FOREST BASED RURAL LIVELIHOODS IN AKASSA MANGROVE FORESTS, BAYELSA STATE, NIGERIA

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DEDICATION

This research is dedicated to God Almighty for His immeasurable grace, ever present help and supernatural provision.

To numerous people worldwide, whose lives and livelihoods are continually placed in a balance as a result of the competing demands for dwindling global forest resources.

ABSTRACT

Akassa Mangrove Forests (AMFs) provide crucial support to the livelihoods of rural households who dwell within and around them. The formulation of Akassa forest and wildlife policy (AFWP) in 1999 notwithstanding, the rate of forest and wildlife depletion has continued to increase in these vital coastal wetlands. Understanding the participation of communities in the implementation of AFWP and livelihood parameters in AMFs is imperative. Therefore, forest based rural livelihoods in AMFs was assessed to elicit forest policy options for sustainable mangrove forest management.

Nineteen communities across three coastal barrier Islands in Akassa were selected by complete enumeration. Thereafter, 950 (30%) of total households were selected in the nineteen communities using simple random sampling. Structured questionnaire was used to collect information on demographic characteristics, livelihood activities and income. Data were analysed using descriptive statistics, Benefit-cost ratio (BCR), Return-on-Investment (ROI), Alkire and Foster multidimensional poverty measure, ANOVA and Chi-square at α 0.05

There were more male-headed households (73.1%) than female-headed households (26.9%). Respondents ages ranged between 22-80 years with most (57.89%) in the age range of 41-60 years. Marital status indicated that 1.6%, 97.6%, 0.5% and 0.31% respondents were single, married, widowed and divorced respectively. Most (97.7%) respondents were indigenes while 2.3% were non-indigenes. Seventeen percent of the respondents had no formal education while 32.0%, 48.7% and 2.3% had primary, secondary and tertiary education respectively. Forestlands were mainly owned by families (99.4%) while 87.2% of respondents were not aware of AFWP. Out of the respondents, 39.2% and 13.6% were engaged in fishing as their main and secondary occupation respectively. Coastal erosion (15.6 %), regular oil spillage (7.6%), low income from activities (6.0%) and high cost of water transportation (7.7%) militate against household livelihoods. Speedboat driving (₦38,952.38±4253.63), canoe carving (₦36,823.67±3283.09) and logging/chain saw rental (₦31,075.25±2181.71) had the three highest average monthly income. Livelihood activities with the highest and lowest values of BCR and ROI were basket weaving (4.98 and 4.45) and timber harvesting (2.38 and 1.6). Multidimensional Poverty Index (MPI) across four poverty cut-offs (K1-K4) were 45.0, 33.9, 16.5 and 4.2 respectively. Lack of household assets had the highest contribution to MPI across (K1-K4) with 55.2, 40.7, 31.2 and 25.0. Household annual income, annual profit index, household total income and household total expenditure had significant impacts on MPI.

Akassa mangrove forests in Bayelsa State are seriously threatened by over-exploitation for canoe carving, logging and chain saw rental which are unsustainable to livelihood. There is an urgent need for people centred and community driven forest policy for sustainable mangrove forest exploitation.

Keywords: Akassa Mangrove Forests, Akassa Forest and Wildlife Policy, Community Participation, Rural Livelihood

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CERTIFICATION

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LIST OF ACRONYMS

ADF	Akassa Development Foundation
AFMDP	Alkire and Foster Multidimentional Poverty
AFWP	Akassa Forest and Wildlife Policy
AMFs	Akassa Mangrove Forests
ANCC	Akassa National Council of Chiefs
ANOVA	Analysis of Variance
BCR	Benefit Cost Ratio
CANARI	Carribean Natural Resources Institute
CBOs	Community Based Organizations
CIFOR	Centre for International Forest Research
DFID	Department for International Development
EU	European Union
FAO	Food and Agriculture Organization
FGDs	Focus Group Discussions
FLEG	Forest Law Enforcement and Governance
GDP	Gross Domestic Product
IFAD	International Fund for Agricultural Development
IISD	International Institute for Sustainable Development
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
KII	Key Informant Interview
MDGs	Millennium Development Goals
M&E	Monitoring and Evaluation
MPI	Multidimensional Poverty Index
NGOs	Non Governmental Organizations
NR	Natural Resources
PNI	Pro Natura International
PRA	Participatory Rural Appraisal
PRSP	Poverty Reduction Strategy Papers
RGC	Royal Government of Cambodia
RMAFC	Revenue Mobilization Allocation and Fiscal Commission
ROI	Return on Investment

SLs	Sustainable Livelihoods
SSI	Semi Structured Interview
USAID	United States Agency for International Development
WCED	World Commission on Environment and Development

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CHAPTER ONE

INTRODUCTION

1.1. Background

The natural resource base presents a direct opportunity for supporting diversities of livelihood activities engaged in by rural communities. This is largely evidenced by the role forests and wildlife resources play in sustaining rural livelihoods. According to Chomitz *et al*. (2007), forests play a crucial role in the lives of many poor people and support about 735 million rural people who live in or near tropical forests and savannas, relying on them for much of their fuel, food and income. World Bank (2002) also reported that forests constitute about 90% of terrestrial biodiversity and contribute to the livelihoods of over 1.2 billion people. The majority of these people are poor and depend significantly on forests for their livelihood.

Mangroves are coastal forests found in sheltered estuaries, along river banks and lagoons in the tropics and subtropics. The term 'mangrove' describes both the ecosystem and the plant families that have developed specialized adaptations to live in this tidal environment (Tomlinson, 1986). Mangrove forests are vital coastal wetlands which protect and enrich our planet's coastal zones. Spalding *et al.* (2010) stated that mangrove ecosystems are unique, highly productive areas, which are important from social, economic and biological points of view. Tens of millions of people in the tropics and subtropics depend on mangrove forests to provide a variety of wood and non wood forest products, as well as other resources such as dyes, medicines, livestock feed and honey. Mangroves host a wide variety of organisms, including a number of endangered species. They serve as a valuable nursery to many shrimps, crustaceans and molluscs, and act as a breeding and feeding ground for many commercially important fish species. Mangroves maintain water quality and clarity, filtering pollutants (including heavy metals) and trapping sediments. Mangroves also help prevent erosion by stabilizing sediments and protecting the coast, especially during surge storms and hurricanes. These ecosystems are, however, fragile and it is estimated that over half the world's mangroves have been lost in recent times (Spalding *et al.* 2010).

In the view of Roda *et al*. (2005), the current global focus on poverty issues has revived debate on how significant improvements in the wellbeing of forest dependent poor people can be achieved while conserving forest biodiversity. Meeting this twin goal of conservation and improvement of well-being is often met with the challenge of ensuring active participation and support from local forest users. CIFOR (2006) posits that the lack of existing reliable information about forest dependent people- their numbers, livelihoods and circumstances- is itself a symptom of their marginalization in forest policy making. Ostrom (1999) observed that forest resources share attributes with many other resource systems that make difficult their governance and management in a sustainable, efficient and equitable manner, destruction or degradation of which is most likely to occur in open- access forests where those involved or external authorities have not established effective governance. This scenario, according to Bantilan and Shiferaw (2004) has left policy makers, development practitioners and policy analysts with an increasing search for ways in which policy interventions can achieve multiple objectives, more effectively addressing the livelihood needs of people living in poverty and improve the productivity and sustainability of the resource base.

Forest law enforcement and governance (FLEG) has emerged as a major policy response by international agencies and national governments seeking to promote good forest management (CIFOR, 2006). However, it envisages that a narrow focus on law enforcement could intentionally harm poor and marginalized social groups by reinforcing current laws and policies that contribute to 'social exclusion'. There are also growing arguments that forest users are more likely to devise their own rules when they use a forest that is starting to deteriorate but has not substantially disappeared; however, the International Tropical Timber Organization (ITTO) (2000) stressed that the failure of forest planners and managers to meaningfully involve local communities has resulted in a lack of transparency that has contributed to both deforestation and the development of corrupt practices in the forestry sector. More so, evidence has been mounting from a wide variety of sources that local forest users are still capable of managing forest resources in many diverse locations (Ascher 1995; Becker *et al*. 1995; Shivakoti *et al*. 1997).

The International Fund for Agricultural Development (IFAD) (2001) opined that acting directly on poverty means addressing the constraints that trap large numbers in poverty; where they are and in terms of how they earn their livelihood. The natural resource base is therefore undeniably important as a share of total cash income for poorer households. DFID's (2002) study on wildlife and poverty linkages revealed that poor people are significantly dependent on wildlife for livelihood and food security, particularly through bush meat and tourism. The International Union for Conservation of Nature (IUCN, 2005) observed that despite endorsement of the concept of sustainable development and its link with the Millennium Development Goals, progress towards the eradication of poverty has been disappointing, particularly in sub-Saharan Africa. Although poverty is often defined in absolute terms (people falling below a specified level of income, commonly 2 US Dollars per day), it can also be seen as having multiple dimensions. World Bank (2001a) refers to three dimensions of poverty: assets, powerlessness and vulnerability. Roda *et al.* (2005) observed that low levels of education, low levels of asset holding, poor health, lack of power and opportunities to be heard, weak local institutions and unfavourable institutional frameworks are factors that characterize the poor.

In view of the value of forest resources to rural livelihoods, there is a pressing need to harmonize natural resource management and conservation activities with sustainable livelihoods aimed at winning local people's support and participation.

1.2. Statement of the problem

Akassa Forest and Wildlife Policy (AFWP) has been in existence since 1999. However, there is lack of popular participation of local people in the policy formulation and implementation which has negative impact on forest resources use. In the same vein, the design of management plan adopted the British system and has little or no impact on the local people due to inability of the people to contribute to the management plan. Several problems are associated with forest based livelihoods and these are usually due to dearth of information on various activities that are going on in the forest. This has seriously negated maximization of the economic benefits derivable from these activities that could have increased the Gross Domestic Product (GDP) of local people in Akassa.

Despite the fact that Bayelsa state is one of the richest oil producing states in Nigeria, oil derivation from the Federal Government has little or no effect on the standard of living of Akassa people which have reflection of poverty on many people. Poverty indicators have been seriously manifested in the area with lack of clean water, absence of adequate health facilities, poor sanitation and lack of connection to the national grid amongst others plunging the people into more severe poverty situation. This has negative impact on the people who therefore, depend excessively and solely on forest and wildlife resources for their survival.

Various factors combine to militate against the livelihoods of the people living within Akassa mangrove forests. Landlessness and lack of alternative livelihoods heightened by poor governance weaken the ability of the people to cope with stresses during time of reduced fish catch or seasonal climate impacts. Furthermore, the impacts of sea level rise are becoming more glaring through excessive coastal erosion which often renders the people homeless and landless; while also engendering land based communal conflicts. Due to the huge dependence of people on the natural resources for survival, frequent oil spills from oil pipelines and installations undermine the capacity of fishing and other related water based livelihoods from the mangrove forests.

The mangrove forests of Akassa have potential benefits to people of Akassa. However, it has been encumbered with vagaries of conflicting uses. These include multinational oil companies' preference for oil exploration in the mangroves against local use of forest for people's sustenance. The arguments for conservation of the vast mangrove resources for future generations as against negative impacts of land degradation that manifest after seismic operations are carried out (without necessary mangrove reclamation and reforestation), have rarely been successful.

1.3. Research questions

1. What practical steps could be taken to readdress the local forest policy issues to ensure successful implementation of sound local forest policy and thereby support sustainable use of forest and wildlife resources in the Akassa forests?
2. What livelihood activities/opportunities are available to the local communities from the Akassa Mangrove Forests and how economically viable are these activities/ opportunities?

3. What relationships exist between the people's level of poverty and their dependence on forest resources?

1.4. Objectives of the study

This study assessed forest based rural livelihood activities in Akassa mangrove forests with a view to eliciting forest policy options for sustainable mangrove forest management.

Specific objectives

(i) To examine the existing local forest and wildlife policy of Akassa mangrove forest

(ii) To identify various forest-based livelihood activities in the Akassa mangrove forest communities and to determine the economic benefits from these activities

(iii) To assess the level of poverty in the study communities.

(iv) To identify factors militating against sustainable livelihoods in the study area.

(v) To examine conflicting issues in forest resource use.

1.5. Justification of the study

Mangrove forest resources in Akassa support livelihoods of many rural people. However, the current threats to the forests through excessive deforestation have scarcely been addressed by the stakeholders. Rural dwellers' perspectives and expectations gathered from this study will assist in devising strategies for participatory planning of resource management in conjunction with the Local and State government agencies, non-governmental organizations and the Akassa people. Efforts aimed at achieving sustainable livelihoods require the integration of local knowledge and community strengths with contemporary science and enabling policies. This study will therefore, provide Akassa community and forest users with sustainable forest management options through people centred policies. This will assist in developing short, medium and long term policies toward securing the livelihoods of the rural dwellers in the mangrove forests. The findings of this study will also be relevant in decision making for forest policy enunciation in Bayelsa State and the Federal

government of Nigeria in terms of monitoring and coordination of revenue generation from the Akassa mangrove forests.

This study will uncover several livelihood activities and latent opportunities in the Akassa mangrove forests which could be explored by the Local, State and Federal governments to better the lots of the people in Bayelsa State. Completion of this research will also be a pivotal tool to assist the researcher and other experts within and outside Akassa mangrove forests to further address livelihood and poverty issues in Akassa coastal wetlands by improving socio-economic opportunities. Ecotourism is highly regarded in the world as a tool for sustainable development; as such Bayelsa state has an opportunity to benefit from this by exploring vast ecotourism opportunities for socio-economic development of the rural economy in Akassa coastal wetlands.

The paradox of living in poverty amidst massive oil wealth will be investigated with intent to determine the causes and extent of poverty in Akassa mangrove forests communities. This study will therefore, be a catalyst towards addressing the gaps in development and existing poverty indicators in Akassa mangrove forest communities, Brass Local Government and Bayelsa State.

There are huge opportunities to address the factors militating against sustainable livelihoods in Akassa mangrove forests. This study will expose important governance structures that should be put in place to reduce landlessness by encouraging implementation of existing laws and policies on oil spill and environmental pollution. Efforts will be intensified to increase synergy among environment related agencies, institutions and oil companies working to address pollution in the Niger Delta. The Federal Ministry of Environment will benefit from the results of this study and attention will be drawn to salient environmental challenges in the study area such as the implementation of shore line protection projects in the region.

There is a need to critically re-evaluate options for mangrove forest resources use with a view to reduce and possibly reverse huge losses emanating from conflicts within the degraded mangrove ecosystems in Akassa. Proactive measures, peace building and education initiatives to prevent natural resource conflicts will improve communal coherence and peaceful co-existence in the Akassa mangrove forest communities. This will have a positive impact on the rural people by creating an enabling environment for

socio-economic development and limit tendencies for forests, land and water resource based conflicts.

1.6. Scope of the study

The research was conducted in three coastal barrier Islands in Akassa wetland, Bayelsa State, Nigeria. Nineteen communities and adjoining fishing settlements were utilized for the study namely: Apparanbie, Buoama, Ereweibie, Kongho, Kotikiri, Ogbokiri, Bekekiri, Miniamgba, Minibeleu, Itohonoama, Minibie, Okumbiribeleu, Opu-Okumbiri, Sangana, Otuo, Fishtown, Hununu, Kolobie and Oginibiri.

1.7. Limitation of the study

The study encountered some limitations in terms of inability of respondents to provide price of some of the items sold in the market because people still engage in trade by barter in the study area. Also, estimates of household annual income and expenditure were based on the respondents memory recall. During the field work planned trips to outer coastal communities were often dependent on the ability to study the tidal movement; hence planned field work had to be rescheduled to target when the tide was unfavourable for any boat ride. This was a necessary precaution for safety since there was no other means of affordable transport.

CHAPTER TWO
LITERATURE REVIEW

2.1. The importance of rural livelihoods

Rural livelihoods have continued to generate global interest especially in terms of their sustainability. With a huge rural population still predominantly dependent on forests for their livelihoods (World Bank, 2001b; Angelsen and Wunder, 2003) , it is necessary to understand the 'what', 'who' and 'how' to chart a course towards securing livelihoods of these rural communities. World Bank (2008) reported that majority of the world's poor are concentrated in rural areas and consequently depend on natural resources and often forests in particular for livelihoods.

2.1.1. Definition of livelihoods

According to the World Commission on Environment and Development WCED (1987) livelihoods represent adequate stocks and flows of food and cash to meet basic needs. Livelihoods are simply a means of living for which resources or assets are needed; various macro and micro level factors such as natural calamities, shocks, policy legislation, government and non-government structures and agencies, markets, social processes, (cultural norms, values, customs, festivals and traditions) affect the livelihoods of people (Pokharel, 2002). Ellis (1998) in line with the sustainable livelihood framework defined a livelihood as the activities, assets and access that jointly determine the living gained by an individual or household. In the view of Chambers and Conway (1991), a livelihood comprises people, their capabilities and their means of living, including food, income and assets. Tangible assets are resources and stores while intangible assets are claims and access. A livelihood is environmentally sustainable when it maintains or enhances the local and global assets on which livelihoods depend, and has net beneficial effects on livelihoods (Chambers and Conway, 1991). A livelihood is socially sustainable when it can cope with and recover from stress, shocks and provide for future generations (DFID, 1999).

Ellis (1999) opined that pursuing livelihood strategies which are composed of a range of activities, both the access, the assets and the use to which they can be put are

mediated by social factors (social relations, institutions, organizations) and by exogenous trends (e.g. economic trends) and shocks (drought, disease, floods, pests). Farrington *et al.* (1998) suggest that people pursue a range of livelihood outcomes (health, income, reduced vulnerability etc.) by drawing on a range of assets to pursue a variety of activities. Also, the activities people adopt and the way they reinvest in asset- building are driven partly by their own preferences and priorities. However, they are also influenced by the type of vulnerability, including shocks (such as droughts), overall trends (e.g. in resource stocks) and seasonal variations. Farrington *et al.* (1998) observed that livelihood options are also determined by the structures (such as the roles of the government or the private sectors) and the processes (such as institutional, policy and cultural factors) that people face; concluding that in aggregate these conditions determine their access to assets and livelihood opportunities, and the way in which these can be converted into outcomes.

2.1.2. Sustainable rural livelihoods

According to Carney (1999), sustainable rural livelihoods is an approach which stresses rural risk management aimed at reducing vulnerability- helping people to develop resilience to external shocks and increase the overall sustainability of their livelihoods. The approach puts people at the centre and attempts a holistic diagnosis by taking their non-agricultural income-diversifying activities into account, emphasizing the social, environmental as well as economic dimensions of rural life.

2.1.3. Principles and concepts of sustainable livelihoods

According to Carney (2002), the conceptual understanding of poverty and its causes (which underpins sustainable livelihoods approaches) has influenced thinking throughout the development world. The UK Department for International Development (DFID, 1999) refers to a livelihood as being sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future. A livelihood is sustainable when it can cope with and recover from shocks, and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (Scoones, 1998). Chambers and Conway (1991) propose that a livelihood is sustainable when it contributes net benefits to other livelihoods at the local and global levels, in the short and long term. This concept presents sustainable livelihoods (SLs) as a way of thinking about the objectives, scope and priorities for development, in order to enhance

progress in poverty elimination. SLs aim to help poor people achieve lasting improvements against the indicators of poverty that they define. The premise is that the effectiveness of development activity can be improved through:

- systematic – but manageable – analysis of poverty and its causes;
- taking a wider and better informed view of the opportunities for development activity, their likely impact and 'fit' with livelihood priorities; and
- placing people and the priorities they define firmly at the centre of analysis and objective-setting (DFID, 1999).

Sustainable livelihoods security therefore, refers to secure ownership of, or access to resources and income earning activities including reserves and assets to offset risk, ease shocks and meet contingencies. Sustainable refers to the maintenance or enhancement of resources productivity on a long-term basis. A household may be enabled to gain sustainable livelihood security in many ways: through ownership of land, livestock or trees; rights to grazing, fishing, hunting or gathering; through varied repertoires of activities. Chambers and Conway (1991) describe household livelihoods as having four categories:

People	their livelihood activities	repertoire
Activities	what they do	
Assets	tangible (resources and stores) and intangible (claims and access) which provide material and social means	portfolio
Gains or inputs	a living, what they gain from what they do	

Of these four, the most complex is the portfolio of tangible and intangible assets (Figure, 2.1).

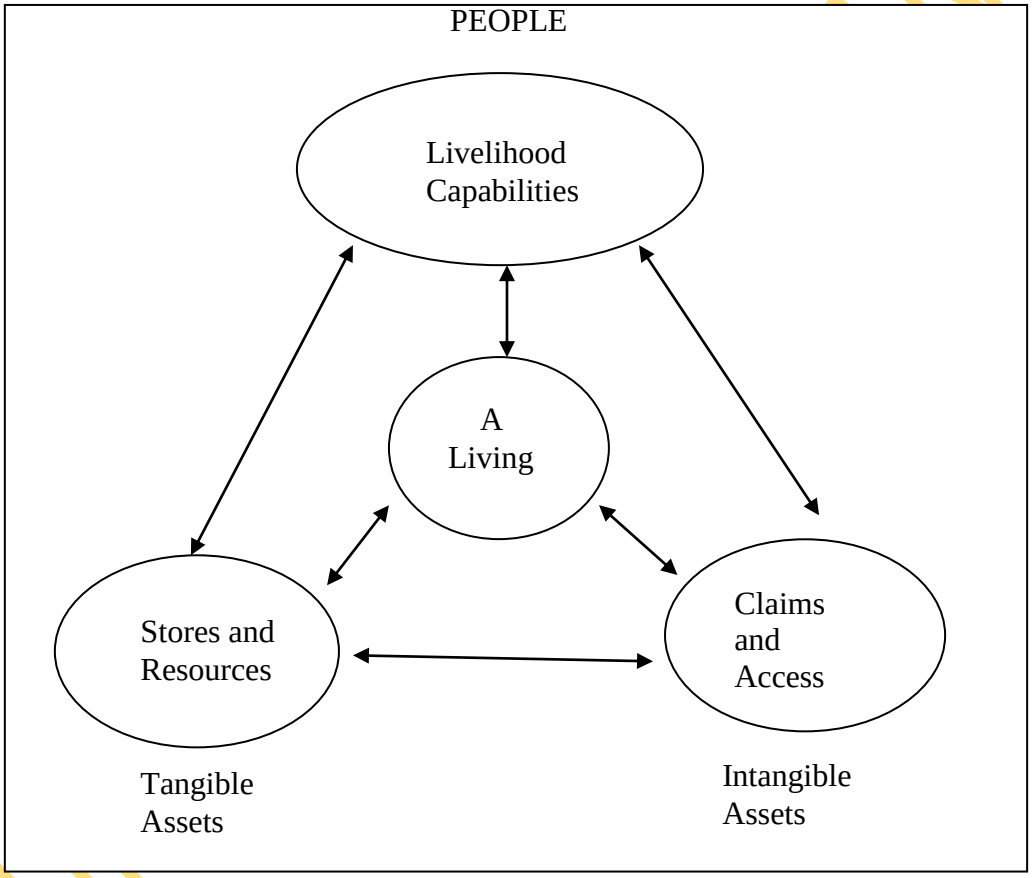

Figure 2.1. Component flows in a livelihood

Source: Chambers and Conway (1991)

Shocks are impacts which are typically sudden, unpredictable, and traumatic, such as fires, floods, storms, epidemics, thefts, civil disorders and wars.

Stresses are pressures which are typically cumulative, predictable and variously continuous or cyclical such as seasonal shortages, rising populations, declining soil fertility and air pollution.

Tolervey (2002) stated that "for development to be truly sustainable, the livelihoods of poor people must be secure". Bryceson (2000) observed that households are often pursuing several non-agricultural activities simultaneously or at different points throughout the year. Farrington *et al.* (1999) described the sustainable livelihood approach as an analytical device for improved understanding of livelihoods and poverty. In his submission, Ellis (1999) stated that livelihoods diversify results in complex interactions with poverty, income distribution, farm productivity, environmental conservation and gender relations that are not straight forward, are sometimes counter-intuitive and can be contradictory between alternative pieces of case study evidence. Ellis (1999) proffered that it should be widely agreed that a capability to diversify is beneficial for households at or below the poverty line because having alternatives for income generation can make the difference between minimally viable livelihoods and destitution.

Goldman *et al.* (2000) suggest that a number of prerequisites will promote sustainable livelihoods: strong and sustained political will; clear understanding of the clients and their needs; a very strong understanding of external environment; definition of a socio-economic strategy before structure; clear policy direction coupled with clear and effective implementation strategy; a learning process approach; experimentation before routinizing; focused attention by dedicated teams on pilot approach; flexibility and responsiveness as the complexity of the change process throws up lessons; the courage to re-think the organization's process ; the ability to use hard and soft authority effectively to enforce change; a major investment in communication and change agents to facilitate the change process. In the same vein, Farrington *et al.* (1999) suggest that practical application of sustainable livelihoods concepts should (i) start with analysis of people's livelihoods and how these have been changing over time; (ii) fully involve people and support them in achieving their own livelihood goals; (iii) focus on the impact of different policy and institutional arrangements on people's livelihoods and (iv) seek to influence these arrangements so they promote the agenda of the poor.

Shahbaz *et al.* (1999) observed that in the linkages between rural livelihoods security and forest management, overarching issues stand out: (1) how and to what extent forest resources can contribute to poverty alleviation; and (2) how and to what extent poverty alleviation and forest conservation can be made convergent rather than divergent goals. Norton and Foster (2001) identified five areas in which SLs approaches have the potential to enrich poverty reduction strategy papers (PRSPs):

- Understanding livelihood groups and assets
- Predicting responses to different policy options
- Managing cross-cutting issues
- Highlighting the long term
- Underlining the importance of participation

2.1.3.1. Sustainable livelihood assets

DFID (1999) describe assets as the building blocks of a sustainable livelihood. By building assets, individuals and households develop their capacity to cope with the challenges they encounter and to meet their needs on a sustained basis. The DFID sustainable livelihoods framework draws attention to the variety of assets that contribute to making a sustainable livelihood and to ways in which they are interdependent. Within the five broad categories of assets, it suggests a wide range of subcategories as shown in Figures 2.2 and 2.3 below.

Figure 2.2. The five asset building blocks

Source: DFID (1999)

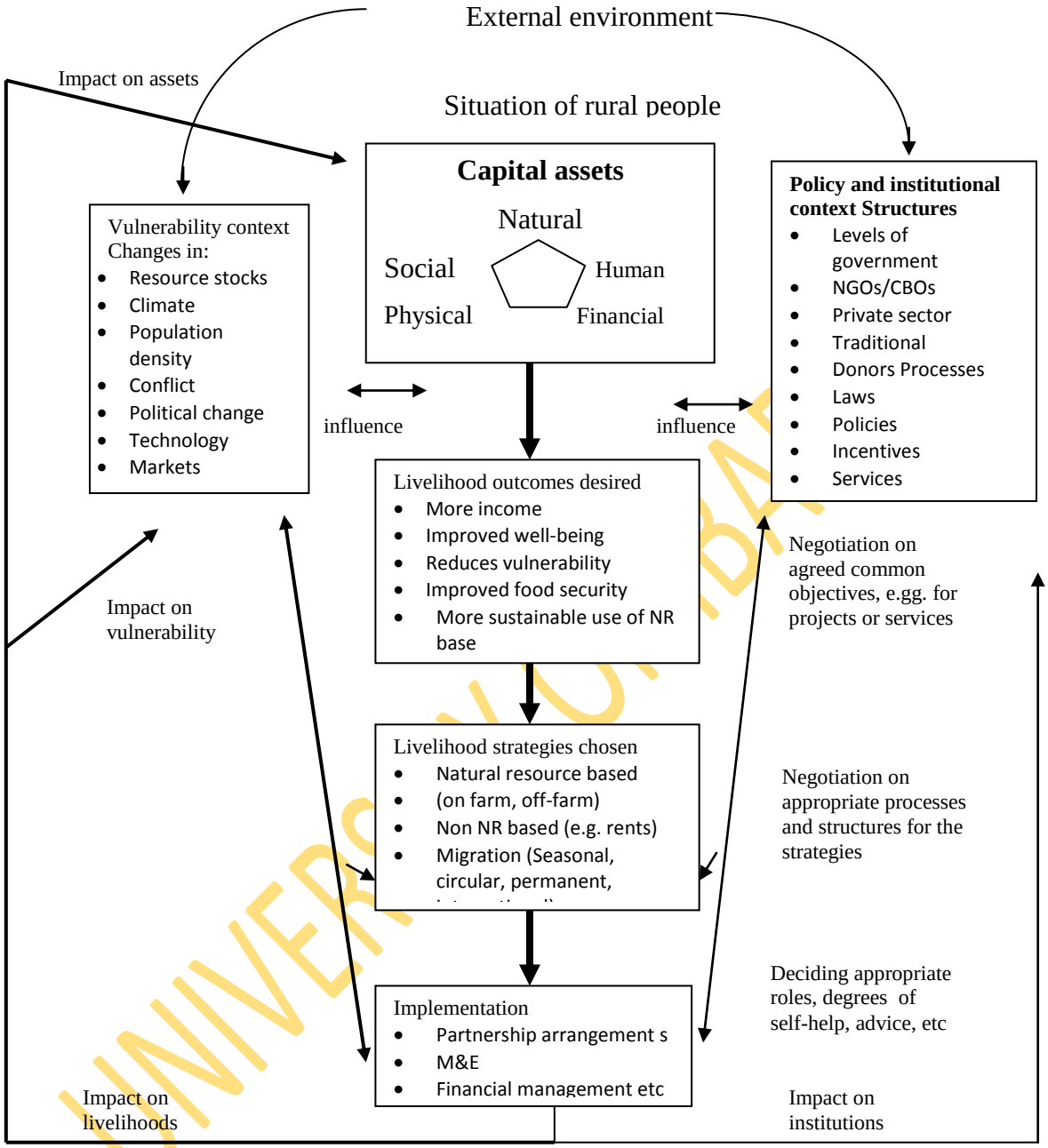

Figure 2.3. The sustainable livelihoods framework

Source: DFID (1998)

2.1.3.2. Vulnerability

According to World Bank (2001c), vulnerability is defined as the expected welfare loss above a socially accepted norm which is caused by uncertain events and the lack of appropriate risk management instruments. It is the likelihood that at a given time in the future an individual or household will have a level of welfare below some norm or bench mark. DFID (1999) posited that the factors that create and perpetuate vulnerability and poverty can be seen at two levels: that of individuals and their circumstances, and that of the broader context. This aspect draws from the sustainable livelihoods framework and directs attention to the contextual and systemic factors that contribute to the occurrence of poverty. It points out the need to seek changes at the organizational, community and policy levels in addition to building the assets of individuals and households. Figure 2.4 summarizes the vulnerability context.

