time of fishing?</p> <p><u>It is an open affair, no restriction, even you can fish (referring to me). What we do is charge per canoe for those interested in fishing. They know our rules and they stick to it. Also during the fishing period we all go through the creek called Efiororo, leading from Polako to the lake.</u></p> <p>Q: Are women allowed into the lake?</p> <p><u>Yes, they can come to the lake. We drink from the lake so our women go to fetch water from the lake.</u></p> <p>Q: What of plant or animal in the lake or maybe in the surrounding forest, do you protect any?</p> <p><u>No, we can kill crocodile at anytime and no single plant is inside that lake it is a clear lake (Q: Not even water hyacinth?)</u></p> <p><u>Not one water hyacinth, if they come there after sometime wind comes and blows it away. The lake is clean and we drink from it.</u></p> <p>Q: What would you say is your major occupation?</p> <p><u>Fishing and also farming, farming mostly for feeding family.</u></p> <p>Q: What kind of crops do you grow?</p> <p><u>Banga (Palm Oil trees), cassava, cocoyam, plantain (From my observation banga (Palm nuts) is not cultivated but rather harvested from the surrounding forest).</u></p> <p>Q: What is the amount charged per canoe during the festival?</p> <p><u>The last festival we charged about N1, 000 and we realised about N50, 000</u></p> <p>Q: What do you do with this money?</p> <p><u>It is for entertainment</u></p> <p>Q: What of co-operative for the farmers, do you have any?</p> <p><u>No</u></p> <p>Q: Who saw or discovered the lake</p> <p><u>His name was Okereke and he was a hunter. The priest that has being chosen this year is a young man who is a descendant of Okereke. It was because we had some problems internally, that is why we have not done the festival (this appears to be in conflict with the earlier narrative by Mr. Agbozu)</u></p> <p>Q: What kind of animals is common within the lake area? Different species of monkeys, duiker, porcupine, cane rat, antelope.</p> <p><u>During flood season we see Red River hog, the antelope (Sitatunga) and manatee.</u></p> <p>Observations: The journey to Sabagreia (GPS: N 05°02.099', E 006°14.655') was hassle-free and straight forward. The community is located on the Southwest bank of Polako (GPS: N 05°01.803', E 006°16.839') on the River Nun (the town where we hired a motor boat from). The Nun River is one of the major rivers in Bayelsa State. On arrival we asked for the paramount ruler but we were told he (Chief Bokumo Orukari) spent most of his time in Port Harcourt. We were then taken to an elder's house, a retiree of the Nigerian Army, who welcomed the team. Chief Ogrigade Ebienfa, the ex-army man, didn't need an interpreter for translation; he could communicate using the English language, occasionally switching to Pidgin English (which seems to be the acceptable lingua franca of the Deltas). On stating our mission he asked the young man who followed the team (Mr. Ikuromo Agbozu) to invite another chief of the community for the meeting. On arrival of the invited chief (Burubai Asabase), pleasantries and exchange of drinks were</p>	
253	Las-nise		
254	Bel-obs		
255	Bel-gode		
256			Fishing Tools
257	Fit-net		
258			
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260	Fit-hosp		
261			Fishing
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263	Fis-any		
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267			Social Networks
268	Son-mark		
269	Fes-fc		
270			Fishing Festival
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274			
275	Fil-geni		
276			Fishing Laws
277			
278			
279	Bip-nil		
280			Biodiversity Protection
281			
282	Wet-drin		
283		Wetland Resources	
284	Liv-fish1		
285	Liv-fish2		
286			
287			
288		Fishing festival	
289	Fes-fc		
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294			
295		Belief	
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297	Bel-prit	Conflict	
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299	Con-int		
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317		done and we had to restate our mission to the group. Interview on the Efi	
318		Lake and were conducted with Chief Ogrigade Ebienfa, with Ikuromo	
319		Agbozu filling in when the chief left out information, he (Mr. Ikuromo)	
320		thought was necessary. After the interview, we were given permission by	
321		the chief to survey the lake. Mr. Agbozu led the team to the lake. My first	
322		impression of the lake was the absence of water hyacinth as told by Chief	
323		Ebienfa. <u>Mr. Agbozu also told the team that the cause of the blockage of</u>	
324		<u>the creek adjacent to the lake is due to the bridge that had been</u>	
325		<u>constructed up stream.</u> It's interesting to note that the source of water	
326		feeding the lake contains a considerable population of water hyacinth,	
327		while the lake itself has no record of this plant. Unlike Lake Samei. Lake	Problem
328		Efi (N 05 ^o 02.344', E 006 ^o 15.025' and Elevation 11.58metres) is located	Wetland
329	Pro-bloc	close to the village. <u>It took about five minutes to walk to the lake from</u>	
330		<u>Chief Ebienfa's house. The side of the lake close to the village shows</u>	
331		<u>highly degraded vegetation. Vegetation composed of food crops, notably</u>	
332		<u>cassava plants while vegetation on the other side of the lake is riparian.</u>	
333		The lake seems rich with fish, intermittently we could see fishes dart from	
334		side to side. Also with the aid of a pair of binoculars we saw three	Access Routes
335		crocodiles (Exhibit C) sunning themselves, with their noses barely visible	
336	Acr-clos	above the water surface while the rest of their bodies were submerged in	Resource Use
337		the water. <u>Firewood, Mr. Agbozu comments is picked regularly from the</u>	
338	Res-fam	<u>bush around the lake. He also recounts that the crocodiles do not cause</u>	
339		<u>harm, even when people swim in the lake.</u> The interview with Chief	
340		Ebienfa went smoothly, <u>but the contradicting information on the reasons</u>	
341		<u>for the postponement of the fishing festival bothered me a little. Chief</u>	
342		<u>Ebienfa said that the festival was postponed based on internal problems</u>	
343		<u>while Mr. Agbozu maintains that the cause was an attribution of ongoing</u>	
344		<u>road construction. It appears someone is trying to hide something here.</u>	Wetland
345		<u>Chief Ebienfa's narrative has an element of truth (I probably would know</u>	Resources
346	Wet-fiwo	<u>as I interact with other people within the community). However, since the</u>	
347		<u>above information is coming from an elder person, Chief Ebienfa, I would</u>	
348		<u>presume this to be more likely the case for the postponement of the</u>	
349		<u>fishing festival, since it is the chief priest who fixes the date for the</u>	Conflict
350		<u>festival. The other thing I noticed is that Sabagreia is close to Yenagoa</u>	Contradiction
351		<u>(45minutes) and most of the youths appear to be out in the city. Sabagreia</u>	
352		<u>town appears a changing town and with the construction of the NDDC</u>	
353		<u>road might become more cosmopolitan. Within the community I counted</u>	
354		at least two big shops; a depot for Coca-Cola products and a multi -	
355		commodity shop (a rare feature in riverine towns within this area).	
356		Building pattern within the community consist of blockhouses alongside	
357		traditional mud houses. <u>The newly constructed road is close to the lake</u>	
358		<u>and one wonders what changes might occur in the system by the road</u>	Modernity and
359		<u>access. Road openings are known to bring an influx of visitors and</u>	Change
360	Mod-roco	immigrants that might contribute to conflicts in the use of resources, as	
361	Mod-prox	different people with varying views settle in the community. Follow-up	
362	Mod-cosm	questions would be to have a session with the youths (to question their	
363	Cha-mig	perception of the existing traditional belief and practice in the use of this	
364		wetland resource base). This could determine the strength of local	
365		management of this resource within the current dispensation. If for	
366		instance they (the youths) don't believe in the 'sacredness' of this	
367		resource, then there likely might be an opening for other users, trade-offs	
368	Mod-roco	could easily be effected. For instance the youths could sell out to	
369		government or external interested parties in exchange of something	
370		thought to be more beneficial to the community perceived. However these	
371		are perceptions, more probing questions and follow-up interview with	
372		identified opinion youth leaders might give more insights. Second Field	
373		Visit to Sabagreia (May 20, 2005) Observations: Team met with chief	
374		Ebienfa again, who appeared to be more at home with us, <u>first thing he</u>	
375		<u>showed to us was a burnt fishing net in front of his compound. The burnt</u>	
376		<u>net, he said was seized or rather taken off the lake. Presumably a poacher</u>	
377		<u>had stolen into the lake at night to lay traps for some quick sales, it was</u>	
378		<u>the youths he said who patrol the lake at night who noticed the net and</u>	
379		<u>brought it in; poaching chief Ebienfa said is a regular occurrence on the</u>	
380		<u>lake.</u>	
381		<u>Q: What route do they take?</u>	Pressure on

