PHD DISSERTATION

THE ROLE OF ENVIRONMENTAL VALUES AND ATTITUDES OF GHANAIAN COASTAL WOMEN IN NATURAL RESOURCE MANAGEMENT

A thesis approved by the Faculty of Environmental Sciences and Process Engineering at the Brandenburg University of Technology in Cottbus in partial fulfilment of the requirements for the award of the academic degree of PhD in Environmental and Resource Management

By

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DECLARATION

I, Elaine Tweneboah hereby declare that this thesis is written independent of any unauthorised help. All secondary material used have been duly acknowledged. The thesis is wholly mine and has not been part of any presentation for any other qualification in its present form or similar version.

Elaine Tweneboah
B.Sc. (Hons.), Dip. ed., MPhil.

DEDICATION

To my husband Mr. Theophilus Odartey Lawson with whose immense love and support I dare to dream, whilst making sure of the more important things in life!

To my children Lana Lamley Lawson and Richard Lante Lawson for giving me the strength to face each day.

To my parents Dr. Charles Kwame Tweneboah and Mrs Comfort Tweneboah for having me.

To my sisters Abigail and Carolyne Tweneboah for going the extra mile with me.

ABSTRACT

Over the last decade or so, there has been an increasing need to acknowledge the role played by local resource users in environmental decision making and to incorporate their perceptions in the management of natural resources. This has led to the development of various methods of assessing environmental attitudes and of natural resource valuation. Most of these studies have been conducted in developed countries and have utilised economic methods of valuation.

This study highlights the environmental attitudes and values of a very important group of stakeholders - women - and the significance of taking these into consideration in the management of local coastal natural resources. Using respondents from two Ghanaian coastal communities, Bortianor and Moree, the study also investigated poverty-coastal natural resource linkages and how this knowledge can be used to improve Natural Resource Management in Ghana. In proposing specific policy options for managing the coastal environment an examination of formal, informal institutional and legal framework was also done.

Primary data was collected by means of focus group discussions, personal interviews and participant observations. A total of 304 women (151 from Bortianor and 153 from Moree) took part in the study. The results showed that the study communities had poor access to basic amenities such as potable water, schools, health facilities as well as basic sanitation services. Their livelihood patterns revolve around the availability of coastal natural resources such as fish and fuel wood.

The attitudinal scale used to assess environmental attitudes achieved adequate internal consistency with Cronbach's (1951) Alpha reliability coefficients of 0.729 in Bortianor and 0.735 in Moree. The environmental attitudes of respondents were overwhelmingly positive; this however did not match the state of affairs in the area. The study showed that positive attitudes do not always result in pro-environmental behaviour. In the study areas poverty, low educational levels and other social and cultural practices could also influence the ability of respondents to translate the generally positive environmental attitudes into positive environmental action.

The section on environmental values assessed the environmental values of respondents through the relative importance they placed on the different benefits derived from coastal natural resources. It also prioritised environmental issues or concerns in the study areas from the perspectives of the respondents. Rather than use a simple ordinal ranking of all objects, the paired comparison approach was used. The study showed that in both areas respondents placed the greatest importance on the coastal natural resources as sources of wealth creation and food. When it came to environmental concerns, it was not surprising that issues of safe drinking water, available fish and good sanitation were most important to respondents.

From the results it was argued that since coastal natural resources as sources of food and income ranked highest, developing activities and policies that add value to the fishery industry, generate income and improve the standard of living of respondents would be most effective. Improving their standard of living could shift their focus from more utilitarian values to that of more pro-natural resource values. After examining existing institutional capacities and respondents' perceptions of who should manage local coastal natural resources, the study concludes by using the findings to make some practical policy recommendations.

ZUSAMMENFASSUNG

Im Verlauf des letzten Jahrzehnts ist ein zunehmendes Bedürfnis eingetreten, die Rolle, die von den Nutzern örtlicher Ressourcen bei der Entscheidungsfindung in Umweltfragen gespielt wird, wahrzunehmen und ihre Bedürfnisse in das Management natürlicher Ressourcen einzubeziehen. Das hat zur Entwicklung verschiedener Methoden der Beurteilung von Umwelteinstellungen und der Bewertung natürlicher Ressourcen geführt. Die meisten dieser Studien wurden in hochentwickelten Ländern durchgeführt und verwendeten dabei ökonomische Bewertungsmethoden.

Diese Studie unterstreicht die Umwelteinstellungen und –werte eines sehr wichtigen Personenkreises der Akteure – der Frauen – und die Bedeutung, diese Gruppe beim Management der örtlichen, natürlichen Ressourcen der Küste in Betracht zu ziehen. Unter Einbeziehung von Befragten aus zwei ghanaischen Küstengemeinden, Bortianor und Moree, untersuchte die Studie auch Verflechtungen zwischen Armut und natürlichen Ressourcen der Küste und die Art und Weise, wie dieses Wissen eingesetzt werden kann, um das Management natürlicher Ressourcen in Ghana zu verbessern. Es wurden spezifische Optionen einer Strategie zum Management der Küstenumwelt vorgeschlagen und daraufhin auch eine Untersuchung des formellen und informellen, institutionellen und gesetzlichen Rahmens durchgeführt.

Die Primärdaten wurden mittels Diskussionen mit der Zielgruppe, persönlichen Befragungen und Beobachtungen der Teilnehmer erfasst. Insgesamt 304 Frauen (151 von Bortianor und 153 von Moree) nahmen an der Studie teil. Die Ergebnisse zeigten, dass die Gemeinden, die in die Studie einbezogen wurden, unzureichenden Zugang zu den fundamentalen Annehmlichkeiten, wie Trinkwasser, Schulen, Gesundheitseinrichtungen sowie grundlegenden sanitären Leistungen hatten. Ihre Existenzmuster drehten sich um die Verfügbarkeit der natürlichen Ressourcen der Küste, wie Fisch und Brennholz. Die Umwelteinstellungen der Antwortender war überwältigend Positiv und; die natürlichen Ressourcen der Küste als Quelle für Nahrung und Einkommen den höchsten Stellenwert haben.

Die Ergebnisse sprachen dafür, dass Entwicklungsaktivitäten und Strategien, die zu einer Wertschöpfung in der Fischereiwirtschaft führen, Einkommen erzielen und den Lebensstandard der Befragten verbessern, am effektivsten sein würden, da die natürlichen Ressourcen der Küste als Quelle für Nahrung und Einkommen den höchsten Stellenwert haben. Die Verbesserung des Lebensstandards der Befragten könnte ihren Schwerpunkt von mehr praktischen Werten in Richtung zu Werten, die mehr auf natürliche Ressourcen gerichtet sind, verlagern. Nachdem die vorhandenen institutionellen Kapazitäten und die Auffassungen der Befragten auf die Frage, wer das Management der örtlichen, natürlichen Ressourcen der Küste durchführen sollte, untersucht worden waren, schließt die Studie damit, dass die Ergebnisse dafür eingesetzt werden, um einige praktische Empfehlungen für die Strategie zu geben.

Stichworte:

Küste, Frauen, Ghana, Management natürlicher Ressourcen, Umwelteinstellungen, Umweltwerte.

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LIST OF ACRONYMS

CBD	Convention on Biological Diversity
CBFMC	Community-Based Fisheries Management Committee
CBOs	Community Based Organisations
CWIQ	Core Welfare Indicators Survey
CWTP	Consultations With The Poor
DA	District Assembly
DEMCs	District Environmental Management Committees
DFID	Department For International Development
EBM	Ecosystem-Based Management
EM	Ecosystem Management
EPA	Environmental Protection Agency
EPC	Environmental Protection Council
FBOs	Faith Based Organisations
FCUBE	Free Compulsory Universal Basic Education
FMP	Fishery Management Plan
FSCBP	Fisheries Sub-sector Capacity Building Project
GAPVOD	Ghana Association of Private Voluntary Organisations in Development
GDHS	Ghana Demographic Health Survey
GDP	Gross Domestic Product
GLSS	Ghana Living Standards Survey
GOG	Government of Ghana
GPRS I	Ghana Poverty Reduction Strategy
GPRS II	Growth and Poverty Reduction Strategy
IFAD	International Fund for Agricultural Development
KVIP	Kumasi Ventilated Improved Pit
MDAs	Ministries, Departments and Agencies
MDGs	Millennium Development Goals
MESS	Ministry of Education, Science and Sports

MEST	Ministry of Environment Science and Technology
MLGRDE	Ministry of Local Government, Rural Development and Environment
MMDAs	Metropolitan, Municipal and District Assemblies
MOWAC	Ministry of Women and Children's Affairs
NDPC	National Development Planning Commission
NEAP	National Environmental Action Plan
NEPAD	New Partnership for Africa's Development
NFED	Non-Formal Education Division
NGO	Non-Governmental Organisation
NUENGO	National Union of Environmental Non Governmental Organisations
R & DPCU	Regional and District Planning Co-ordinating Unit
RCCs	Regional Coordinating Councils
SEA	Strategic Environmental Assessment
SFLP	Sustainable Fisheries Livelihoods Programme
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNICEF	United Nations Children Emergency Fund
WSSD	World Summit on Sustainable Development

CHAPTER ONE
INTRODUCTION

1. Introduction to chapter

This chapter introduces the study. It provides a background to the study and states the problems being investigated. It also provides information on the coastal zone of Ghana, highlighting some of the ecological and socio-economic problems occurring here.