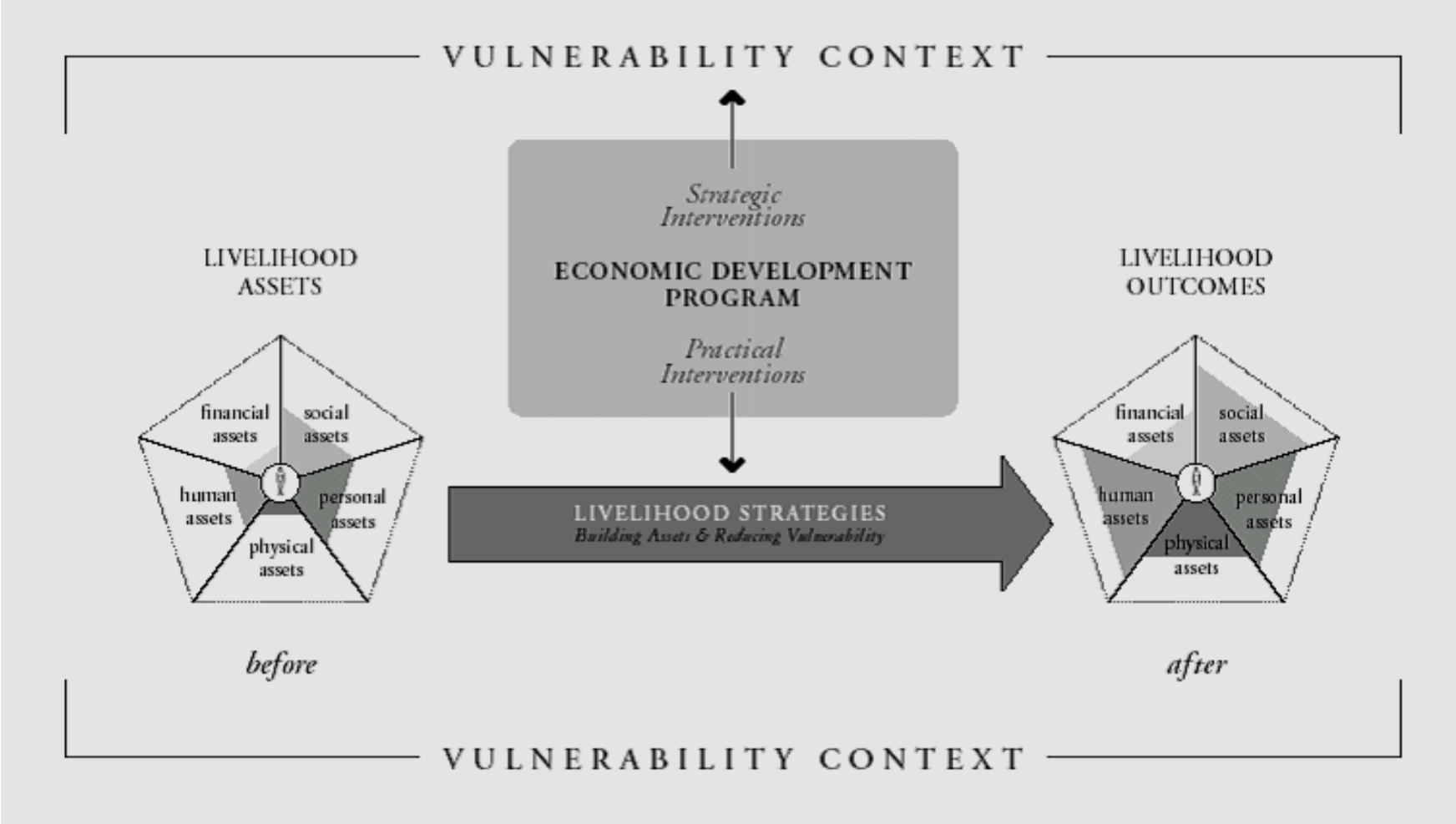

Figure 2.4. The vulnerability context and role of interventions
Source: DFID (1999)

2.2. Livelihood potentials of mangrove forests

Forests are the renewable natural resources, which means if managed properly and used wisely, can be re-used and regenerated over and over again (Pokharel, 2002). Forest-derived products generate additional income for households, supply household needs such as fuelwood and also provide some food sources directly. This is especially the case for poorer households with little or marginal quality land (Ojha *et al.* 2009). Arnold *et al*. (2011) submitted that forests provide a diversity of healthy foods, high in micronutrients and fibre and low in sodium, refined sugar and fat; these forest products are often culturally valued, integral to local food systems and food sovereignty, and help households fill seasonal and other cyclical food gaps and act as a 'safety net' or 'buffer' in times of shortages due to drought, crop failure, illness or other kinds of emergency or external shock. Forest products also widely form a major source of income for rural households with which to purchase foods or the inputs they need for agricultural production.

According to Spalding *et al.* (2010), mangrove forests occupy about 15 million hectares of tropical and subtropical coastline worldwide. These forests, although account for only 1 percent of the total area of tropical forests, are highly productive ecosystems rich in biodiversity, consisting of a wide variety of plant species that provide important habitats for a wealth of fauna, including mammals, birds, reptiles, fish and molluscs. Mangrove forests contribute to livelihoods locally and globally by providing forest resources such as timber, firewood and thatching materials as well as non-timber forest products. Mangrove forests provide possibly the most direct and essential connection between life in the ocean and life on land. FAO (1992) stated that mangrove forests cover an estimated area of 160,000 sq km worldwide, with the largest forests in Brazil, Indonesia, Australia, Nigeria and Malaysia; these forests are under increasing threats from human activities. Gasana *et al.* (2004) observed that mangrove ecosystems are a very valuable resource and that they are also a source of timber and income for local communities and perform valuable protective functions; absorbing the energy of the driven waves and wind as well as regulating the estuarine coastal water quality through sedimentation and nutrient uptake. FAO (1992) observed that forests not only provide rural people with a source of food, but they also contribute to food security by supplying raw materials and fuelwood for many income generating activities, e.g. rattan, bamboo, fibres and wood are used for furniture and

implement making and fuelwood is essential for food processing, fish smoking, brick making and brewing beer. Honey production is also an important forestry industry in many parts of the world; Indian villagers are thought to produce more than 37,000 tonnes a year for sale, (FAO, 1992).

Wells *et al.* (2006) found that the annual economic value of mangroves, estimated by the cost of the products and services they provide has been estimated to be $200,000-$900,000 per hectare. Mangroves act as important filters to purify water and arable land, help prevent coastal degradation and sea grass beds from siltation; they act as protective buffers against dangerous storms and wave action, preventing serious land loss, minimize erosion and flooding. They act as carbon sinks and thereby lessen the impact of global warming. Mangrove poles are used for communication lines, foundation piles, local sign posts, the saplings and twigs are used for mud and thatch house construction because the wood is highly resistant to fungi and insect attack. Mangroves also serve as habitat for marine animals, spawning nursery, breeding and feeding ground for fish (Kinako, 1986). According to Nwosu (2005) Nigeria's mangrove ecosystem is one of the largest and richest biodiversity reserves of the world, it comprises of mangrove trees and shrubs, ferns and palms, in addition to a rich faunal diversity including microorganisms, crustaceans, molluscs, amphibians, fishes, reptiles, birds and mammals. Oyieke (1996) noted that the mangrove ecosystem has the highest biodiversity in the sea, contributing about 25% of biological productions, and more than 2,145 species of plants and animals. Onofeghera (1986) observed that mangrove swamps have great potentials ranging from swamp rice cultivation, fishing and fish culture, shrimps culture, crabs culture, mangrove oyster culture, wood exploitation, mat and other craft products.

Bene (2006) opined that socio-economic activities such as small scale fisheries can contribute positively to the quality of life of those who depend directly or indirectly on it for part or totality of their livelihoods. These activities have a measurable contribution to rural development even beyond the geographical areas within which they are operated.

Mangroves have traditionally been widely used and exploited in the past in the majority of countries in which they exist. Knowledge of their current and past extent, condition and uses is essential for forest managers, policy and decision makers (FAO,

1997). The Carribean Natural Resources Institute, CANARI (2010) reported that people in the Carribean Islands have made wide use of forest resources for subsistence and commercial purposes. These include uses for edible plant and animal products, animal fodder, medicines/tonics, wood fuel, fencing and construction, implements and tools, and craft materials. Forests also play a key role in Caribbean culture and recreation, as well as in providing ecosystem services such as: soil and water conservation in the watersheds; coastal protection and links with marine ecosystems from mangrove forests; and conservation of biological diversity. The Royal Government of Cambodia, RGC (2010) observed that the role of forest contributions to the national economy has not been fully realised and its share of GDP has continued to fall; noting that the challenge is to capture revenues from extractive activities relating to forest and non-forest products, and also accounting fully the values of biodiversity conservation and environmental services. Table 2.1 shows economic valuation of some mangrove resources.

Table 2.1. Selected Examples of Economic Valuation: Values have been converted to 2007 US$ equivalent using the Consumer Price Index(CPI); most are focussed on use or material values

Service or Value	Economic Value US$/ha/year	Description	Location	Source
Total/combined value	2060 -9270	Estimated value of benefits derived from all products and services they provide	Global	Wells *et al.*,(2006)
	4432- 4488	Mangrove wood and fish products combined	Thailand	Sathirathai and Barbier(2001)
	1972- 2577	Estimate for the potential economic value of protected mangrove forest	Vietnam	Ratner *et al.*,(2004)
	106	Aggregate value of a 400 ha forest based on conservation estimate of village use rates	Thailand- Tha Po village	Sathirathai and Barbier(2001)
	1176	Direct, indirect and option values	Indonesia- Berau	Wiryawan and Mous(2003)
	104	Non wood forest resources	Sri Lanka	UNEP/GPA (2003)
	2859	Option Value	Sri Lanka	UNEP/GPA (2003)
	22,526	Total Economic Value	West Coast Malaysia	Chong(2006)
	13,819	Total Economic Value	Sri Lanka	UNEP/GPA (2003)
Timber/fuelwood	10	Forestry	Fiji	Lal (2003)
	1093	Timber for housing and Charcoal	Mexico,Terminos	Cabrera *et al.*,(1998)
	235	Timber and fuelwood	Micronesia-Kosrae	Nylor and Drew (1998)
	538	Fuelwood and sustainable Charcoal	Cambodia(Koh Kong)	Bann(1997)
	64	Income from sustainably harvested timber	Philippines- Western Visayas	Walton *et al.,* (2006)
	221	Timber	Matang, Malaysia	Sani bin Shaffie(2007)
Fisheries	953- 21,272	Estimates of the market value of capture fisheries supported by mangroves	Global	Ronnback(1999)
	159	Fisheries	Fiji	Lal (2003)
	2146	Fisheries	Mexico,Terminos	Cabrera *et al.*,(1998)
	609	Crabs and fish	Micronesia- Kosrae	Naylor and Drew(1998)
	108	Local, non commercial fishing benefits	Cambodia(Koh Kong)	Bann (1997)
	6826	Fin fish and shellfish from rich mangrove area	India- Tamil Nadu	Kathiresan and Qasim(2005)
	491- 2348	Fisheries benefits including to surrounding area	Phillipines- Western Visayas	Walton *et al.,* (2006)
	1480	Capture fisheries	Matang, Malaysia	Sani bin Shaffie(2007)
	276	Cockle and cage culture	Matang, Malaysia	Sani bin Shaffie(2007)
	10,071	Crabs plus molluscs within mangroves	Brazil- Santa Catarina	Tognella-de-Rosa *et al*(2006)

	39,750	Mangrove-linked fisheries(including offshore). Estimate only looks at seaward mangrove fringe, not entire extent	Mexico- Gulf of California	Aburto-Oropeza *et al*(2008)
Coastal Protection	41	Storm protection	Cambodia(Koh Kong)	Bann(1997)
	4415	Coastline protection and stabilization	Thailand- Tha Po village	Sathirathai and Brbier(2001)
	91	Storm protection and erosion control	Sri Lanka	UNEP/GPA (2003)
	1265	Coastline protection and stabilization	Egypt- Nabq	Spurgeon(2002)
Biofiltration	4124	Nutrient filter	Fiji	Lal (2003)
	1623	Biofiltration	Mexico,Terminos	Cabrera et al.,(1998)
	5168	Pollution treatment benefits	Sri Lanka	UNEP/GPA(2003)
	5150	Sewage treatment	Brazil- Santa Catarina	Tognella – de- Rosa *et al.*, (2006)
Biodiversity values	1	Critical habitat for threatened species(willingness to pay)	Mexico,terminus	Cabrera *et al.*,(1998)
	21	Biodiversity maintenance benefits	Sri Lanka	UNEP/GPA(2003)
Recreation	152,100	Recreation and education value based on US$ 15 per visitor	Egypt-Ras Mohammed National Park	Spurgeon(2002)
	44/trip	Charge for a trip that includes a 'jungle tour' of the mangroves	Mexico	Lubowski *et al.*, (2001)
	2406	Recreation	Sri Lanka	UNEP/GPA(2003)
	43	Income from Tourism	Philippines-Western Visayas	Walton et al (2006)
Carbon Sequestration	85	Carbon Sequestration benefits	Sri Lanka	UNEP/GPA(2003)
Non material values	412	Existence value over a ten year period	Indonesia- Berau	Wiryaman and Mous(2003)
	5151	Non –use value	Sri Lanka	UNEP/GPA(2003)

Adapted from Spalding *et al.* (2010)

2.3. The role of forest policy

Policy has been defined as any governing principle, plan or course of action (Webster, 1998). Husch (1987) opined that it is a course of action adopted and pursued by a government, ruler, political party etc according to the social and economic objectives which it desired to achieve. According to FAO (2010), it can mean "a course of action adopted and pursued" and is intended to guide and determine present and future decisions and actions. It usually comprises two elements:

- a set of aspirations, goals or objectives
- an outline of a course of action to achieve them

Pasteur (2001) opined that policy has been widely acknowledged as a central factor shaping the livelihoods of the poor. He stressed that policy and the institutional arrangements through which they function have a clearly pervasive and fundamental influence on the nature of livelihoods, mediating the capacity of households to gain access to assets and activities. Forest policy has moved from one sectoral (sustained yield of timber) to a multi-sectoral policy area that requires inter-sectoral coordination, policy interpretation and regime interaction (Gluck and Rayner, 2009). Ahenkan and Boon (2010) revealed that in Ghana the dilemma of most of the forest resources management policies is the lack of attention to human dimension aspects and a focus on a pro-conservation and timber development approach even at the cost of local livelihoods.

2.3.1. Impact of forest policy on livelihoods

FAO (1995) observed that the future development of the forestry sector has to confront the increased demands for its products, services and the conservation of the increasingly scarce ecosystem and biodiversity, as well as for providing sustainable livelihoods to forest dwelling and forest-dependent communities. According to Mudgal *et al.* (2004) policy decisions, rules and regulations that apply across the board have impacts on both dependence on and contribution of forest resources to household livelihood strategies. Mudgal *et al.'s* (2004) study examined and contributed to improvement in the influence of policies (Figure 2.5) and institutions at four connected 'circles of influence' on livelihoods, namely:

- *Access to assets* – rights and rules about forest resources, water, finance, infrastructure etc

- *Development of assets* – capabilities to do something with the accessed assets
- *Demand for products* – chiefly the markets for developed assets (the outputs of livelihood strategies)
- *Macro-policy/ economy* – the big policy frameworks which originate at the district and state level and may shape all of the above (whereas policies and institutions in the other three circles of influence have more specific effects)

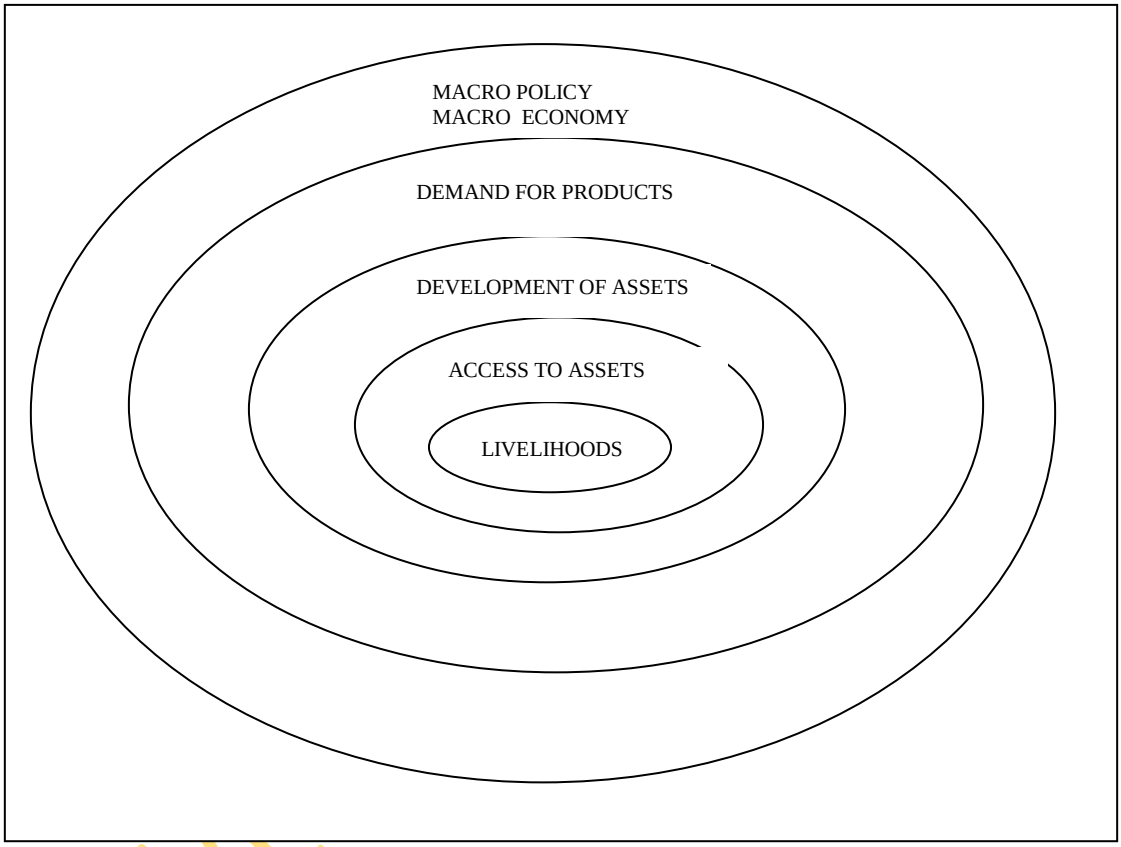

Figure 2.5. Four circles of influence of policies on institutions and livelihoods

Source: Mudgal *et al.* (2004)

Clawson (1975) observed that the economic benefits of a forest management program accrue to certain individuals or groups, and the costs fall on certain individuals or groups. Rennie and Singh (1996) pointed out that the rural poor depend heavily on natural resources for their livelihoods, and therefore understanding how policy mediates the success and sustainability of resource use is critical to broader poverty reduction. The World Bank's 2004 forest strategy and operational policy has three interdependent parts:

1. Harnessing the potential of forests to reduce poverty by:
    - Strengthening rights of people (especially marginalized groups) to forests and fostering their participation in forest management.
    - Promoting sustainable forestry, community forestry, and agroforestry.

2. Integrating forests in sustainable economic development by:
    - Improving forest governance and introducing legal and institutional reforms.
    - Encouraging investments that catalyze production of forest products, including environmental services.

3. Protecting local and global environmental values by:
    - Establishing protected areas.
    - Improving forest management in other areas.
    - Developing markets and finance for international public goods such as biodiversity and carbon sequestration, and helping governments create national markets for environmental services from forests.
    - Addressing cross-sector links that affect environmental values.

FAO (1992) asserted that if the food security of people living in or near forest areas is to be increased, forest management policies must be re-designed to national, industrial and local forest resource needs. Goldman *et al.* (2000) submitted that rural people have their own aspiration and it is important that government programmes do not impose outcomes but negotiate with communities to find out what their aspirations are and what may be achievable outcomes, combining people's assets and access to resources. Ellis (1999) noted that the diversity of livelihoods is an important feature of rural survival but often overlooked by the architects of policy. The sustainable livelihoods

framework (Carney, 1998) emphasized a focus on people, their assets and activities rather than on sectors and their performance, which is the conventional point of entry to policy. Ellis (1999) suggests that one of the key conclusions to emerge from livelihoods research is that untested assumptions about survival attributes of rural families cannot be made. This is supported by FAO's (1992) observation that the challenge for forestry project workers is to device programmes that are relevant to each individual community and provide local people with an opportunity to increase their incomes and improve their food security.

Papka (1999) identified the problem of incompatibility of forestry laws with other laws, like customary, land tenure and environmental law that makes the matter worst. Therefore, it is imperative to harmonize forest laws with other laws relating to land, agriculture, environment at all levels of the government or the federating units, namely; host community , local council, State and Federal. Papka (1999) suggests the following guideline principles:

i. Customary laws and socio-economic measures are ineffective unless it harmonizes with land use pattern, customs, occupation etc
ii. Legislation should be flexible to allow community to meet needs
iii. Provision and opportunity should be made for the host community to partake in the management, protection and utilization of the resources
iv. Tree tenure should be fully exercised so that individuals who planted trees could harvest them without undue restriction
v. The legislation should be simple and easily understood to ensure compliance and enforcement

The United States Agency for International Development, USAID (2012) recommended that forest policy reformers in governments, forest advocacy groups and donors help reform forest departments in ways that reduce the focus on rule enforcement and develop programs and staff skills supportive of community ownership and management of forest resources. DFID (2002) observed that those primarily involved in advising policy makers have limited access to information about poverty in the local context, about who the poor are; and what their needs and aspirations are; noting that without this information it is very difficult to accurately target policies and policy instruments.

2.3.2. Conflicts in forest uses

FAO (2010) observed that forests and their products and services are vital for the well-being of society. They provide fuelwood for energy, timber for construction and furniture, living space and food. They also protect soil from erosion, house valuable biodiversity, are sources of income for individuals and families and offer recreation opportunities. Due to these diverse functions, conflicts arise on how to use forests, who can use them, who benefits and who does not. Effective implementation of policies and policy processes (Figure 2.6) requires, first and foremost, synergy between State and citizens. Although a national forest administration may be the source of most technical expertise about managing forests to deliver various goods and services, it is not necessarily in the best position to determine and speak for what society wants and needs from forests. Balancing often conflicting interests is a political rather than a technical matter; one major lesson that FAO has drawn from its policy assistance to countries is that the importance of non-technical issues, knowledge and skills is often underestimated (FAO, 2008).

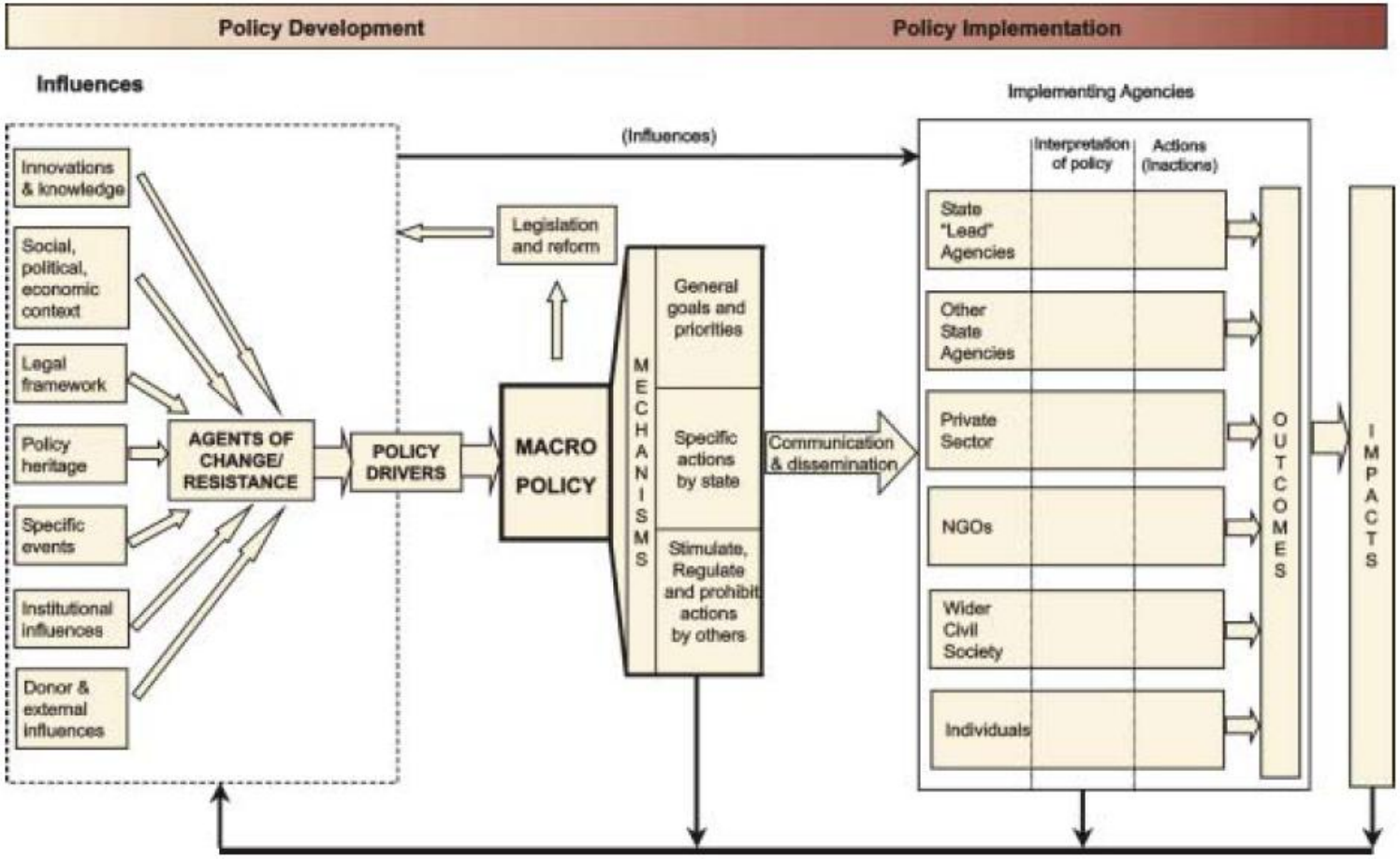

Figure 2.6. The policy process model
Source **:** Soussan *et al.* (2003)

2.4. The challenge of poverty in rural communities

The concept of poverty is elusive- it has no straight forward definition and a generally accepted way of measurement (Praag, 2005). Poverty is an unacceptable deprivation in wellbeing (World Bank, 2001). It exists when there is lack of the means to satisfy critical needs. Poverty is a situation in which an individual or a household has difficulty fulfilling its basic needs, lacks opportunities provided by an enabling environment to sustainably improve its wellbeing or is vulnerable to losing its current standard of living. Poverty can be regarded as the status, objective or subjective, of an individual or a population. Poverty remains a global challenge and is exacerbated by the global economic recession, thereby allowing more and more people to be trapped into poverty. Three billion people – almost half of humanity – live in rural areas of the developing world, and 1.5 billion of them on less than $2 a day (Chomitz *et al.* 2007). Poverty has been observed to be highest in rural areas where people lack access to quality health, education and opportunities (IFAD, 2001). The immediate relevance of forests to livelihoods of hundreds of millions of rural residents is therefore of great interests.

Despite the fact that the Nigerian economy is paradoxically growing, the proportion of Nigerians living in poverty is increasing every year. Oyekale *et al.* (2007) adopted a multidimensional measure of wellbeing in studying households in rural Nigeria and found that the multidimensional poverty ratio for rural Nigeria was 0.3796. According to Omonona (2010) in spite of Nigeria's abundant natural and human resources endowment; poverty remains pervasive, multifaceted and chronic. Table 2.2 shows determinants of welfare in Nigeria. Obayelu *et al.* (2010) discovered that the depth of poverty among male-headed households was deeper than among female-headed households in rural areas of Nigeria.

Table 2.2. Determinants of welfare in Nigeria

Variables	Influence on Poverty
1.Size of household	Generally, large family size reduces welfare in most regions of Nigeria. The larger the household size, the poorer the family
2.Dwelling type	Decent accommodation also influences welfare positively. Poverty is common among household dwelling in huts than those dwelling in decent houses.
3. Safe toilet	There is also a positive relationship between safe toilet and welfare. Poverty is more pervasive in household with an unsafe toilet than those with a safe toilet.
4. Marital status and type of family	Polygamous families generally are poorer than monogamous family type. Also, welfare is higher in households headed by someone who is monogamous, polygamous or by those in the divorced/separated/widowed category than households headed by never– married persons.
5. Education	Households with formal education have higher welfare than households without formal education.
6. Gender and age	The gender of the head of the household impacts on the nature of household poverty. Similarly, the age of the head of the household has an overall positive effect on the welfare of the household.

Source: Omonona (2010)

2.5. Forest law enforcement

Shahbaz and Suleri (2009) observed that although the international community has issued policy responses for sustainable forest management, forest degradation has not been halted in most developing countries; and that this situation requires a comprehensive analysis of the political economy of forest governance and an examination of the underlying causes of deforestation. Forest law enforcement efforts can usefully be analyzed in terms of soft enforcement, where compliance is encouraged by providing positive incentives and 'hard' or 'tough' enforcement, including the criminalization of violators. CIFOR (2006) observed that hard enforcement is ineffective where there is a lack of strong penalties, weak institutional capacity, lack of independence in the judiciary or because those charged with enforcement may be complicit in illegalities.

World Bank (2002) estimated that illegal logging results in an annual loss of around US$10-15 billion in developing countries worldwide. The European Commission (EC) (2004) observed that existing forest laws exclude local people from access to forest resources in 334easome countries, forcing them to operate illegally to meet their basic livelihood needs. Wells *et al.* (2003) noted a variety of other legal and institutional constraints that leave legal community organization highly vulnerable to capture by illegal timber traders. These include annually permitted cut volumes being set lower for community operations than for commercial ventures, making legal logging unprofitable by comparison, and unrealizable demands on community to develop management plans and follow reporting systems that are too technical, costly, legally ambiguous and bureaucratically tortuous for communities to comply with. According to Bodegom *et al.* (2008) experiences with local natural resources governance show that the following principles contribute to successful management:

- There should be clearly defined boundaries
- Rules should be adaptable to local conditions
- There should be space for collective choice arrangements
- Monitoring is needed, with a third party for enforcement and punishment
- The severity of the punishment should match the seriousness of the violation
- There should be conflict resolution mechanisms
- Groups should have the right to organize themselves

- Arrangements should be in place in which local knowledge and local institutions prevail, but shaped to accommodate larger and broader interests

At national level, space should be created for local governance to develop according to the above principles; the FLEG process should also create such space at the local level. Forest governance is definitely related to decentralization. A successful framework for decentralized forest governance would entail the following:

- Appropriate and effective sharing of authority to make decisions and raise revenues, and sharing of responsibilities for forest- related activities among levels of government, according to their individual abilities and needs.
- Effective enforcement of accountability at all levels of government to assure citizens and civil society groups that government agencies are acting fairly, efficiently and effectively to carry out their various mandates.
- Appropriate and effective linkages with other sectors that affect or are affected by what happens in the forestry sector, such as finance, the judiciary, agriculture, energy, transportation etc (Bodegom *et al. 2008*).

Governance is not limited to government or the formal decision-making sphere but rather refers to the ways in which power and authority are exercised in a particular arena or locale, taking into account the interplay of both formal and informal authorities and institutions (Newell, 2000; Oyono, Ribot and Larson, 2006 cited in Larson *et al.* 2007).

2.6. Decentralisation of forest management

Decentralisation refers to 'any act by which a central government cedes rights of decision making over resources to actors and institutions at lower levels in a politico-administrative and territorial hierarchy.' It takes different forms: decentralization, delegation, devolution, privatization (Blaser *et al.* 2005). According to Timko *et al.* (2010) the links between forests and rural livelihoods present both an opportunity and challenge for achieving conservation and development goals. Decentralisation in forest management brings benefits to local people and districts and should be well institutionalized, such cases occur in Berau, East Kalimantan (Obidzinski and Barr, 2003). Larson *et al.* (2007) posited that decentralization policies can bring government controls closer to local populations and make them easier to enforce. Baumann (2000) opined that devolution of forest management authority to local communities on the one

hand provides a good opportunity to improve the living standards of the poor. However, it may lead to an increase in exploitation of resources in order to raise incomes of local people. Gluck (2010) suggests that there should be a co-existence of old and new governance, each with its own distinct sources of legitimacy.

Sam and Shepherd (2011) argued that the important roles forests play in rural livelihoods are now universally recognized; and that the need to involve rural users in forestry is also widely accepted. These shifts in emphasis and approach are becoming more important as the State reduces its involvement in forestry and adjusts to the presence of civil society and private-sector players. The needs of communities will vary based on location and context, and thus policies at all levels should take into consideration livelihood needs, as well as the value of resources and infrastructure.

2.6.1. Ownership of forests

Ownership refers to a particular type of tenure involving exclusive and permanent rights; forest or tree ownership may be public or private. In public ownership there are two sub categories:- administered by government or designated for use by communities and indigenous group. However, private forests may be owned by individuals, firms or by communities (Dahal, 2011). In their submission, (White and Martin, 2002; Molnar, 2003; in Cronkleton *et al.* (2008) reported that as much as one-quarter of the forests in developing countries are community owned or managed. According to Molnar (2003), in the year 2002 communities owned or administered 377 million ha or 11% of the 3.6 billion ha of global forest. Sam and Shepherd (2011) stated that policy and legislative reforms slowly created opportunities for local communities to participate legally in the management of forestlands and resources – which in many cases they had long been doing outside of legal frameworks.