Appendices

382		<i>They come in with canoes from the Polako creek linking the lake</i>	Resources
383		<i>Q: How long does the fishing festival take?</i>	
384		<i>Three days and during these days you would not experience mosquitoes</i>	
385		<i>and soldier ants. <u>Opokuma and Gbarain clans are not allowed to fish</u></i>	Conflict
386	Prs-poac	<i><u>during the fishing season.</u></i>	
387		<i>Q: Why?</i>	Management
388		<i>Sometime ago somebody died and the copse was found in the lake, due to</i>	
389	Com-ext	<i>this they are barred from fishing in the lake.</i>	
390		<i><u>The current priest to the lake is a very young boy</u></i>	
391		<i>Q: How old is he?</i>	Fishing Festival
392	Man-lopl	<i>Less than 30years, his name is John Okoro.</i>	
393			Social
394		After the interview we were led by our guide to the lake, also to visit the	Exclusion
395		village's crocodile hunter. <u>The crocodile hunter, Forokarah Obed, who</u>	
396	Fel-day3	<i><u>says he traps crocodile for sales, had several pictures of the crocodiles he</u></i>	
397		<i><u>had hunted in the past.</u> Forokarah, who is a civil servant and a fisherman,</i>	Belief
398		<i>showed us two skulls of crocodiles that he had killed in the past.</i>	
399		Observations	
400		Chief Ebiefa showed a lot of concern on the issue of poaching and	
401	Exc-sins	wanted help from any organisation or persons and thought we could help	
402		speak to interested parties to come to their aid. One interesting thing he	Pressure on
403	Bel-prit	said was that he had heard from a source that the Efiks (he knew from	Resources
404		earlier introductions that I was from that part of the country) <u>were known</u>	
405		<u>for juju medicine. This juju medicine is reputedly used in trapping</u>	
406	Prs-mrkt	<u>trespassers or poachers, he wondered if I could get such medicine for the</u>	Belief
407		<u>community). It brings to mind questions on changes in people's attitude</u>	
408	Bel-juju	<u>towards these sacred lakes. Question is what is causing the change, could</u>	
409		<u>it be disregard for cultural practises or are people simply desperate to get</u>	Changes
410		<u>food and probably income. Regulating access to these areas, which have</u>	
411		<u>creeks, roads and various points of entry, might indeed be a question to be</u>	
412		<u>addressed. The practical incidence reported today shows in my own</u>	
413		<u>perspective some limitations of these traditional institutions. The question</u>	
414		<u>is, are these traditional institutions capable of patrolling open places such.</u>	
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APPENDIX 4