1.1 Background to study

1.1.1 Coastal zones- ecosystems under pressure

The world's coastal zones contain a large part of the world's population – about 21% and 37% of global population are reported to live within 30 and 100 km from the sea, respectively (Cohen et al. 1997). In addition some of the world's most productive ecosystems such as sea grasses, mangroves and coral reefs occur here (UNEP/MAP/PAP, 1999). For example many subsistence and commercial activities are supported by mangroves. They provide protection of the coastline from erosion and storm surges (UNEP, 2007).

In many parts of the world coastal zones are under pressure especially from developmental activities and rapid population growth. This often leads to environmental degradation, unsustainable[1] use and increasing poverty. There are also many African economies that depend substantially on natural resources such as coastal ecosystems and marine biodiversity. According to the Action Plan of the Environment Initiative of the New Partnership for Africa's Development (NEPAD), in the 32 coastal countries in Sub-Saharan African, more than 50% of the population live within 100 km of the coast (NEPAD, 2003). According to the report, in countries such as Ghana, Benin, Togo, Sierra Leone, and Nigeria, most of the economic activities that form the backbone of the

[1] There are many definitions of sustainable development. However, the definition of the United Nations Environmental Programme (UNEP), namely "development that ensures that the use of resources and the environment today does not restrict their use by future generations", is what is used in this thesis.

national economies are located within the coastal zone. It is estimated that over 40% of Africa's population derive their livelihood from coastal and marine ecosystems; a percentage that continues to increase with current migration and demographic patterns (NEPAD, 2003).

However, over the past decades the coastal natural resources of Africa have been some of the most affected by ecological and socio-economic problems. The main environmental problems and threats to coastal and marine natural resources in Africa have been from anthropogenic sources. These include pollution, coastal habitat change and modification, stress on ecosystems, fisheries and biodiversity degradation, mining and oil exploration activities and global issues of climate change and sea-level rise. Among the socio-economic issues are poverty (sometimes resulting from the unequal distribution of the natural resource benefits), urbanisation, and population growth (NEPAD, 2003). For example an estimated 38% of coastal ecosystems such as mangrove swamps and coral reefs, including 68% of marine protected areas are under threat from developments such as ports and the growth of coastal settlements and their sewage discharges (UNEP, 2002). Furthermore, almost a fifth of the world's mangroves are found in Sub-Saharan Africa. These are in moderate decline, with average estimates reducing by a quarter between 1980 and 2006 (UNEP, 2007).

1.1.2 Issues affecting the coastal zone of Ghana

The most commonly cited definition of the coastal zone of Ghana is found in Laing (1991) where it is defined a "as the band of dry land and adjacent ocean space (water and submerged land), in which land ecology directly affects the ocean space ecology and vice versa" (Figure 1.1). The land area of the coastal zone of Ghana is also defined as the area below the 30 m contour and covers about 7% (16,240 km^2) of the total area of Ghana. It has a 18,095 km^2 continental shelf area and the fifth largest Exclusive Economic Zone (EEZ) in West Africa with an area of 216,867 km^2 (Earthtrends, 2003; Directorate of Fisheries, 2003) (Table 1.1).

Ghanaian coastal ecosystems provide unique services which vary from place to place. Important coastal species such as waterfowl, crabs, shrimps, marine turtles and juvenile

stages of commercial fishes depend on these ecosystems for physical habitats and nursery grounds. These habitats include lagoons, marshes, estuarine swamps together with the intervening interfluve areas (Laing, 1991; Clark, 1992).

However the main economic activity in the coastal zone of Ghana is fishing and majority of its residents have their lives revolving around this industry. The sector contributes about 1.7% to the country's Gross Domestic Product (GDP) (UN, 2002). In many coastal areas the fishery sector drives the local economy and a decline in the ability of the sector to provide employment and income threatens the very survival of community members (Campbell and Townsley, 1995; Odotei, 1995). It is estimated that there are over 300 different species of commercially important finfish, 17 species of cephalopods, 25 species of crustacean and three turtle species occurring in Ghana (Directorate of Fisheries, 2003).

Table 1.1 Some statistics of the coastal zone of Ghana

	Ghana	**Sub-Saharan Africa**	**World**
Length of coastline {a} (km)	553	63,124	1,634,701
Population within 100 Km of the coast	42 %	-	39 %
Area of continental shelf (km^2) {b}	18,095	987,021	24,285,959
Territorial sea (up to 12 nautical miles) (km^2)	11,890	871,895	18,816,919
Number of Mangrove Species	6	17	70
Average Annual Capture (excludes aquaculture) in metric tons: Marine Fish, 2000	374,229	-	84,411,066
Claimed Exclusive Economic Zone (km^2)	216,867	7,866,074	102,108,403

Source: After EarthTrends, 2003

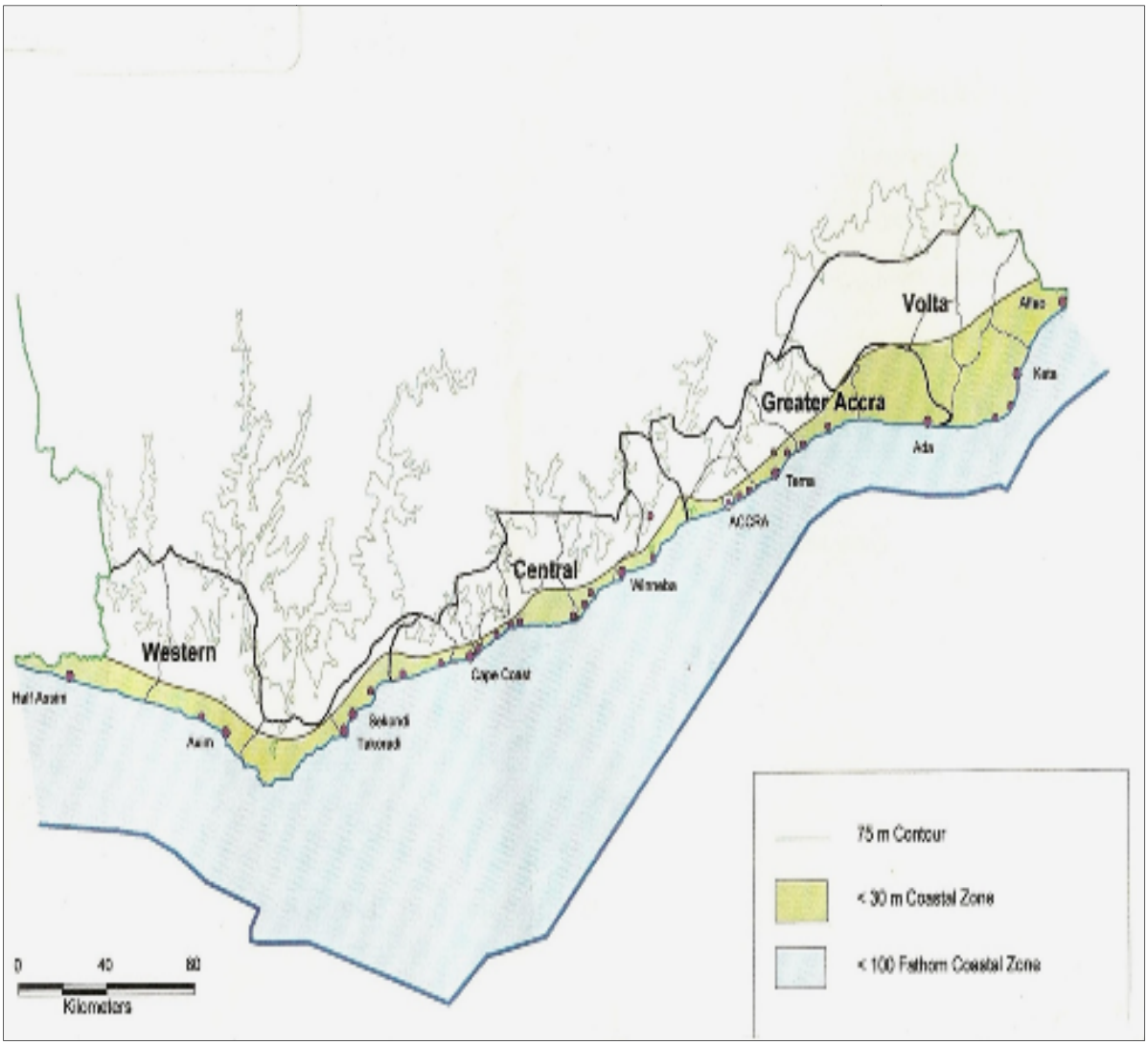


Figure 1.1 Map showing the coastal zone of Ghana

Source: World Bank, 1997

Apart from fishing, the coastal zone offers economic and cultural benefits to residents and non residents. These include food, meat, fuel wood, household materials such as thatch, building poles, mats and ropes, salt and medicines (Laing, 1991). In the last decade or so, tourism has been one the fastest growing sectors of the Ghanaian economy. It is currently Ghana's third largest foreign exchange earner (GTB, 2000), with the coastal zone playing an important role. In addition, with the discovery of crude oil in the Central region of Ghana oil drilling is expected to start within the next decade. This activity is

expected to change the ecological, social, cultural and economic profile of the coastal zone of Ghana. The issues directly affecting the coastal zone of Ghana include:

- Population increases and poverty;
- Loss of habitat and land through coastal erosion;
- Wetland and mangrove degradation;
- Fisheries degradation;
- Poor access to safe drinking water;
- Poor sanitation;
- Industrial pollution of land;
- Water pollution.