Agrawal and Ostrom (2001) described five property rights that are most relevant to common- pool resources, such as community forests as follows:

1. *Access* – The right to enter a demarcated area and "enjoy non-subtractive benefits" (e.g. hiking, using the area as a short-cut to pass through).
2. *Withdrawal* – The right to extract resources and products (e.g. cutting wood, collecting leaves).

3. *Management* – The right to regulate resource withdrawal and beneficially alter the area (e.g. setting limitations on wood or leaf collection, planting trees or thinning the forest).

4. *Exclusion* – The right to determine who is allowed access and use of the forest, including how that right may be transferred.

5. *Alienation* – The right to transfer management and exclusion rights, through sale or lease.

Millions of people live with limited or insecure rights to trees and land, unable to tap forest resources and without any motivation to preserve them (Chomitz *et al.* 2007. Communities at all levels, from local watersheds to the entire planet, need to find ways of rewarding forest owners and managers whose actions benefit others. Alden (2002) utilizes a "community ownership" framework to place community forestry practices in a hierarchy and advocates Community-Based Forest Management, stating that, 'local participation becomes a great deal more meaningful and effective when local populations are involved not as cooperating forest users but forest managers and even owner managers in their own right'. Chomitz *et al.* (2007) observed that communities are increasingly sharing management of or taking ownership of public forests; noting that in principle, communities should be better than distant governments at managing and policing their forests, and better suited than individuals to exploit economies of scale in forest management. However, successful community management depends on the strength of community organization, the regulations facing communities, and economic and cultural incentives to maintain forests. Communities need strong social capital to enforce compliance with management rules and avoid elite capture of forest resources.

2.7. Forest based livelihoods, living standards and human wellbeing

2.7.1. Role of forests in livelihoods

Forests play many roles in the development of a country and especially in securing the livelihoods of people who live in and around them. They also provide non-material goods that contribute to livelihoods by enhancing social and human capital (Chomitz *et al*. 2007). Forests play a crucial role in the lives of many poor people. Almost 70 million people -many indigenous - live in remote areas of closed tropical forests. Another 735 million rural people live in or near tropical forests and savannas, relying

on them for much of their fuel, food, and income - or chopping them down for crops and pasture (Chomitz *et al.* 2007).

Charlie *et al.* (2004) discovered that more than 80% of rural households in South Africa used products such as wild spinach, fuel wood, wooden utensils, edible fruits etc. Forests are important resources for the rural poor, with over 800 million people living in forests and woodlands in the tropics alone. However, global deforestation continues at an alarming rate, with annual losses the size of Portugal, as forests are cleared for agriculture or harvested unsustainably. In addition to the implications for poor populations' welfare, forest destruction results in globally irreplaceable biodiversity loss and contributes to global climate change, which threatens both the rich and poor (Chomitz *et al.* 2007).

2.7.2. Forest dependence and poverty

Hobley (2007) argues that although villages may be forest dependent it doesn't necessarily mean that they are the poorest, but that there are limited other livelihood opportunities to change the level of their poverty. Dewi *et al.* (2005) stated that a good forest endowment allows people to live well at or near the subsistence level. The worst-off villages are those with poor resource endowments and limited alternative income-earning opportunities. Shaffer (2000) described the forces of social change that underlie the poverty scenario in terms of different forms of capital which play important roles- social, political, cultural, coercive and environmental. He observed that changes in any one of the above forms of capital interacts in complex ways with other forms of capital to constitute poverty-relevant social change; these may have mutual reinforcing links with the different forms of capital (Figure 2.7) and different underlying conceptions of wellbeing. Warner (2010) submitted that sense of wellbeing is affected by numerous factors including self-esteem, sense of control and inclusion; health status, access to service, participatory decision making and equity also assist in increasing wellbeing especially that of the poor. Angelsen and Wunder (2003) observed that people living in remote areas with abundant forest resources sometimes have good access to food consumption or even relatively high cash incomes. However, low government service levels at the forest frontier mean that they lag behind in terms of health and education indicators.

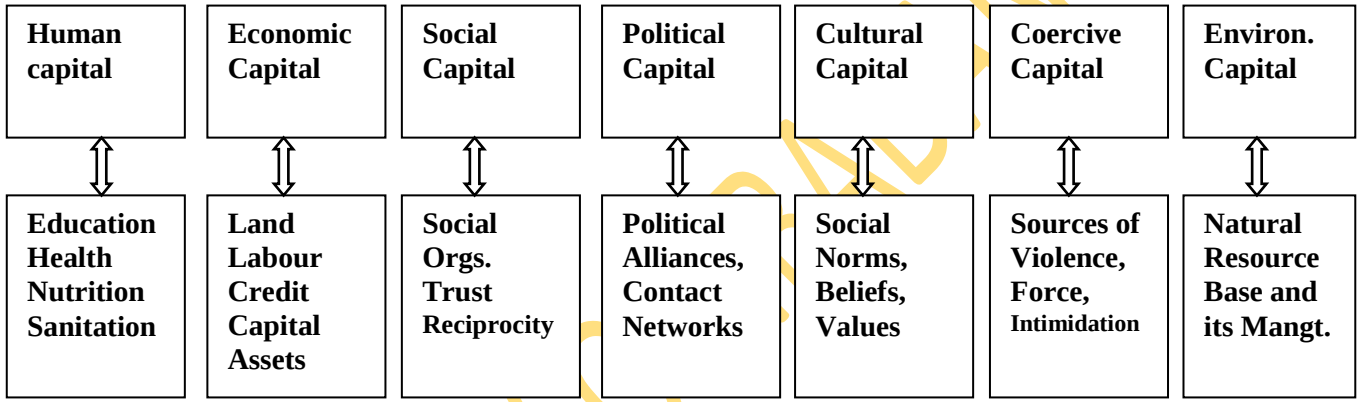

Figure 2.7. Forces of social change: forms of capital
Source: Shaffer (2000)

According to Babatunde *et al.* (2007), unequal rights between men and women for both natural and physical assets leads to inadequate and inappropriate use of resources and limited alternatives, low income, poor diet and low living standard. These disparities have serious consequences for well-being not only for women themselves, but also for their families and the society at large.

2.7.3. Measuring human wellbeing

World Bank (2001) stated that wellbeing is used to describe all elements of how an individual experiences the world and their capacities to interact and includes the degree of access to material income or consumption, levels of education and health, vulnerability and exposure to risk, opportunity to be heard and ability to exercise power, particularly over decisions relating to securing livelihoods. Prakongsai (2005) observed that difficulties in using money metric measures to clarify household socio-economic positions, especially in developing and low income countries have led to development of asset index. Different methodologies have emerged that are designed to measure poverty for comparative purposes. These include material wealth measured in terms of income; cultural security measured in terms of identity. Measuring socio-economic wellbeing has been an issue of growing debate on the appropriate criteria to adopt (Dalt, 1998). Prakongsai (2005) observed that this concern inevitably leads to a need for practical tools to identify individuals or households' socio-economic status.

World Bank (2000) defines poverty as pronounced deprivation in wellbeing. This of course begs the question of what is meant by wellbeing. One approach is to think of one's well-being as the command over commodities in general, so people are better off if they have a greater command over resources. In this view, the main focus is on whether households or individuals have enough resources to meet their needs. A second approach to well-being (and hence poverty) is to ask whether people are able to obtain a specific type of consumption good: do they have enough food? Or shelter? Or health care? Or education? In this view, the analyst would need to go beyond the more traditional monetary measures of poverty: nutritional poverty might be measured by examining whether children are stunted or wasted; and educational poverty might be measured by asking whether someone is illiterate, or by the amount of formal schooling they have received.

Sen (1976) offers the broadest approach to wellbeing (and poverty) and argues that wellbeing comes from a "capability" to function in society. Thus poverty arises when people lack key capabilities, and so have inadequate incomes or education, or poor health, or insecurity, or low self confidence, or a sense of powerlessness, or the absence of rights such as freedom of speech. This view therefore, presents poverty as a multidimensional phenomenon, and less amenable to simple solutions.

Dagum (2002) observed that until the 1970s poverty has been dominantly an economic concept and dealt with personal (individual, family or household) levels of income or expenditure. This was referred to as a univariate approach (UA). In this context, poverty is defined as an insufficient command over resources for a person to be able to survive (absolute poverty) or to live according to the standard of living reached in the process of growth and development of a country (relative poverty), or something in between, that would be partially but not totally sensitive to the per capita income (quasi absolute or quasi relative). Rather than viewing poverty as a result of a lack or lowness of a single resource variable or trait, the multidimensional approach weighs in a more comprehensive set of information. Whereas economic wellbeing, capability, and social inclusion are treated as poverty indicating proxy concepts, this approach incorporates all three as separate dimensions of poverty. The multidimensional approach to poverty measurement as presented by (Alkire and Foster, 2007; 2008a, 2008b, 2011), helps to identify 'who is poor' and the dimensions in which they are deprived.

2.8. Brief summary of literature review

A closer look at the concept of livelihoods from a rural perspective was covered in this review. A livelihood is said to be sustainable if it is able to cope with and recover from shocks and stress as outlined by the sustainable livelihoods framework. The review also captured the indispensable value of forests to livelihood of the poor who live within and around forests, especially the mangrove forests ecosystem. Mangroves were particularly observed to perform many other functions such as sustaining the ecological balance in the coastal regions of the world. The vital role of forest policy was also covered and this has been seen to show an increasing trend of exclusion of local communities in the fight to secure the future of forest resources. This has raised attention on the issue of enforcement due to lack of compliance by forest users; subsequently there is a call for a more participatory process involving key

stakeholders. The challenge of growing poverty and the relationship with forest dependence has also gained much attention. However, gaps still exist in terms of limited studies on an in-depth assessment of several forest based livelihoods at the individual or household level to clarify issues on forest poverty.

This study therefore tries to close this gap by investigating and assessing current forest based livelihoods and their benefits for the poor as an emerging research focus. Furthermore, the study adopts a multidimensional approach to shed more light on forest household economy as a proactive way forward in addressing the challenge of poverty in the study area.

CHAPTER THREE
METHODOLOGY

3.1. Description of the study area

The forests of Akassa lie in Bayelsa State in Southern Nigeria. As part of the area known as the Niger Delta Wetlands, they are a component element of the West African sub- region of the Afro-tropical region, and consists of moist tropical lowland alluvial forest (rain forest), much of it seasonal freshwater swamp forest, with the remaining (and largest- proportion of the land) making up part of possibly the largest single remaining area of mangroves (*Rhizophora racemosa and Avicennia africana*) swamp left in the world (approximately 4,500 square kilometers). This area may be the only extensive tract of such swamp left in West Africa (Weeks and Claude-Eze, 1997). The forests are located on three 'sand barrier Islands' on the Bight of Bonny and are separated from each other by substantial rivers (the Nun River, Sangana River, Brass River and the Fishtown River). It lies between 0 4^0 21'N and 0 5^0 59'E (Figures 3.1 and 3.2).

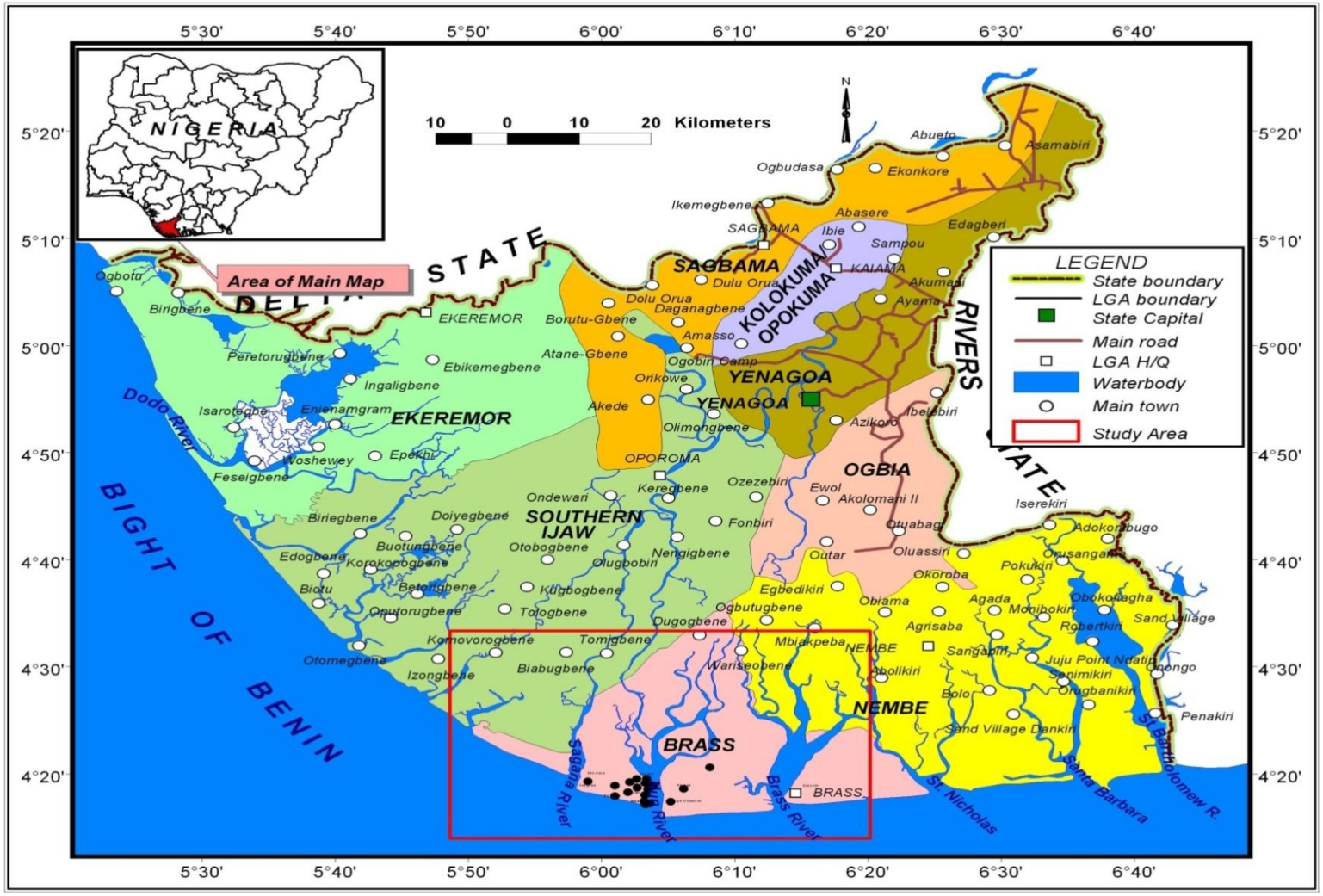

Figure 3.1: **Map of Bayelsa state showing the study area within Brass local government area**

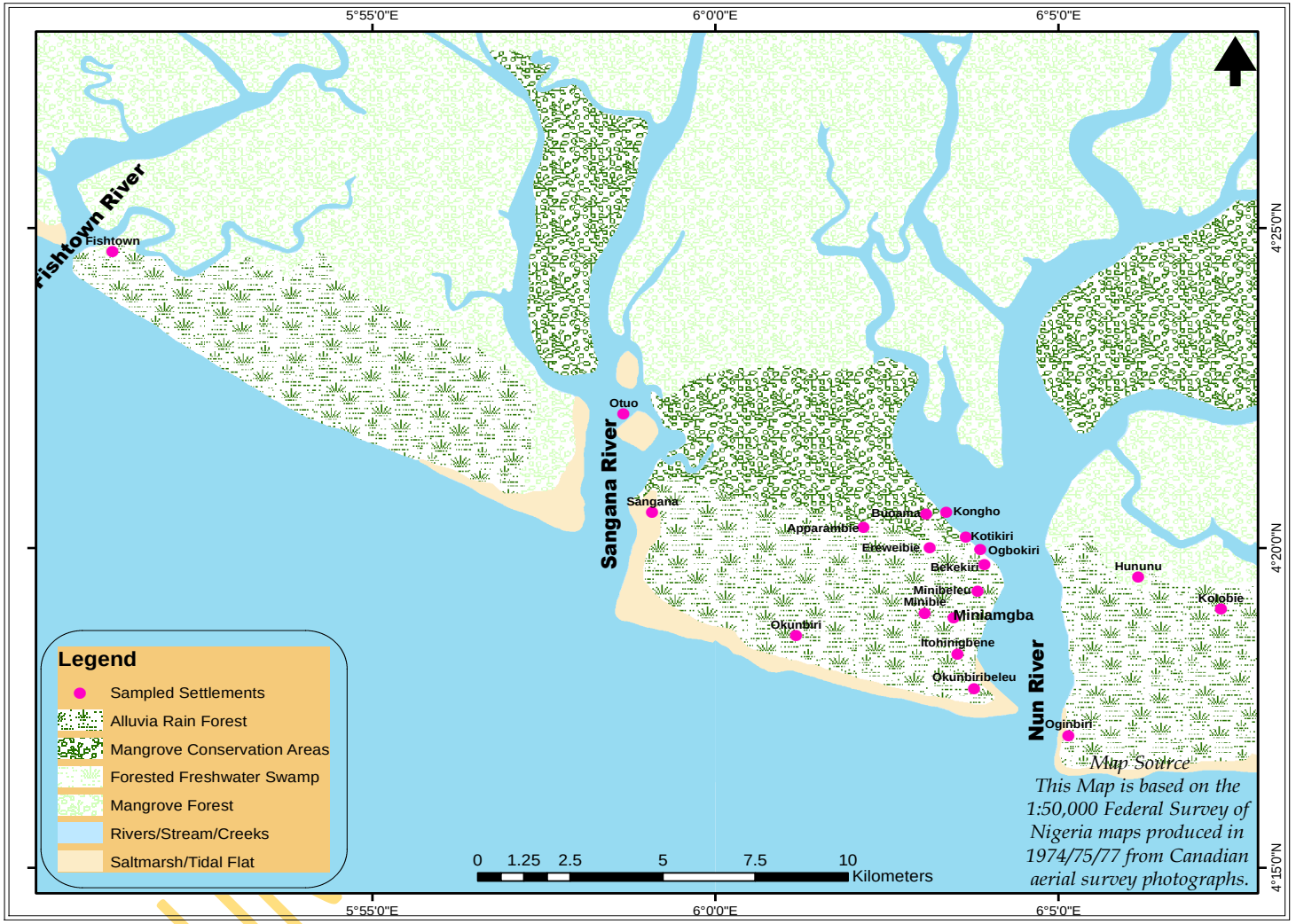

Figure 3.2. Map of Akassa mangrove forests showing study communities

The area of the western non-mangrove forest is approximately 3425 hectares, that of the central forest is 2250 hectares while that of the Eastern forest is 2225 hectares; totalling 7900 hectares or 79 square Kilometers. The forest is rich in biodiversity and supports livelihoods of thousands of people. It is a mangrove swamp, lowland forest and sandy loamy shore habitat. The forest has an abundance of plant species such as *Rhizophora racemosa, Rhizophora harrisonii, Rhizophora mangle* and several other species. The forests are habitats to various rare bird species, monkeys, antelopes, bush pigs, and are breeding sites for gray parrots. The sandy shore habitats provide breeding sites for endangered sea turtles (*Demochelys coriacea, Chelonia midas and Lepidochelys olivacea)* (Weeks and Claude-Eze, 1997).

3.1.1. Geology and climate

The area is based on sedimentary deposits of Tertiary and Quaternary rock overlain by deep drifts of sand forming a series of ridges and furrows running parallel to the coastline and deposited as a function of long-shore drift. Soils of the area vary from the well drained topsoil of the sand ridges, through the hydromorphic soils of seasonal and permanent swamp, both brackish and fresh water in nature, to acidic mangrove soils where tidal creeks are guided inland by the lay of the furrows. The sandy soils of the ridges are classed as Orthoxes. They suffer from leaching due to the very heavy rainfall in the delta, are shallow, with a high water table and a relatively humus-and iron-rich subsoil. In the furrows between the ridges, the soils have a higher silt and clay content, and are classed as Inceptisols and Aquepts. In freshwater areas and where drainage is more effective, there are areas of gley with patches of iron oxide deposit. Elevation is between 0.5 metres below and 2 metres above mean sea level (m.s.l). Although in most places the elevation above m.s.1 does not exceed 0.5 metres. Rainfall is in the region of 4,500mm per year, most of it occurring between May and November. Storms can be extremely violent, and it is not unusual for there to be rain for many days. Temperatures range from about 17^0C (night time during the dry season) to 40^0C (daytime maximum), but the mean diurnal temperature range in any month is usually between 5^0C and 8^0C. The annual range of temperature is only about 5^0C. Humidity is always high. The monthly relative humidity is not less than 95% at 0600hrs, though this can fall to below 60% at noon during the driest months. However, there is often a cool sea breeze which makes life quite bearable for the non-indigenous resident (Weeks and Claude-Eze, 1997).

Akassa clan territory spans an area nominally at 450 km^2 at the base of the Niger Delta in Nigeria. The territory includes three major estuaries of the Niger; from east to west these are the Nun River, the Sangana River and the Fishtown River. It has an adjacent sea area within Nigerian Territorial Waters of approximately 9,600 km^2, and runs inland from the Atlantic seaboard of three beach ridge islands between the Brass River Estuary and the Fishtown River Estuary. These islands feature depleted high forest and most of the permanent settlement of the Clan. Further inland are large expanses of mangrove swamp forest, and an intricate network of rivers and creeks. The entire territory of Akassa, in rough estimate, comprises some 70 km^2 of largely depleted 'high forest', 60 km^2 of rivers (essentially estuaries), 320 km^2 of mangrove swamp forest and 9,600 km^2 of open sea (to the limit of the Exclusive Economic Zone).

Akassa is reputed to have the highest rainfall in West Africa (above 4,500 mm p.a). the basis of this assumption is explicit in the sustained rains during the wet seasons. All rivers in the territory receive the flood waters of the River Niger and turn fresh right down to their mouths at the peak of the rainy season, from June to October. It is generally windy along the coast, with the South West Monsoons blowing from April to October each year. Akassa, like any other part of the Niger Delta is essentially flat country, a maze of wetlands hardly exceeding an altitude of 1.5m above sea level on average. The estuaries and the entire in-shore waters off the Akassa coast are also very shallow averaging just about 3m. Akassa shares boundaries with the communities of Lobia (Logubia) in Southern Ijaw Local Government Area to the North-east, Igbemotoru and Opuama also in Southern Ijaw Local Governement Area, and with Nembe in Nembe Local Government Area of Bayelsa State to the North. To the West, Akassa has boundaries with the Liama and Egweama communities of Brass Local Government area and the West Atlantic sea board to the South. The natural heritage of the Akassa Clan is a vast resource base of land and water that includes rain forests, mangrove swamp forests, brackish and fresh water transition forests and their associated flora and fauna (Weeks and Claude-Eze, 1997).

3.1.2. Forests

3.1.3. Freshwater forest

The natural ecosystem of the beach ridge of Akassa, like those of similar Islands in the Niger Delta, is youthful in comparison with the lowland tropical rain forest beyond the Niger Delta.

The forests previously had ample supplies of good timber trees and non-timber forest products. These have provided the base for lumbering, canoe carving and related crafts, traditional medicine, food and food additives, hunting and fibre-related gathering (Weeks and Claude-Eze, 1997).

3.1.4. Transitional zones forests

The forests of the brackish water transition zone are found around some of the northern borders of the Akassa Clan. Though not as extensive as either the coastal barrier island forests of the mangrove forest, they house a considerable mixture of mangrove, assorted palms, ferns and a few other trees. The zone of brackish water exists only in the dry season and is completely freshened during the rains. It is characterized by many narrow creeks similar to the ones found in the mangrove forests area (Weeks and Claude-Eze, 1997).

3.1.5. Coastal barrier island forests

The natural ecosystem of the beach ridge of Akassa, like those of similar Islands in the Niger Delta, is youthful in comparison with the lowland tropical rain forest beyond the Niger Delta.

The coastal barrier islands now feature depleted high rain forests and extensive backwater swamps. The forests previously had ample supplies of an enormous number of sawn timber pieces (locally called 'cubics') exploited mainly for commercial purposes. They also provide trees for canoe carving; rattan and other useful plants for weaving and related crafts; and, a variety of items that are used for traditional medicine or as food and food additives. They also support hunting. The humid rain forests of the coastal barrier island also provide a habitat for animals including monkeys, antelopes, snails and tortoises. Three varieties of turtles are also known to breed annually on the ocean beaches fringing these islands. In addition, a number of sea birds also come to roost on these islands. (Weeks and Claude-Eze, 1997).

3.1.6. Mangrove forests

The main natural resources of the mangrove area are the mangrove trees. There are three broad types of mangroves in the mangrove belt of Akassa known by the indigenes as *angala* (red mangrove), *ekeu* (white mangrove) and *iyorou-ekeu* (black mangrove).

The red mangrove is by far the most common and most frequently used. The red mangrove stock was until recently quite healthy and intact, but it is now seriously exploited as fire wood for household use and commercial fish drying. In recent times, with the cultivation of rice, the mangrove swamps have come under even greater threat. The margins of the sandy beach islands, before the red mangrove colonies have large colonies of white and black mangroves and these are also threatened by expanding rice farming. In the very few places in the mangroves where canals have been constructed or where an oil pipeline has been laid, infant rain forest vegetation has developed where the dredge-spoil has been deposited (Weeks and Claude-Eze, 1997).

3.1.7. Fisheries

The fisheries of Akassa can be classified on the basis of their environment into coastal, estuarine, mangrove, brackish water swamp and freshwater river fisheries. Fishing is the main occupation of the Akassa people. The vast resources of fish and shellfish are harvested both for food and economic purposes (Weeks and Claude-Eze, 1997).

3.1.8. Coastal fisheries

The coastal fisheries consist of what is apparently a vast stock of fish, the most popular of which are Shad, Shark, Shiny Nose, Croaker, Drum, Mullet and Barracuda. The coastal fisheries also contain a wide selection of shrimps and other shellfish. Most of the indigenous fishermen explore the relatively shallow water while a few indigenes and some non-native fishermen, including Ghanaians and Ilaje people, fish in more distant waters. The former use mainly small dug-out canoes while the latter use fairly large canoes of a different design and build. Although women and children are also involved in coastal fishing, the fishing involves mostly the men (Weeks and Claude-Eze, 1997).

3.1.9. Estuarine fisheries

The natural resources of the estuaries are largely fish. These are not very different from the stock found in coastal waters but are often smaller in size. They include an assortment of crabs, shrimps and fin fish. To exploit these resources, long-lines and varieties of nets are used according to whether they are bottom (demersal) fish or off-bottom (pelagic) fish. The estuaries are the main theatre of work for women in fisheries. The soils of beach islands are orthoxes over sedimentary deposits of tertiary

and quaternary rock, deposited as a function of longshore drift, or inceptisols and aquepts in areas that support any worthwhile vegetation. On these soils, leaching is very high and so fertility is very low. The soils are fragile and are quickly stressed when subjected to any intensive agricultural use. There is acidic mangrove soil where tidal creeks are guided inland by furrows in the land form, and in freshwater areas there are areas of gley with patches of iron oxide deposit. The soils and the underlying sub-soils overlay rock formations which are alluvial in nature. The soils of the beach ridges are classified as Orthoxes. The soils in the furrows between ridges have a higher silt and clay content. Relatively small patches of these are passed into growing a few local crops. The vast deposit of sand is exploited primarily for building, in spite of its fine texture that renders it relatively less ideal for the purpose (Weeks and Claude-Eze, 1997).

3.2. Hydrology

Water is easily the most abundant natural resource in Akassa territory as a result of the vast waters of the ocean, estuaries and creeks and the enormous rainfall. The hearts of the beach-ridge islands are water-logged all year round. Even in areas not subject to water-logging, the water table is so high (often less than 15cm below the surface) that in most places meaningful agriculture is not possible, especially for root crops.

3.2.1. Seasons

There are two pronounced seasons in Akassa, namely the rainy and dry seasons. The rainy season is from April to October, with a brief break about early August (locally known as the "August break"), while the dry season is from November to March. The dry season is only relatively dry, as light showers are common even in the driest of times.

3.3. Method of data collection

Primary and secondary data were collected for this study. Primary data were gathered by the use of structured questionnaire (open and closed ended questions were used), Participatory Rural Appraisal (PRA) exercises such as Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), Semi Structured Interviews (SSIs) and direct observation by the researcher. Household heads, community leaders, Chiefs and members of the Chiefs council and the Akassa Development Foundation (ADF) were interviewed. Secondary data were obtained from field reports, project documents and

files of the ADF, Pro Natura International (PNI) and other online internet resources. Information on the demographic characteristics of the respondents and the various livelihood activities were gathered with indication of household income and expenditure. The researcher worked with two field assistants and a translator to administer the questionnaire.

3.3.1. Reconnaissance survey

Preliminary field visits: Two visits were accomplished to each of the communities before the actual questionnaire administration. A reconnaissance survey was carried out and this was later followed by PRA exercises which provided key information that assisted in the fine tuning of the questionnaire and timing of questionnaire administration.

3.3.2. PRA tools and procedures

PRA tools were such as focus group discussions (FGDs), wealth ranking and community mapping were adopted to gather information across the communities. PRA techniques have now become widely accepted tools in conservation and development research (Malleson *et al.* 2008) argue that when they are used in isolation they provide little insight into people's livelihoods and limited understanding of the broader socio-economic political and historical processes that impact on rural people and influence land use management practices. Homewood (2005) argues that while PRA methods may be used successfully as part of pilot studies, they are no substitute for more in depth research; a combination of participatory methods and sample surveys help to achieve more complete understanding of livelihood strategies (Ellis, 2000). Non-participant observation was adopted to collect detailed information on livelihoods (Holy, 1984). Community mapping was carried out in the study communities; also through the aid of field assistants each of the study households were identified by compounds, names and location within the community with support from community Chiefs and youth leaders. Wealth ranking exercise was also used to identify local people's criteria used to differentiate households on basis of wealth and wellbeing (Mukherjee, 1992).

3.4. Sampling intensity and sampling size

Simple random sampling and purposive sampling techniques were adopted for the study. The nineteen communities in the Akassa kingdom were purposively selected for

the study. Based on a pre-assessment of household patterns in the study area, a simple random sampling technique was adopted to select fifty households from each of the nineteen study communities giving about 30% sampling intensity (there are about 150 – 170 households in each community). This gives a total of nine hundred and fifty households to be used for the study (Table 3.1).

Table 3.1. Distribution of respondents by communities

Community	Number of respondents
Apparanbie	50
Buoama	50
Kongho	50
Ereweibie	50
Kotikiri	50
Sangana	50
Fishtown	50
Otuo	50
Oginibiri	50
Kolobie	50
Hununu	50
Ogbokiri	50
Bekekiri	50
Miniamga	50
Minibeleu	50
Minibie	50
Itohonoama	50
Okumbiribeleu	50
Opuokumbiri	50
Total	**950**

Source: Field Survey, 2008

3.5. Access to study site

Access to the study communities was mainly by water transportation to the southernmost tip of the Niger Delta Wetlands in Bayelsa State, Nigeria. Speed boats and wooden boats were employed for movements across the communities at different times depending on the location to be accessed.

3.6. Data analysis

Data gathered from the study were analysed using descriptive and inferential statistical tools. Descriptive statistical tools used are tables, graphs, percentages. Inferential statistics were chi-square test, analysis of variance (ANOVA). Tools for economic evaluation were employed to measure profitability of the livelihood activities namely; return on investment, Benefit-cost analysis. To assess the level of poverty in the study area, Alkire and Foster multidimensional poverty measure was adopted.

Objective one

Objective one was realized through content analysis technique (Larson, 1988; Tyler, 1999; Stemler , 2001; Elo and Kyngas 2008; Prasad-undated) whereby the existing Akassa Forest and Wildlife Policy of 1999 were critically examined to analyze the challenges, problems, progress made, advantages and disadvantages of the policy and the way forward. Provisions of the Akassa Forest and Wildlife Policy were critically assessed and key areas of weaknesses and gaps identified.