HOUSEHOLD QUESTIONNAIRE

Household Interview

Name of Community: -----

LGA: -----

State: -----

Name of Interviewer: -----

Date of Interview: -----

Introduction: The purpose of this interview is to get your opinion on the importance of the different types of wetlands in your community to you and your household, especially in their contributions to your livelihood. We want to assure you that the information you give would be used only for research purposes and shall be held in strict confidence.

A. Natural Resource and Wetland Use

First we would like to know more on the different types of wetlands present in this community, whether there are differences between the forest and wetland and on how you have used these resources over the years;

1) What significance does the wetland hold for you?

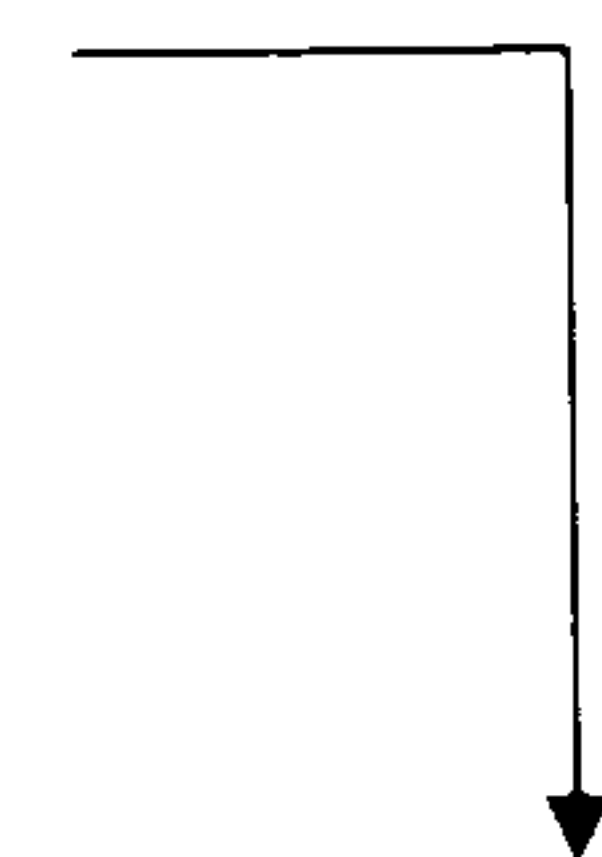
- A source of livelihood [] 1
- A place of worship [] 2
- An inheritance from my ancestors [] 3
- A place of enjoyment [] 4
- A place whenever I think of it.
- I have satisfaction [] 5
- Others (Please specify) [] 6

2) Are there restrictions/laws placed on the uses of the wetland within your community?

- Yes _____ [] 1 (If Yes, go to question 2 (a))
- No _____ [] 2 (If No, go to question 7)

a. What are these restrictions/laws? _____

b. Who placed these restrictions laws?



- Traditional ruler [] 1
- Council of chiefs [] 2
- CDC [] 3
- Egbesu [] 4
- Others _____ [] 5
- (Please specify)

3) How do these restrictions/laws affect your livelihood activity?

I make enough during the fishing season to meet all my needs, so it doesn't change anything [] 1

I do not make enough during the fishing season to keep my family, so I have to look for other alternative of making money [] 2

I burrow money from money lenders till the next fishing season [] 3

I have to move to other fishing communities to continue fishing [] 4

4) Do you think they are necessary?

- Yes [] 1 if yes go to question 5 (a) _____
- No [] 2 if no go to question 6

a. Why are they necessary?

Because of the laws we always have fish to eat and to sell [] 1

Because of the laws there is peace in our community [] 2

Others (Please specify) [] 3

5) Do you think they should be removed?

- Yes [] 1
- No [] 2

6) How do people acquire areas for carrying out their occupation? For instance if fishing do they just fish anywhere within the community?

- By inheritance from their fathers [] 1
- By allocation from clan head [] 2
- By buying land and area for fishing [] 3
- By bequest from extended family [] 4
- We fish and farm anywhere we chose [] 5
- Others _____
- (Please specify) [] 6

7) What is your primary occupation?

- Fishing [] 1
- Farming [] 2
- Hunting [] 3
- Forest products gathering [] 4
- Petty Trading [] 5
- Logging [] 6
- Others _____
- (Please specify) [] 7

8) What is your secondary occupation?