Population increases and poverty

The population of the coastal zone of Ghana continues to increase as the available natural resources decrease. The coastal regions are the Western, Central, Greater Accra and Volta Regions of Ghana which represent about 6.5% of the area of the country. About a quarter of the nation's population are reported to live here (World Bank and EPA, 1995), with an average population density of 263 per km^2 as against the national density of 67 per km^2. The population is concentrated within the main urban centres namely Accra-Tema, Secondi-Takoradi and Cape Coast. Population increases in the coastal zone brings more people into the vicinity of sensitive ecosystems (Hunter, 2000).

Loss of land and habitat through erosion

Coastal erosion in Ghana occurs both naturally and as a result of human influences (World Bank and EPA, 1995). Natural erosion and sedimentation processes include the scouring effects of a high wave energy environment, strong littoral transport and a subsiding coastal plate (Ly, 1980). The problem of erosion is most profound along the eastern coastline where erosion rates exceed 1.5m per annum (Laing, 1994). However, river-dam construction is also a major cause of erosion since it alters the sediment discharge and flow rates of the river systems considerably (World Bank, 1996; Armah and Amlalo, 1998). Another example of human interference is materials collection such as sand winning from the shore zone.

Wetland and mangrove degradation

The most developed mangroves are found in the western part of the country along the low-lying coastal belt between Côte d'Ivoire and Cape Three Points. They are primarily associated with the extensive lagoons (UNEP, 2007). Six species of mangroves found in Ghana are *Acrostichum aureum*, *Avicennia germinans*, *Conocarpus erectus*, *Laguncularia racemosa*, *Rhizophora harrisonii*, and *Rhizophora racemosa* (Table 1.2).

Table 1.2 Mangrove area estimates in Ghana

Year	1980	1990	1997	2000	2005	2006
Area (km^2)	181	168	214	138	124	137

Source: UNEP, 2007

The open lagoons tend to be dominated by *Rhizophora racemosa*, whilst closed lagoons with an elevated salinity contain *Avicennia germinans*, *Conocarpus erectus*, *Laguncularia racemosa* and *Acrostichum aureum* (UNEP, 2007). Wetlands and mangrove provide a number of vital ecosystem functions. In addition the products they provide can be for human use at the subsistence, commercial, recreational levels. The primary causes of wetlands and mangrove degradation can be linked to activities such as exploitation of fish, crabs and oysters, fuel wood gathering, salt extraction, urban pollution and urban encroachment (World Bank, 1996).

Fisheries degradation

The fishery industry not only employs many people; it is an important source of protein thereby playing a crucial part in food security in the country. At the national level, the sector contributes significant to the Gross Domestic Product (GDP) and foreign exchange earnings of the country. For example in 1998 it contributed 5% of the country's GDP. However this figure is reportedly on the decline and was estimated to contribute 4.3% of GDP in the year 2004. At the community level artisanal fishermen's incomes have also declined (UNDP/ISSER, 2001; Directorate of fisheries, 2003).

The reasons for the general decline are believed to be poor resource management, increased competition, rising input costs, the depletion of resources, loss of biodiversity, habitat destruction, high poverty, the open access of coastal resources and pollution (Directorate of Fisheries, 2003; UNEP, 2007).

Poor access to safe drinking water

According to the Ghana Environmental Action Plan Vol. 1 (1991), a fundamental principle from the environmental standpoint should be that water must be available in a potable form to the entire population, and that its availability on a sustainable basis should be guaranteed (Laing, 1991). Households without access to piped water tend to rely on a variety of less reliable and unhygienic sources leading to a rise in water-borne diseases (Table 1.3)

Table 1.3 Sources of drinking water in Ghana

Source of drinking water	Ghana	Urban	Rural
Pipe-borne	41.6	80.3	18.8
Well	33.9	10.8	47.2
Natural sources	24.6	8.8	33.9

Source: Ghana Living Standards Survey 4

Poor sanitation

Poor sanitation is perhaps the most widespread and pervasive of all the problems affecting the coastal zone of Ghana (Armah and Amlalo, 1998; Gordon and Ibe, 2006). It creates unsanitary conditions and also visually pollutes the coastal ecosystem and lowers the aesthetic value of coastal natural resources. It can also lead to contamination of surface waters particularly in high density, low-income areas such as along the coast (Gordon and Ibe, 2006; Drechsel et al. 2007).

Industrial Pollution

The main producers of industrial waste include the textile, food, petroleum refinery and processing industries. It has been estimated that 60% of all manufacturing industries are located in the Accra-Tema metropolis, which covers less than 1% of the area of Ghana. (Armah and Amlalo, 1998; Gordon and Ibe, 2006). Over 80% of Ghana's international trade is handled by the country's deep water ports located in Tema and Takoradi. The Tema Port is the bigger of two sea ports. It has water-enclosed area of 1.7 million m^2 and a total land area of 3.9 million m^2. Most of the country's chief export, cocoa, is shipped from Tema (OTAL, undated). It has become an ideal port for the handling of transit cargo for the landlocked countries of Burkina Faso, Mali and Niger. On the other hand, Takoradi is Ghana's main export port with around 500 vessel calls per year handling 65% of Ghana's exports. Main commodities are manganese, bauxite, timber and cocoa. Estimates put cargo coming in and going out of both the Tema and Takoradi ports in 2006 at an all-time high of 13.4 million tons, up from 4.9 million tons recorded a decade earlier (OTAL, undated).

For now the potential impacts of oil spills and their impacts are is usually associated with oil distribution by ocean currents and along busy oil tanker routes (Laing, 1991). Oil pollution damages coastal habitats and living resources such as commercial fish stocks, reducing catches and the incomes derived from them.

Water pollution

Research has shown that water quality in the peri-urban areas has fallen as increasing demands on waste management systems cannot cope with urbanisation. Household discharge of pathogens is the dominant source of pollution. Besides pathogens, urban wastewater also contains nutrients (Drechsel et al. 2006). The use of polluted water in irrigation poses high risks to both farmers and consumers (Drechsel et al. 2006).

Quite a number of efforts been established in attempt to ameliorate the impacts of some of the above mentioned environmental and socio-economic problems. However despite the interventions (sometimes at the policy level) coastal natural resources are continually being overexploited and the effects of this are felt more strongly by certain groups than others (Tweneboah, 2003). For example the depletion and degradation of natural

resources eventually leads to resource scarcity and worsens the plight of poor people, particularly the rural poor, who depend mostly on natural resources for their livelihood (White and Hunter, 2005).

1.2 Statement of problem

This chapter has highlighted some environmental as well as socioeconomic issues in the coastal zone of Ghana, which also affect the management of coastal natural resources. Whilst it is worthy to acknowledge the broad institutional arrangements and legal framework put in place, it is also important to appreciate that the very problems these are meant to solve in the coastal zone worsen daily.

This study contends that the problems facing the coastal zone persist mainly because the efforts put in place have not taken into consideration the relationships between coastal natural resources and their socio-economic importance. Effective coastal Natural Resource Management (NRM) needs to take into consideration not only the environmental significance but also the social, cultural and economic contributions of natural resources. The attitudes and values of resource users and stakeholders are thus fundamental in this respect.

Men and women have different gender based roles and responsibilities in their households and communities. Women form a great proportion of resource users in the coastal zone of Ghana and also form the majority of the poor in Ghana. Their daily activities are both crucial for the survival of the family and bring them in close contact with the biophysical environment[2]. A study detailing the environmental attitudes and values of primary coastal natural resource users such as women and how this can be used to recommend practical ways of natural resource management is a requirement for the sustainable management of the coastal natural resources in Ghana.

[2] The term environment was defined "as all the conditions, circumstances, and influences surrounding, and affecting the development of an organism (or living being) or a group of organisms" (Ceballos-Lascurain, 1996). In this research, emphasis will be placed on the natural environment.