Objective two

Objective two was realized through interviews, participatory research techniques (Ellis-Jones *et al*. 2005) namely: livelihood analysis, focus group discussions (FGD) and personal observation by researcher. The Return on Investment (ROI) and the Benefit-cost ratio were applied to determine the economic benefit for some forest dependent livelihood activities.

Benefit-cost ratio: here benefit and cost values from the identified livelihood activities were used to determine the profitability of the venture. For any enterprise to be economically viable the benefit-cost ratio must be greater than +1.

This is as given by Adegeye and Dittoh (1985) as:

$$B/C = \frac{\sum_{t=1}^{n} \frac{Bt}{(1+r)^t}}{\sum_{t=1}^{n} \frac{Ct}{(1+r)^t}}$$

where Bt = benefit in each project year

Ct = cost in each project year

n = number of years

r = interest (discount rate)

The Return on Investment (ROI) measures the profitability of the livelihood activities at a point in time. Return on investment is a very popular metric because of its versatility and simplicity. That is, if an investment does not have a positive ROI, or if there are other opportunities with a higher ROI, then the investment should be not be undertaken

This is given by the formula:

$$ROI = \frac{(TR-TC)}{TC} \times 100$$

Note that total revenue represents total income in this study. Total income for a household is the sum of the income from the main and secondary occupations.

Objective three

To determine the level of poverty, Alkire and Foster Multidimensional Poverty (AF MDP) measure was adopted. Here, order than consider only a unit measure such as income or expenditure, a multidimensional approach was applied (Alkire and Foster, 2007; 2008; 2011) and is given by the formula:

$$M_0 = \frac{1}{nd}\sum_{i=1}^{n} C_i\, pk\,(x_{i;z})$$

Where

M_0 = Adjusted multidimensional headcount

n= Number of individuals or households (population)

z= dimension specific thresholds (z j)

x= individual or households achievements in each dimension

d = number of dimensions

p= identification functional 0 = not poor, 1=poor)

k= cut off ie if pk (xi; z) =1 (individual i is poor, if 0 then individual is not poor.

c_i = number of deprivations suffered by individual or household i

3.6.1. Multidimensional headcount ratio

The multidimensional head count ratio (Ho) indicates the prevalence of poverty, i.e. the poverty incidence and it is the share of the population whose income or consumption is below the poverty line. To compute for multidimensional poverty, we are searching for a multidimensional poverty measure *M(y;z)* to be used with the dual cutoff identification approach. A natural place to begin is with the percentage of the population that is poor. The headcount ratio *H=H(y; z)* is defined by $H = q/n$, where $q = q(y; z)$ is number of persons in the set Z_k, and hence the number of the poor identified using the dual cutoff approach. This is entirely analogous to the income headcount ratio and inherits the virtue of being easy to compute and understand, and the weakness of being a crude, or partial, index of poverty. However, an additional problem emerges in the multidimensional setting. If a poor person becomes deprived in a dimension in which that person had previously not been deprived, *H* remains unchanged. This violates what we will call 'dimensional monotonicity' which is defined rigorously below. Intuitively speaking, if poor person *i* becomes newly deprived in an additional dimension, then overall poverty should increase. To reflect this concern, we can include additional information on the breadth of deprivation experienced by the poor. Let *c(k)* be the censored vector of deprivation counts defined

as follows: If $c_i \geq k$, then $c_i(k) = c_i$, or person i's deprivation count; if $c_i < k$, then $c_i(k) = 0$. Notice that $c_i(k)/d$ represents the share of possible deprivations experienced by a poor person i, and hence the *average deprivation share* across the poor is given by $A = |c(k)|/(qd)$. This partial index conveys relevant information about multidimensional poverty, namely, the fraction of possible dimensions d in which the average poor person endures deprivation (Alkire and Foster, 2008)

3.6.2. Dimension adjusted headcount ratio

Consider the following multidimensional poverty measure $M_0(y;z)$ which combines information on the prevalence of poverty and the average extent of a poor person's deprivation. The dimension adjusted headcount ratio is defined by M_0 is defined by $M_0 = HA$. As a simple product of the two partial indices H and A, the measure M_0 is sensitive to the frequency and the breadth of multidimensional poverty. In particular, it clearly satisfies dimensional monotonicity, since if a poor person becomes deprived in an additional dimension, then A rises and so does M_0. Note that M_0 can be defined as Mo = □(g°(k)), or the mean of the censored deprivation matrix $g^0(k)$. In words, the adjusted headcount ratio is the total number of deprivations experienced by the poor, or $|c(k)| = |g^0(k)|$, divided by the maximum number of deprivations that could possibly be experienced by all people, or nd. The measure M_0 ranges in value from 0 to 1. The adjusted headcount ratio can be used with purely ordinal data, which arises frequently in multidimensional approaches based on capabilities. This important characteristic of the measure will be discussed at some length in a separate section below. The adjusted headcount ratio is based on a dichotomisation of the data into deprived and non-deprived dimensions, and so it does not make use of dimension specific information on the depth of deprivation. Consequently, it will not satisfy the traditional monotonicity requirement that poverty should increase as a poor person becomes more deprived in any given dimension. (Alkire and Foster, 2008)

3.6.3. Dimension adjusted poverty gap

The (dimension) adjusted poverty gap M_1 *is defined by* M_1= HAG. This defines the depth of poverty (poverty gap). To develop a measure that is sensitive to the depth of deprivation, let us return to the matrix g^1 of normalised gaps. This matrix provides information on the depth of deprivation across all dimensions and all persons, whether poor or not. Define the associated censored matrix $g^1(k)$ by $g_{ij}^1(k)$ = 0 if $c_i < k$ and

$g^1_{ij}(k) = g^1_{ij}$ if $c_i \geq k$, so that $g^1(k)$ only includes the deprivations of the poor. Let G be the *average poverty gap* across all instances in which poor persons are deprived, given by $G = |g^1(k)|/|g^0(k)|$. Consider the following multidimensional poverty measure $M_1(y;z)$ which combines information on the prevalence of poverty, the average range of deprivations and the average depth of deprivations when the poor are deprived. The adjusted poverty gap is thus the product of the adjusted headcount ratio M_0 and the average poverty gap G. It is easily shown that $M_1 = \mu(g^1(k))$; in words, the adjusted poverty gap is the sum of the normalised gaps of the poor, or $|g^1(k)|$ divided by the highest possible sum of normalised gaps, or nd. The poverty measure M_1 ranges in value from 0 to 1. If the deprivation of a poor person deepens in any dimension, then the respective $g^1_{ij}(k)$ will rise and hence so will M_1. Consequently, M_1 satisfies monotonicity. However, it is also true that the increase in a deprivation has the same impact no matter whether the person is very slightly deprived or acutely deprived in that dimension. One might argue that the impact should be larger in the latter case. The dimension adjusted poverty gap measures the average depth of poverty across the whole population; it provides information regarding how far households are from the poverty line (Alkire and Foster, 2008).

3.6.4. The dimension adjusted P_2 measure

The (dimension) adjusted P_2 measure, denoted by M_2 is defined by $M_2=HAS$. This is the poverty severity (squared poverty gap) and is denoted by M_2 . Consider the matrix g^2 of squared normalized shortfalls whose typical entry g^2_{ij} is defined by $g^2_{ij} = (g^1_{ij})^2$ and let $g^2(k)$ be its censored version with $g^2_{ij}(k) = (g^1_{ij}(k))^2$. These matrices provide information on the severity of deprivations as measured by the square of the normalised shortfalls, with the censored matrix $g^2(k)$ including only the data on the poor. Rather than using the matrix $g^1(k)$ to supplement the information of M_0 (as was done in M_1), we can use the matrix $g^2(k)$ which suppresses the smaller gaps and emphasises the larger ones. The average severity of deprivations, across all instances in which poor persons are deprived, is given by $S = |g^2(k)|/|g^0(k)|$. The following multidimensional poverty measure $M_2(y;z)$ combines information on the prevalence of poverty and the range and severity of deprivations. M_2 is thus the product of the adjusted headcount ratio M_0 and the average severity index S; it can also be expressed

as $M_2 = \mu(g^2(k))$, the mean of the matrix $g^2(k)$ which in words is the sum of the squared normalised gaps of the poor, or $|g^2(k)|$, divided by the highest possible sum of the squared normalised gaps, or nd. The poverty measure M_2 also ranges in value from 0 to 1. For a given sized increase in deprivation, the measure registers a greater impact the larger the initial level of deprivation. It satisfies a 'transfer' property (as noted below), and is sensitive to the inequality with which deprivations are distributed among the poor, and not just their average level. Indeed, $M_2 = (M_1)^2 + V$, where V is the variance among all normalised gaps. Therefore, the poverty severity (squared poverty gap) (M_2), takes into account not only the distance that separates the poor from the poverty line (poverty gap), but also the inequality among the poor; i.e. a higher weight is placed on those households further away from the poverty line. It is the distribution sensitivity and measures the conditions of the poorest of the poor. (Alkire and Foster, 2008).

3.6.5. Deprivation cutoffs: A vector z = (z1,…,zd) of deprivation cutoffs (one for each dimension) is used to determine whether a person is deprived. If the person's achievement level in a given dimension j, falls short of the respective deprivation cutoff zj, the person is said to be deprived in that dimension; if the person's level is at least as great as the deprivation cutoff, the person is not deprived in that dimension.

3.6.6. Weights: A vector w = (w1,…,wd) of *weights* or *deprivation values* is used to indicate the relative importance of the different deprivations. If each deprivation is viewed as having equal importance, then this leads to a benchmark case where all weights are one and sum to the number of dimensions d.

3.6.7. Deprivation counts: A column vector c = (c1 … cn)' of *deprivation counts* reflects the breadth of each person's deprivation. The ith person's deprivation count ci is the number of deprivations experienced by i (in the case of equal weights) or the sum of the values of the deprivations experienced by i (in the general case).

3.6.8. Poverty cutoff: A poverty cutoff *k* satisfying $0 < k \leq d$ is used to determine whether a person has sufficient deprivations to be considered poor. If the i th person's deprivation count c_i falls below k, the person is not considered to be poor; if the person's deprivation count is k or above, the person is identified as being poor. Note that when k is less than or equal to the minimum weight across all dimensions we have

union identification. When k=d, the intersection approach is being used. The deprivation count and poverty cutoff can also be expressed as percentages of d.

3.6.9. Identification function: The identification function summarizes the outcome of the above process and indicates whether a person is poor in 'Y' given deprivation cutoffs z, weights w, and poverty cutoff k. If the person is poor, the identification function takes on a value of one; if the person is not poor, the identification function has a value of zero.

3.6.10. Application procedure for Alkire and Foster multidimensional poverty

The method applies a dual cutoff approach and was achieved through the following steps:

- The unit of analysis was determined as the Household. Dimensions for assessment were chosen (as shown in Table 3.2), this was achieved basically through participatory methodologies with the local people which gave insights on the values and perspectives of local people as to how and whom they perceive to be rich or poor; secondary sources such as poverty assessment reports were also consulted; as a result this study adopted four dimensions namely (i) education, (ii) health and nutrition, (iii) assets and (iv) quality of life.
- Indicators were then chosen for each dimension to ensure ease of analysis for policy purposes, transparency and standard practice or expectations (Table 3.2).
- Setting poverty lines: A poverty cutoff was set for each dimension; this established the first cutoff in the methodology. Households were then identified as deprived or not deprived with respect to each dimension.

Table 3.2. Dimensions and deprivation thresholds for MPI measurement in the study area

Dimension	Attributes	Remarks
Education	Number of years of formal education of household head	Generally if any member of the household of school age is not in school or does not have 6 years of primary education the household is deprived in that dimension (MDG standard)
Health and Nutrition	1. Household expenditure on food 2. Number of times food is eaten daily 3. Household expenditure on health and medicine 4. Point of call when sick 5. Distance of household to nearest health centre	1. Average HH expenditure on food was used as used as a criteria, whereby all those who spend below the average are deprived. 2. Those who eat less than three times a day were considered deprived 3. An average HH expenditure was determined and all HH who spend below this value are deprived 4. Households that do not use the health facility when sick are considered deprived 5. Households whose distances to the nearest health centre was above 2.5km and does not have a means of transport were considered deprived
Quality of Life	1. Type of housing unit 2. Quality of housing unit 3. Sanitation(type of toilet facility used) 4. Source of household cooking energy 5. Source of drinking water 6. Distance of water source to household 7. Source of lighting for the house 8. Access to land	1. Households without a separate room from the living room were considered deprived 2. Only block and zinc constructions were considered not deprived due to quality of concrete flooring (PRA) 3. Anyone without water system was considered poor 4. Households that use fuelwood or saw dust were considered deprived 5. Any source other than tap water was considered deprived 6. Household that walk more than 1km to source of water were considered deprived 7. Households without electricity supply were considered deprived 8. Households without access to land were considered deprived
Assets	Number of asset owned by household	Households without at least two assets classified during the (PRA) were considered deprived

Source: Field Survey, 2008

In the education dimension, as an example and considering schooling (respondents level of education), attainment of primary education and above means non deprivation, while 'no education' identifies deprivation in the dimension.

- Apply poverty lines. At this step each household's achievement was replaced with its status with respect to each cutoff; for example, in the dimension of health, when the indicators are 'point of call when sick' and 'number of times household eats in a day,' people are identified as being deprived or non deprived for each indicator. The process is repeated for all indicators across all other dimensions.
- The number of deprivations for each household were counted using equal weights
- A second cutoff (K) was set assuming equal weights; this gives the number of dimensions in which a household must be deprived in order to be considered multidimensional poor.

This process was used to calculate the multidimensional poverty index (MPI) at four (4) levels of K, (K1 – K4). To obtain the number of poor households, cutoff (K) was applied and all non poor data censored. At this stage the focus was now on the profile of the poor households and the dimensions in which they are deprived. The above values were subjected to analysis using the STATA software to derive the Multidimensional Headcount (Ho), the Average Poverty Gap (A) and the Adjusted Headcount, M_0.

Chi-square test was used to determine the relationship between multidimensional poverty index (dependent variable) and the following independent variables: sex, age, length of stay in community, level of education, family size. The chi- square test is a non- parametric test used to test for independence or association of variables in contingency tables, this is given by the formula:

$$\chi^2 = \sum \frac{(Oij - Eij)}{Eij}$$

Where χ^2= chi square value

Σ = Sum

Oij = Observed cell frequency

Eij = Expected cell frequency

Degree of freedom (df) = (r-1)(c-1)

Where r= number of rows and c= number of columns

Hypothesis tested

Null hypothesis (H_0): Contribution of forest resources to household annual income does not depend on demographic characteristics

Alternative hypothesis: (H_1) Contribution of forest resources to household annual income depends on demographic characteristics of respondents

Null hypothesis (H_0): Willingness to participate in in AFWP does not depend on demographic characteristics

Alternative hypothesis (H_1): Willingness to participate in in AFWP depends on demographic characteristics of respondents

Analysis of variance (ANOVA)

Analysis of variance (ANOVA): ANOVA was used to test the hypothesis that several means are equal. When comparing means of more than two samples, analysis of variance is a very useful technique. This is given by the formula: $y_{ij} = \mu + t_i + e_{ij}$

Where y_{ij} = the $_{ij}$th observation (household)

μ = general mean

t_i = effect of treatment (community)

e_{ij} = random error due to treatment.

Objective four

The descriptive statistics were used to depict militating factors in a simple table using frequency and percentages.

Objective five

Identified conflicts in forest resource were analysed by use of simple percentages and frequencies.

CHAPTER FOUR

RESULTS

4.1. Demographic characteristics of respondents

According to sex of household heads in the study area (Table 4.1), there were more male- headed households, six hundred and ninety four (73.05%) than female-headed households two hundred and fifty six (26.95%). Three hundred and fifty nine (37.79%) respondents were less than forty years, five hundred and fifty were between ages forty one and sixty years (57.59%), while forty one (4.32%) respondents were above sixty years (Plate 4.1a-d shows some respondents during the field work in the study area).

Respondents marital status showed that fifteen (1.58%) were single, nine hundred and twenty seven (97.58%) were married, five (0.52%) and three (0.31%) were divorced. According to respondents educational status, three hundred and four (32%) had primary education, four hundred and sixty three (48.74%) had secondary education, twenty two (2.31%) while one hundred and sixty one (16.95%) had no formal education. In terms of household size, two households had between eighteen and thirty members (0.21%), ten households had between eleven and fourteen (1.05%), six hundred and twenty three households had between six and ten members (65.58%), three hundred households had between three and five members (31.58%) while fifteen households had between one and two members (1.58%). Nine hundred and twenty eight (97.68%) respondents were indigenes (natives) while twenty were non indigenes (2.32%). Nine hundred and thirty respondents (97.90%) had lived in the community for about ten years and above, twelve (1.26%) had lived between six and ten years while eight (0.84%) had lived between one and five years.

Table 4.1: Demographic characteristics of respondents

Variables	Frequency	Percentage
SEX		
Female	256	26.95
Male	694	73.05
Total	950	100.0
Age Distribution (years)		
< 40	359	37.79
41-60	550	57.89
Above 60	41	4.32
Total	**950**	**100.0**
Marital Status		
Single	15	1.58
Married	927	97.58
Widowed	5	0.52
Divorced	3	0.31
Total	**950**	**100.0**
Educational Status		
No formal Education	161	16.95
Primary School	304	32.00
Secondary School	463	48.74
Tertiary Education	22	2.31
Total	**950**	**100.0**
Household Size		
1-2	15	1.58
3-5	300	31.58
6-10	623	65.58
11-14	10	1.05
18-30	2	0.21
Total	**950**	**100.0**
Nativity		
Native	928	97.68
Non- Native	22	2.32
Total	**950**	**100.0**
Length of Stay (years)		
1-5	8	0.84
6-10	12	1.26
10 and above	930	97.90
Total	**950**	**100.0**

Source: Field survey, 2008

a.

b.

c.

d.

Plate 4.1: Some respondents in the study area (a) Researcher with a male household head in Bekekiri community during questionnaire administration, (b) Questionnaire administration with a female household head in Minibeleu community, (c) Researcher with a respondent holding ogba (tree climbing rope) in Apparanbie community and (d) Cross section of female participants during FGD in fishtown community

4.1.1. Akassa forest and wildlife policy

The Akassa forest and wildlife policy (AFWP) was designed as a measure to curb massive deforestation and loss of biodiversity in the study area; however, a critical examination of the local policy showed that the provisions did not combine local people's knowledge with scientific knowledge by giving rapt attention to the socio-cultural dimensions of natural resource environments. Local participation and support was not fully proven before execution of the AFWP. The study revealed that there were subsequently huge technical and managerial capacity gaps on the side of the local Natural Resource Committees (NRC). Hence, they were unable to fully interpret and understand the policy. Furthermore, the policy lacked an enforcement backed by the State, Akassa or Brass Local Government authorities; therefore it was impossible for the local forest monitors (guards) to operate only on the grounds of customary legal backing. The approach adopted in formulation and implementation of the AFWP was very hasty.

This study also found that local forest and land owners gave up as much of their land to loggers in order to reap as much financial benefits to themselves directly. The AFWP made provisions for indigenes to harvest some products such as fuelwood, and other NTFPs freely from the forests; only non-indigenes were prohibited from harvesting from the forests.

4.1.2. Land ownership and the impacts of AFWP on household livelihood activities in the study area

Nine hundred and forty four respondents (99.37%) affirmed that land is owned by family, six (0.63%) opined that land is community owned while none indicated for individual or government ownership of land. In terms of impacts of AFWP forest policy on livelihoods, six respondents (0.64%) said the policy impacted on their livelihood activities, while nine hundred and forty four respondents (99.36%) opined that the policy did not impact on their livelihoods (Table 4.2).

Table 4.2: Respondents view on land ownership and impact of AFWP on household livelihoods in the study area

Ownership of land	Frequency	Percentage
Family owned	944	99.37
Community owned	6	0.63
Individually owned	0	0
Government owned	0	0
Total	950	100.00
Impacts of AFWP on household livelihoods		
No Impact	944	99.37
Impact	6	0.63
Total	950	100.00

Source: Field survey, 2008

4.1.3. Local consultations for formulation of AFWP

According to respondents view on the level of local consultations during formulation of the Akassa forest and wildlife policy (Table, 4.3), two respondents said the consultations were poor (0.21%), thirty said there were no consultations (3.16%), nine said only community chiefs were involved (0.95%), twelve said they suddenly heard of the policy (1.26%), eight hundred and ninety two (93.89%) said they do not know of the policy while five respondents said the consultations were good (0.52%).

Table 4.3: Respondents view on local consultations on Akassa forest and wildlife policy

Respondent views	Frequency	Percentages
Very poor	2	0.21
No consultations	30	3.16
Only chiefs involved	9	0.95
Suddenly heard of the policy	12	1.26
I don't know of the policy	892	93.89
Good	5	0.52
Total	**950**	**100.0**

Source: Field survey, 2008

4.1.4. Respondents awareness and willingness to participate in AFWP in the future

There was a very low level of awareness to the AFWP in the study areas. One hundred and twenty two respondents (12.84%) affirmed they were aware of the Akassa Forest and Wildlife Policy while eight hundred and twenty eight respondents (87.16%) were not aware of the local forest and wildlife policy (Table 4.4). Also, respondents willingness to participate in AFWP showed that five hundred and one respondents (52.74%) were willing to participate in the Akassa Forest and Wildlife Policy in the future while four hundred and forty nine respondents (47.26%) were not willing to participate in the future.

4.1.5. Permission of timber harvesters to operate in Akassa forests

All respondents affirmed that timber harvesters were permitted to operate within the Akassa forests once they pay the land owners (Table 4.5). It was observed that no formal document is presented to the timber harvester by the landowner after payment is made. However, the timber harvester is introduced to key members of the landowner's family notifying them of the permission granted to the timber harvester and the area he is permitted to access for logging.

Table 4.4: Respondents awareness and willingness to participate in Akassa forest and wildlife policy in the future

Responses	Frequency	Percentage
Awareness of AFWP		
Aware	122	12.84
Not aware	828	87.16
Total	**950**	**100.00**
Willingness to participate in AFWP in future		
Yes	501	52.74
No	449	47.26
Total	**950**	**100.00**

Source: Field survey, 2008

Table 4.5: Permission of timber harvesters to operate in Akassa forests

Responses	Frequency	Percentage
Yes	950	100.0
No	0	0
Total	950	100.0

Source: Field survey, 2008

4.1.6. Effects of demographic variables on respondents willingness to participate in AFWP

Results of chi square results showed that willingness to participate in the AFWP in the future depends on sex, age, marital status, educational status, nativity, length of stay in the community, access to land and the location of the household in terms of community in the study area (Table 4.6).

Table 4.6: Effect of respondents demographic characteristics on willingness to participate in Akassa forest and wildlife policy

Variables	df	Chi-square calculated	Chi-Square tabulated	Remark
Sex	1	2.85	3.841	Sig
Age	2	21.624	5.991	Sig
Marital Status	3	0.021	7.815	Sig
Educational Status	3	3.38	7.815	Sig
Nativity	1	3.609	3.841	Sig
Length of stay	2	1.085	5.991	Sig
Location	18	37.206	28.869	Sig
Access to land	1	0.017	3.841	Sig

*Sig means it is significant at 95% level of probability

Source: Field survey, 2008

4.2. Identification of livelihood activities in the study area

4.2.1. Livelihood analysis

Table 4.7, presents a summary of livelihood analysis in the study communities; it shows the diversity of livelihood activities that households engage in to make a living, the level of involvement, relative importance, trends and reasons for observed trends.

The level of involvement in carpentry was observed to be the same in the study area because youths were not willing to engage in carpentry, they rather preferred less tasking activities with faster daily income generation like motorbike riding or speedboat driving (Plate 4.2 shows a carpenter working in the study area). Involvement of people in timber harvesting and logging/chainsaw rental was generally observed to be on the increase in the study area. This is inseparable from the fact that the Akassa Forests still have some remaining commercially valuable forest trees. Loggers have continued to invade Akassa forests to exploit its wood (Plate 4.3a-f and Plate 4.4a-f). In terms of canoe carving/ boat building (Plate 4.5a-f) it was observed that the level of involvement still remained the same. The activity is time consuming and requires a high level of skill with fewer people interested in learning it.

Basket weaving is a very lucrative livelihood activity engaged mostly by women in the study area as shown in Plate 4.6a-f. Respondents observed an increase in involvement in basket weaving which serves as a major income generating craft for women. The baskets are in high demands for fishing activities and markets outside Akassa. Fishcard weaving is also engaged in primarily by women in the study area. It provides income and is needed for drying and preservation of fish.

On the other hand, forest fishing, oyster picking and crabs harvesting were observed to be decreasing in trends in the study area. These activities are seasonal and are affected by deforestation and destruction of mangrove forests and other breeding grounds. Fuelwood collection and gathering from the mangrove forests has also continued to increase as observed by the respondents. It is mostly important for food than cash; this is because of the high dependence on fuelwood for cooking and fish drying in the study area.

Bricklaying and building activities were also observed to be on the increase within the study area. Respondents observed that zinc and thatch buildings are gradually being replaced by block buildings and more people are interested in building block buildings especially elites in the community (Plate 4.7 a-f shows some construction works and buildings in the study area). Sand collection (Plate 4.8 a-d) in the study area is a quick source of income for youths and is observed to be on the increase. This increase in demand for sand is driven by the increase in construction of buildings and other rural infrastructure. Sawmilling (Plate 4.9 a-d) was observed to be at the same level in the study area. Most of the trees felled in the forest are sawn into planks by use of chainsaw before they are transported to outside markets by wooden boats.

Fishing as a livelihood activity was engaged in by both male and female community members and is important for both food and cash. Respondents observed that the level of involvement remained the same because the fish catch is dwindling annually. Wood carving (such as paddle carvers- Plate 4.10 a-d) was still at the same level because interest of younger generation is low. However, deep sea fishing is mostly engaged in by men; this is because the activity is carried out at night and is very risky and tasking. More women are involved in shrimp fishing mostly for income than for food.

Table 4.7: Summary of livelihood analysis in the study area

Activity	Involvement 1-10 Male	Female	Relative Importance 1-10 Food	Cash	Observed Trends and Reasons
Carpentry	1	-	4	6	Same. People(especially youths) are not ready to learn carpentry.
Timber Harvesting	1	-	3	7	Increasing; more people are going into wood business to make quick money.
Saw milling	1	-	1	8	Same. Only the people that fell wood use the saw mill, and they use chainsaw mostly to saw the wood before transporting to Portharcourt or Yenagoa
Wine tapping	2	-	5	5	Same. Non-indigenes from Calabar mostly produce it inside the forest
Farming	1	-	3	6	Decreasing. People prefer to buy food items instead of farming themselves, also they complain of degraded soil due to oil spills.
Beekeeping	1	-	-	10	Decreasing. Due to lack of skills and low interest of people
Logging/Chain saw rental	2	-	4	10	Increasing. More loggers have been coming from other places to Akassa to exploit wood from the forests
Canoe carving	2	-	-	10	Same. Carving is takes time and skill and fewer people are interested
Basket weaving	-	3	2	8	Increasing. This is a major employer of women and baskets are in high demands for fishing activities and demands from outside markets
Fish card making	-	3	4	10	Increasing: It is needed for drying fish
Hunting	1	-	5	5	Decreasing. Lesser wild animals are seen; logging destroys their habitat
Snail collection	1	2	2	8	Decreasing. Logging activities disrupt gatherers.
Traditional medicine	2	1	3	10	Same. Most people are very elderly that practice it.
Fishing	8	5	10	10	Same. The fish catch is dwindling annually with fewer catch
Deepsea fishing	5	-	3	10	Same. Trawling affects catch of deep sea fishers
Shrimp fishing	2	5	2	10	Same. Fewer catch and over exploitation
Forest Fishing	1	-	-	10	Decreasing. Non indigenes from Ogoni are involved in it seasonally
Hired labour	2	-	4	9	Increasing. Lack of paid employment, youths engage in loading and off loading transport boats
Trading	3	4	2	8	Increasing. The lack of access to markets except in Yenagoa (2 hours by speed boat)
Civil service	3	2	5	5	Same. No employment by government.
Bricklaying/building	2	-	5	8	Increasing. More buildings are coming up by elites
Tailoring	1	2	3	7	Same. Lack of skill and interest
Hair dressing	-	2	4	10	Same. Good stylist travel out for greener pastures
Engine fixing	1	-	5	10	Same. Most are non indigenes and often leave with their skill
Boat driving	2	-	5	10	Same. The number of speed boats are not increasing
Oyster picking	-	1	3	7	Decreasing. Fewer catch
Crabs harvesting	1	1	10	4	Decreasing. Seasonal and no breeding going on
Periwinkle picking	-	1	3	7	Same. Mangrove degradation is high
Motor bike riding	1	-	5	10	Increasing. More youths use this as a means of self employment
Fuelwood collection	3	4	6	4	Increasing. Growing need for fuelwood for fish drying and household energy
Woodcarving	1	-	3	10	Same. Skill and interest is low, degrading cultural history
Mat weaving	-	1	5	5	Decreasing. Older women do the weaving
Hat weaving	-	1	2	10	Same. Some new youths are trying to learn from the elderly
Thatch weaving/Broom making	-	2	2	8	Same. Fewer people are willing to learn the craft
Sand collection	2	-	5	10	Increasing. To meet need for building construction going on.
Welding	1	-	1	10	Same. Lack of skill and training opportunities
Food vendoring	-	3	2	8	Increasing. Meet food needs of people
Local savings collection	1	2	1	10	Increasing. Local savings group to support member's small businesses through a revolving fund

Source: Field survey, 2008

*Note that Involvement and Relative importance are scale values (1= Least important, 10= most important)

Plate 4.2: A carpenter working in his shed while researcher assisted in holding the plank in Bekekiri community

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Plate 4.3: Logging/ chain saw rental in the study area (a) Flitches transported by water in Apparanbie community, (b) Flitches carried by loggers from drop point to timber shed, (c) Researcher poses with logger on mud flats along the River Nun near Buoama creek, (d) Logger rearranging planks before sawing, (e) Wood sawn using chain saw and (f) Flitches arranged in layers before loading into boat

Plate 4.4: Timber extraction, conversion & transportation in the study area (a) Flitches transported on a boat while sea turtle trapped by a fishing net is loosed, (b) Flitches offloaded at a drop point in Fishtown forest, (c) Researcher beside wood tied together on a drop point in Kotikiri community, (d) Flitches stockpiled in Miniamgba community, (e) Boat loaded with wood longsides on Kongho Jetty and (f)Wood transported by a lorry from Yenagoa to Port Harcourt market

Plate 4.5: Canoe carving and boat building in the study area (a) Stump of tree felled for canoe carving in Oginibiri forest, (b) Initial stage of canoe carving shown, (c) Researcher standing by a boat under construction in Sangana community, (d) Wooden boat carved and painted in Opu-Okumbiri community, (e) Two wooden boats under construction on the mudflats along Ereweibie creek and (f) Side view of a wooden boat

Plate 4.6: Basket weaving in the study area (a) Woman prepares rattan for basket weaving in fishtown, (b) Foundation for basket weaved by a woman in Okumbiribeleu community, (c) Baskets ready for sales in Miniamgba community, (d) Researcher with a basket weaver in Miniamgba Community, (e) Covered basket in Ogbokiri community and (f) Basket weaver with her products in Fishtown community

a.

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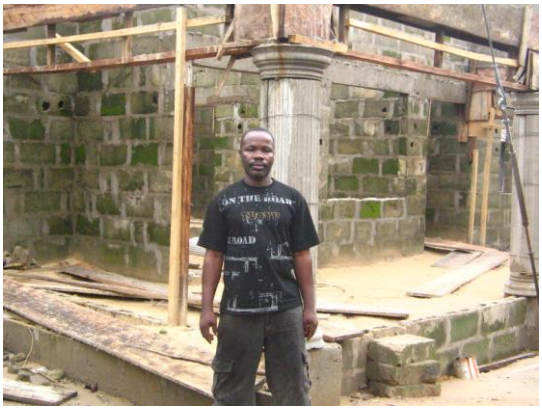

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Plate 4.7: Bricklaying and construction works in the study area (a) Local wooden bridge built with mangrove wood connecting Kongho to Kotokiri, (b) Concrete bridge built across the mangrove forests to link Apparanbie community, (c) Bricklayers at work on a building in the study area, (d) Road construction in Minibie community using mangrove wood, (e) Block building under construction in Kotikiri community and (f) View of Sangana community showing access road and buildings

a.

b.

c.

d.