- Fishing []
- Farming []
- Hunting []
- Forest products gathering []
- Petty Trading []
- Logging []
- Others _____
- (Please specify) []

B. Wetlands and Livelihoods

i. Assets

9) What are the things that you have that can bring you money? (Mark as many as are applicable)

- Farmland []
- Fishing net []

- Dugout canoe []
- Speedboat []
- Local gun []
- My school certificate []
- My family []
- Others _____ []
- (Please specify)

10) How large is your household

- 2 – 4 [] 1
- 4 – 6 [] 2
- 6 – 8 [] 3
- 8 – 10 [] 4
- > 20 [] 5

11) Do you make money from fishing activities?

- Yes [] 1 (if yes, go to questions 12 – 15)
- No [] 2 (if no, go to question 16)

12) How much do you make monthly from this activity?

- N5, 000 – 10,000 [] 1
- N10, 000 – 15,000 [] 2
- N15, 000 – 20,000 [] 3
- N20, 000 – 25,000 [] 4
- N25, 000 – 30,000 [] 5
- Others _____ [] 6
- (Please specify)

13 The money you make from fishing is it enough to meet your family needs?

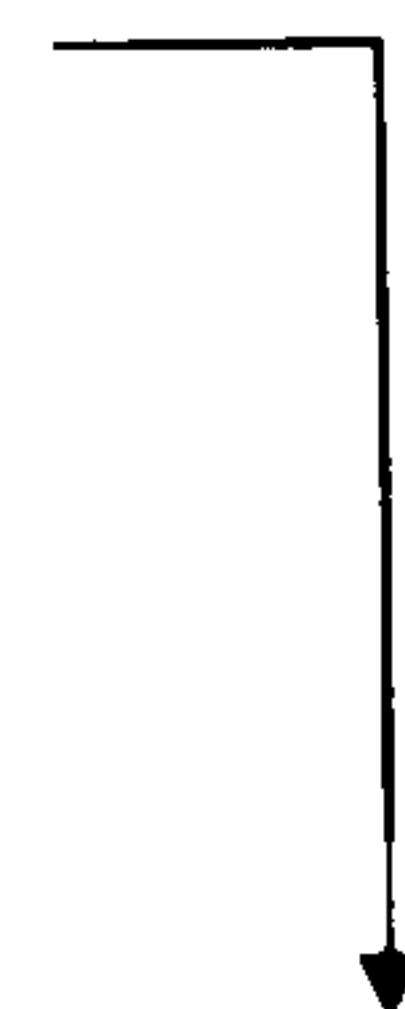
- Very Adequate [] 1
- Somehow Adequate [] 2
- Uncertain [] 3
- Somehow Inadequate [] 4
- Very Inadequate [] 5

14) Are you able to make savings from fishing activities?

- Yes [] 1
- No [] 2

15) Are you indebted to anybody?

- Yes [] 1 if yes, go to question 15 (a) and (b)
- No [] 2 if no, go to question 16



a. Who are you indebted to?

- Money lender [] 1
- Fellow fisherman [] 2
- Village cooperative [] 3
- Middlemen [] 4
- External Micro credit scheme [] 5
- Others
- (Please specify) [] 6

b. How do you plan to pay off your debt?

- Wait for next fishing season [] 1
- Trade fish for cash to creditor to offset balance owed [] 2
- Engage in other trade outside fishing [] 3
- Look for job outside my village [] 4
- Seek assistance from extended family [] 5
- Seek remittance from children living outside the village [] 6
- Seek assistance from government [] 7
- Others [] 8
- (Please specify)

ii. Activities

16) Are there available markets for your products within your community?

- Yes [] 1 (if yes, go to question 17)
- NO [] 2 If no, go to question 16 (a)



a. Where do you market your products?

- Yenagoa [] 1
- Warri [] 2
- Port Harcourt [] 3
- To middlemen who
- Take the products to
- Other places [] 4
- Others _____
- (Please specify) [] 5

17) Who determines the pricing of your produce/products?

- The Clan head/chief [] 1
- The head of my extended family [] 2
- Me and my wife and children [] 3
- The members of the village cooperative [] 4
- Our customers [] 5
- Others _____
- (Please specify) [] 6

iii. Access

18) Are you allowed to use these resources (wetland and forest) when you want?

- Yes [] 1
- No [] 2
- Sometimes [] 3

a. Who grants permission/licence for use of these resources?

- Elders of the owners
of the resources [] 1
- Traditional ruler [] 2
- Council of chiefs [] 3
- CDC [] 4
- Egbesu [] 5
- Others _____ [] 6
- (Please specify)

19) Do people fight over using your wetlands (lakes, rivers and swamps)?

- Yes [] 1 if yes go to question 19 (a) and (b)
- No [] 2 if no go question 19b

a. Who are these people?

- Strangers who live in our village [] 1
- Other people from neighbouring villages [] 2
- Oil company people who come to lay pipes [] 3
- The government [] 4
- Others _____



(Please specify)

[] 5

b. Have you ever had problem in accessing this assets (forest and wetlands)

(Probe for reasons for inaccessibility to resource base, if not from personal encounter, it could be remotely related to interviewee, for instance past experiences of extended family)

20) Do you have any problem concerning your wetlands (swamps, lakes and rivers)?