1.3 Aims and objectives of study

This study highlights the environmental attitudes and values of a very important group of stakeholders – women and the significance taking these into consideration in the management of local coastal natural resources. It investigates poverty-coastal natural resource linkages and how this knowledge can be used to improve Natural Resource Management in Ghana. It also examines the feasibility of using the paired comparison method as an alternative methodology in assessing environmental values in a developing country setting.

The outcome of this research addresses the following specific objectives, which were to:

- Document how respondents construct and perceive poverty in their community;
- Elucidate the linkages between poverty and natural resource use in coastal environments;
- Assess the attitudes of respondents towards the current trends of natural resource degradation along the coast;
- Estimate environmental values of respondents in the study areas;
- Propose specific policy options for managing the coastal environment;
- Examine existing institutional and legal frameworks with regards to coastal NRM in Ghana and propose practical recommendations to improve coastal NRM within the study areas and beyond.

1.4 Impact and relevance of research

Broadly this research seeks to understand the importance of human environmental behaviour and how this affects natural ecosystems. Hence it provides information and recommendations that could be used to improve the management of coastal natural resources. It gives policy makers knowledge of environmental attitudes, values and behaviours of women as primary users of these natural resources. This information could contribute to the monitoring progress towards meeting goals in international agreements such as the Abidjan Convention, NEPAD and the Millennium Development Goals.

Since poverty alleviation ranks high among the objectives of many investors in NRM research, a better understanding poverty-NRM linkages is a crucial issue. Finally the

study increases understanding of the relevance of integrating environmental issues into development plans and policies such as the Ghana Poverty Reduction Strategies. It does it by emphasising the important role the environmental attitudes and values play in coastal NRM. It also shows how environmental and social issues such as poverty and educational levels are all intertwined. Whilst most studies assessing non-market environmental values in Ghana have used the contingency valuation method, this dissertation provides strategic information about assessing environmental values using a simplified paired comparison method.

1.5 Overview of dissertation

The Chapter 1 has provided an introduction to the research in terms of its rationale, aims and objectives, hypothesis and its relevance. Chapter 2 elaborates on the conceptual foundation for the study. The chapter begins by presenting some basic principles of NRM and explores why it is important to involve women. The chapter then examines the various definitions of poverty in literature and its linkages with NRM. Attitudes and values are then examined from different disciplines. The chapter ends with a discussion on the theory behind the chosen methods of evaluating environmental attitudes and values, namely the Likert scales and paired comparison method. Chapter 3 presents a background to the two coastal towns chosen for the case studies namely Bortianor and Moree. Chapter 4 focuses on the research methodology by explaining how the research design evolved. It also provides details of the experimental design, and the analysis of the various data obtained. The results of the study can be found in Chapter 5 to 8 (Table 1.4).

The background of the respondents and other basic information can be found in Chapter 5 whilst Chapter 6 provides a poverty profile of the respondents and examines poverty-coastal NRM linkages and its potential in assessing specific policy options available for managing coastal natural resources. Chapter 7 is divided into three main sections. The first section assesses respondents' attitudes and their knowledge of some global environmental issues such as climate change. The second section evaluates the environmental values of respondents and their environmental concerns whilst the last section uses the resulting environmental attitudes and values to recommend detailed strategy for an effective management of coastal natural resources.

Chapter 8 examines formal and informal institutions for natural resource management within the study areas and respondents' perceptions of who should have the foremost responsibility of managing coastal natural resources. The final chapter, Chapter 9 concludes the study, providing further recommendations and future research needs.

Table 1.4 Presentation of objectives of the study

Objectives	Chapter
Document how respondents construct and perceive poverty in their community	Chapter 6
Elucidate the linkages between poverty and NRM in coastal environments.	Chapter 6
Assess the attitudes of respondents towards the current trends of natural resource degradation along the coast.	Chapter 7
Estimate environmental values in the study areas.	Chapter 7
Propose specific policy options for managing the coastal environment.	Chapter 7
Examine existing institutional and legal frameworks with regards to coastal NRM in Ghana and propose practical recommendations to improve coastal NRM within the study areas and beyond.	Chapters 8 and 9

1.6 Definition of key terms as used in the study

Anthropocentric value theory: Confers value on human beings and regards all other things including other life forms as being only instrumentally valuable (Callicot, 1984). Hence humans are seen as separate from the natural world, with nature as an object of study and use.

Assigned values: This is the relative importance or worth of a particular object in a particular context (Brown, 1984).

Attitudes: Fishbein and Ajzen (1975) define an attitude as "a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given

object". An attitude can also be a positive or negative concern toward a particular group, institution, concept or social object (Ary et al. 1990).

Biocentric value theory: Places value on all living organisms. Argues that behaviour toward the environment should only be evaluated on how it affects all living things (including human beings).

Coastal zones: The broad interface between land and water where production, consumption and exchange processes occur at high rates of intensity (Laing, 1994).

Deep ecology: Focuses on the intrinsic value of nature and takes a holistic approach that emphasises ecosystems, species, and the planet as a whole. Asserts that humans are part of the natural world and of equal value with all other species (Kallof and Satterfield, 2005).

Ecocentric value theory: Ecocentrics believe that the ecosphere or global ecosystem has inherent value and must be appreciated for its own sake (Meyers, 2003).

Ecofeminism: It emphasises the similar ways nature and women have been conceptualised, devalued and oppressed.

Environmental attitudes: A collection of beliefs, affect and behavioural intentions a person holds regarding environmentally related activities and issues (Schultz et al. 2004).

Natural Resource Management: Decision-making by individuals and groups about natural resources allocated over time and space (Williams and Patterson, 1996).

Non-anthropocentric value theory: Proposes that some nonhuman species have some moral interests or value in themselves. Hence it confers intrinsic value at last to some living organism (Kallof and Satterfield, 2005).

Non-use values: These involve resources do not usually involve market purchases and may not involve direct participation. These values are sometimes referred to as passive

use values since they represent the resources' value to those who have not used, and may never use, the resources (Heyde, 1995; Chuenpagdee, 2003).

Poverty: From an income point of view, people are poor when they are in a state where their income (or consumption) is less than that required to meet certain defined needs (Sola, 2001).

Use values: Value derived from the actual use of a good or service. They result from current use of the resource and encompass the values humans extract from natural areas (Adamowicz, 1995).

Values: Rokeach (1973) defines values as "an enduring belief that a specific mode of conduct or end state is personally or socially preferable to an opposite or converse mode of conduct or end state of existence". Values can also act as "guiding principles in life which act as the foundation upon which an attitude towards a more specific object or behaviour is based" (Stern et al. 1995). These kind of values are also referred to as held values by Brown (1984).

Wilderness: A specific location, separate from and unaffected by humans.

CHAPTER TWO
LITERATURE REVIEW

2. Introduction to chapter

This chapter provides the theoretical framework for the study. It offers an extensive literature search into current empirical and theoretical knowledge in the research area. It begins by putting to the fore certain basic principles of NRM and explores its relationship with poverty. It is against this background that attitudes and values are examined from different disciplines. The chapter ends with a discussion on the theory behind the chosen methods of evaluating environmental attitudes and values.

2.1 Concepts of Natural Resource Management

In this dissertation, Natural Resource Management (NRM) will be used to refer to decision-making by individuals and groups about natural resources allocated over time and space (Williams and Patterson, 1996). NRM sometimes involves the control and manipulation of ecosystems (Schlaepfer, 1997). The term "ecosystem" has been defined in many ways. A relatively simple definition is found in Article 2 of the Convention on Biological Diversity (CBD). Here is it is defined as "a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit" (SCBD, undated). Chapter 18 of Agenda 21 recommends that strategies for the environmentally sound management of freshwater and related coastal ecosystems, including consideration of fisheries, aquaculture, animal grazing, agricultural activities and biodiversity are put in place.

The ecosystem approach proposed under the CBD is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Hence it encourages community involvement in the effective management of species and habitats (UNEP, 2000).

Ecosystem Management (EM) emphasises ecological interactions within an ecosystem, rather than human activities, and implies that it is possible to understand, control and manage entire ecosystems (Kappel et al. 2006). On the other hand, Ecosystem-Based Management (EBM) is an integrated, science-based approach to the management of natural resources that aims to "sustain the health, resilience and diversity of ecosystems while allowing for sustainable use by humans of the goods and services they provide" (Kappel et al. 2006). EBM's goals include learning how these biophysical and socio-economic spheres interact. It also includes understanding of the linkages among activities and social and ecological system components by using institutional and scientific ways of managing multiple human activities within entire ecosystems (Kappel et al. 2006). Understanding how humans interact with ecosystems is important because decisions on natural resource use and management are made in a social context (Savory, 1988).