Plate 4.8: Sand collection and use in the study area (a) Wooden boat loaded with sand in Kongho community, (b) Sand loaded on a boat along Minibie-Bekekiri creek, (c) Sand used for community road work in Kongho Community and (d) Community members carrying sand from the jetty for road work in Kongho community

a.

b.

c.

d.

Plate 4.9: Saw milling activity in the study area (a) Sawmiller turning on his circular saw machine while researcher observes carefully (b) Wood being processed by circular sawing machine in the sawmill, (c) Community member loading sawn wood purchased from the sawmill into a canoe and (d) Purchased wood transported by canoe from the sawmill on the Ereweibie creek

a.

b.

c

d

Plate 4.10: Paddle carving in the study area (a) Boat paddle carver in Kongho community, (b) Researcher holding a carved paddle at the carver's workplace, (c) paddle carver in Oginibiri community and (d) paddles packed and ready for the market in Oginibiri community

4.2.2. Main and secondary occupation of respondents in the study area

Table 4.8 showed the distribution of respondents according to their main and secondary occupation in the study area. Seventeen respondents were involved in carpentry as their main occupation and one respondent as secondary occupation (1.78% and 0.10% respectively), ten respondents were involved in wine tapping as main occupation while seven are involved in wine tapping as secondary occupation (1.05% and 0.73% respectively). Seventeen (1.78%) respondents' main occupation was farming while six respondents (0.63%) engage in farming as secondary occupation (Plate 4.11a-e). Thirty two respondents (3.36%) were into logging or chain saw rental as main occupation while four respondents (0.42%) engaged in it as secondary occupation. Twenty two respondents (2.31%) main occupation was canoe carving; it was seldom a secondary occupation for any respondent.

Basket weaving was carried out by women in the study area whereby thirty seven respondents (3.89%) engaged in basket weaving as main occupation and while nine respondents (0.94%) as secondary occupation. Forty respondents (4.21%) main occupation was fishcard weaving (as shown in Plate 4.12a-d) while it was secondary occupation for 32 respondents (3.36%). Hunting was main occupation for fifteen respondents (1.57%), while it accounted for 4 respondents (0.42%) secondary occupation. Snail collection was mostly a secondary occupation engaged in by 13 (1.36%) respondents and five (0.52%) respondents engaged in it as main occupation. Traditional medicine was a main occupation for fifteen (1.57%) respondents in the study area. Three hundred and seventy two respondents engaged in fishing (39.15%) as main occupation while one hundred and twenty nine (13.57%) respondents engaged in fishing as secondary occupation (Plate 4.13a-f and 4.14a-f). One hundred and thirty eight respondents (14.52%) main occupation was trading or business (Plate 4.15a-d) and eighty three respondents engage in some form of trading as a secondary occupation. Forty two respondents were engaged in fuelwood harvesting (4.42%) while ten respondents (1.05%) engaged in fuelwood harvesting (Plate 4.16a-d) as secondary occupation. Thatch weaving was engaged in by twelve (1.26%) as main occupation and seven (0.73%) respondents as secondary occupation (Plate 4.17a-e).

Table 4.8: **Respondents main and secondary occupation in the study area**

	Main Occupation		Secondary Occupation	
Type of Occupation	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Student	4	0.42	0	0
Carpentry	17	1.78	1	0.10
Timber harvesting	4	0.42	0	0
Saw milling	3	0.32	0	0
Wine tapping	10	1.05	7	0.73
Farming	17	1.78	6	0.63
Beekeeping	0	0	0	0
Logging/ chainsaw rental	32	3.36	4	0.42
Canoe carving	22	2.31	0	0
Basket weaving	37	3.89	9	0.94
Fishcard weaving	40	4.21	32	3.36
Hunting	15	1.57	4	0.42
Snail collection	5	0.52	13	1.36
Traditional Medicine	15	1.57	0	0
Fishing	372	39.15	129	13.57
Hired labour	0	0	0	0
Trading/ HH business	138	14.52	83	8.73
Civil service	62	6.52	2	0.21
Bricklaying/ building	16	1.68	3	0.31

Tailoring	9	0.94	2	0.21
Hair dressing	1	0.10	3	0.31
Engine fixing	2	0.21	1	0.10
Speed boat driving	23	2.42	6	0.63
Oyster picking	0	0	0	0
Perewinkle picking	5	0.52	8	0.84
Motor bike riding	38	4.00	10	1.05
Fuelwood collection	42	4.42	10	1.05
Wood carving	6	0.63	3	0.31
Mat weaving	2	0.21	1	0.10
Hat weaving	1	0.10	2	0.21
Thatch weaving	12	1.26	7	0.73
Carpentry and fishing	0	0	1	0.10
Fishing and snail collection	0	0	2	0.21
Wine tapping and basket weaving	0	0	1	0.10
Civil service and fishing	0	0	1	0.10
Bricklaying/ building and fishing	0	0	1	0.10
Thatch weaving and fishing	0	0	1	0.10
Trading and thatch weaving	0	0	1	0.10

Source: Field survey, 2008

a.

b.

c.

d.

e.

Plate 4.11: Farming in the study area (a) Plantain farmer in Oginibiri community, (b) and (c) Community farmer on his maize, cassava and melon farm in Oginibiri community, (d) Groundnut farmer displays part of his harvest in Okumbiribeleu community and (e) A young female farmer on her farm in Kongho community

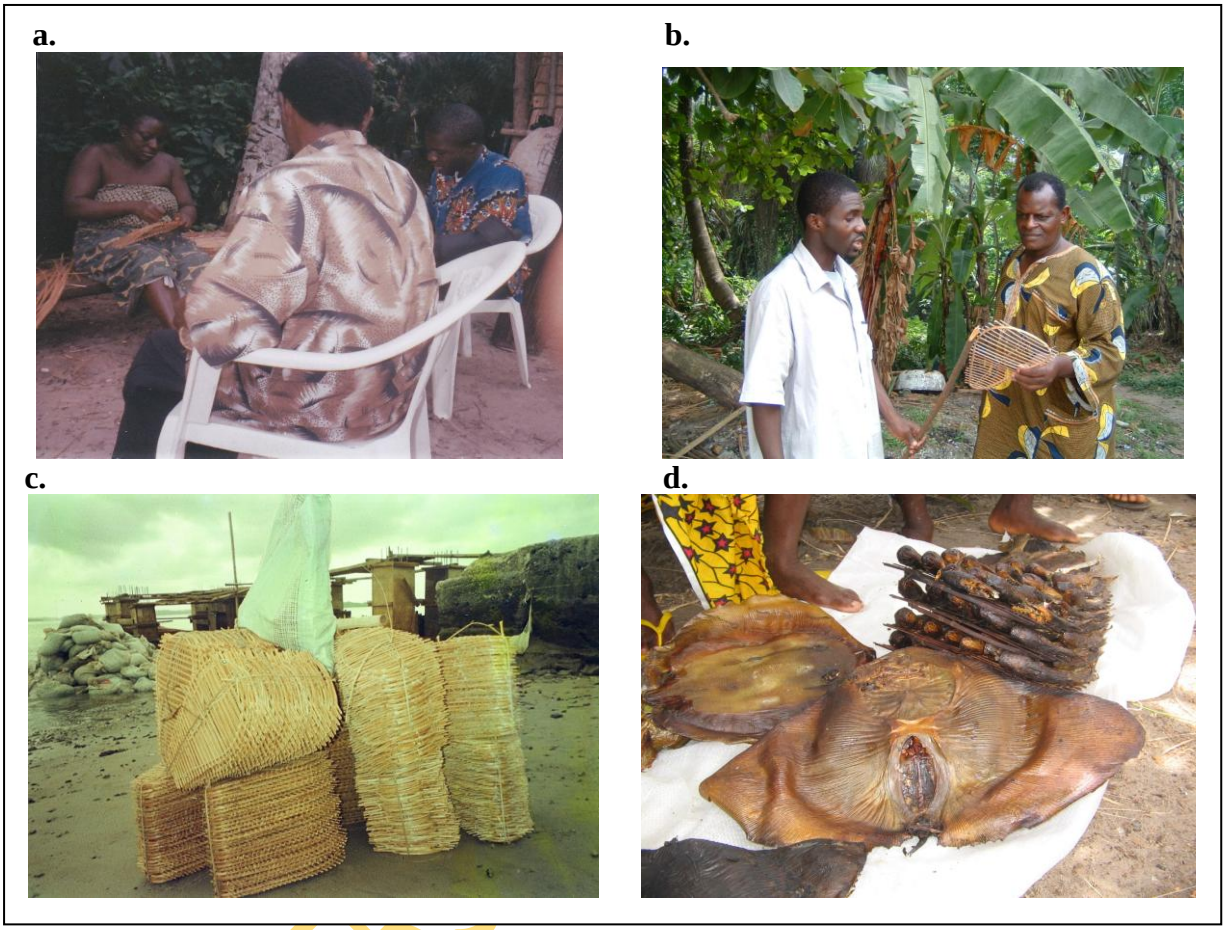

Plate 4.12: Fish card weaving in study area (a) woman weaving fishcards while researcher administers questionnaire with field assistant in Buoama community, (b)Researcher and a community leader in Fishtown taking a closer look at a fishcard design, (c) Fishcard stockpiled transport to Yenagoa and (d) Fish smoked on fishcard displayed for sale in Fishtown community

a.

b.

c.

d.

e.

f.

Plate 4.13: Fishing activities in the study area (a) A fisherman mending his net in Fishtown, (b) Fishing boats long side along Kongho water side are shown, (c) Fisher folks during fishing on the Nun river, (d) A fisherman with his catch while household members welcome him, (e) Devil ray (*manta birostris*) caught by a fisherman in Itohonoama community and (f) small shark caught from Akassa waters in Minamgba community

Plate 4.14: Livelihoods from fishing in the study area (a) Fishermen and women preparing their fishing gears for deepsea fishing in Opu Okumbiri community, (b) Leather back sea turtle caught by a fisher man in Sangana community, (c) prawn from Akassa water displayed, (d) Crayfish displayed in baskets in Itohonoama before drying with heat while researcher observes the catch, (e) Researcher holding a local fish trap in Ereweibie community and (f) Researcher poses with a local fish trap designed by a migrant fisherman in Oginibiri community

a.

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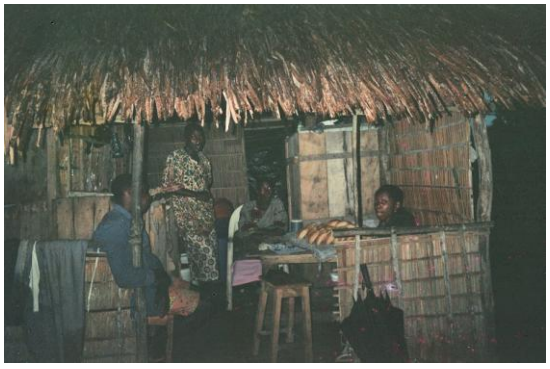

Plate 4.15: Business activities in the study area (a) Household business kiosk in Fishtown community, (b) Provision store in Buoama community, (c) One-storey market boat arriving with traders and goods from Portharcourt, (d) Researcher interviewing a baker in Buoama community and (e) Bread baked and displayed for sale in Fishtown community

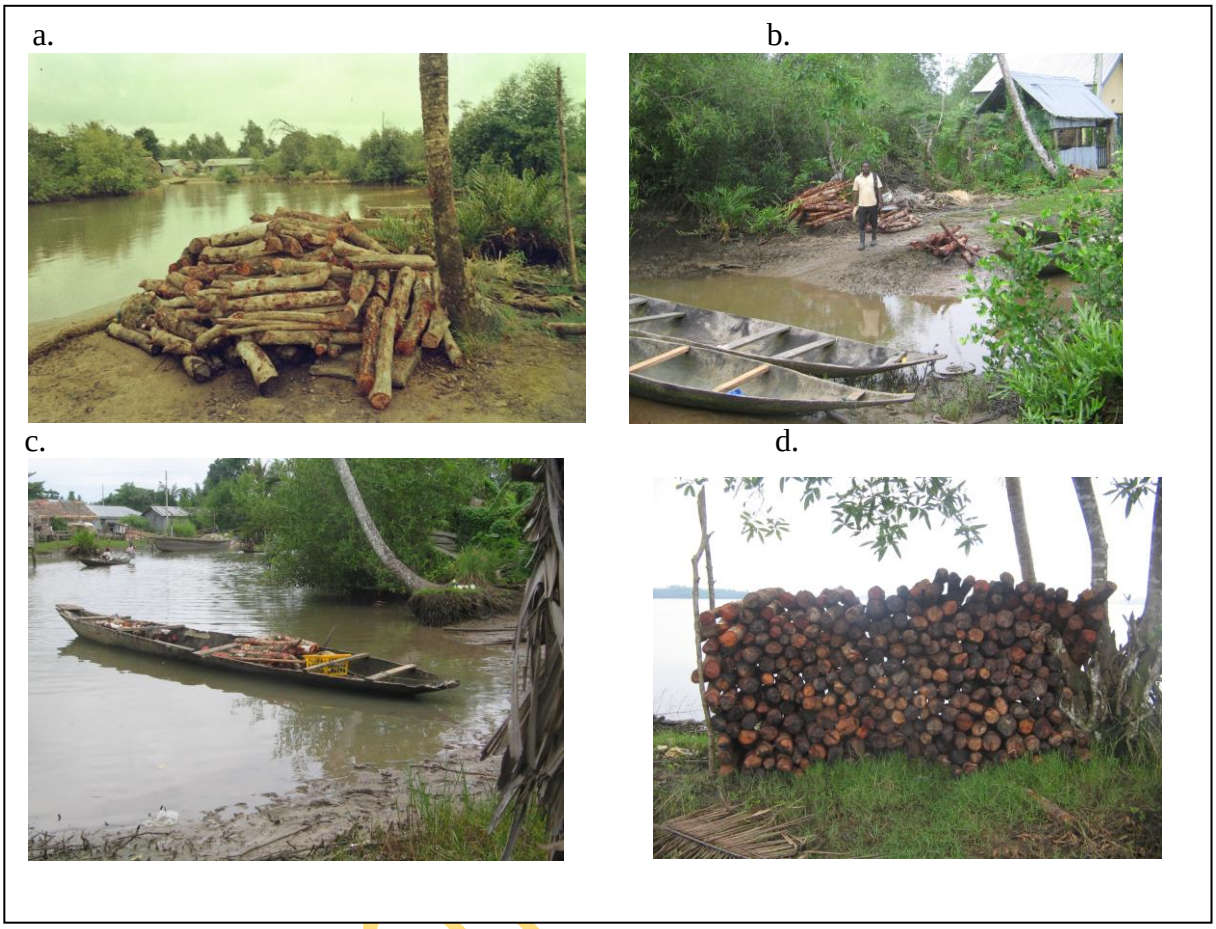

Plate 4.16: Fuelwood collection in the study area (a) Fuelwood stockpiled on Itohonoama creek, (b) Researcher observes fuelwood fetchers route by boat through the creek in Minibeleu community, (c) Fuelwood fetched from the mangroves transported by canoe and (d) Fuelwood arranged for sales in Ogbokiri community

a.

b.

c.

d.

e.

Plate 4.17: Thatch weaving and broom making in the study area (a) Thatch weaved by a woman while researcher administers questionnaire in Bekekiri community, (b) Weaved thatch stockpiled in Ereweibie community (c) Thatch used for roofing houses in Otuo community (d) Thatch used as material for walls of a living room in Minibeleu community (e) Young girl making brooms in Ereweibie community

4.2.3. Livelihood pattern in the study area

According to respondents' livelihood pattern one hundred and forty five respondents (15.26%) said their livelihood activities are seasonal while five hundred and ten (53.68%) respondent's livelihoods are not seasonal (Table 4.9). This may be due to the fact that several rural people in the area combined various activities to meet their needs; some of these activities are seasonal. Warner (2000) observed that a significant proportion of forest products are consumed by those who collect them, with the amount collected varying according to seasonality, access and options (alternatives).

4.2.4. Contribution of forest resources to household annual income in the study area

Three hundred and thirty nine respondents (35.68%) said forest resources contribute immensely to their annual income while six hundred and eleven respondents (64.32%) said forest resources do not contribute immensely to their annual income as shown in (Table 4.10).

4.2.5. Existence of forest based associations in the study area

Table 4.10 shows that nine hundred and forty nine respondents (99.89%) said they were no forest based associations in the study areas, while only one respondent (0.11%) said a forest based association exists.

Table 4.9: Respondents livelihood pattern in the study area

Livelihood pattern	Frequency	Percentage
Seasonal	145	15.26
Not Seasonal	510	53.68

Source: Field survey, 2008

Table 4.10: Respondents view on contribution of forest resources to household annual income and the existence of forest based associations in the study area

Responses	Frequency	Percentage
Contribution of forest resources		
Contributes	339	35.68
Does not Contribute Immensely	611	64.32
Existence of forest based associations		
Exist	1	0.11
Does Not exist	949	99.89
Total	**950**	**100.0**

Source: Field survey, 2008

4.2.6. Effect of respondents demographic characteristics on contribution of forest resources to household annual income in the study area

The chi square test showed that the location in terms of community, nativity (being an indigene or non indigene), sex, as marital status, educational status, length of stay in the community and access to land affects the contribution of forest resources to household annual income (Table, 4.11).

4.2.6.1 Analysis of variance for community effects on household total income and household total expenditure in the study area

Tables 4.12 and 4.13 show analysis of variance for community effects on household total income and household total expenditure respectively. According to Table 4.12, there was a significant difference in total income across communities from 2003- 2007; ($P<0.05$). This shows that total income generated from these livelihood activities vary from one community to the other across the study area. In the same vein, from Table 4.13, there was a significant difference in total household annual expenditure across communities from 2003- 2007; ($P<0.05$). This shows that total expenditures from these livelihood activities vary from one community to the other across the study area.

Table 4.11: Results of chi Square test of respondents' demographic characteristics on contribution of forest resources to household annual income

Variables	df	Chi square Cal	Chi Square Tab	Remark
Sex	1	42.373	3.841	Sig
Age	2	2.445	5.991	Sig
Marital Status	3	2.906	7.815	Sig
Educational Status	3	3.688	7.815	Sig
Nativity	1	0.1159	3.841	Sig
Length of stay	2	2.550	5.991	Sig
Location	18	65.25342	28.869	Sig
Access to land	1	0.006	3.841	Sig

*Sig. means it is significant at 95 % level of probability

Source: Field survey, 2008

Table 4.12: Analysis of variance for community effect on household total income (TI) in five years

Total income per year	df	MS	F	P-level	Remark
TI (2007)					
Community	18	216408E6	8.85032	0.000	Sig
Error	931	243564E5			
TI (2006)					
Community	18	217186E5	9.059218	0.000	Sig
Error	931	239740E5			
TI (2005)					
Community	18	216378E6	9.119041	0.000	Sig
Error	931	237281E5			
TI (2004)					
Community	18	252301E5	5.029950	0.000	Sig
Error	931	501599E5			
TI (2003)					
Community	18	217021E6	9.704136	0.000	Sig
Error	931	223638E5			

Source: Field survey, 2008

Table 4.13: Analysis of variance for community effect on household total expenditure (TE) in five years

Total expenditure per year	df	MS	F	P-level	Remark
TE (2007)					
Community	18	120669E6	8.758125	0.000	Sig
Error	931	137780E5			
TE (2006)					
Community	18	123874E6	7.822359	0.000	Sig
Error	931	158360E5			
TE (2005)					
Community	18	156144E6	12.32800	0.000	Sig
Error	931	126659E5			
TE (2004)					
Community	18	198821E6	15.17485	0.000	Sig
Error	931	131020E5			
TE (2003)					
Community	18	231573E6	18.09947	0.000	Sig
Error	931	127944E5			

Source: Field survey, 2008

4.2.6.2. Annual profit index in the study area

Profit index across communities for a five year period (2003- 2007) are shown in Figures 4.1a, 4.1b and 4.1c. From Figure 4.1a , profit index for Buoama community was fairly stable within the five years. However, Minibie and Itohonoama communities showed a constant positive increase in profit index from 2003 to 2007, while Appranbie community had a showed a sharp decline in profit index between 2005 and 2006. According to figure 4.1b, Otuo community peaked between 2003 and 2004 but experienced a very sharp drop in profit index in 2005. Sangana community on the other hand had a very stable ans steady increase in profit index from 2003- 2007. Ogbokiri, Kotikiri and Otuo showed the lowest profit index values. From figure 4.1c, Okunbiribeleu community showed a distinct marked increase in profit index from 2003- 2007. On the other hand, Fishtown, Kolobie,Hununu, Oginibiri and Opu-Okumbiri communities showed a gradual increase in annual profit index from 2003 – 2007.

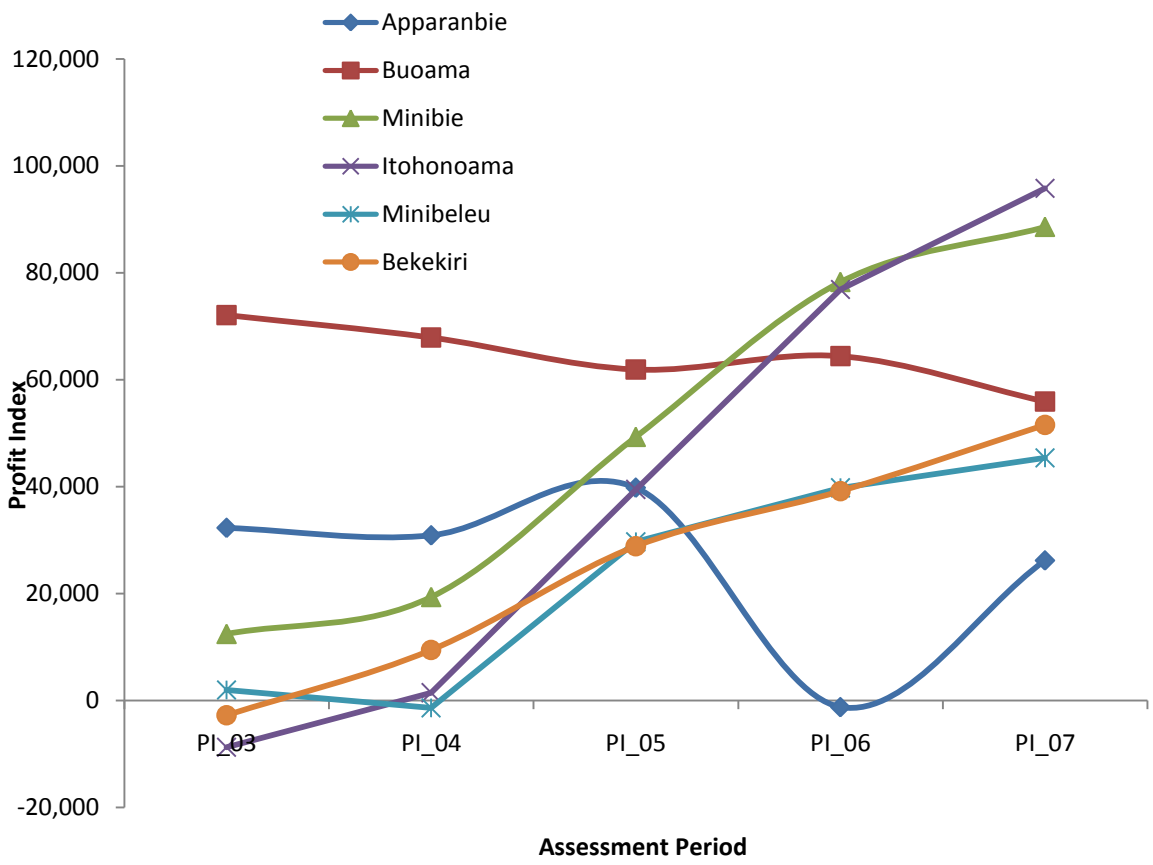

Fig. 4.1a : Profit index values between 2003 and 2007 for Inland communities.

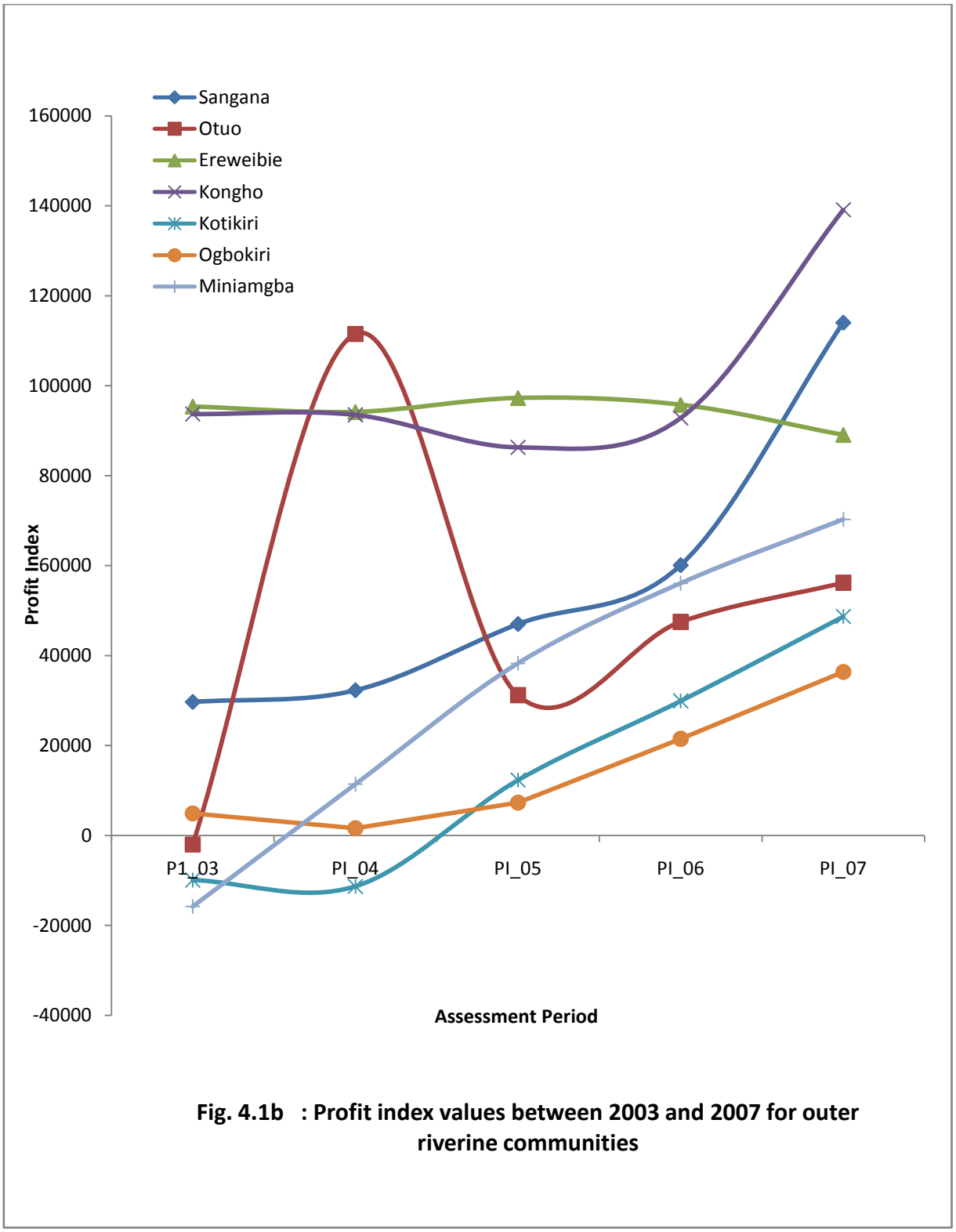

Fig. 4.1b : Profit index values between 2003 and 2007 for outer riverine communities

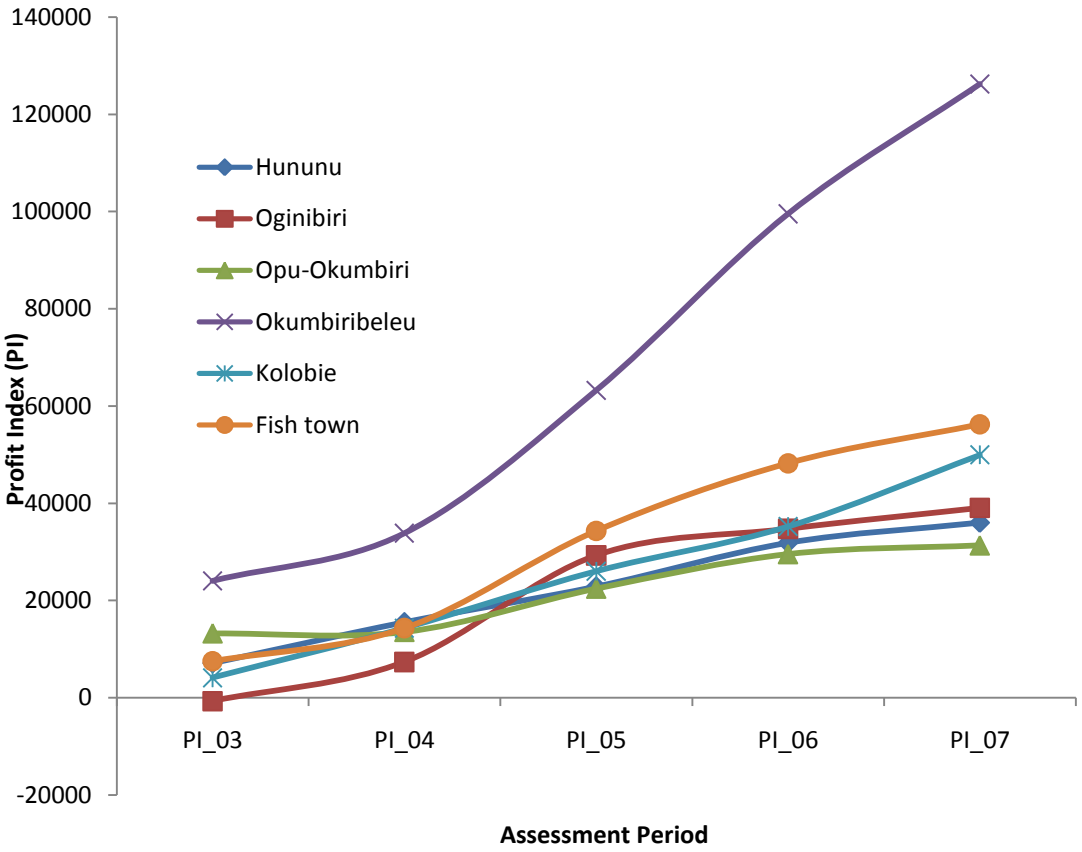

Fig. 4.1c : Profit index values between 2003 and 2007 for different communities along the coast line

4.2.6.3. Analysis of variance for community effects on profit index

Profit Index was significantly different across the study communities in a five year period (Table 4.14). P= 0.000, 0.000, 0.000, 0.1239 and 0.000 for year 2003, 2004, 2005, 2006 and 2007 respectively.

4.2.6.4. Benefit-cost ratio for selected livelihood activities in the study area

Result of Benefit-cost analysis for selected household livelihood activities in five years showed that all the livelihood activities were viable (BCR ≥1) (Table 4.15). The highest BCR value was 4.98 for basket weaving, while the lowest value was 2.38 for timber harvesting.

4.2.6.5. Analysis of return on investment for selected livelihoods in the study area

Table 4.16 shows the values of analysis of Return on Investment for the selected livelihood activities; all activities are profitable because they have positive values. The two highest values of ROI for selected livelihood activities were 4.45 (Basket weaving) and 4.33 (fishcard weaving), while the two lowest values of ROI were 2.20 (logging) and 1.6 (timber harvesting).

4.2.6.6. Average monthly income from respondents' livelihood activities

The average monthly income from respondents livelihoods in the study area are presented in Table 4.17. Livelihood activities with the three highest annual monthly income were speed boat driving (₦38,952.38±4253.63), canoe carving (₦36,823.67±3283.09) and logging (₦31,075.25±2181.71) respectively. Speed boat driving is shown in Plate 4.18.