Presence of poachers from neighbouring
villages [] 1

Flood level is too high these days, it spoils
our traps [] 2

Water hyacinth is too much in the water,
so we spend more time fishing, because we
have to clear the weed first before fishing [] 3

The amount of fish and type of fish we
catch these days is smaller than before, so we
lose customers [] 4

People don't have money to buy fish from
us, they prefer to buy ice fish because it is
cheaper, so we do not make money like before [] 5

The oil companies have spoilt our water
through oil pollution [] 6

Others _____
(Please specify) [] 7

21) What can be done to solve these problems?

22) If something bad should happen to your swamps, lakes and rivers, how would it affect your livelihood and the culture of your community?

I would pray to die, because I can't live
Without our waters and forest [] 1

I would move to another community
where there is water, because I do not know any

- other way of life [] 2
- I would have to look for other things to do that
would bring me money [] 3
- I don't know it is unimaginable [] 00

C. Sacred Lakes and Conservation

We would like to know more about the different types of lakes within your community and on the importance of these lakes to you as a member of this community and on how you use these lakes;

23) What are the different types of lakes in your community?

- Restricted access lakes [] 1
- Unrestricted access lakes [] 2
- Both restricted and
Unrestricted access lakes [] 3

24) Why is one type of lake different from the other?

- One is set apart for spiritual reasons [] 1
- Because we want to always have fish
so we decided to set aside one of our
lakes for occasional fishing [] 2
- Because of laws set by our ancestors and
elders [] 3
- I don't Know [] 00

25) How often do you fish in (A) restricted access lake and (B) unrestricted access lake?

- | (A) | (B) |
|------------------------|---------------------------|
| Every 2 years [] 1 | Anytime of the year [] 1 |
| Every 4 years [] 2 | Once in 1 month [] 2 |
| Every 5 years [] 3 | Once in 2 months [] 3 |
| Every 7 years [] 4 | Once in 3 months [] 4 |
| Others _____ | Others _____ |
| (Please specify) [] 5 | (Please specify) [] 5 |

26) What type of fishing is done in lake (A) restricted access and lake (B) unrestricted access? (Tick as many as may apply)

(A)		(B)	
Trap fishing	[]	Trap fishing	[]
Hook and spears	[]	Hook and spears	[]
Line net fishing	[]	Line net fishing	[]
Scoop net fishing	[]	Scoop net fishing	[]
Others _____		Others _____	
(Please specify)	[]	(Please specify)	[]

27) What are the different types of fishes you catch in lake? (A) Restricted access and lake (B) unrestricted access?

	(A)		(B)
Aba	[]	Aba	[]
Apede	[]	Apede	[]
Eweri	[]	Eweri	[]
Kobiye	[]	Kobiye	[]
Imuno	[]	Imuno	[]
Peleowei	[]	Peleowei	[]
Agbeki	[]	Agbeki	[]
Akoi	[]	Akoi	[]
Toriye	[]	Toriye	[]
Iyoro	[]	Iyoro	[]
Elei	[]	Elei	[]
Ikpidi	[]	Ikpidi	[]
Others _____		Others _____	

(List all species that are found in the lake)

28) Would you please rank these fishes in lake (A) Restricted access and lake (B) unrestricted access, according to their importance in contributing to your household

earnings? (give the highest number to the most important and lowest number to least important)

	(A)		(B)
Aba	[]	Aba	[]
Apede	[]	Apede	[]
Eweri	[]	Eweri	[]
Kobiye	[]	Kobiye	[]
Imuno	[]	Imuno	[]
Peleowei	[]	Peleowei	[]
Agbeki	[]	Agbeki	[]
Akoi	[]	Akoi	[]
Toriye	[]	Toriye	[]
Iyoro	[]	Iyoro	[]
Elei	[]	Elei	[]
Ikpidi	[]	Ikpidi	[]
Others _____		Others _____	

(List all species that are found in the lake)

29) In the year that the restricted lake is closed where do you fish?

- Other Lakes [] 1
- The river [] 2
- I engage in other activities [] 3
- I move out of the community [] 4
- I wait till the next open season [] 5
- Others [] 6

(Please specify)

30) Can you please compare the two lakes for me? We would take the lake you fish once in a while as lake (A) and the lake you fish all the time as lake (B)