NRM is achieved in a number of ways. One option is to focus on policies that promote conservation and more sustainable resource use. Another method is to involve the various stakeholders in NRM in the decision-making processes concerning the use, management and conservation of natural resources (Tyler, 2006). Issues of social, economic and environmental importance are intertwined and considering one in isolation could lead to unsuccessful NRM plans and strategies (Byron et al. 2004). For example, community involvement, their attitudes toward natural resources and economic benefits of natural resources directly or indirectly influence the way natural resources are managed. Conversely, changes in natural resources can affect social issues such as employment, spatial distribution and the type and number of social groups within a community. Byron et al. 2004 suggest steps for integrating social and economic factors into NRM planning (Table 2.1)

Table 2.1 Steps for integrating social and economic factors into NRM planning

Action	How?
Understand the socio-economic trends in the target area.	By means of both primary and secondary sources of data.
Select the most important social, environmental and economic issues.	Identifying and selecting the most important issues relevant to NRM outcomes through rankings and ratings.
Identify high priority issues and benchmark area's baseline situation.	Identifying the issues that are a high priority in the community and taking these into consideration NRM strategies. Benchmarking can be used to evaluate future changes in attitudes following an activity such as a public awareness campaign.
Assess likely impacts of NRM targets and estimate the potential impacts of the proposal.	Using social and economic data determine the likely positive and negative impacts of change.
Conduct detailed planning and analysis.	Analyse a range of regional NRM issues through input/output analysis, cost/benefit analysis, cost effective analysis, and multi-criteria analysis, or social impact assessment.
Recommend the best actions.	Weighing all of the impacts, benefits, and alternatives and using these to recommend an appropriate management action the social context. Once actions are underway, an effective monitoring and evaluation program should be maintained.
Overcome barriers and build bridges.	By conducting solid social and economic research to understand local constraints and tailoring NRM programs to fit area and region.

Source: Byron et al. 2004

When natural resources are used by different groups of people conflicts often arise. There is substantial literature on conflict management and NRM. These conflicts can take place at a variety of levels, from within the household to local, regional, societal, and global scales. In some cases egoism is developed as a strategy for survival.

According to Buckles (1999), conflicts occur when:

- There is scarcity and unequal distribution of natural resources and their benefits;
- Those with greater access and power over natural resource act egoistically;
- Communities establish an immediate logical connection between environmental degradation and the activities of certain social agents.

Conflicts are also common in areas where there are no clear property rights. Access to resources is not only based on one's productive activities and endowment but also one's legal, political and social position in the society (Verstegen, 2001). Property rights define who owns the property, who can use them and how. They can be privately or state owned, or held locally by communities. Where the rights to property are well defined by law or custom, people can be reasonably sure they will be able to use the resources indefinitely into the future (Grimble et al. 2002). This is especially so with Common Property Resources (CPRs)[3]. In such situations there may be no incentives to manage resources in the communal interest and open competition may lead to over-exploitation and degradation. In his article about the "Tragedy of Commons," Hardin (1968) attributed the reasons for overexploitation and degradation of common goods to the social nature of humans and recommended such resources to be privatised or protected by powerful governmental authorities.

Rural poor women are disproportionately affected by the degradation of natural resources because of their particular dependence on CPRs. For instance, they are primarily involved in the collection of fuel, fodder, and water (Agarwal, 2000; Beck et al. 2000). Not only do men and women differ in the way they use and manage environmental natural resources but they are also differently affected by the degradation of natural resources. The next section emphasises the relationships between women and the natural environment.

[3] Used in most literature alternatively with common-pool resource (CPR).

2.1.1 Women and Natural Resource Management

Increasingly, women's roles in managing natural resources are being highlighted in literature (Dankelman and Davidson, 1988; Dankelman, 2001). In Africa women produce 80% of the consumed food, in Asia this percentage is 60% and in Latin America 40% (Dankelman, 2001; Darimani, 2004). In certain regions, women are generally the most stable members of the community, as men often pursue work in distant locations, leaving women to safeguard the natural resources. In some cases women provide the backbone of the rural economy as is evident in much of Sub-Saharan Africa (Manuh, 1998).

The last few decades have seen more research being done on women and the natural environment. After the first United Nations Conference on Environment and Human Settlements in Stockholm in 1972, the Women's Decade (1975-1985) began. This decade ended during the UN Conference on Women in Nairobi in 1985 and the parallel Non Governmental Organisation (NGO) Forum. For the first time attention was asked for women's position in relation to environment and natural resources at the international level (Dankelman, 2001). During the process for the preparations of the United Nations Conference on Environment and Development (UNCED) in Rio 1992, many women's organisations and individuals played a major role in putting gender issues on the agenda and finally in Agenda 21. Again the multiple roles of women were highlighted. The Agenda 21 the Programme of Action devotes Chapter 24 to the need to recognise and increase women's participation in development. In particular the document stresses the need to raise the capacity of women to participate in environmental decision-making and to ensure that structures of decision-making facilitate this. In Section 24.2 (b)-(e), the following objectives are proposed for national governments:

- To increase the proportion of women decision makers, planners, technical advisers, managers and extension workers in environment and development fields;
- To consider developing and issuing by the year 2000 a strategy of changes necessary to eliminate constitutional, legal, administrative, cultural, behavioural,

social and economic obstacles to women's full participation in sustainable development and in public life;

- To assess, review, revise and implement, where appropriate, curricula and other educational material, with a view to promoting the dissemination to both men and women of gender-relevant knowledge and valuation of women's roles through formal and non-formal education, training institutions, together with NGOs.

The United Nations Fourth World Conference on Women in 1995 resulted in the "Platform for Action", with a special section (K) on Women and the Environment. This sections calls upon governments (at all levels), international organisations, NGOs and private sector institutions to:

- Involve women actively in environmental decision making as managers, designers, planners, implementers and evaluators of projects;
- Integrate gender concerns, perspectives in policies and programmes for sustainable development;
- Strengthen or establish mechanisms at the national, regional and international levels to assess the impact of development and environmental policies on women.

Beijing +5 (2000) recommends actions to:

- Adopt national legislation consistent with the Convention on Biological Diversity;
- Establish programmes and infrastructure that are gender sensitive to respond to disaster and emergency situations.

Other United Nations conferences and summits relevant for women and the environment include:

- United Nations Conference on Children in New York in 1990;
- The UN Conference on Human rights in Vienna in 1993;
- The UN Conference on Population and Development in Cairo in 1994;
- 5th Africa Regional Preparatory Conference on Women (Dakar) in1994;

- The UN Conference on Social Development in Copenhagen in 1995;
- The Millennium Summit, 2000;
- World Summit on Sustainable Development (WSSD), Johannesburg, South Africa 2002.

Reviewed literature explores the relationship between women and the natural environment in three main ways (Tweneboah, 2002). The first is the roles assigned to women, especially in highly gendered communities, by the society, which brings women in very close contact with natural resources. Some literature have particularly stressed that women's work is often linked to the environment (through subsistence agriculture, domestic chores and hired work such as sowing and weeding) and that much of this work is made harder through environmental degradation (Reardon, 1993). As Venkateswaran (1995) explains, in developing nations where issues of survival for many people are inextricably linked to the state of the natural environment, women interact extensively with the natural environment (World Bank, 1991).

The second relationship between women and the environment has been highlighted for the most part by ecofeminist[4] thought (Mies and Shiva, 1993). The term ecological feminism or "ecofeminism" was first coined by Françoise d'Eaubonne in 1974 and is now generally applied to analyses that combines environmental advocacy with feminist analysis. Ecofeminists argue that women have a natural tendency to care for the land and that the separation of humanity and nature is a result of patriarchal ideology (Salleh, 1993). It is from this background that Mellor (1997) argues that it is imperative to involve women in natural resource management because women hold a "privileged position". They cross boundaries between society-nature and public-private, and so constitute the foundation of a new ecological/social movement (Warren, 1994). The movement

[4] Ecofeminists view women's relation with the environment is either understood as biologically determined or as occurring from the historical development of patriarchal oppression (Mies and Shiva, 1993). Generally, ecological feminism (often shortened to ecofeminism) is categorised into two- cultural eco-feminism and social ecofeminism. Cultural ecofeminism links women and nature through the female reproductive functions whilst social ecofeminism links women with the natural environment by virtue of the fact that both share the experience of domination by men (Warren, 1994).

believes that a relationship exists between the oppression of women and the degradation of nature.

The third relationship is that men have conquered and dominated women and nature alike. Women are in a similar situation as "nature" in being portrayed as "victims of oppression" (Davion, 1994). This means that since women and the environment share the same position of being dominated and abused, they are in a better position than men to deal with environmental issues and tend to care more about the environment.

Hence, some authors have linked the violation of nature with the violation and marginalization of women, especially in the Third World (Shiva, 1989). Agarwal (1992) however warns that the fact that women within their own socio-economic classes occupy different positions from men is related to gender-roles and not to an inborn affinity with the environment. Wickramasinghe (1994) stresses that it is mainly a material interest in the well-being of their families which motivates women to become active in environmental struggles.