Table 4.14: Analysis of variance for annual profit index (PI)

Profit Index Per year	df	MS	F	P-level	Remark
PI(2007)					
Community	18	316986E5	8.455094	0.000	Sig
Error	931	374905E4			
PI (2006)					
Community	18	300246E5	5.789717	0.000	Sig
Error	931	518584E4			
PI (2005)					
Community	18	268767E5	4.758283	0.000	Sig
Error	931	564840E4			
PI (2004)					
Community	18	636911E5	1.910355	0.01239	Sig
Error	931	333400E5			
PI (2003)					
Community	18	548000E5	8.019994	0.000	Sig
Error	931	683292E4			

*Sig. means significant at 95% level of significance

Source: Field survey, 2008

Table 4.15: Benefit-cost analysis for selected livelihoods in the study area for five years

Livelihoods	Discounted benefit	Discounted cost	B/C
Basket weaving	422872.7	84751.4	4.989567
Fishcard weaving	338298.2	69342.05	4.878687
Logging	880984.9	300482.2	2.931903
Timber harvesting	2114364	8860374	2.386314
Fuelwood collection	6343091	130979.4	4.842815
Wine tapping	352394	80899.06	4.355971

***Discount rate adopted is 14.0% CBN rate for agricultural investments**

Source: Field survey, 2008

Table 4.16: Analysis of return on investment of selected livelihoods for 2007 in the study area

Livelihoods	Total Revenue	Total Cost	ROI
Basket weaving	120000	22000	4.45
Fishcard weaving	96000	18000	4.33
Fuelwood collection	180000	34000	4.29
Logging	250000	78000	2.20
Timber harvesting	600000	230000	1.6
Wine tapping	100000	21000	3.76

*This was calculated specifically for year 2007 values

Source: Field survey, 2008

Table 4.17: Average monthly income from household livelihoods in the study area

Livelihood activity	Average monthly income in Naira(₦)
Carpentry	18859.65
Timber harvesting	27525.25
Saw milling	22404.76
Wine tapping	5728.07
Farming	7539.68
Logging/ Chain saw rentals	31075.25
Canoe carving	36823.67
Basket weaving	12693.33
Fish card weaving	10478.26
Hunting	5447.36
Snail collection	4462.12
Traditional medicine	20694.44
Fishing	22703.92
Trading	20555.21
Civil service	21764.10
Bricklaying/ builder	24801.58
Tailoring/ Dressmaking	9880.95
Hair dressing	16400
Engine fixing	11666.67
Speedboat driving	38952.38
Oyster picking	6041.67
Periwinkle picking	4463.54
Motorbike riding	15621.52
Fuelwood collection	15925.92
Wood carving	18125
Mat weaving	4777.7
Hat weaving	3750
Thatch weaving	9190.48

Source: Field survey, 2008

Plate 4.18: Speed boat driver conveying passengers from Akassa to Yenagoa

4.3. Understanding poverty and wellbeing in the study area

4.3.1. Composition of households in the study area

There were nine respondents without adult males in their households (0.95%), nine hundred and eighteen respondents (96.63%) had between one and three adult males while twenty three respondents had between four to six adult males (2.42%). Also, six respondents had no adult females (0.63%), nine hundred and twenty three (97.16%) had between one and three adult females, seventeen respondents had between four and six adult females while two respondents had between ten and eighteen adult females (0.21%). Twenty one respondents had no children dwelling within their household (2.21%), three hundred and forty five respondents had between one and three children (36.31%), five hundred and thirty seven respondents had between four and six children (56.74%), while forty five respondents had between seven and ten children (4.74%) within their households (Table 4.18).

Table 4.18: Analysis of respondents household composition in the study area

Number of adult males in households		
No. of Males	Frequency	Percentage
None	9	0.95
1-3	918	96.63
4-6	23	2.42
Total	**950**	**100.00**
Number of adult females in households		
No. of Females	Frequency	Percentage
None	6	0.63
1-3	923	97.16
4-6	17	1.79
10-18	2	0.21
Total	**950**	**100.00**
Number of children in households		
No of Children	Frequency	Percentage
None	21	2.21
1-3	345	36.31
4-6	537	56.74
7-10	45	4.74
Total	**950**	**100.00**

Source: Field survey, 2008

4.3.2. Types and quality of household buildings in the study area

From Table 4.19, most household buildings in the study area were room and parlour representing 94.95% i.e. nine hundred and two respondents; forty two respondents (4.42%) building were flats having several rooms while six respondents buildings (0.63%) were single room types. In terms of quality of building construction, four hundred and eighty respondents built their houses with wood and thatch roofing (50.52%); eight respondents with mud and thatch roofing (0.83%); two hundred and seventy six with zinc, wood and zinc roofing (29.05%) while one hundred and eighty six respondents (19.60%) with blocks having zinc, aluminium or asbestos roofs. Plate 4.19 shows household buildings in the study area.

Table 4.19: Types and quality of household building constructions in the study area types of household buildings

	Frequency	Percentage
Hut	0	0
Single rooms	6	0.63
Room and Parlour	902	94.95
Flats	42	4.42
Total	950	100.00
Quality of Household Building Constructions		
Wood and thatch roofing	480	50.52
Mud and thatch roofing	8	0.83
Mud and zinc roofing	0	0
Zinc, wood and zinc roofing	276	29.05
Block with zinc/aluminium/asbestos	186	19.60
Total	**950**	**100.0**

Source: Field survey, 2008

Plate 4.19: Types and quality of household building constructions in the study area (a) & (b)Zinc house with zinc roofs in Oginibiri and Fishtown communities respectively, (c) Thatch buildings in Otuo community, (d)Researcher holding onto a thatch and wood building under construction in Buoama community, (e) Researcher with respondent in a block building in Ogbokiri community and (f) Block bulding in Buoama community while field assistant interviews female household head

4.3.3. Respondents access to land and type of access to land

Three hundred and sixty six (38.53%) respondents said they have access to land while five hundred and eighty four (61.47%) respondents do not have access to land. Out of the three hundred and sixty six respondents with access to land, two (0.21%) were by lease, four by purchase of land (0.42%) while three hundred and sixty (37.89%) inherited the land (Table 4.20).

4.3.4. Respondents ownership of selected household assets

According to ownership of selected household assets (Table 4.21), two respondents had a bicycle (0.21%), fifty four respondents (5.68%) had a motor bike, nine hundred and twenty five respondents (97.36%) owned a house, sixteen respondents (1.68%) had extra land, seven respondents (0.73%) had a household business, four respondents (0.42%) had bank savings, five hundred respondents (52.63%) had wooden boats while seventeen respondents (1.78%) had speed boats. Selected household assets are shown in Plate 4.20.

Table 4.20: Respondents access to land and type of access to land in the study area

Access to Land	Frequency	Percentage
Yes	366	38.53
No	584	61.47
Total	950	100.0
Type of Access		
Lease	2	0.21
Purchase	4	0.42
Inheritance	360	37.89

Source: Field survey, 2008

Table 4.21: Respondents ownership of selected household assets

Asset	Frequency	Percentage
Bicycle	2	0.21
Motorbike	54	5.68
Building	925	97.36
Extra land	16	1.68
Household Business	7	0.73
Share Certificate	0	0
Bank Savings	4	0.42
Wooden boats	500	52.63
Speed boats	17	1.78

Source: Field survey, 2008

a.

b.

c.

d.

e.

f.

Plate 4.20: Some household assets in the study area (a) Fishing boats, engine and nets in a fishing camp, (b) women leaning on a motorbike owned by household, (c) shrimp fishing net loaded in a boat in Okumbiribeleu creek, (d) household head mending his long line fishing net, (e) Speedboats conveying people at the Kongho jetty and (f) One storey market boat at Kongho jetty set for trip to Port Harcourt

4.3.5. Household toilet facilities in the study area

Most of the households, nine hundred and forty three respondents (99.26%) in the study area had no toilet facilities within their households. However, they use toilets built on the water body (Plate 4.21); this is usually washed into the river when there is high tide. Seven respondents (0.74%) use a water system facility within their household (Table 4.22).

4.3.6.1. Household source of water and distance to source of water in the study area

Six hundred and fifty one respondents (68.53%) fetch water from dug out ponds (Plate 4.22) for domestic use; two hundred and ninety nine respondents (31.47%) fetch water from hand dug wells. Also, one hundred and thirty two respondents (13.89%) distance to source of water was between (0.002 to 0.02 km); three hundred and seventy six respondents (39.58%) cover between (0.025 to 0.055km); two hundred and sixty respondents (27.36%) cover between (0.06-0.10km); one hundred and four respondents (10.94%) cover between (0.15 to 0.50km) while seventy eight (8.21%) cover between 0.55 to 0.75km daily to fetch water (Table 4.23).

Plate 4.21: Toilet built directly on water body in Sangana community

Table 4.22: Type of household toilet facilities in the study area

Type of Toilet	Frequency	Percentage
Toilet on water body	943	99.26
Bucket latrine	0	0
Pit toilet	0	0
Water system	7	0.74
Total	**950**	**100.00**

Source: Field survey, 2008

a. b.

Plate 4.22: Sources of household water in the study area (a) Dug out pond in Kongho serves as drinking water and (b) Researcher drawing water from a well in Apparanbie community

Table 4.23: Household source of water and distance to source of water in the study area

Sources of Water	Frequency	Percentages
Pond	651	68.53
Stream	0	0
Well	299	31.47
Borehole	0	0
Total	**950**	**100.0**
Distance to source of water in Km		
0.002-0.02	132	13.89
0.025- 0.055	376	39.58
0.06-0.10	260	27.36
0.15-0.50	104	10.94
0.55-0.75	78	8.21
Total	**950**	**100.0**

*Distance of households to source of water were gotten by simple estimation

Source: Field survey, 2008

4.3.6.2. Respondents preferred point of call when sick

One hundred and eleven respondents (11.68%) preferred to visit itinerant drug sellers when sick, one hundred and ninety seven respondents (39.58%) preferred native doctors, two hundred and fifty one (26.4%) respondents preferred to visit the dispensary while three hundred and ninety one (41.16%) preferred to visit the health centre (Table 4.24).

4.3.6.3. Respondents estimated distance to nearest health facility in the study area

In terms of distance of households to the nearest health facility, one hundred and thirty three respondents (14.0%) travel a distance between (0.02-0.15km), one hundred and sixty respondents (17.5%) travel between (0.17-0.35km), one hundred and fifty seven respondents (16.5%) travel between (0.40-0.55km), one hundred and forty one (14.84%) respondents travel between (0.60-0.80km), fifty respondents(5.6%) travel between (0.85-1.0km),one hundred respondents each (10.52%) travel between (1.50-2.0km), (2.5-3km) and (3.1-3.5km) (Table 4.25).

Table 4.24: Respondents preferred point of call when sick

Point of call	Frequency	Percentage
Itinerant drug seller	111	11.68
Native doctor	197	39.58
Dispensary	251	26.42
Clinic (Health centre)	391	41.16
Total	**950**	**100.0**

Source: Field survey, 2008

Table 4.25: Respondents estimated distance to nearest health facility in the study area

Distance (Km)	Frequency	Percentage
0.02-0.15	133	14.0
0.17-0.35	166	17.5
0.40-0.55	157	16.5
0.60-0.80	141	14.84
0.85- 1.0	53	5.6
1.50-2.0	100	10.52
2.5-3	100	10.52
3.1-3.5	100	10.52
Total	**950**	**100.0**

Source: Field survey, 2008

4.3.7.1. Household sources of energy for cooking, estimated fuelwood collection time and number of times households eat in a day

Nine hundred and forty five respondents (99.47%) use fuelwood as source of energy (Plate 4.23) for cooking while nine hundred and forty eight respondents (99.80%) use kerosene as source of energy for cooking In terms of time spent to collect fuelwood, four hundred and seventy one respondents (49.57%) spend between half an hour to two hours to collect fuelwood, one hundred and eighty four respondents (19.68%) spend between three to five hours to collect fuelwood while twelve respondents (1.26%) spend between six to eight hours in collecting fuelwood. Number of times households eat in a day showed that, nine hundred and forty two respondents (99.15%) said they eat three times daily, seven (0.74%) respondents said they eat two times daily, while one respondent (0.11%) said they eat once daily (Table 4.26).

a.

b.

c.

d.

Plate 4.23: Fuelwood as source of energy for cooking in the study area (a) Fuelwood arranged in a household compound, (b) Fuelwood used for drying crayfish in Itohono-ama, (c) A fire place with burning fuelwood in Apparanbie community and (d) Fuelwood gathered beside a household kitchen in Oginibiri

Table 4.26: Household sources of energy for cooking, estimated fuelwood collection time and number of times households eat in a day

Source of Energy	Frequency	Percentage
Fuelwood	945	99.47
Sawdust	0	0.00
Kerosene	948	99.80
Electricity	0	0.00
Gas	0	0.00
Estimated fuelwood collection time in the study area		
Time (Hours)		
0.5-2	471	49.57
3-5	184	19.68
6-8	12	1.26
Number of times households eat daily		
Responses		
2	7	0.74
3	942	99.15
4	1	0.11
Total	**950**	**100.00**

Source: Field survey, 2008

4.3.7.2. Gender division of labour for household fuelwood collection in the study area

In terms of gender division of labour, two hundred and eighty one respondents (29.57%) said that adult males collect household fuelwood, three hundred and forty one respondents (35.89%) said adult females collect household fuelwood, ninety respondents said children alone collect household fuelwood, forty seven respondents (4.94%) said male and female adults collect fuelwood, while five respondents (0.55%) said it is a collective effort of household members (Table 4.27). Plate 4.24 shows collection of fuelwood by male and female members of a household.

Table 4.27: Gender division of labour for household fuelwood collection in the study area

Fuelwood collector	Frequency	Percentages
Adult male	281	29.57
Adult female	341	35.89
Children	90	9.47
Male and female adult	47	4.94
Collective efforts of HH members	5	0.55

Source: Field survey, 2008

a. b.

Plate 4.24: Fuelwood collection by Household members (a) fuelwood collected by adult females in Ogbokiri community (b) fuelwood collected by young males in Ogbokiri community

4.3.8. Multidimensional poverty index and relative contribution of dimensions to MPI in the study area

Tables 4.28 and 4.29 show the multidimensional poverty index (MPI) and relative contribution of dimensions to the MPI in the study area and presents all possible outcomes depending on the different cutoff values. At poverty cutoff K1, (households with one or more deprivations), the incidence of poverty H_0 (poverty head count) is 99.7%, MPI is 45.0%, the poverty intensity (M_1) is 24.7% while the average deprivation among the poor ($M_{2)}$. The values at cut off K1 will be too high for the study area; If the cutoff is set at K2, (households with two or more deprivations), about 55.5% of the households will be identified as poor (H_0), MPI will be 33.9%, M_1 will be 18.0% and M_2 11.6% . At cut off K4, H_0 becomes 4.2%, the MPI is 4.2%, M_1 is 2.4% while the M_2 is 1.7%. Also in terms of contribution of Dimensions to the MPI in the study area, at cut-off K1 lack of household assets contributed 55.20% as compared to Health and nutrition (18.07%), quality of life (17.31%) and Education (9.82%). In terms of contributions to poverty intensity in the study area, at K1 lack of household assets contributed (60.53%) as compared to health and nutrition (14.13%), quality of life (7.97%) and education (17.17%). Similarly at cutoff K2, lack of household assets contributed (40.70%) to the MPI as compared to health and nutrition (23.88%), quality of life (22.95%) and education (12.48%) in the study area. In terms of contributions of dimensions to poverty intensity, lack of household assets accounted for 45.92%) against health and nutrition (19.60%), education (23.55%) and quality of life (10.93%). At cut off K4, the level of education, health and nutrition, lack of household asset and quality of life have the same impact on MPI (25%), however in terms of contribution of these dimensions to the poverty intensity, education accounts for 43.76% as against health and nutrition (20.42%), lack of household asset (24.34%) and quality of life (11.49%).

Table 4.28: Multidimensional poverty index in the study area

Poverty Cut off (K)	Multidimensional Headcount H_O	Multidimensional Poverty Index M_O	Intensity of Deprivation M_1	Average Deprivation among the poor M_2
1	99.7	45.0	24.7	15.9
2	55.5	33.9	18.0	11.6
3	20.6	16.5	8.9	5.9
4	4.2	4.2	2.4	1.7

Source: Field survey, 2008

Table 4.29: Relative contribution of dimensions to multidimensional poverty index in the study area

Poverty Cut off (K)				
K1	**Dimensions**	**M_O**	**M_1**	**M_2**
	Education	9.42	17.17	26.67
	Health and Nutrition	18.07	14.13	10.88
	Household Asset	55.20	60.53	59.28
	Quality of Life	17.31	7.97	3.18
K2	Education	12.48	23.55	36.41
	Health and Nutrition	23.88	19.60	14.82
	Household Asset	40.70	45.92	44.43
	Quality of Life	22.95	10.93	4.34
K3	Education	15.61	29.08	43.76
	Health and Nutrition	28.98	24.63	19.00
	Household Asset	31.21	34.87	32.77
	Quality of Life	24.20	11.42	4.47
K4	Education	25.00	43.76	60.98
	Health and Nutrition	25.00	20.42	14.91
	Household Asset	25.00	24.34	19.53
	Quality of Life	25.00	11.49	4.57

Source: Field survey, 2008

4.3.8.1. Gender dimensions of MPI in the study area

According to Table 4.30, at cut off K1, among the female headed households (FHHs) the head count H_o was (99.2%) and their relative contribution (RC) to H_o was (26.8%), the M_o among female headed households was (47.7%) and the RC to M_o was (28.5%), the M_1 among female headed households was (26.8%) and the RC to M_1 was (29.3%). However among the male headed households (MHHs) the head count H_o was (99.9%) and their RC to M_o was (73.2%), the M_o was (44.0%) and their RC to M_o was (71.5%), the M_1 was (23.9%) and their RC to M_1 was (70.7%). At cut-off K2 the H_o for FHHs was (61.7%) and their RC to H_o was (30.0%), the M_o was (38.3%) and their RC to M_o was (30.4%), the M_1 was (21.0%) and their RC was (31.5%). Among MHHs H_o was (53.2%) and their RC was (70.0%), M_o was (32.3%) and their RC was (69.6%), M_1 was (16.9%) and their RC to M_1 was (68.5%). At cut off K4, H_o and M_o among FHHs were (3.9%) and their RC to H_o and M_o were (25.0%), M_1 was (2.4%) and their RC to M_1 was (27.3%). Similarly, H_o and M_o among MHHs was (4.3%) and their RC to H_o and M_o was (75.0%) each, M_1 was 2.4% and their RC to M_1 was (72.7%).

Table 4.30: Gender dimensions of multidimensional poverty and the relative contribution of gender dimensions to MPI in the study area

	Female				Male			
Poverty cut off (K)	**H_O**	**M_O**	**M_1**	**M_2**	**H_O**	**M_O**	**M_1**	**M_2**
K1	99.2**(26.8)**	47.7**(28.5)**	26.8**(29.3)**	17.7**(30)**	99.9**(73.2)**	44.0**(71.5)**	23.9**(70.7)**	15.2**(70.0)**
K2	61.7 (**30.0**)	38.3(**30.4**)	21.0(**31.5**)	13.9(**32.3**)	53.2(**70.0**)	32.3(**69.6**)	16.9(**68.5**)	10.8(**67.7**)
K3	25.8(**33.7**)	20.3(**33.1**)	11.6(**35.2**)	8.0(**36.7**)	18.7(**66.3**)	15.1(**66.9**)	7.9(**64.8**)	5.1(**63.3**)
K4	3.9(**25.0**)	3.9(**25.0**)	2.4(**27.3**)	1.8(**28.4**)	4.3(**75.0**)	4.3(**75.0**)	2.4(**72.7**)	1.7(**71.6**)

*figures in bracket represent the relative contributions of gender dimensions to MPI

Source: Field survey, 2008

4.3.8.2. Effects of household demographic characteristics on multidimensional poverty index

Table 4.31 shows the result of Chi square test of independence on selected household demographic characteristics and MPI in the study areas. The test indicates that marital status, education, household size, access to land and point of call when sick ($p< 0.05$) impacts on MPI, while age, length of stay in the community, willingness to participate in AFWP and contribution of FR to HAI had no significant relationship on MPI in the study area; $p>0.05$.

Table 4.31: Effect of household demographic characteristics on multidimensional poverty index in the study area

Variables	df	Chi-square	P-value	Remark
Sex	1	0.2415706	0.62308	NS
Age	48	42.04343	0.71435	NS
Marital Status	3	9.927452	0.01920	sig
Educational Status	3	164.7861	0.000	sig
Household size	14	23.95770	0.04638	sig
Length of stay	2	2.893119	0.23538	NS
Access to land	1	6.337919	0.01182	sig
Willingness to Participate in AFWP	1	0.0019005	0.96523	NS
Contribution of Forest Resources to Household Annual Income	1	.0002205	0.98815	NS
Point of call when sick	4	825.0507	0.0000	sig

*NS means not significant while sig means it is significant both at 95% level of probability

Source: Field survey, 2008

4.4. Factors militating against sustainable livelihoods in the study area

Respondents identified several factors that militate against sustainable livelihoods in the study areas, fourteen respondents (1.47%) said poor health facilities militate against their livelihoods, fifty seven respondents (6.0%) said low income militate against sustainable livelihoods, eighty four respondents (8.84%) said fast disappearing forest and wildlife resources, one hundred and thirty five respondents (15.88%) said it was due to coastal erosion problems (Plate 4.25), seventy three respondents (7.68%) said high cost of water transportation militate against their livelihoods, fifty one respondents (5.36%) said it was due to poor market access, twenty respondents (2.10%) said it was due to high investment costs, seventy four (7.78%) respondents said it was due to poor accessibility to forest resources, five (0.52%) said it was due to very strict forest regulations, one respondent (0.11%) said it was due to communal clashes, seventy two respondents (7.58%) said it was due to regular oil spills (Plate 4.26) in the area. One respondent each said it was due to a combination of one or more factors (Table 4.32).

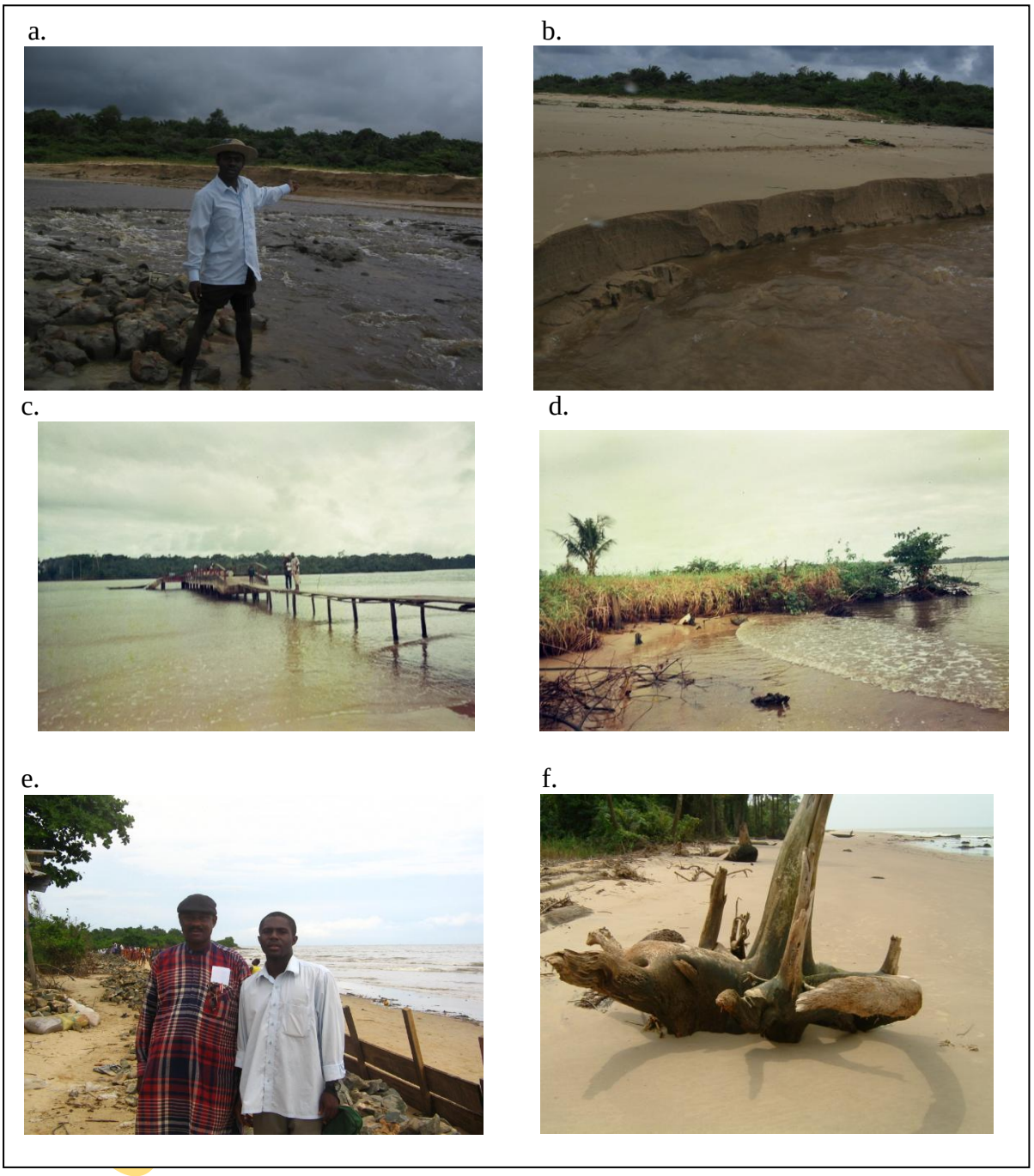

Plate 4.25: Coastal erosion in the study area (a) Researcher showing the impact of coastal erosion in Opu Okumbiri community, (b) A closer view of the impact of waves in washing-off land, (c) Location of concrete jetty built before Erosion Impact in Fishtown community, (d) Wash-off of land by erosion in Fishtown, (e) Local embarkment against coastal erosion in Sangana community and (f) Debris of wood indicating an initially forested area along Oginibiri seashore

a.

b.

c.

d.

e.

f.

Plate 4.26: Oil spillage in the study area (a) Oil film on the Nun river after a oil spillage, (b) Thick crude oil scooped from the River Nun, (c) Researcher observes crude oil on leaves of mangrove, (d) Dark and thick crude oil found on the river bank after a spill from oil pipeline, (e) Researcher scooping oil from the mud flat while children fill their containers with crude oil and (f) Damage to fishing gears and nets of fisher folks due to oil spillage in the study area

Table 4.32: Factors militating against household livelihoods in the study area

Militating Factors	Frequency	Percentage
Poor Health Facilities	14	1.47
Low income from activity	57	6.0
Fast disappearing Forest and wildlife Resources	84	8.84
Coastal Erosion Problem	135	14.21
High Cost of water transportation	73	7.68
Poor market access	51	5.36
High Investment cost	20	2.10
Poor accessibility to forest resources	74	7.78
Very strict Forest Regulations	5	0.52
Communal clashes/ Conflicts	1	0.11
Regular Oil spillage	72	7.57
Poor health facilities and low income from activity	1	0.11
Low income from activity and fast disappearing forest and wildlife resources	1	0.11
Low income from activity and coastal erosion	1	0.11
Low income from activity and high cost of water transportation	1	0.11
Fast disappearing forest and wildlife resources and poor accessibility to forest and wildlife resources	1	0.11
Coastal erosion problem and high cost of water transportation	1	0.11
High cost of water transportation and poor market access	1	0.11

High investment cost and poor accessibility to forest resources	1	0.11
Poor accessibility to forest resources and very strict forest policy	1	0.11
Poor health facilities, low income from activity, fast disappearing forest and wildlife resources and coastal erosion	1	0.11
Fast disappearing forest and wildlife resources and regular oil spillage	1	0.11
Poor accessibility to forest resources and regular oil spillage	1	0.11
Low income from activity, fast disappearing forest and wildlife resources and high cost of water transportation	1	0.11
Poor market access, high investment cost and poor accessibility to forest resources	1	0.11
Poor accessibility to forest resources and regular oil spillage	1	0.11
Coastal erosion problem, high investment cost and regular oil spillage	1	0.11
Poor health facilities, low income from activity, high cost of water transportation and poor market access	1	0.11
Low income from activities, fast disappearing forest and wildlife resources and regular oil spillage	1	0.11
Low income from activities, fast disappearing forest and wildlife resources, Coastal erosion problem and poor accessibility to forest resources	1	0.11

Source: Field survey, 2008

4.5. Conflicting issues in forest resource use in the study area

As shown in Table 4.33 below, fourteen respondents (1.47%) affirmed that conflicts existed in the use of forest resources in the study area, while nine hundred and thirty six respondents noted that there were no conflicts in the use of forest and wildlife resources (98.53%).

Table 4.33: Respondents view on existence of conflicts in use of forest resources

Responses	Frequency	Percentage
Yes	14	1.47
No	936	98.53
Total	**950**	**100.0**

Source: Field survey, 200

CHAPTER FIVE

DISCUSSION

5.1. Demographic characteristics of respondents

There were more male headed households than female headed households in the study area. This fact is corroborated by (FGN, 2007; UNDP, 2006) that there are more male headed households in the Niger Delta area. The prevalent age categories in the study area, (41 and 60 years) and (31 and 40 years) implies that there will likely be an increasing use of forest resources for survival to meet household and family needs. This will continue to grow and thus impact on Akassa forest resources. This may be related to Shepherd *et al*. (1999) who pointed out that poor people will be faced with diminishing forest resources due to factors such as population growth. The prevalence of households with 6-10 members in the study area is partly because of the high fertility rate in the area and early marriages (FGN, 2007). Most respondents had lived in the community for over ten years and this could directly account for the long relationship the people have built with use of forest and wildlife resources for their sustenance.

5.2. Akassa forest and wildlife policy

5.2.1. Forest policy issues

Management of forest resources by local communities has been gaining credence over the years; owing to the need for inclusion of rural dwellers in the management of resources that are found closest to them (FAO, 2000). There are arguments that through the process of decentralization of authority, local people are capable of managing their forests in a more sustainable manner. The process of local organization and implementation of such procedures will need a combination of local and technical expertise to achieve success.

5.2.2. Planning, management and capacity gaps

The Akassa Forest and Wildlife Policy had been in place since 1999. However, from the findings of this study, it does not have full backing of the local forest land owners, and other forest users. This was firstly due to a limitation in exhaustive consultations,

planning and designing of regulations with the community members who had built long term socio-cultural relationship with the forests in their domain. This same view has been observed by Peterside (2007) that the plan design failed to undertake comprehensive stakeholder consultations in developing a Community Based Forest Management Programme in Akassa.

Secondly, the AFWP while a robust document, was highly technical for the locally formed Natural Resource Committees (NRCs) to interpret, these people also had little capacity to grasp the bigger space of forest governance and management.

5.2.3. Failure in enforcement and land tenure system

The enforcement of the AFWP also had to contend with land tenure system in the study area because most of the land is owned by families who hold the rights to decide what uses land should be put. Ezenwaka and Abere (2010) also observed that under the indigenous tenure system, land, could also be owned by the family and the absolute title to the land is vested in the family as a corporate entity and not in any single individual member of the family no matter his position or status in the family. This fact holds for the general characteristics of customary tenure systems which includes the inalienability of land so that families have secure and inheritable land holdings that cannot be traded freely on the market (Peterside, 2007). Forest tenure has been changing over the years. Dahal (2011) observed that tenure is a bundle of rights that includes access, use, management, exclusion and alienation. ITTO (2010) submitted that 58% of forests in China are now owned by communities while the situation differs by country, laws governing tenure are unclear and usually leave communities disadvantaged by neglecting or overriding the customary ownership of communities and indigenous peoples. The failure of facilitators of AFWP to win the support of the forest and land owners greatly limited the level of acceptance and hence successful implementation of the AFWP.