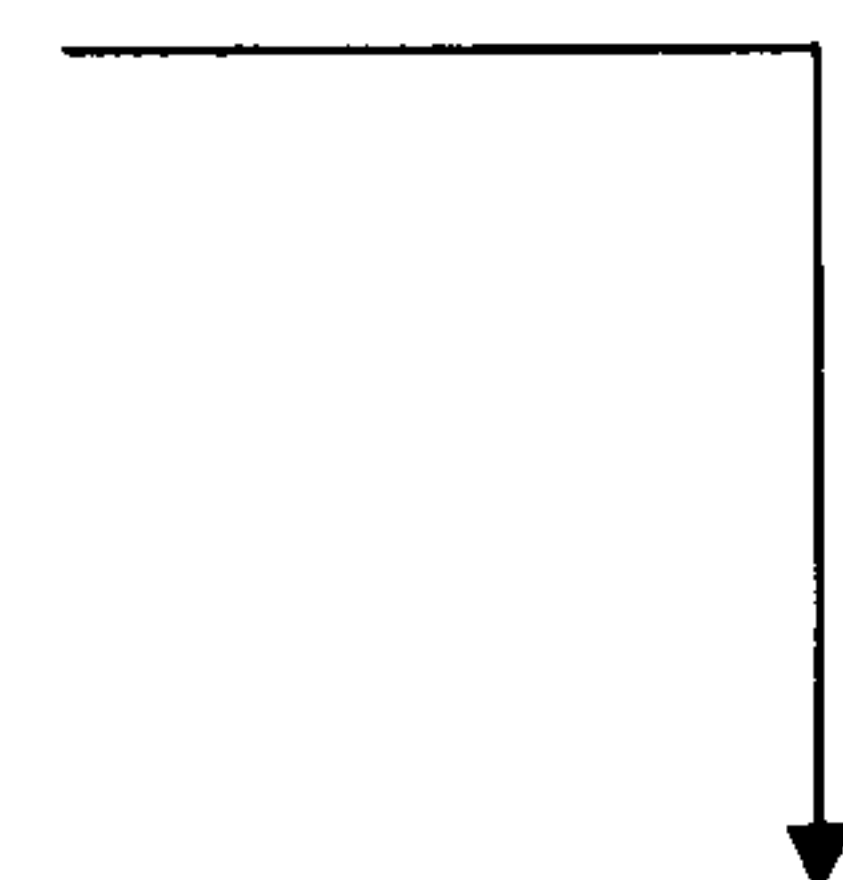
		Lake Type							
		Lake A				Lake B			
		Present	More (++++)	Less (++)	Absent (-)				
						Present	More (++++)	Less (++)	Absent (-)
S/N	Fish								

	Species								
1	Aba								
2	Apede								
3	Eweri								
4	Kobiyo								
5	Imuno								
6	Peleowei								
7	Agbeki								
8	Akoi								
9	Toriye								
10	Iyoro								
11	Elei								
12	Ikpidi								

31) Are there any other resources apart from fish which you harvest from the two types of lakes?

Yes _____ if yes, go to question 31 (a)

No _____ if no, go to question 32



a. What type of resources do you harvest from these lakes?

- Molluscs []
- Shellfish []
- Amphibians []
- Reptile []
- Crayfish []

D. 32) please tick which statement is true concerning your opinion on the following item

Statement	5 Strongly Agree	4 Agree	3 Uncertain	2 Disagree	1 Strongly Disagree
1. The sacred lake in our village is more productive than non-sacred lakes and					

rivers.					
2. If I have a choice between keeping the taboos and laws given to us by our ancestors and getting rich by disregarding the taboos and laws of our ancestors, I would definitely chose to keep the taboos and laws.					
3. The sacred lake in our village is richer in fish species than non-sacred lakes.					
4. Because of the taboos on some animals, for example crocodile, in the sacred lake, people are prevented from hunting them, so we still have a lot of them around.					
5. The sacred lake is very important to my family, because it contributes a lot to our source of income.					
6. Management of our natural resources, including our sacred lake should be left for only the owners of the resources					

7. Management of resources should be a joint venture between the owners of the resources and other interested parties				
---	--	--	--	--

Thank you very much for your cooperation with us, but please before we round up this interview, we would like to know a little bit about you;

E. Bio data of Interviewee

Name of Interviewee: _____

33) Role of Interviewee in community

- Traditional Ruler [] 1 CDC member [] 2 Medicine man [] 3 Women leader [] 4 Men leader [] 5 Youth leader [] 6
 Others _____ (please specify) [] 7

34) Sex of Interviewee

- Male [] 1
 Female [] 2

35) Age

- 20 – 30 [] 1
 30 - 40 [] 2
 40 – 50 [] 3
 50 – 60 [] 4
 > 60 [] 5

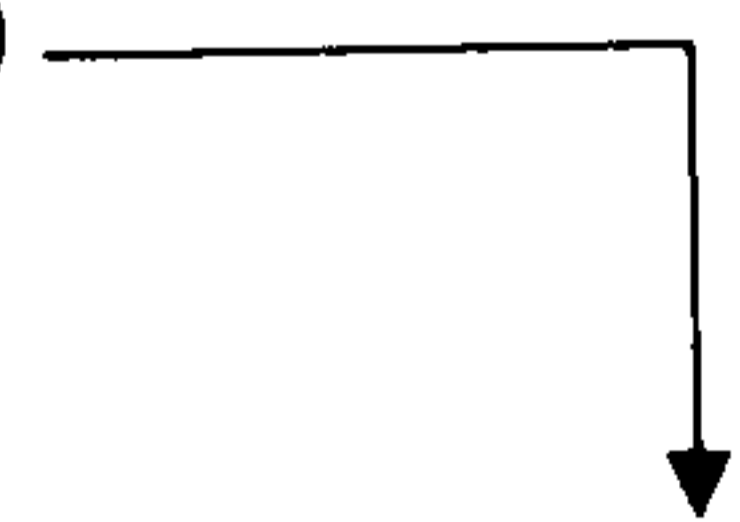
36) Resident Status

- Indigene [] 1
 Non-Indigene [] 2 (please go to question (a) and (b))

a. How long have you lived within the community

- 5-10years []
 10-20years []
 >20years []

b. Ethnic origin (please specify) _____



37) Educational Background:

- Primary level [] 1
- Secondary/Technical level [] 2
- Tertiary level [] 3
- No formal education [] 4

38) Religious Orientation:

- Christian [] 1
- Moslem [] 2
- Egbesu [] 3
- Traditional Religion [] 4
- Others (please specify) [] 5

APPENDIX 5

VEGETATION PROFILE OF STUDY AREA

Table 5.1 Floristic Composition of Study Area and Distribution

Plant Identified		Location Found					
		Bis eni Ar ea	Lake Esiri -bi	Lake Obaa	Ossi- ama Area	Lake Adigbe	Lake Amen- eduno
Family	Name of Plant						
ADIANTACEAE	<i>Ceratopteris cornuta</i>	+	+	+	+	+	+
ANACARDIACEAE	<i>Spondias</i> sp.	+	-	-	+	-	-
ANNONACEAE	<i>Cleistopholis patens</i>	+	-	-	-	-	-
APOCYNACEAE	<i>Alstonia boonei</i>	+	-	-	+	-	-
APOCYNACEAE	<i>Funtumia africana</i>	+	-	-	-	-	-
ARACEAE	<i>Culeasia scandens</i>	+	-	-	-	-	-
ARACEAE	<i>Cyrtosperma senegalense</i>	+	-	-	+	-	-
ARACEAE	<i>Pistia stratiotes</i>	+	+	+	-	-	+
ASPLENIACEAE	<i>Asplenium africanum</i>	+	-	-	-	-	-
ATHYRIACEAE	<i>Diplazium</i> sp	+	+	+	+	+	+
AZOLLACEAE	<i>Azolla africana</i>	+	+	+	-	-	+
BOMBACACEAE	<i>Ceiba pentandra</i>	+	-	-	+	+	-
CERATOPHYLLACE AE	<i>Ceratophyllu m</i> sp	-	+	+	-	-	-

CHRYSOBALANACEAE	<i>Maranthes</i> sp	+	-	-	-	-	-
CONVOLVUCEAE	<i>Ipomoea eriocarpa</i>	+	-	-	-	-	-
CONVOLVUCEAE	<i>Ipomoea aquatica</i>	+	+	+	+	+	+
CYPERACEAE	<i>Scirpus cubensis</i>	-	+	+	-	-	-
EUPHORBIACEAE	<i>Alchornea cordifolia</i>	+	-	-	-	-	-
EUPHORBIACEAE	<i>Alchornea laxiflora</i>	+	-	-	-	-	-
EUPHORBIACEAE	<i>Macaranga</i> sp	+	-	-	-	-	-
EUPHORBIACEAE	<i>Uapaca heudelotii</i>	+	-	-	-	-	-
GUTTIFERAE	<i>Harungana madagascariensis</i>	+	-	-	+	-	-
GUTTIFERAE	<i>Symphonia globulifera</i>	+	-	+	+	-	-
IXONANTHACEAE	<i>Irvingia gabonensis</i>	+	-	-	+	+	+
IXONANTHACEAE	<i>Irvingia smithii</i>	+	-	-	+	+	+
LOGANACEAE	<i>Anthocleista vogelii</i>	+					
MARANTHACEAE	<i>Thalia welwitschii</i>	+	+	-	-	-	-
MIMOSACEAE	<i>Cathormion altissimum</i>	+	-	-	-	-	-
MORACEAE	<i>Ficus lutea</i>	+	-	-	+	-	-
MORACEAE	<i>Musanga cecroipioides</i>	+	-	-	+	+	-

MORACEAE	<i>Treculia africana</i>	+	-	-	+	-	-
MYRISTICACEAE	<i>Pycnanthus angolensis</i>	+	-	-	+	-	-
NYMPHAEACEAE	<i>Nymphaea lotus</i>	+	+	+	+	+	+
ONAGRACEAE	<i>Ludwigia</i> sp	-	+	+	-	+	+
ORCHIDACEAE	<i>Cyrtochilum aerangis</i>	+	+	-	-	+	-
ORCHIDACEAE	<i>Bulbohylum</i> sp	+	+	-	-	-	-
PALMAE	<i>Elaeis guineensis</i>	+	+	+	+	+	+
PALMAE	<i>Raphia hookeri</i>	+	-	-	+	-	-
PALMAE	<i>Oncocalamus</i> sp	+	-	-	-	-	-
PALMAE	<i>Calamus deerratus</i>	+	+	+	+	+	+
PALMAE	<i>Laccosperma secudiflorum</i> (syn. <i>Ancistrophylum</i>)	+	+	+	+	+	+
PAPILIONACEAE	<i>Pterocarpus</i> sp	+	+	+	+	-	-
PONTEDERIACEAE	<i>Eichhornia crassipes</i>	+	+	+	+	+	+
RUBIACEAE	<i>Nauclea</i> sp	+	-	-	+	-	-
RUBIACEAE	<i>Rothmania</i> sp	+	+	-	+	+	-
RUBIACEAE	<i>Psydrax subcordata</i>	+	-	-	-	-	-
RUBIACEAE	<i>Mitragyna ciliata</i>	+	+	+	+	+	+