Although highlighting the comparison between women and the natural environment have been criticised (examples are Jackson, 1993 and Joekes et al. 1996), generally environmental policy makers have come to appreciate that women indeed do play a vital role in the management of natural resources. In addition they have a profound traditional and contemporary knowledge of the natural world around them. The exclusion of women from the management of these resources - through outright neglect or belief in the gender neutrality of projects - would thus be a recipe for project failure (World Bank, 1991).

2.2 Defining poverty

Poverty may be defined in several ways depending on the intended emphasis. It can be understood in absolute or relative terms. However it is commonly assessed by level of income or wealth. From an income point of view, people are poor when they are in a state where their income (or consumption) is less than that required to meet certain defined needs (Sola, 2001). A common measure of poverty is the number of people living on less than US$2 per day (Table 2.2). With this definition out of the world's more than 6 billion people, 2.8 billion live on less than US$2 a day, and 1.2 billion on less than US$1 a day

(DFID et al. 2002). About 46% of the population of Sub-Saharan Africa and 31% of South Asians are believed to live on less than a dollar a day (Chen and Ravallion, 2004).

Much debate has gone on about the sustainability of using such measures of poverty. This is because such metrics do not take into consideration what that income can buy. Especially for inter-country or inter-regional comparisons such definitions might not give accurate results. In addition whilst income-based metrics may be useful for assessing poverty levels in situations where people receive wages or salaries, they are less useful in rural locations or for those who are very poor (Grimble et al. 2002). Also there are significant differences between rural and urban poverty. Many of the rural poor for example depend heavily on natural resources, making extensive use of subsistence crops and products gathered from the natural environment. Ownership of land is another important issue here (Cavenddish, 2000). On the other hand, for the urban poor, issues such as potable drinking water, energy, sanitation and waste removal, drainage, and secure tenure are key concerns. In addition, issues such as anxiety, stress and corruption all impact peoples poverty levels. Poverty concerns also differ with gender. Poor women regard safe and physically close access to potable water, sanitation facilities, and abundant energy supplies as crucial aspects of well-being, reflecting women's primary role in managing the household (DFID et al. 2002; Sola, 2001).

Another weakness of income-based poverty assessment is that it does not show other factors often associated with poverty such as the prevalence of disease, low life expectancy, inferior housing and poor education and inadequate diet (Grimble et al. 2002). In consequence, broader definitions of poverty have been developed. According to Kwankye and Mba (2003), such definitions need to cover areas such as:

- People's inability to satisfy basic needs;
- Malnutrition;
- Income;
- Ill health;
- Insecurity;
- Lack of employment opportunities;

- Illiteracy and low level of education,
- Poor access to water and sanitation;
- Lack of shelter;
- Violence and crime;
- Lack of political freedom.

Table 2.2 Concepts and terms associated with poverty and its measurement

Absolute poverty	The degree of poverty below which the minimal requirements for consumption (or survival) are not met. Can be measured in monetary terms (e.g. the US$1 per day poverty line) or in terms of minimum calorific requirement plus essential non-food items. Indigence usually refers to those who do not have access to the basic necessities for human survival, while other forms of poverty refer to degrees of deprivation above that threshold.
Abject poverty	When households earn incomes insufficient to pay for the very basic necessities such as food, they are said to be living in abject poverty.
Extreme poverty	People living on less than 1$ per day.
Relative poverty	This reflects the distribution of poverty and levels of income inequality in a society. It may be defined as a ratio or proportion of absolute poverty to the average or total income.
Human Poverty Index (HPI) for developing countries	The HPI has been developed by UNDP as a composite measure of poverty assessment. It covers factors such as the number of people expected to die under 40 years, adult illiteracy, people without access to safe water or health services, and underweight children.

Source: After Grimble et al. 2002

It is estimated that one in five people in the world, two-thirds of them women, live in abject poverty. To address this problem, the world's governments committed themselves at the United Nations Millennium Summit to the Millennium Development Goals (MDGs), including the overarching goal of halving extreme poverty (by the year 2015 (DFID et al. 2002). The Ghana Poverty Reduction Strategy I (GPRS I), which is the blue print of the government's efforts towards poverty reduction in Ghana recognises poverty as multi-dimensional with complex interactive and causal relationships between the dimensions. Hence the document defines poverty as unacceptable physiological and social deprivation (NDPC, 2003). In addition the document points out that poverty may be caused or exacerbated by:

- Lack of macro-economic stability that erodes the resources of the poor through inflation and other variables;
- The inability of the national economy to optimise benefits within the global system;
- Low capacities through lack of education, vocational skills, entrepreneurial abilities;
- Poor health and poor quality of life;
- Low levels of consumption through lack of access to capital, social assets, land and market opportunities;
- Exposure to shocks due to limited use of technology to stem effects of droughts;
- Floods, army worms, crop pests, crop diseases, and environmental degradation;
- The lack of capacity of the poor to influence social processes, public policy choices and resource allocations;
- The disadvantaged position of women in society;
- Other factors leading to vulnerability and exclusion.

2.2.1 Dimensions of poverty in Ghana

According to the GPRS I, poverty in Ghana remains a predominantly rural phenomenon, although even urban areas in the poor savannah regions of the north experience high levels of poverty. Again perceptions of poverty often vary between rural and urban areas.

It has many dimensions and requires a range of indicators to inform the variety of policies needed to tackle the causes and mitigate the consequences of poverty (NDPC, 2003). Trends in consumption poverty in Ghana in the 1990s show that overall poverty levels decreased between 1991/92 and 1998/99 from 52% to 40% respectively. Extreme poverty declined from 37% to 27% over the same period. Evidence from the results of various Ghana Living Standard Surveys (GLSSs) conducted up to the fourth round indicates that poverty levels have been falling consistently. Results from the GLSS 5 conducted in 2005/2006 and cited in the Growth and Poverty Reduction Strategy (GPRS II) indicate that the proportion of Ghanaians described as poor in 2005/06 was 28.5%, falling from 39.5% in 1998/99. The proportion of persons described as extremely poor declined from 26.8% to 18.2% (Table 2.3). This is significant. However, rural poverty has deepened as inequality gaps have widened (Coulombe and Wodon, 2007).

Table 2.3 Poverty incidence by locality

Locality	Poverty[5]		Extreme poverty	
	1998/99 (%)	2005/06 (%)	1998/99 (%)	2005/06 (%)
Accra	4.4	10.6	1.9	5.4
Urban coastal	31.0	5.5	19.0	2.0
Urban forest	18.2	6.9	10.9	2.9
Urban savannah	43.0	27.6	27.1	18.3
Rural coastal	45.6	24.0	28.5	11.5
Rural forest	38.0	27.7	21.1	14.6
Rural savannah	70.0	60.1	59.3	45.4
All	39.5	28.5	26.8	18.2

Source: NDPC, 2007

[5] The Ghana Living Standards Survey of 1998/1999 draws from two nutrition-based lines of poverty. The poverty line is the consumption expenditure needed to achieve minimum nutritional needs. Overall poverty is based on an upper poverty line of GH¢90 per adult per year. Extreme poverty is based on a poverty line of GH¢70 per adult per year. (In 2007 GH¢ 1.450 = 1 €).

In order to empower and help the extremely poor, provide for their basic needs and to assist them move out of this state the Livelihood Empowerment Against Poverty (LEAP) programme was developed. In 2007, government allocated the sum of GH¢20 billion to support the programme and has earmarked another GH¢220 billion for 2008. It is a welfare programme, which is a component of the National Social Protection Strategy of the government. Proposed amounts of between GH¢8 and GH¢15 are to be disbursed each month. The programme is to be implemented nationwide from 2008 to 2012 and beginning with 15,000 households in 2008, scaling up to 164,370. The Ghana Living Standard Survey (GLSS) data, district poverty maps and the regional distribution of extreme poor are to be used to select poor households.

2.3 Poverty and natural resource linkages

According to the Brundtland report, poverty is a major cause and effect of global environmental problems. It is therefore futile to attempt to deal with environmental problems without tackling the factors underlying world poverty (World Commission on Environment and Development, 1987). The link between environment and poverty reduction is strong. Since the Rio Earth Summit in 1992, the importance of a sound environment to sustainable livelihoods has been widely acknowledged, particularly for the rural poor in Africa, Asia, and Latin America (UN, 1992). Although in the last two decades or so the numbers of people who depend directly on natural resources have decreased, millions of poor rural people still directly depend on them for their livelihoods (DFID et al. 2002). For example, current estimates cited in DFID et al. (2002) are that up to 1 billion people are affected by soil erosion and land degradation due to deforestation. Shortage of wood fuel imposes time and financial costs on poor households, as more women and children have to travel longer distances in search of wood fuels (DFID et al. 2002). In some African countries female-headed households are especially disadvantaged due to lack of access to productive resources or because they are denied their rights to own resources such as land (Sola, 2001).