5.2.4. Lack of government involvement before implementation

There was no formal involvement of the government authorities planning, designing and formulation stage of the AFWP as such support from the State was greatly absent. This gap was a vital aspect that could have provided a platform to negotiate and harness government's proactive support towards sustainable forest management by making resources such as man power, skills and finance available to support local conservation initiatives. The fact that a large proportion of the respondents in the study

area claimed that the forest policy does not impact on their livelihoods is an indication that the AFWP did not hold water. This situation may be because the process of monitoring had collapsed due to paucity of funds to support local forest guards; hence local people continued to harvest from the forest without any resistance or recourse to the existing local forest policy. Also, the level of awareness of the AFWP in the study area was very low.

5.2.5. Non-conclusive consultations

The decision to implement the AFWP even after a non conclusive consultation process was partly because the facilitators of the approach saw it as the panacea to address the ongoing degradation of the forest resources and as such were hasty to implement the approach. There was no full consideration of the time elements needed to fully transfer ownership of the idea to the local people. A more strategic and tested consultation process would possibly have aided a more critical analysis into the political, economic and social spheres of the policy. This could be related to (Lescuyer, 2003) who observed in southern Cameroun, that due to the way procedures are interpreted by officials, the short time for consultations and the lack of accessible information, zoning often overriding local land use systems; these curtails customary rights and denies compensation to those who loose food crops or access to hunting reserves and forests. According to Agbeja (2003) majority of people live in rural areas, therefore the design and implementation of land policy measures must acknowledge the wide range of stake holders with an interest in land and its role both as an economic good, social and political asset; because in some cases government have failed to consult adequately and have imposed polices which lack popular support and understanding.

5.2.6. Respondents awareness of the AFWP

The low level of awareness of the AFWP directly implies that the strategies adopted for creating awareness were not well tested to ensure the message was well understood by the local people. Also, while the use of community Chiefs as key representatives is in line with the political positioning of Chiefs as decision makers in the study areas, there was a need to involve a broader spectrum of the community into the consultative process; especially the loggers and other forest users.

5.2.7. Permission for timber contractors to operate in Akassa forests

In the study area, land is mostly owned by families and any request for permission to operate in the forest is granted directly by the family chief to the timber contractor, logger or any intending forest user. However, a token fee normally agreed through negotiation with the Chief is paid to the family alongside bottles of alcoholic drinks (depending on the type of trees to be felled, the size of the land and the nativity of the intending forest user). It was also discovered that non indigenes had lesser rights to use forests and as such demand for payment before forest use was stiffer for non indigenes.

5.2.8. Forest based associations

The near absence of forest based associations in the study area revealed that there was lack of coordination off forest user groups. People's use of the forests was on individual basis and not based on organized groups. However, an organized group of Fishtown women basket weavers exist in the study area; the group have gained recognition and plan to develop the use of rattan to expand the scope of their local forest industry. This is a form of social capital from which these women have been able to access support for their livelihood activity. According to DFID (1999) social capital is a vital aspect of sustainable livelihoods. Carney (1998) observed that social capital is the set of social relationships on which people can draw to expand livelihood options; and that these include kinship, friendship, patron-client relations, reciprocal arrangements, membership of formal groups and memberships of organizations that provide loans, grants and other forms of insurance.

5.2.9. Willingness to participate in AFWP in the future

Respondents' willingness to participate in AFWP in the future is an indication that the local people may be aware of the need to manage the natural resource in a sustainable manner. This may be due to the socio-cultural ties they have developed with forest resources for their sustenance. Developing a workable plan must therefore adopt a wholly participatory and inclusive approach to gain the full support of the respective stakeholders.

5.2.9.1. Demographic characteristics and willingness to participate in AFWP

Respondents willingness to participate in the AFWP in the future depends on sex, age, marital status, educational status, nativity, length of stay in the community or having access to land. This implies that the respondent's level of education will influence their

participation in the forest policy planning and implementation towards addressing the challenges of unsustainable forest management. The significant relationship between location of respondents and their willingness to participate may be because most people in the study area are engaged in fishing as a major source of livelihood. This may also be because of the discovery of crude oil in some communities within Akassa which commands more economic value than choosing to maintain the ecological integrity of forests and natural resources for future generations.

5.3. Identification of forest based livelihoods in the study area

Growing levels of forest operations and increasing number of loggers can be attributed to the availability of economic trees in Akassa forests at a low extraction cost. These trees are harvested and transported to cities such as Port Harcourt and Yenagoa for higher economic returns. Consequently, the study observed that the activities of loggers are inflicting more degradation to the forests than the activities of other forest users and gatherers. The use of forest resources by local people has been highlighted by (Falconer and Arnold, 1991) that people in many developing countries have historically had a relatively unrestricted access to forests and poorer people have thus been able to exploit the forests, for food, fuel and marketable products. The increase in logging activities in the study area was noticeable because there were several drop points for sawn wood across the communities.

5.3.1. Main and secondary occupation of respondents

Most respondents were involved in more than one livelihood activity. This fact is consistent with the growing evidence that rural people engage in several livelihood activities to earn income for survival (Ellis, 2000; Carney, 1999). Households use a variety of resources as inputs into their productions processes as they attempt to meet and extend their livelihood needs. IFAD (2001) opines that the livelihoods of poor rural households are diverse across regions and countries and within countries; and that while some households rely primarily on one type of activity most seek to diversity their livelihood base as a way to reduce risk.

Livelihood activities of most forest dependent households were seasonal due to poor access to the mangrove forest during the rainy season; loggers and other forest users maximize the dry season to exploit as much wood as possible. However, fuelwood collectors are still able to collect firewood throughout the year from the mangrove forest.

5.3.2. Contribution of forest resources to annual income

There is no doubt that forests contribute directly and indirectly to livelihoods of people living in and around forests and even beyond. Some of the respondents' main livelihood activities may not have been primarily based on extraction of forest resources; however, they all depend on forest resources for fuelwood, spices, medicine, wood and thatch for construction of houses. This confirms (Falconer and Arnold, 1991)'s view that forest resources contribute to household food security, by supplying fuelwood, food , medicine, meat and other useful plants. Arnold (1998) examined contributions of forest to sustainable livelihoods and concluded that forests include all resources that can produce forest products. He also noted that the contribution of forests is measured not only by the products they provide, but also by the non-tangible services they offer. Local women have free access to an array of natural fibers and mangroves that they exploit for basketry, weaving and fuelwood used for cooking and fish drying. Activities of men and women differ within the forest, while males are involved in logging activities by use of chain saw, more women engage in snail picking and collection of rattan for basket weaving and fish card weaving. This confirms the role rattan industry plays as a major source of income for both rural and urban livelihoods (Falconer,1994; Townson, 1995). Men also use wood for canoe paddle carving.

5.3.3. Level of household income and expenditure from livelihood activities

Variations in household income and expenditure in the study area is likely due to the proximity of each community to the resources. Communities closer to the sea have more access to the fish supplies than households located in the inner communities across the three coastal barrier Islands. This also applies for communities further away from the forest. Timko *et al.* (2010) buttressed this fact by observing that rural people's dependence on forest resources is influenced by where they are physically situated in relation to forests (location), as well as by the governing institutions that restrict or enable their access to these forests. Kamanga *et al*. (2009) also found that poor households with access to forests had much higher forest incomes than those without access. The presence of oil companies in some of the study communities also contributes to the financial capacity of the households in such communities. Speed boat driving ranked highest in terms of average monthly income in the study area. This

is likely because speedboats are the mostly used mode of daily transportation from the Akassa wetland to the capital city Yenagoa. Travelling from Akassa to Yenagoa and back to Akassa takes about 4-5 hours by speed boat (this movement will depend on the availability of speed boats for the return movement on the same day), while transport by wooden boats takes about 18 hours to cover the same distance. Hence, people use the speedboat and have to bear with the high costs of transportation. The difference in levels of household expenditure across communities is most likely due to the extra transportation cost incurred by traders in moving items to the farther communities in the eastern, western and central barrier Islands.

5.3.4. Profitability of livelihood activities in the study area

The values of the BCR and ROI indicate that all ventures are profitable. Most respondents spend little amount of money in the pursuit of their livelihood activities. Most of the fishcard and basket weavers either collect rattan by themselves or pay someone to collect for them from the forest. However, they pay for transportation of their products to Yenagoa and Port Harcourt. This trend was also observed by previous researchers who discovered that the cost of resource extraction within a mangrove dependent community, such as the Niger Delta, ranges between zero and 10% of the gross income (Naylor and Drew, 1998; Ronnback and Primavera, 2000). Also, the Partnership for Development in the Niger Delta, PIND (2008) observed that given that trading and smoking fish require low investment and basic technology, both activities attract large numbers of participants. According to (Bray et al. 2002) as many as 7,000 indigenous and non-indigenous communities are collectively organized around common-property forests and enjoy varying degrees of participation in forest management, with many controlling the processes that add value all the way to the finished product. This is also corroborated by Antinori (2003) who analyzed the complex system of governance, decision-making, costs and benefits in the state of Oaxaca to demonstrate surprisingly high levels of profitability, where profit as a percentage of sales revenue ranges from near 30% for finished products to over 50% for lumber.

5.3.5. Household composition in the study area

In terms of household composition, it was clear that children and youths constituted a higher population in the study area; this means that the pressure on the natural resources system is likely to increase since there are fewer alternatives available to the

people. This dimension of the possibility of creating more jobs on a sustainable basis for people dependent on forests is still largely debated (Sene, 2000).

5.3.5.1. Types and quality of household buildings in the study area

The construction of houses in the study area involved the use of wood from the forest and thatches for a higher number of respondents, this accounts for the growing dependence on forest resources in the study area. Also, due to coastal erosion problems and livelihood dependent migration in the area, people prefer to construct a thatch building that is less expensive rather than building a zinc house or a block building which is more costly and faces a higher risk of loss to coastal erosion.

5.3.5.2. Respondents ownership of selected household assets

The asset base of the people shows that they use most of their annual income to cater for household needs and other expenditures while also gathering some assets with time. This fact is directly related to the sustainable livelihoods framework, which relates the assets that rural people build with their ability to recover from vulnerability and shocks (Carney, 1998).

Asset poverty indicates a vicious circle, (IFAD, 2001) opined that people without asset tend to be consumption poor because they rely mainly on selling their labour in poorly paid markets or to the landed class, have nothing to sell or mortgage in hard times and are economically dependent and politically weak. An Asset (also called capital 'stock' or 'endowment' is anything that can be used, without being used up, to increase regular returns above receipts from labour, whether hired or self employed and thus enhance producer's income or consumer's welfare they could be shares, skills, health, roads.

5.3.5.3. Household toilet facilities in the study area

Most households' in the study area do not have toilet facilities within their houses, however they use toilets built at specific places on the water body within the community. This is one of the many uses of mangrove trees to build local infrastructure in the study areas. Most people therefore have no access to modern toilet facilities.

5.3.5.4 Sources of water in the study area

Water supply in the communities is mostly from dug out ponds just beside the root of a tree. These ponds are often dry during the dry season resulting to scarcity of water; hence most people device a means to harvest rain water during the rainy season.

Access to pipe water has been an elusive goal over the years, even though many water project had been initiated in the past but were abandoned or had stop functioning.

5.3.5.5 Household preferred point of call when sick

Respondents' preference for use of native doctors when sick was due to the people's belief in natural remedies and native methods which they believe was handed down by their ancestors. However, people are becoming more exposed to modern health and make use of the only health centre in the central Island. Access to health care was mostly initiated by an NGO working in the area, which has health posts spread across communities in the three barrier Islands**.**

5.3.5.6. Household source of energy for cooking

Most of the respondents depend to a large extent on fuel wood for household energy for cooking. This is because fuelwood is the most readily available source of fuel collected from the forests and used for fish drying, cooking and other heating purposes. This confirms the view of Arnold (1991) that household depend largely on forests for their fuelwood supply.

5.3.5.7. Number of times households eat in a day

Food consumption is seen by the people as a key measure of wellbeing; so most of the households eat three times daily. In the view of (Warner, 2000), food insecurity exists when people lack access to sufficient amounts of food and therefore not consuming the food required for normal growth and development. This may be due to lack of access to food- because of unavailability, insufficient purchasing power, inappropriate distribution or inadequate utilization at the household level (Warner, 2000).

5.3.5.8. Gender and fuelwood collection time

More women and girls were involved in fuelwood collection in the study areas, this is because culturally the people assign the role of gathering firewood, cooking and fetching water to the female gender. This fact is re-echoed in the United Nations

Millennium Development Goals (MDGs) 3 on the need for gender equality because of the burden and time spent by women on household activities.

5.4. Identifying the poor through a multidimensional approach

Multidimensional poverty measure revealed that lack of household assets contributed heavily to the level of poverty and concurrently the wellbeing of the people in the study area. This fact is not far from observations of (Carney, 1998; Ellis, 2000) who describe the vulnerabilities suffered by the poor due to a lack of access and assets. It was also clear that poverty is many sided and an attempt to address it must utilize a holistic approach; considering all aspects that trap the poor (IFAD, 2001). Ludi *et al.* (2001) also observed the importance of better education, skills, and improved individual and household assets in moving people out of poverty in rural areas. This is important because understanding a livelihood system means paying attention to the dynamics of household well-being with an interest in how households balance short and long term perspectives in order to manage poverty and vulnerability (Conway *et al.* 2003).

5.4.1. Respondents demographic characteristics and MPI

Marital status, level of education, the size of household, point of call when sick and access to land has effects on multidimensional poverty in the study area; this may be due to the a non educated, married household head with a large family has lesser opportunities to support the family needs of food, health and education of children. This directly impacts on multidimensional poverty index because of the increased deprivations. As observed by IFAD (2012) the legacy of history and the long marginalization of poor groups in terms of institutions and centuries of inequity in access to education, nutrition and health create too great an obstacle for development.

5.5. Factors militating against sustainable livelihoods in the study area

Factors that militate against the livelihoods of the people were identified as poor health facilities, low income, fast disappearing forest and wildlife resources, problem of coastal erosion and changing climate, high cost of water transportation, poor market access, communal clashes and regular oil spills. To access good medical care people have to travel to Yenagoa which is about 2- 2.5 hours by speed boat and over 9 hours by wooden market boat; as such people have limited access to standard health care in

the study area. Income generated from the livelihood activities is mostly used to meet household needs; hence people are living in a circle of poverty. The disappearance of forest resources is due mainly to excessive logging in the Akassa Forest. This agrees with Wells *et al.* (2003) who observed that the impact of illegal logging and loss of most valuable forests species is most likely felt by the poorest households, who are often the most forest dependent. Due to excessive depletion of the forest resources in the area, available forest resources are either inaccessible within the forest or the technology for extraction is unavailable due to the terrain.

5.6. Identifying conflicting issues in forest resource use

According to the Millennium Ecosystem Assessment (2005), the denial of the indigenous people's access to forests and natural resources has caused poverty and severe social pathologies, these includes high incidence of self destructive behaviours. Communities' lack of security in forest contributes to their poverty, conflict over resources, subsequent repression and human rights violation (CIFOR, 2006). The use of forest resources often generates conflicts in varying dimensions.

Conflicts that were identified by respondents were mostly due to the activities of loggers who often burrow channels in the mangrove to enable movement of wood out of the forest. These activities destroy traps set by forest fishermen, snail collectors, while also destabilizing wildlife habitat of several animals that are hunted for meat. A larger conflict scenario in the Akassa mangrove forest is the issue of oil exploration which has led to deforestation of large areas of forest through seismic operations. The conflict arises in making decisions between oil exploration and forest conservation; most people favour oil exploration while some decry the neglect that often occurs after oil companies commence oil extraction. This is alarming especially based on the high rate of oil spills that destroy forest resources and livelihoods of people in the Niger Delta. The larger effect of oil exploration is the incidence of communal conflicts which are highly destructive; and has made a lot of communities hostile to one another thereby retarding socio-economic development through huge losses of lives and properties.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The current trend of forest utilization in Akassa mangrove forests is unsustainable. Devising a means for sustainable use of mangrove forest resources is therefore vital to secure the livelihoods of forest dependent people. This move will also impact positively on maintaining the ecological and economic potentials of the Akassa mangrove forests, in the southernmost tip of Nigeria's Niger Delta wetlands. Successful implementation of AFWP will require local support and hence popular participation through exhaustive consultations with relevant stakeholders to promote joint implementation. This will ensure that local knowledge is built into planning processes. Involving stakeholders such as governments and other NGOs will also assist in closing local capacity gaps and hence create an interphase for transfer of technical skills and capacities while building on local strengths.

Forest based livelihoods can contribute to the GDP, through recognition of their potentials in livelihoods of rural people; this will yield economic returns to the community, local, state and Federal Governments. People's survival still depends largely on the use of forest resources in the study area. They are involved in logging or chain saw rental, canoe carving, basket weaving, fishcard weaving, hunting, snail collection, crab collection, traditional medicine, fishing, trading or business, fuelwood harvesting, collection of sharp sand etc. While there is a lot of support from the forest, they are currently under serious threats through over exploitation. Organized forest user groups can be a viable entry point for policy and resource dialogue. This can be a turning point in the change process. A challenge that needs to be overcome is the growing trend of landlessness that is further exacerbated by coastal erosion which has washed away entire communities in some parts of the study area. Several communal conflicts have emerged due to scarcity of land. Furthermore, there is a pressing need to strike a balance between oil exploration and conservation of mangrove forests to save guard future generations needs.

Poverty continues to emerge in multiple dimensions in Akassa: lack of infrastructure e.g roads and electricity, poor health facilities, poor education, lack of assets, loss of forest resources to coastal erosion and frequent oil spillage destroying the livelihoods of people.

6.2 Recommendations

The following recommendations are made based on the findings of this study

- There should be a process of ensuring popular participation in AFWP to ensure that local people's concerns, ideas and knowledge are integrated into planning of the revised AFWP. This should also involve the relevant local government authorities; to give a stronger enforcement of the forest policy.
- There should be a pre-testing of the idea before a general passage of the policy; this will help close any underlying conflicting issues among stakeholders.
- There should be adequate training and capacity building for the natural resource committees and all locally recruited personnel to facilitate a better understanding, interpretation and support for the AFWP.
- The Bayelsa State Ministry of Environment should create a forestry zonal office within Akassa community to aid monitoring and revenue generation into the government coffers. This will help promote income generation for the state and local government and also provide employment for Akassa people as forest guards and forestry officers. Government should establish a strong linkage with the Federal Ministry of Environment for implementation of outstanding coastal protection projects in the area.
- Land policies should be harmonized with other policies to ensure sustainable management of the wetland resources in Akassa.
- There should be wide and exhaustive stakeholders consultation to define a way forward in forest management and sustainable livelihoods within and around Akassa forests.

6.2.1. Alternative livelihoods for the rural dwellers

- Government should develop and invest in other sources of livelihoods; such as agroforestry, fisheries and skill acquisition for youths within the wetlands to create opportunity for livelihood diversification.

- Forest users should be facilitated to organize themselves in groups, this will help to initiate targeted interventions for the group.
- Forest based industries should be encouraged with management practices in place
- Government should encourage mangrove conservation and reforestation on a large scale and protection of the wetland from coastal erosion due to sea level rise.
- Provision of portable water is a priority in the Akassa communities. This will limit incidence of water borne diseases.
- Basic health care delivery should be strengthened with support from all stakeholders.
- There should be investment in sustainable energy sources that also reduce the burden on women; government of Bayelsa State should consider setting up wood lots in specific locations within the three barrier Islands to limit the over exploitation of the mangroves for fuelwood.

6.2.2. Poverty reduction strategies

- Poverty reduction interventions should adopt a holistic approach that will address multiple challenges ranging from access roads, power provision, scholarships for education and development of local forest industries such as furniture and basketry.
- Proper clean up after oil spills should be conducted by oil companies and compensation should be paid to affected communities on time.
- Government should be invest in subsidized water transportation schemes to lessen the burden of transportation costs for the rural dwellers.
- Markets should be created to encourage economic activities that will increase the GDP of the Akassa people.
- NGOs working in the area should adopt participatory conflict management strategies in addressing conflicting issues in forest resource use. Loggers should adopt other means of transporting their logs from the mangroves other than burrowing large troughs within the mangroves. These not only destroys traps set by fishermen, snail pickers and hunters, but it destroys the ecological balance of the mangrove ecosystem.

- Adequate attempts should be made to ensure mangrove reclamation is carried out after seismic operations in the Akassa mangrove forests. The Akassa National Council of Chiefs (ANCC) should insist on implementation of environmental impact assessment reports. Capacity building and enlightenment for members of the ANCC should be a continuous process in ensuring that Akassa benefits from the Ramsar convention on wetlands since it has potentials as a Wetland of International importance in Nigeria.

6.3. Contribution to Knowledge

- This study has added to the wealth of knowledge on the important role mangrove forests in Akassa can play in sustaining the ecological, economic and social development of Bayelsa State and Nigeria.
- The study has also closed the gaps in terms of unclear definitions of poverty in the study area and the reasons people are poor by employing a multidimensional approach to poverty assessment.
- The study also reveals that there are opportunities for forest- based enterprise development and also opportunity for investment into ecotourism to provide employment and increase GDP in the area.

REFERENCES

Adegeye, A.J. and Dittoh, S.J.1985. *Essentials of Agricultural Marketing*. Impact Press Ltd. 2nd Edition 251pp.

Agbeja B.O. 2003. The need to link state and federal forest policies and institutions in Nigeria. In proceedings of an International symposium on *Building Agricultural resources capacity in Africa; quality and relevance of tertiary education*, held at Kenyatta University, Nairobi, Kenya 14 –16 April 2003 pp. 1-15.

Agrawal, A. and Ostrom,E.2001.Collective action, property rights and decentralization in resource use in India and Nepal. *Politics and Society* 29.4:485-514.

Ahenkan, A and Boon, E. 2010.Assessing the Impacts of Forest Policies and strategies on promoting the development of non- timber forest products in Ghana. *Journal of Biodiversity* 1.2: 85-102, Pp 8. http://www.krepublishers.com/02-Journals/JBD/JBD-01-0-000-10-Web/JBD-01-2-000-10-Abst-PDF/JBD-01-2-085-10-009-Ahenkan-A/JBD-01-2-085-10-009-Ahenkan-A-Tt.pdf **assessed 16/09/ 2012**

Alden,W. 2002. Participatory forest management in Africa: An overview of progress and issues. *Second International Workshop on Participatory Forestry in Africa*, February 18-22, 2002: 31-58.

Alkire, S. and Foster, J. 2007.Counting and multidimensional poverty measurement. OPHI. Working Papers No. 7. Oxford, Oxford University.

_____2008a. Counting and Multidimensional poverty measurement. Oxford Poverty and Human Development Initiative. OPHI Working Paper series. Oxford. Pg 1-33.

_____ 2008b. Choosing dimensions: The capability approach and multidimensional poverty. The many dimensions of poverty.In Kakwani, N. and J. Silber Eds. New York, Palgrave Macmillan.

_____ 2011. Counting and multidimensional poverty measurement. *Journal of Public Economics* 95:7-8.

Alkire, S. and Roche, M.J. 2011. Beyond Headcount: Measures that reflect the breath and depth of child poverty. OPHI working paper No. 45. Pp 1-26

Angelsen, A. and Wunder, S. 2003. Exploring the forest-poverty link: Key concepts, issues and research implications. CIFOR occasional paper No.40. CIFOR, Bogor, Indonesia. Pp 1-70.

Ascher, W. 1995. Communities and sustainable forestry in developing countries. ICS press, Oakland,CA. cited in Centre for International Forestry Research (CIFOR), Self Governance and Forest Resources, Occassional PaperNo. 20. Feb. 1999. 1-15Pp.

Antinori, C.2003.Vertical Integration in the Community Forestry Enterprises of Oaxaca In: D.B. Bray, D. Barry and L. Merino Volume on Community Forestry in Mexico, University Press, Austin, Texas,. September, 2003

_____1991 Household Food security and Forestry: An analysis of socio-economic Issues. FAO. Pp 1-55.

Arnold,M.,Powell,B.,Shanley, P and Sunderland,T.C.H. 2011. Forests, biodiversity and food security. *International Forestry Review Vol.13.3, 2011.Pp 1-3.*

Babatunde, R.O., Owotoki, G.M.,Heidhues, F and Buchenrieder G. 2007: Vulnerability and food insecurity differentials among male and female-headed farming households in Nigeria. *Pakistan Journal of Social Sciences* 4.3.:414-418; Medwell .Available at http://www.unilorin.edu.ng/ publications /Babatunde /no% 204 %20 vulnerability%20and%20food%20insecurity.pdf. Sourced: 16/09/2012

Bantilan, C. and Shiferaw, B.2004. Agriculture, rural poverty and natural resource management in less favoured environments: Revisiting challenges and conceptual issues. In: *Journal of Food, Agriculture and Environment* Vol. 2 1: 328 – 339. WFL Publishers.

Baumann, P. 2000. Sustainable livelihoods and political capital: arguments and evidence from decentralisation and natural resources management in India. Sustainable livelihoods working paper No.136. Overseas Development Institute ODI, London.

Becker, C.D., Banana, A.Y., and Gombya- Sembajwe, W. 1995. Early detection of tropical forest degradation; an IFPRI pilot study in Uganda. *Environmental conservation 22: 31-38.*

Bene, C. 2006. Small scale fisheries: assessing their contributions to rural livelihoods in developing countires. FAO fisheries circular No. 1008 (available at ftp://ftp.fao.org/docrep/fao/009/j7551e/j7551e00.pdf) sourced 24/08/2012.

Bodegom, A.J., Klaver, D., Schoubroeck F and Valk O. 2008. FLEGT Beyond T: Exploring the meaning of Governance concepts for the FLEGT process. Wageningen University and Research centre, the Netherlands. Pp 49- 50.

Bray, David and Merino- Pérez, Leticia. 2002. "The rise of community Forestry in Mexico: history,concepts, and lessons learned from twenty-five years of community timber production," Ford Foundation (unpublished), September, 2002."The community-managed forests of Mexico: The struggle for equity and sustainability.

Bryceson ,D 2000. Rural Africa at the cross roads: livelihood practices and policies. Natural resource perspectives No. 52 April 2000. ODI Pp 5.

Carney, D.1998. Sustainable rural livelihoods: what contributions can we make? Cited In: Farrington, J., Carney, D.,Ashley, C., and Turton, C. 1999. Sustainable livelihoods in practice. Early applications of concepts in rural areas. Natural Resource Perspectives No. 42 June 1999. Pp 6. London DFID.

_____ 1999. Approaches to sustainable livelihoods for the rural poor. ODI Poverty briefing. 2, Jan 1999. London Pp 2.

_____ Sustainable livelihood approaches : progress and possibilities for change. London DFID , pages 10- 29. http://www.eldis.org/vfile/upload/1/document/0812/SLA_Progress.pdf. Sourced 09/20/2009

Carribean Natural Resources Institute- CANARI.2010. Assessing the impacts of climate change on community- based sustainable use of forest resources in the Carribean. Final project report to the United Nations Development Programme, Babardos and OECS. Pp 5.

Centre for International Forestry Research. CIFOR.2006. Justice in the forest: Rural livelihoods and forest law enforcement. Pp 1-30.

Chambers,R. and Conway G.R. 1991. Sustainable rural livelihoods: Practical concepts for the 21st Century. IDS Discussion paper 296.

Charlie, S., and Sheona, S. 2004. The importance of non- timber forest products in rural livelihood security and as safety nets: A review of evidence from South

Africa: In: *South African Journal of Science* 100 Nov/Dec 2004. Pp 58-64 cited in: Babalola F.D (2010): Socio-economic importance of some selected NTFPs in South west Nigeria; unpublished Ph.D Thesis in the Department of Forest Resources management, University of Ibadan, Nigeria Pp 29.

Chomitz,K.M.,Buys,P. Luca D.G., Thomas T.S., and Wertz-Kanounnkoff,S. 2007. At lloggerheads? Agricutural expansion, poverty reduction and environment in the tropical forest. World Bank policy research report. Pp 2-56.

Clawson, M. 1975. Forests for whom and for what? Resources for the future. 1-171Pp.

Conway, T. Moser, C, Norton, A and Famington J.2003. Rights and livelihoods approaches: exploring policy dimensions. In Currents 31/32. Rural livelihoods Swedish University of Agricultural Sciences. Oct 2003. Pp 45-48.

Cronkleton., P,Taylor P.L.,Barry D; Stone-Jovicich S, and Schmink, M. 2008. environmental governance and the emergence of forest based social movements. CIFOR , Ocaassional Paper No. 49. 1- 49 pp.

Dagum, C. 2002. Analysis and measurement of poverty and social exclusion using fuzzy set theory. Application and policy implication, unpublished paper. 1-42pp.

Dahal, G.M.2011. Forest tenure in Asia in tropical forests update.Vol.20.4 ITTO.Newsletter. Pp.8

Dalt, G (1998) Computational tools for poverty measurement and analysis: FCND Discussion paper No. 50. Food consumption and nutritional division, International food policy research institute, Washington, DC. Oct,1998.

Dewi, S., Belcher, B. and Puntodewo, A. 2005 'Village economic opportunity, forest dependence and rural livelihoods in East Kalimantan, Indonesia'. *World Development Vol. 33.9 Pp.1419-1434.*

DFID.2002.Wildlife and poverty study. Prepared by the Livestock and Wildlife Advisory Group, Rural Livelihoods Department, Department for International Development, United Kingdom.19 Dec. 2002.

_____1999. Sustainable Livelihoods Guidance Sheet: Introduction. Department for International Development http://www.livelihoods.org/info/infoguidancesheets.html#1.

Ellis-Jones, J., Schulz, S., Chikoye, D.,Haan, N de.,Kormawa,P., and Adedzwa D.2005. Participatory research and extension approaches : a guide for researchers and extension workers for involving farmers in research and

development. International Institute for Tropical Agriculture, Ibadan, Nigeria and Silsoe Research Institute , UK. Pp 4-27.

Ellis, F. 1998. Survey article: household strategies and rural livelihood diversification. *Journal of development studies* Vol. 35. Pp 1-38.

_____ 1999. Livelihood diversity in developing countries: evidence and policy implications. Natural resource perspectives No. 40 April 1999. Pp 2.

_____ 2000. Rural livelihoods and diversity in developing countries. Oxford University Press.

Elos S., and Kynga S.H. 2008. The qualitative content analysis process. *Journal of Advanced Nursing* 62.1. 107–115. Available at http://www.researchgate.Net/publication /5499399

European Commission. (EC). 2004. What is legal timber? FLEG Briefing note No. 3. European Commission Brussels.

Ezenwaka Jasper and Abere S. A. 2010. Community participation in natural resources management in the Niger Delta, Nigeria, a case study of Bonny Island, Rivers State; being a paper presented at the International conference on sustainable development, Ebitimi Banigo Auditorium, University of Port-Harcourt, 9 – 12 February 2010; Pp 16 – 21.

Falconer, J and Arnold J.E.M (1991) Household Food Security and Forestry: An Analysis of Socio-Economic Issues. Pp 11- 25.

Falconer, J. 1994. Non-timber forest products in Southern Ghana. Main report, Natural Resource Institute/ Overseas Development Administration.

FAO. 1992. Forest, trees and food. Pp. 7-10.

_____ 1997. World Mangroves: 1980 – 2005 FAO Forestry Paper 153. Food and Agricultural Organization of the United Nations, Rome, Italy.

_____ 2000. Forests and Food Security in Africa. The place forestry in FAO's special programme for food security. http://www.fao.org/doerep/x7273e/x7273e 02htm

_____2001. *How Forests can Reduce Poverty*. Food and Agricultural Organization of the United Nations, Rome ,Italy and DFID UK.

_____2010. *Developing Effective Forest Policy*: A guide-FAO Forestry Paper 161. Food and Agricultural Organization of the United Nations, Rome ,Italy. Pp11- 80.

Farrington, J; Carney, D; Ashley, C; and Turton, C. 1999. Sustainable livelihoods in practice: early application of concepts in rural areas. Natural Resource Perspectives No. 42 June 1999.