SALVINIACEAE	<i>Salvinia nymphellula</i>	+	+	+	-	-	-
SAPOTACEAE	<i>Omphalocarpum procerum</i>	+	+	-	-	-	-
SAPOTACEAE	<i>Pachystela brevipes</i>	+	-	-	-	-	-
SCHIZAEACEAE	<i>Lygodium microphyllum</i>	+	-	-	-	-	-
SELAGINELLACEAE	<i>Sellaginella myurus</i>	+	-	-	+	-	+
STERCULIACEAE	<i>Sterculia</i> sp	+	-	-	-	-	-
VERBANACEAE	<i>Vitex grandifolia</i>	+	-	-	-	-	-
VIOLACEAE	<i>Rinorea dentata</i>	+	+	-	-	-	-
VIOLACEAE	<i>Rinorea subintegrifolia</i>	+	+	-	-	-	-

(+) - seen; (-) not seen

APPENDIX 6

SUMMARY OF HOUSEHOLD INTERVIEWS

1. BISENI CLAN

FAMILY COMPOUNDS WHICH MADE UP THE SAMPLING FRAME IN BISENI CLAN

Akpede

1. Ere-wari
2. Obunwan-wari

Tuburu

1. Towari
2. Egberedonu
3. Bodiwari/Kirilubo
4. Ebilubo
5. Egbelubo
6. Ebibiri
7. Egbekiri
8. Tuburuobunwan-wari

Egbebiri

1. Ayakuroama
2. Adeama
3. Egilewari
4. Evuruwari
5. Ikubiri
6. Omedewari
7. Aguawari
8. Bilezuwari
9. Piawari
10. Asimesewari

Tein

1. Onudonu- Akpede
2. Oguentiwari
3. Biriesakuwari
4. Ajafewari
5. Atuwari
6. Gbisawari
7. Igbumawari
8. Amerawari
9. Amafeniwari
10. Agbadawari
11. Awowari
12. Ediwari
13. Kiriselegha
14. Kausowari

15. Ojolubowari

Table 6.1 Distribution of respondents within Biseni clan

Villages		Frequency	Percent
	Akpede	10	5.4
	Tuburu	40	21.6
	Egbebiri	51	27.6
	Tein	84	45.4
	Total	185	100.0

Table 6.2 Distribution of respondent's sex within Biseni clan

Villages			Sex of respondent		Total
			Male	Female	
Akpede	Count		9	1	10
	% of Total		4.9%	.5%	5.4%
Tuburu	Count		33	7	40
	% of Total		17.8%	3.8%	21.6%
Egbebiri	Count		45	6	51
	% of Total		24.3%	3.2%	27.6%
Tein	Count		78	6	84
	% of Total		42.2%	3.2%	45.4%
Total	Count		165	20	185
	% of Total		89.2%	10.8%	100.0%

2. OSIAMA CLUSTER VILLAGES

FAMILY COMPOUNDS WHICH MADE UP THE SAMPLING FRAME OSIAMA-OWEI CLUSTER VILLAGES

Osiama 1 Village

1. Akoromobiri
2. Tanyin
3. Akordiwari
4. Kingpolo
5. Kurobiri

Ogbubolama

1. Opubiri
2. Okolobiri
3. Ayakoroma
4. Tamubiri

Awegbene

1. Seikua
2. Buobiri
3. Egboko

Ogbubolama

1. Kegbekebiri
2. Atokobiri
3. Akogbenebiri

Table 6.3 Distribution of respondents within Osiana community

Villages		Frequency	Percent
	Osiana 1	43	55.8
	Ogbubolama	19	24.7
	Ogbunugbene	15	19.5
	Total	77	100.0

Table 6.4 Distribution of respondent's sex within Osiana

Villages		Sex of respondent		Total	
		Male	Female		
	Osiana 1	Count	29	14	43
		% of Total	37.7%	18.2%	55.8%
	Ogbubolama	Count	15	4	19
		% of Total	19.5%	5.2%	24.7%
	Ogbunugbene	Count	13	2	15
		% of Total	16.9%	2.6%	19.5%
Total		Count	57	20	77
		% of Total	74.0%	26.0%	100.0%

Table 6.5 Socio-economic characteristics of the respondents ($N = 262$)

Category	Frequency
Gender	
i. Male	222 (84.7%)
ii. Female	40 (15.3%)
Estimated Age	
i. <40	71 (27.1%)
i. 40-60	135 (51.5%)
ii. >60	56 (21.4%)
Education	
i. Primary only	100 (38.2%)
ii. At least secondary	116 (44.3%)

iii. Never been to school	46 (17.6%)
Religion	
i. Christian	221 (84.4%)
ii. Traditional religion	41 (15.6%)
Primary Occupation	
i. Fishing	111 (42.4%)
ii. Farming	103 (39.3%)
iii. Hunting	3 (1.1%)
iv. Forest products gathering	1 (0.4%)
v. Logging	2 (0.8%)
vi. Petty trading	9 (3.4%)
vii. Others(Civil servants / traditional ruler/ students)	33 (12.6%)