Results from the Millennium Ecosystem Assessment in 2005 confirm that the burden of environmental decline affects the poor and that further degradation will increase the numbers of poor people (MEA, 2004). The current global food crises and environmental

problems are also set to hit the poor and those who depend on CPRs hardest. The links between poverty and the natural environment have been acknowledged for many years although obtaining empirical data to support this is sometimes complex task. There are a number of theoretical models put forward to support this. These include:

- Vicious circle model;
- Downward spiral model
- Environmental entitlement model;
- Household assets composition model.

2.3.1 Vicious circle model

According to this model, the natural environment can support only a limited number of people and beyond these limits exhaustion and degradation take place. Since poor people, particularly the rural poor, depend mostly on natural resources for their livelihoods, they tend to exploit natural resources to meet the increasing needs. This often leads to natural resources depletion and degradation which also leads to even deeper poverty (Gbadegesin and Mabawonku, 2002). Poverty is thus both the cause and result of environmental degradation, and environmental degradation is also a cause and result of poverty. This vicious circle is difficult to break (Sola, 2001). One way to break into this chain and avoid environmental degradation is through policies and programmes that alleviate rural poverty (Cleiver and Shreiber, 1994).

However, some researchers have described this model as simplistic and suggest that it sometimes leads to one dimensional policies that reduce poverty at the expense of the environment, or reduce degradation at the expense of poor people (Scherr, 1999).

2.3.2 Downward spiral model

The downward spiral model is based on the premise that poverty, especially rural poverty, together with population growth, is a major cause of degradation of the natural environment (Grimble et al. 2002). Like the vicious circle model, the downward spiral model also supposes that there are limits to the numbers of people that the natural

environment can support and beyond these limits exhaustion and degradation take place. In the face of scarce natural resources, growing populations have no alternative but to over-exploit and degrade the natural resources and environment on which they depend. This may become a downward spiral leading to further environmental degradation and a reduction in the land's carrying capacity and poverty (Grimble et al. 2002; Dasgupta, 1998).

2.3.3 Environmental entitlement model

The entitlements approach was first developed by Armatya Sen (1981) who used it to explain how people can starve in the midst of plenty as a result of their means of command over food. The environmental entitlements approach lays emphasis on access to natural resources as a means of alleviating poverty (Figure 2.1). Hence it assesses the roles that formal and informal institutions play in shaping peoples' resource endowments and entitlements (Leach et al. 1997). According to Leach et al. (1997), endowments refer to the rights and resources that people have. These include land, labour and skills. The environmental entitlements are alternative sets of benefits derived from environmental goods and services over which people have legitimate effective command and which are instrumental in achieving well being. These include food, water, fuel and ecological benefits. Endowments determine people's entitlements which in turn enhance people's capabilities (Leach et al. 1997).

From this model, poverty reduction through NRM requires strong institutions which will enhance the environmental entitlements of the poor. Local institutional arrangements, underpinned by power relations, are crucial in determining who has access to, and control over natural resources in any situation, and hence how environmental resources are managed (Forsyth et al. 1998).

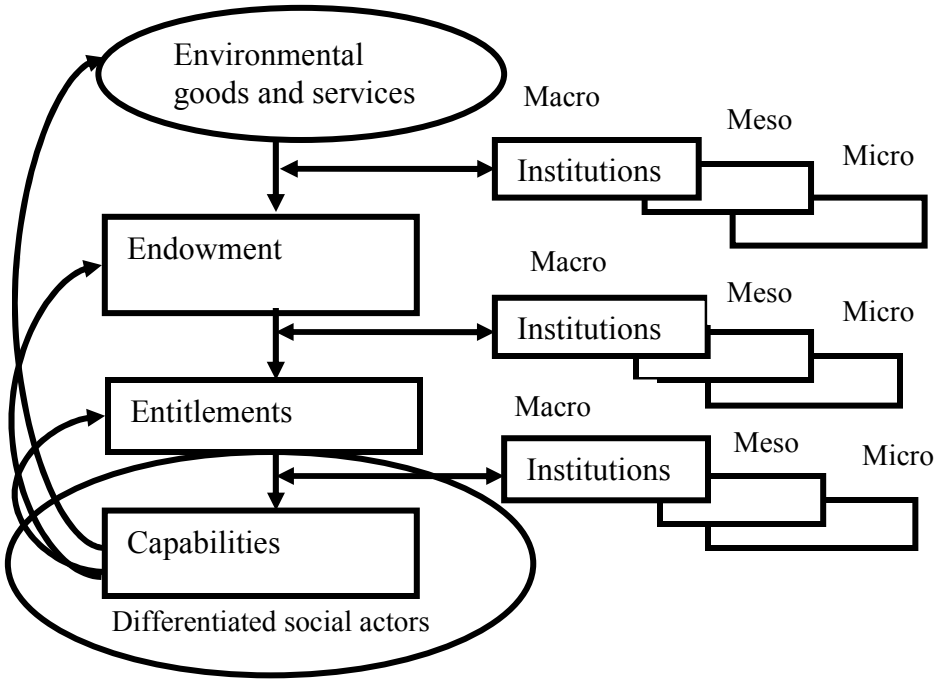


Figure 2.1 Environmental entitlement framework

Source: Leach et al. 1997

As detailed by Masika and Joekes (1997), at the micro-level such as household level, environmental entitlements are determined by a range of factors including natural resource tenure arrangements, labour mobilisation arrangements, social relations (including gender), capital endowments and technology. At the macro-level (sub-national, national, global), wider processes operate via decisions on technologies, incentives, institutions and regulations (land rights) to favour some social groups and some geographical areas.

2.3.4 Household asset composition model

The asset-based approach to poverty reduction focuses on developing the asset base available to the poor and achieving sustainable long-term improvements in well-being by developing on their ability to manage risk and vulnerability (NRIC, 2006). According to the household asset composition model, the institutional framework for assessing between poverty and environmental degradation involves understanding the inter-

relationship between the household asset composition of poverty, household and village behaviour, the state of the environment (such as air and water) and conditioning factors such as markets, technologies, infrastructure (Reardon and Vosti, 1995) (Figure 2.2). Since many resources on which the poor rely have no formal market value, and there are few markets for resources that can translate global demand into secure income streams for poor farmers (Vosti and Reardon, 1997). This often leads to unsustainable extractive activities and overexploitation of natural resources as mentioned earlier (Hardin, 1968).

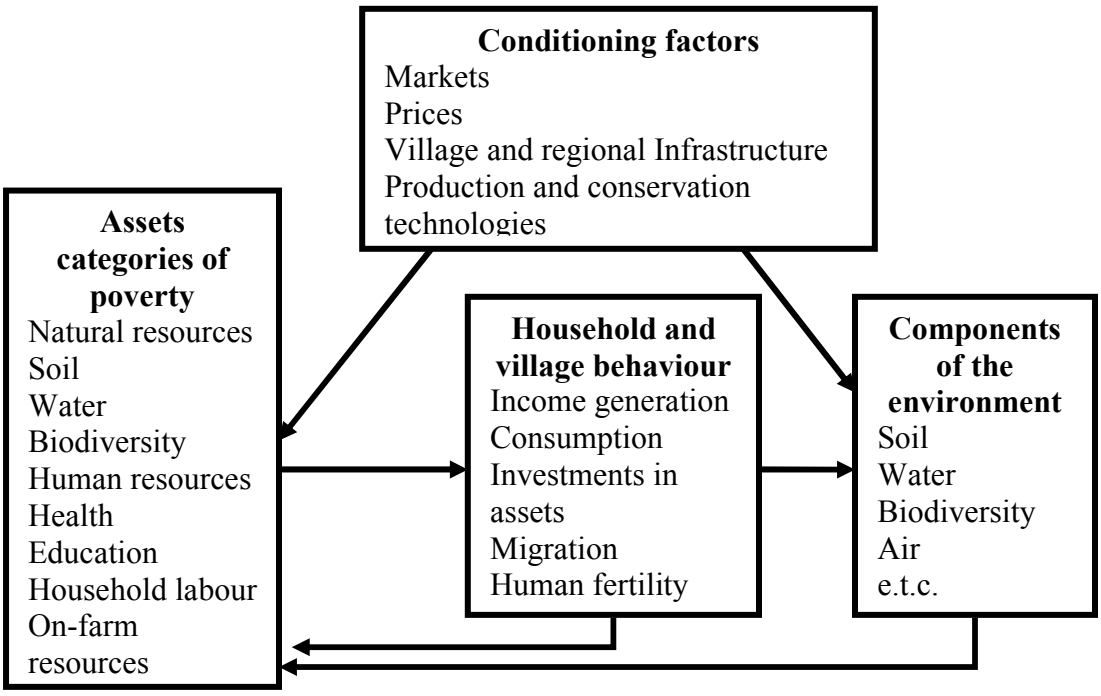


Figure 2.2 The household asset composition model

Source: Gbadegesin and Mabawonku, 2002

Although poverty and the degradation of the natural resources are often closely related, the nature of the linkage is complex and dependent upon many factors. These vary from place to place and include political, geographical, institutional and cultural factors. The MDGs endorsed by 189 countries at the United Nations Millennium Summit focuses on poverty eradication as a means to sustainable development. The MDGs provide time-

bound targets for combating poverty, hunger, disease, illiteracy, discrimination against women and environmental degradation. Reversing environmental decline and making environmental management work for the poor is critical to achieving the MDGs, particularly the overarching goal of eradicating extreme poverty and hunger (Hazlewood, 2002).