FGN. 2007. Niger Delta regional master plan. Federal Government of Nigeria. Available athttp://www.nddc.gov.ng/NDRMP%20Chapter%201.pdf. Accessed: 16/09/2012

Gasana, J,K. and Borobia, M. 2004. ITTO projects in Columbia,, Panama, Thailand, India and Japan have advanced the course of mangrove conservation and sustainable management. Tropical Forest Update Vol. 14 No. 4, 2004. Pp14.

Gluck, P. and Rayner, J.2009. Governance and policies for adaptation. In J. Kooimam ed. Modern governance. New government society Interactions. Sage Publications London Newbury Park, New Delhi Pp 249-262.

Gluck, P. 2010. Governance as choice of policy options. In: Tumasjukka, Tomi (ed): Forest Policy and Economics in Support of Good Governance. EFI Proceedings No. 58, 2010. Pp 9-15.

Goldman, I; Carnegie, J; Maruno , M; Muyoro D; Kela , N; Ntonga, Sand Mwale, E. 2000: Institutional support for sustainable rural livelihoods in South Africa: results from Zimbabwe, Zambia and South Africa. Natural Resource Perspectives No.50 , March 2000. Pp 4.

Hobley, M. 2007: Where in the world is there pro-poor forest policy and tenure reform? Pp 8-16.

Holy, L. 1984. 'Theory, methodology and the research process', In Ellen, R.F.ed. Ethnographic research – a guide to general conduct. ASA research methods in *Social antropolgy 1*. London Academic press.

Homewood, K. 2005. Introduction to rural resource use and local livelihoods in sub-Saharan Africa. In Homewood, K .Ed. Rural resources and local livelihoods in Africa. Oxford. Pp. 1- 10.

Husch, B.1987. Guidelines for forest policy formulation. FAO forestry paper 81. Pp 86.

IFAD.2001.Rural poverty report. The challenge of Ending Rural Poverty, International Fund for Agricultural Development, Oxford University Press.Pp. 2-45.

IFAD.2012. Enabling the rural poor to overcome poverty in Nigeria. Available at http//www.ruralpovertyportal.org. sourced 08-05-2013. Pp1-8.

ITTO.2000.Taking policies to the forest. Tropical forest update. Vol 10.3. International Tropical Timber Organization, Japan. Pp 1-3.

ITTO. 2010. Owing forest in Asia. Tropical forest update. Vol 20.4. International

Tropical Timber Organization, Japan.

IUCN 2005. Poverty and conservation. Landscapes, people and power. Landscapes and livelihood series No.2. International Union for Conservation of Nature. Pp 1-15.

Kamanga, P., Vedeld,P., and Sjaastd,E. 2009. Forest Incomes and Rural Livelihoods in Chiradzulu District, Malawi, *Ecological Economics* 68.3:613-624.

Kinako, P.D.S. 1986. Structure and functions of Nigerian Wetland Ecosystems. In: Akpata, T.V.I and Okali, D.U.U. 1986. Eds.Nigerian Wetlands. Pp 48-50. MAB,UNESCO.

Larson, D.W. 1988. Problems of content analysis in foreign policy research: Notes from the study of the origins of Cold War Belief Systems. *International Studies Quarterly* Vol 32.2. June 1988. Pp. 241-255. Available at http://www.jstor.org/discover/10.2307/2600629?uid=3738720&uid=2129&uid=2&uid=70&uid=4&sid=21102131955807

Larson , A.M., Pacheco,P., Toni, F., and Vallejo, M. 2007. The Effects of Forestry Decentralization on Access to Livelihood Assets. *The Journal of Environment and Development.*16. Pp 251.

Lescuyer, G.2003. Forest law enforcement and rural livelihoods: a case study in Cameroon. Draft Aug.2003. cited in Colchester, M., Boscolo, M., Conterras-Hermosilla, A., Del Gatto, F., Dempsey, J., Lescuyer, G., Obidzinski, K., Pommier, D., Richards, M., Sembiring, N.S., Tacconi, L., Rios, V.T.M and Wells, A. 2006. Justice in the Forest: Rural livelihoods and forest law enforcement. CIFOR. Forest perspectives 3. 1-98 Pp.CIFOR, Bogor, Indonesia

Ludi E and Slater, R..2008. Using the sustainable livelihoods framework to understand and tackle poverty Briefing Notes: Poverty and wellbeing Net. www.poverty-wellbeing.net Accessed 05/11/2009

Malleson, R, Asha, S, Sunderland; T. Burnham P, Egot, M, Okrah-Obeng K, Ukpe, I and Miles, W. 2008. A methodology for assessing rural livelihoods. *Journal of Ecological and Environmental Anthropology* Vol 4.1. Pp 1-6.

Millennium Ecosystem Assessment (MEA). 2005. Ecosystems and human wellbeing: biodiversity assessment. Island press, Washington, DC.1-219 Pp. Available at http://www.millenniumassessment.org//en/products.Synthesis.aspx

Molnar, A. 2003. Forest certification and communities: Looking forward to the next decade. Forest trends, Washington, D.C. Pp 1-4.

Mudgal,G.S., Morrison E., and Mayers, J.2004. Policy influences on forest-based

livelihoods in Himachal Pradesh, India. Pp 13- 29 IIED. Available at http://pubs.iied.org/pdfs/G00331.pdf. sourced 16/09/2012

Mukherjee, N (1992): Villagers' perception of rural poverty through the mapping methods of PRA- special Issue: Wealth ranking RRA notes 15:21-26. London. International Institute for Environment and Development.

Naylor, R. and Drew, M.1998: Valuing mangrove resources in Kosrae, Micronesia. *Environmental and Development Economics* 3, 471–490.

Newell, P. (2000). Governance and sustainable livelihoods (Draft for Discussion). Retrieved January 17, 2005, from www.livelihoods.org

Norton, A. and Foster, M. 2001. The potential of using sustainable livelihoods approaches in poverty reduction strategy papers; ODI, working paper 148. London.

Nwosu, F.M. 2005. An overview of Nigeria's mangrove ecosystem: problem and prospects. Pp 4

Obayelu, O.A., and Awoyemi, T.T. 2010. Spatial dimension of poverty in rural Nigeria. *Journal of Development and Agricultural Economics*. Vol.2.6 Pp. 231-244 June 2010.

Obidzinski K, and Barr, C. 2003. The Effects of Decentralisation on forests and forest Industries in Bureau District East Kalimantan. Case studies on decentralization and forests in Indonesia CIFOR. Pp. 24-38.

Ojha, H., Persha,L., and Chatre, A.2009. Community forestry in Nepal: A policy innovations for local livelihoods. Available at http://www.ifpri.org/sites/default/files/publications/ifpridp00913.pdf

Omonona, B. 2010. Quantitative analysis of rural poverty in Nigeria. IFRI Brief No. 17. Nigeria Strategy Support Program. Pp 1-5.

Onofeghara F.A. 1986. Nigerian Wetlands: An overview: In: Akpata T.V.I and Okali D.U.U Eds. Nigerian wetlands: Man and biosphere national committee, Nigeria. Pp. 14-22.

Ostrom, E. 1999. Self governance and forest resources. CIFOR occasional paper No. 20. Feb.1999. Pg 1-15.

Oyekale, T.O., Okunmadewa, F.Y. Omonona, B.T. and Oni O.A. 2007. Fuzzy set approach to multidimensional poverty decomposition in rural Nigeria. Pp 1-15.

Oyieke, H.A. 1996. The impact of coastal changes on biological resources of Kenyan coastal waters. UNESCO 1996. Assessed 17/08/2012.

Oyono, R., Ribot, J. C., and Larson, A. 2006. *Green and black gold in rural Cameroon: Natural resources for local governance, justice and sustainability* Policy Research Paper). Washington, DC: World Resources Institute.

Partnership for Development in the Niger Delta. PIND. 2008. Analysis of aquaculture value chain in the Niger Delta. http://pindfoundation.net/wp-content/uploads/Aquaculture%20Value%20Chain%20Analysis.pdf.sourced 17/08/2012

Papka, K. 1999. Formulation of policy and legislation in response to emerging concerns in community forestry in Nigeria. In: Obiagu P.C. Eds. 26th Annual Conference of Forestry Association of Nigeria FAN, Maiduguri, Borno,State. 170-178: sited In : Kalu, C.P: 2006. Policy Issues and socio-economic impacts of unregulated exploitation of teak (*Tectona grandis*) in Edo State, Nigeria.Unpublished Ph.D Thesis in the Department of Forest Resources Management, University of Ibadan. Pp 42-44.

Pasteur, K. 2001. Policy processes: What are they, and how can they be influenced in support of sustainable livelihoods. Livelihoods connect website. http://www.livelihoods.org/info/docs/PolPros.rtf

Peterside , J. 2007. Green governance: The case of Akassa community forests management and development plan. Available at: http://oldweb.geog.berkeley.edu/ProjectsResources/ND%20Website/NigerDelta/WP/19-Joab-Peterside.pdf/. Sourced. 05/08/2010.

Pokharel, B.K.2002: Community forestry and people's livelihoods: livelihoods economic opportunity and equity. *Journal of forestry and livelihoods.*Pp16-17.

Prakongsai, P.2005 An Application of asset index for measuring household living standards in Thailand Pp 14.

Praag,B.V. 2005: A Multidimensional Approach to Subjective Poverty: A paper presented at the occasion of the conference on 'The Measurement of Multidimensional Poverty- theory and Evidence' of the International Poverty Centre (UNDP) in Brasilia.Aug 2005.

Prasad, B.D.(undated).Content Analysis a method in social science research. Available at:http://www.css.ac.in/download/deviprasad/content%20analysis.%20a%20method%20of%20social%20science%20research.pdf

Rennie, J.K.; Singh, N.1996. Participatory research for sustainable livelihoods. International Institute for Sustainable Development (IISD), Winnipeg, Canada

Revenue mobilisation allocation and fiscal commission. RMAFC. 2012. Summary of oil derivation attribution to states. Available at: http://www.rmafc.gov.ng/Summary%20of%20Oil%20Derivation%20%20Attribution%20to%20States_February-March%202012.pdf. Sourced. 02/27/2013

Roda, J.M., Mutamba, M.,Campbell, B., Kowero, G., Clarke, M., Gonzales, A., Mapendembe, A., Oka, H., Shackleton, S., Vantomme, P., and Yiping, L. 2005. Forests-based livelihoods and poverty reduction: paths from local to global development. In: Forests in the balance- Change paradigms. Global forum. Pp. 75-96.

Ronnback, P. and Primavera, J. H.2000. Use of environmental functions to communicate the roles of a mangrove ecosystem under different management systems – a critique. *Ecological Economics* 35. 135–141.

Royal Government of Cambodia RGC. 2010.National forest programme 2010- 2029. Pp.12.

Sam,T., and Shepherd, G. 2011. Forests, people, livelihoods and poverty eradication Pp. 8 – 10.

Scoones,I. 1998. Sustainable rural livelihoods : A frame work for analysis. Working paper 72 Brighton IDS. Pp. 2-3

Sen, A. 1976. "Poverty: An Ordinal Approach to Measurement" *Econometrica, Vol. 46* pp.437-446.

Sene, E.H. 2000. Forests and food security in Africa: the place of forestry in FAO's Special Programme for Food Security. Available at: http//www.fao.org/docrep/X7273e/x7273e02.htm#P0_0 .Sourced. 08/12/2008. Food and Agricultural Organization of the United Nations,Rome,Italy.

Shaffer, P. 2000. New thinking on poverty dynamics A paper presented to the Poverty Reduction Working Group, Canadian International Development Agency Ohawa, Sept 28, 2000 Pp. 7-9.

Shahbaz, B and Suleri A.Q. 1999. *The Political Economy of Forest Management in Pakistan*: In: Cronin,R and Pandya A. Eds. Exploiting natural resources, growth, instability and conflict in the Middle East and Asia. Pp 21-31. www.stimson.org/rv/Natural_Resources/Exploiting_Natural_Resources.Chapter_2_shabaz.pdf.

Shepherd, G., Arnold, J.E.M and Bass, S.1999. Forests and sustainable livelihoods. background document, World Bank Forest Policy Implementation Review and Strategy.cited in: Warner, K.2000. Forestry and Sustainable Livelihoods. FAO

Shivakoti, G., Varughese, G., Ostrom, E., Shukla, A. and Thapa, G. Eds. 1997. People and participation in sustainable development: Understanding the dynamics of natural resources systems. Proceedings of an International conference on *political theory and policy analysis* held at the Institute of Agriculture and Animal Science, Rampur, Chitwan, Nepal, March 17-21, 1996. Indiana University, Bloomington.

Soussan, J.; Blaikie, P.; Springate-Baginski, O.; Mayers, J.; Chadwick, M.; Morrison, E.2003. Improving policy-livelihood relationships in South Asia. Department for International Development (DFID), London.

Spalding, M., Kainuma, M., and Collins, L.2010. World Atlas of Mangroves. Earth Scan,London. Pp. 1-257.

Stemler S. 2001. An overview of content analysis. Practical assessment, research and evaluation 7.17. Available at http://pareonline.net/getvn.asp?v=7&n=17

Timko, J.A.,Waeber, R.O., and Kozak, R.A. 2010. The socio-economic contribution of non-timber forest products to rural livelihoods in sub-Saharan Africa: Knowledge gaps and new directions. *International Forestry Review*. Vol.12.3. 2010.

Tolervey, A. 2002. Sustainable development. In Development magazine issue 18, 2nd quarter 2002. Pp 1-98.

Tomlinson, P.B. 1986. The botany of mangroves.Cambridge, UK, Cambridge University Press. Pp.1-22.

Townson, I.M.1995. Incomes from non-timber forest products in Southern Ghana. Main report.National resource Institute/Overseas Development Administration.

Tyler,S.1999.Policy implications of natural resources conflict management. In: Buckles, D. Ed. 1999. Cultivating peace, conflict and collaboration in natural

resources management. International Development Research Centre, Ottawa ,Canada. Pp 263-280.

United Nations Development Programme UNDP.2006. Niger Delta Human Development Report Available at http://www.ng.undp.org/publications/nigeria-delta-hdr.pdf. sourced. 05/12/2008

USAID.2012. Devolution of forest rights and sustainable forest management Vol 1. A Review of Policies and Programs in 16 Developing countries- Property Rights and Resource Governance Project. United States Department for International Development Pp 14.

Warner, K. 2000. Forestry and Sustainable Livelihoods: In: FAO. 2000. Forests and food security in Africa. The place forestry in FAO's special programme for food security. http://www.fao.org/doerep/x7273e/x7273e 02htm

WCED.1987. 0ur Common Future. World Commission on Environment and Development Oxford University Press.Pp 62-87.

Webster's dictionary 1998. Second edition. Smin and Schuster New York U.S.A. Pp 302.

Weeks, M., and Claude-Eze, J. 1997. The forest of Akassa: An Interim report submitted to the Akassa Community Development Project. Pp 4-9.

Wells, A., Del Gatto., Richards, M., Pommier, D., and Contreras-Hermosilla, A. 2003. Rural livelihoods and the illegal timber trade in Honduras and Nicaragua. A case study for CIFOR-PROFOR-DFID 'Forest law enforcement and rural livelihoods.

Wells, S. C. Ravilous E., Corcoran 2006. In the frontline: shoreline protection and other ecosystem services from mangrove and coral reefs. United Nations Programme World Conservation Monitoring centre, Cambridge. Pp. 33. Cited in: IUCN. 2006 Resilience of mangrove ecosystems.

White, A. and Martin, A. 2002. Who Owns the World's Forests? Forest Tenure and Public Forests in Transition. Forest Trends and Center for International Environmental Law, Washington, D.C. Pp 2-3.

World Bank.2000. *World Development Report 2000-2001*. Washington DC. Pp 21.

_____.2001a. A revised forest strategy for the World Bank group. World Bank, Washington D.C. Draft 30 July. Pp14-15.

_____. 2001b. *World Development Report* 2000/2001: Attacking Poverty. The World Bank, New York: Oxford University Press. Pp 5.

_____. 2001c. Risk Management in South Asia: A poverty focused approach, Washington DC. Report. No. 23509- SAS. cited in: Imai, K., and Gaiha, R. 2002. Vulnerability, shocks and persistence of poverty- estimates for Semi-Arid Rural South India Nov. 2002. Pp.1-27, Oxford University.

_____. 2002. A revised forest strategy for the World Bank Group. World Bank, Washington, DC.

_____.2004. 'Sustaining Forests: A Development Strategy'. Washington D.C. cited in Chomitz,K.M.,Buys,P.Luca D.G.,Thomas, T.S. and Wertz-Kanounnkoff,S.2007: At loggerheads? Agricutural expansion, poverty reduction and environment in the tropical forest. World Bank Policy Research Report. Pp 5.

_____.2005. Introduction to poverty analysis. The World Bank Institute, pg 6.

_____.2008. Poverty and forest linkages. A synthesis and six case studies. The World Bank, Washington DC. Pp 1-3.

APPENDICES

APPENDIX 1

QUESTIONNAIRE ON "FOREST BASED RURAL LIVELIHOODS IN THE AKASSA MANGROVE FORESTS, BAYELSA STATE, NIGERIA''

Dear Respondent,

The questions provided below are strictly for research purposes and you are assured of the confidentiality of your responses.

I thank you in advance for taking part of your productive time to complete this questionnaire on forest and wild life resources.

You are required to fill in your opinion or tick as appropriate.

Thank you for your kind response.

Kelechi Eleanya

PERSONAL CHARACTERISTICS

Name:(Dr/Mr/Mrs/Chief)…….

Sex:…….

Age of Respondent: …….

Marital status: Single [ ] Married [ ] Widowed [ ]

HouseholdSize: Adult Male…….Adult Female……..Children……..

Name of Community: ……..

Educational Status: No formal education [ ] Primary school [ ] Secondary school [ ] Tertiary education [ ]

Others; please specify …….....

…….

…….

Main Occupation: ……..

Secondary Occupation: Logging [ ] Wine Tapping [ ] Farming [ ] Canoe carving [ ] Hunting [ ] Snail Collection [ ] Herbalist [ ] Basket weaving [ ]

Others ; please specify ……..

…….

…….

Origin: Native [ ] Migrant [ ] Village (name /origin)……..

GENERAL QUESTIONS

(i) How long have you lived in this community? (a) 1-5 years [ ] (b) 6-10 years [ ] (c) 10 years and above [ ]

(ii) Do you have access to forestland/ resources? Yes [ ] No [ ]

If yes, how did you get access to the forest resource? (a) By lease [ ] (b) Purchase [ ] (c) Inheritance [ ] (d) others ; please specify…….

If No, what are the reasons? ……..……..

(iii) Who owns land in your community? (a) Family owned [ ] (b) Community owned [ ] (c) Individually owned [ ] (d) Government owned [ ]

A. FOREST AND WILDLIFE POLICY

(iv) Are you aware of the Akassa forest and wildlife policy? Yes [ ] No [ ]

If yes, how and when did you know about it?

(v) Is there any forest related association in this community? Yes [ ] No [ ]

If yes, what is it's function and who are the members? ……...

……...

……..

(vi) How has the local Akassa forest and wildlife policy impacted on your livelihood activities since you became aware of it? Please state……

……...

……...……..

……..

(vii) Are you willing to participate in the implementation of a good local forest and wildlife policy in the Akassa clan? Yes [ ] No [ ]

If No, what are your reasons ?……....

……...

……..…...…….

……..

.....

(viii) How well were the consultations with local people (forest land owners and users) made during the drafting of the Akassa Forest and Wildlife Policy?

(a) Very poor [ ] (b) No consultations were made [ ] (c) Only community chiefs were involved [ ] (d) I suddenly heard about the policy [ ] (e) I do not know of any forest policy [ ]

(ix) What (if any) were the local peoples input in the drafting of the Akassa forest and wildlife policy ? Please mention ……

……

……

……

……

……

(x) What aspect(s) of the forest and wildlife policy affect your livelihood activities the most (please ascribe numbers e.g. 1, 2,…To indicate their order of priority)

(a) License and permits [ ] (b) Cost of power saw registration [ ] (c) Fees and charges [ ] (d) Collection of fuelwood and non timber forest products [ ]

(e) Hunting [ ] (f) penalties for contravening the forest policy [ ]

Others; please specify ……

……

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……

(xi) Are timber contractors permitted to operate in this area by consulting with the community? Yes [ ] No [ ]

If yes, what compensation do they provide to the community? Please mention

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B. ECONOMIC BENEFITS

(xii) Income Generating Activities (Income in Naira)

FOREST RELATED ACTIVITIES	Daily	Weekly	Monthly	Yearly
Carpentry				
Timber harvesting				
Saw milling				
Wine tapping				
Farming				
Bee keeping				
Logging				
Canoe carving				
Basket weaving				
Fishcard making				
Hunting				
Snail collection				
Traditional medicine/herbalist				
OTHER ACTIVITIES				
Fishing				
Hired labour				
Trading				
Civil service				
Brick laying/ Building				
Tailoring				
Hair dressing				
Engine fixing				
Boat driving				
Oyster picking				
Periwinkle picking				

(xiii) Is/ are your livelihood activity(s) seasonal? Yes [ ] No [ ]

If yes, when is the peak season?……..

When is the off- season? ……..

(xiv) What is your annual income (in naira)?…….....

(xv) What benefits (forest products) do you derive from the forests?

Please list ……

…….....

……..

……..

.....…….

(xvi) Do forest resources contribute immensely to your annual income? Yes [ ] No [ ]

(xvii) What is your estimated total expenditure and income for the past five years?

Year	Total expenditure(cost)	Total income (naira)
2007		
2006		
2005		
2004		
2003		

C. SOCIO-ECONOMIC WELLBEING

(xviii) Household expenditure

How much in Naira does your household spend on the following items in a month?

Item	Amount spent (Naira)
Food, condiments and drinks	
Clothing and footwear	
Rent for tenants only	
Health and medical care	
Children education	
Fuel and lighting	
Transportation	
Remittances	
Others; please indicate	

(xix) What energy sources do you use for cooking?

Energy source	Yes	No
Gas Kerosene stove Electricity Saw dust Fuelwood Others; please specify		

(xx) If fuelwood is your source of energy for cooking, how do you obtain it?……

……

(xxi) Who collects fuelwood for your household? (a) Adult female [ ] (b) Adult males [ ] (c)Children only [ ] (d)Male and female adults (e) Others; please specify.

……

……

(xxii) How long does it take an adult to collect fuelwood either by walking or by boat?

…… hours.

(xxiii) What proportion of fuelwood that your household uses do you harvest from your own land? (a) Almost all [ ] (b) More than half [ ] (c) About half [ ] (d) less than half [ ] (e) Very little[ ] (f) None [ ]

(xxiv) Do you ever purchase fuelwood? Yes [ ] No [ ]

If yes, how much do you spend weekly on fuelwood?…….....

(xxv) What type of housing unit is this? (a) Flat [ ] (b) Room and parlour [ ] (c) Single rooms [ ] (d) Hut [ ]

(xxvi) What is the quality of construction of the house? (a) Block with zinc roof [ ] (b) Mud with zinc roof [ ] (c) Mud with thatch roof [ ] (d)Wood and thatch construction [ ]

(xxvii) How much would you have paid as rent, if you presently live in your house or a house you do not pay for? ……....

(xxviii) How many times do you eat daily in this household? Please specify……..

(xxix) What kind of toilet facility do you have? (a) Water cistern [ ] (b) Pit toilet [ ] (c) Bucket latrine [ ] (d) Toilet on water body [ ]

(xxx) What is your source of drinking water? (a) Tap water [ ] (b) Bore hole [ ] (c) Well [ ] (d) Stream [ ] (e) Others; please specify ……

……

(xxxi) How far do you walk to get your drinking water? …….meters.

(xxxii) Which is your first point of call when a member of your household is sick? (a) Clinic [ ] (b) Hospital [ ] (c) Dispensary [ ] (d) Native doctors / traditional healers [ ] (e) Itinerant drug dealers [ ]

(f) Others please specify ……..

(xxxiii) What are the distances of these places to your house?

Place	Distance (meters)
Clinic	
Hospital	
Native doctor/traditional healers	
Itinerant drug sellers	

(xxxiv) What is the source of lighting for your house? (a) Electricity [ ] (b) Kerosene lamp [ ] (c) Candle light [ ] (d) Oil lamp [ ] (e) Others; please specify……..

……

(xxxv) Which of these assets does your household possess?

Assets	Yes	No
Bicycle		
Motocycle		
Building		
Extra land		
Household business		
Share certificate		
Bank savings		
Wooden Boat		
Speedboat		

D. MILITATING FACTORS

(xxxvi) What factors militate against the long term continuity of your livelihood activities in this community? (a) Poor health facilities [ ] (b) Low income from activities [ ] (c) Fast disappearing forest and wildlife resources [ ] (d) Coastal erosion problem [ ]

(e) High cost of water transportation [ ] (f) Poor market access [ ] (g) High investment cost [ ] (h) Poor accessibility to forest resources [ ] (i) Very strict forest and wildlife regulations [ ] (j) Regular communal clashes/ conflicts [ ] (k)Oil spillage [ ]

Others; please specify ……...…….....

……..…

……..…

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E. CONFLICTS OVER RESOURCE USE

(xxxvii) Are there any conflicts between users of various forest resources in the Akassa Forests? Yes [ ] No [ ]

If yes, please state the nature of the conflict(s) with details on the forest resource involved……

……...…

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……...

(xxxviii) What are your general opinions on sustainable livelihoods and the need for environmental conservation in the Akassa forest communities? ……

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THANK YOU

APPENDIX 2

Benefit- Cost analysis for selected livelihoods in the study area

BASKET WEAVING						
Year	Benefit	Cost	DF@14%	Discounted benefit	Discounted Cost	B/C
1	120000	22000	0.877193	105263.2	19298.25	
2	121800	23452	0.769468	93721.14	18045.55	
3	123627	24999.83	0.674972	83444.7	16874.17	
4	125481.4	26649.82	0.59208	74295.07	15778.83	
5	127363.6	28408.71	0.519369	66148.68	14754.59	
				422872.7	84751.4	**4.989567**

FISHCARD WEAVING						
Year	Benefit	Cost	DF@14%	Discounted benefit	Discounted Cost	B/C
1	96000	18000	0.877193	84210.53	15789.47	
2	97440	19188	0.769468	74976.92	14764.54	
3	98901.6	20454.41	0.674972	66755.76	13806.14	
4	100385.1	21804.4	0.59208	59436.05	12909.95	
5	101890.9	23243.49	0.519369	52918.94	12071.94	
				338298.2	69342.05	**4.878687**

LOGGING						
Year	Benefit	Cost	DF@14%	Discounted benefit	Discounted Cost	B/C
1	250000	78000	0.877193	219298.2	68421.05	
2	253750	83148	0.769468	195252.4	63979.69	
3	257556.3	88635.77	0.674972	173843.1	59826.62	
4	261419.6	94485.73	0.59208	154781.4	55943.14	
5	265340.9	100721.8	0.519369	137809.7	52311.74	
				880984.9	300482.2	**2.931903**

TIMBER HARVESTING						
Year	Benefit	Cost	DF@14%	Discounted benefit	Discounted Cost	B/C
1	600000	230000	0.877193	526315.8	201754.4	
2	609000	245180	0.769468	468605.7	188658	
3	618135	261361.9	0.674972	417223.5	176411.8	
4	627407	278611.8	0.59208	371475.3	164960.5	
5	636818.1	297000.1	0.519369	330743.4	154252.6	
				2114364	886037.4	**2.386314**

FUELWOOD COLLECTION						
Year	Benefit	Cost	DF@14%	Discounted benefit	Discounted Cost	B/C
1	180000	34000	0.877193	157894.7	29824.56	
2	182700	36244	0.769468	140581.7	27888.58	
3	185440.5	38636.1	0.674972	125167.1	26078.27	
4	188222.1	41186.09	0.59208	111442.6	24385.47	
5	191045.4	43904.37	0.519369	99223.01	22802.55	
				634309.1	130979.4	**4.842815**

WINE TAPPING						
Year	Benefit	Cost	DF@14%	Discounted benefit	Discounted Cost	B/C
1	100000	21000	0.877193	87719.3	18421.05	
2	101500	22386	0.769468	78100.95	17225.3	
3	103022.5	23863.48	0.674972	69537.25	16107.17	
4	104567.8	25438.47	0.59208	61912.55	15061.61	
5	106136.4	27117.4	0.519369	55123.9	14083.93	
				352394	80899.06	**4.355971**

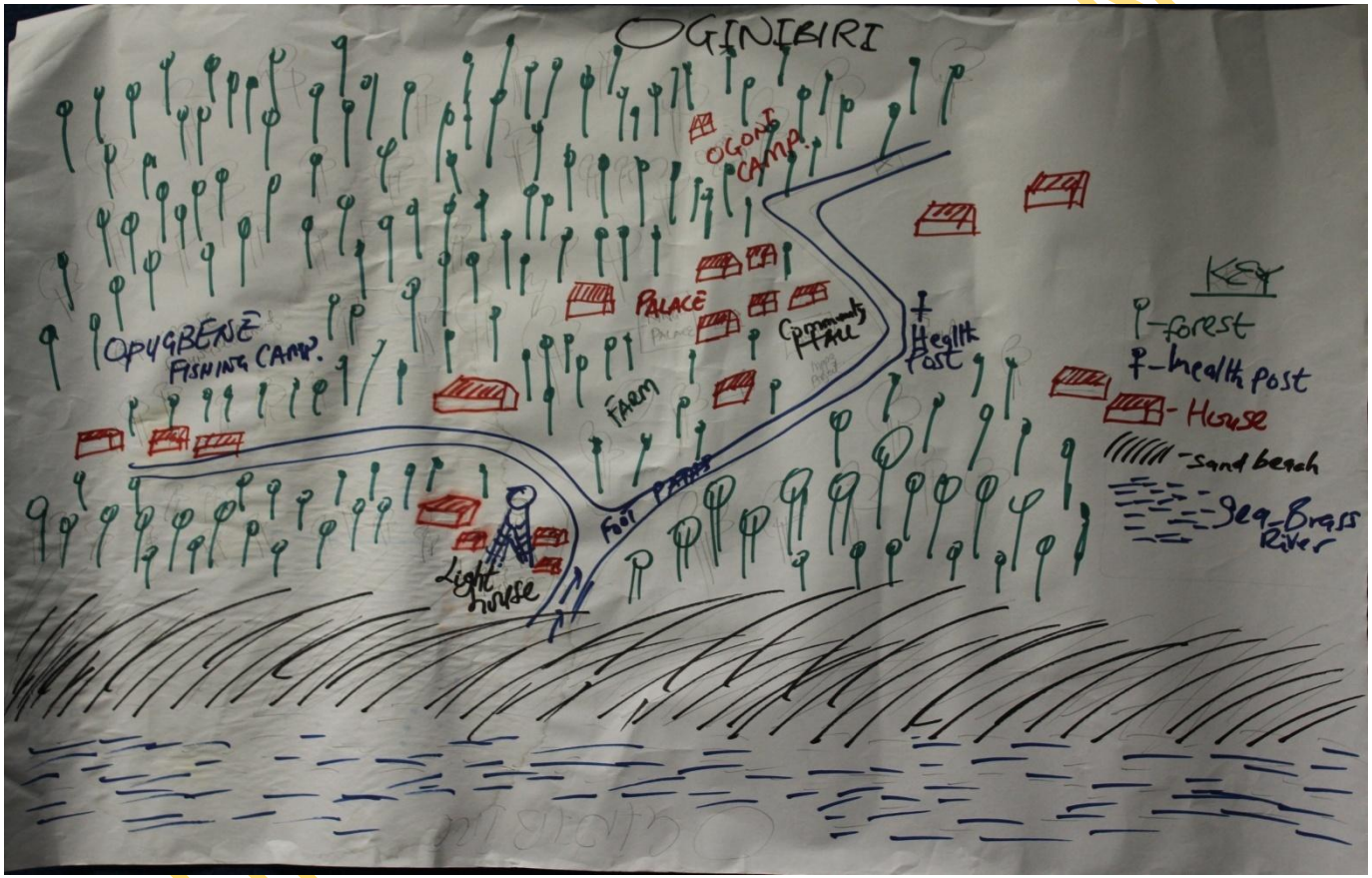
APPENDIX 3

Kongho Community Map

APPENDIX 4

Fishtown Community Map

APPENDIX 5



Oginibiri Community Map