In Ghana, the GPRS recognises a causal link between the environment and poverty. It focuses more on the use of environmental resources to create wealth whilst making sure that the environment is not depleted. A Strategic Environmental Assessment (SEA) of the GPRS has been carried out to bring people together and create mutual understanding on environment and poverty links (MES/NDPC, 2004).

2. 4 Environmental attitudes

Many studies on human attitudes have been undertaken, especially in the field of psychology. Attitudes are thought to be predictors of behaviour. A commonly used definition is that of Allport (1935) who defines an attitude as a "mental and neural state of readiness, organised through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations to which it is related" (Allport, 1935 cited by Gross, 2001). Another commonly used definition is given by Fishbein and Ajzen (1975) who define an attitude as "a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object". With this definition it can be concluded that (1) an attitude is learned, (2) it predisposes action; (3) its action or behaviour is generally consistent.

According to Page-Bucci (2003) there are three generally accepted components of the term attitude. These are:

- Affective - the person's feelings about the attitude object;
- Cognitive - the person's beliefs or knowledge about the attitude object ;
- Behavioural - the person's inclination to act toward the attitude object on a particular way.

To this end, environmental attitudes can be defined as a collection of beliefs, affect and behavioural intentions a person holds regarding environmentally related activities and issues (Schultz et al. 2004).

2. 5 Environmental values: conceptual issues

The study of environmental values is a multifaceted area. Contributions to literature come from natural, economic, social, psychological and decision sciences as well as philosophy. In all these disciplines the term "value" is defined in different ways. Whilst studies on values date back to the early part of the 20th Century, the last decade has seen a lot of research devoted to identifying the value of nature, specific environmental goods and ecosystem services (Kallof and Satterfield, 2005).

The publication of Rokeach's book, "the nature of human values" contributed to the increase in the number of empirical studies on the role of human values especially in the field of sociology and psychology. Rokeach (1973) defined values as "an enduring belief that a specific mode of conduct or end state is personally or socially preferable to an opposite or converse mode of conduct or end state of existence". He divided values into terminal values comprising personal values (happiness, freedom) and social values (equality, sense of community), and instrumental values comprising moral values (honesty, kindness) and competence values (logic, rationality).

Keeney (1992) defined values simply as what we care about. For Stern et al. (1995) values act as "guiding principles in life which act as the foundation upon which an attitude towards a more specific object or behaviour is based". The sources of values include social systems such as institutions, communities, and families, and these social factors affect the nature of terminal and instrumental held values (Beckley et al. 1999).

Brown (1984) was however one of the first researchers to make a distinction between "held" and "assessed" or "assigned" values. He describes three interrelated aspects of value namely the conceptual, relational and object realms.

Conceptual: The conceptual realm is concerned with an important part of the *basis* of value. Brown (1984) defines a value as an enduring conception of the good, and is

sometimes referred to as an ideal or a *held value.* He defined held values as comprising the morals, beliefs, conduct, qualities and states that individuals and groups consider desirable (Brown, 1984).

Relational: The relational realm is concerned with the valuation *process* or deals with the act of preference. Values are viewed as occurring from a relationship between a subject and an object in a given context. Here Brown defines value as the feeling or experience that emerges from a person's preference for an object in a given context.

Object: The object realm is concerned with the end *result* of the valuation process. It is concerned with the relative importance or worth of an object, often called the object's *assigned value.* Assigned values are derived from held values and refer to the worth or importance (monetary or otherwise) attributed to an object, state or behaviour (Brown, 1984). This kind of value is relative, not absolute, and thus can only indicate the importance of the object by implicit or explicit comparison (Brown, 1984).

2.5.1 Linking environmental, social and economic values

According to Preston (2003) environmental values are values related to the environment, and might include socio-cultural values and economic values. Values towards nature have been investigated in a number of ways. However considerable scepticism still exists in the research field on values because of the plethora of questionnaires and definitions, which have been used in the past (Bouckenooghe et al. 2004). Environmental values typologies have been developed by environmental scientists, conservationists, social scientists and environmental philosophers in attempts to understand the meanings and values that society attaches to natural resources. For example values toward natural resources have been investigated through concepts that address people's relationships to places (Preston, 2003).

It has been argued that considering the environment as a "place" facilitates the roles of people in the conservation of its natural resources. Rather than thinking of natural resources at an abstract level, recognising their cultural and emotional significance could

be an important way of developing the respect and responsibility towards an environment, which characterises stewardship (Carr, 2002).

This includes the feelings and perceptions that people have through experiences of these places which make them distinct from others (Preston, 2003; Manzo, 2005). Some of these include:

Sense of place: It is described as an experiential process created by the setting, combined with what a person brings to it (Steele, 1981). An often cited example is a rainforest, which is part of a particular ecosystem but it is also a place of significance, a source of livelihood or inspiration to some people (Measham, 2003).

Place attachment: This reflects people's emotional connections to places that arise through experience (Altman and Low, 1992; Manzo, 2005). It is considered to be the bonding of people to places and these are often shared among groups of people and contribute to defining their relationship to that environment (Low, 1992).

Place identity: This is another common concept of people/place bonds especially within environmental psychology and human geography. There are usually two main links. The first is the way in which a place informs the identity of a person or people (Proshansky et al. 1995) and the second points to the identity of a place as a composite of its characteristic features (Relph, 1996; Williams and Vaske, 2002).

Place dependence: This is the perceived strength of association between a person and specific places (Stokols and Shumaker, 1981).

It is impossible to talk about environmental values without touching on the subject of environmental ethics even if briefly. Contemporary environmental ethics only emerged as an academic discipline in the 1970s and was fuelled by the already widespread perception in the 1960s that the late twentieth century faced a "population time bomb" and a serious environmental crisis (Brennen and Lo, 2002). Over the last decade it has emerged as a new sub-discipline of moral philosophy although there are issues about its place (Callicott, 1984). A complete discussion of the various value typologies is beyond the

scope of this dissertation. However some basic concepts especially those relevant to the study will be discussed here.

Generally environmental philosophers make a very basic distinction between instrumental and intrinsic values. The former is the value of things as means to further some other ends, whereas the latter is the value of things as ends in themselves regardless of whether they are also useful as means to other ends (Brennen and Lo, 2003). Things which have instrumental value are believed to be good because they can be used to obtain something else such as money. Things which have intrinsic value are good for their own sake, and as intrinsically valuable, they are not exchangeable for something else.

The anthropocentric value theory confers value on human beings and regards all other things including other life forms as being only instrumentally valuable (Callicot, 1984). Anthropocentrics believe that environmental improvement should be undertaken for the material benefit of humans only (Thompson and Barton, 1994). On the other hand, the non-anthropocentric value proposes that nonhuman species have moral interests or value in themselves. Hence, anthropocentric value is the instrumental value that something has because it is useful to humans, and non- anthropocentric value is the intrinsic value that things in nature have independently of their usefulness to humans. Both theories are accused of being human centred and have been strongly criticised by proponents of the biocentric and ecocentric value theories. The former argues that behaviour toward the environment should only be evaluated on how it affects all living things (including human beings). Ecocentrics believe that the ecosphere or global ecosystem has inherent value and must be appreciated for its own sake. Hence with biocentrism everything that is alive deserves direct moral consideration whilst with ecocentrism every material thing in the environment, such as water, air, rocks, deserves direct moral consideration (Meyers, 2003).

Deep ecology and ecofeminism are generally classified as part of the **c**ontemporary, ecocentric radical school of environmental philosophy. Deep ecology focuses on the intrinsic value of nature and takes a holistic approach that emphasises ecosystems, species, and the planet as a whole. It claims that the primary cause of environmental

problems is anthropocentrism, which it opposes by asserting that humans are fully a part of the natural world and of equal value with all other species.

The core principles of deep ecology as presented by Naess and Sessions (1995) are as follows.

1. The well-being and flourishing of human and nonhuman life on earth have value in themselves. These values are independent of the usefulness of nonhuman life for human purposes.
2. Richness and diversity of life forms contribute to the realisations of these values and are also values in themselves.
3. Humans have no right to reduce this richness and diversity except to satisfy vital human needs.
4. The flourishing of human life and cultures is compatible with a substantial decrease of human population. The flourishing of nonhuman life requires such decrease.
5. Present human interference with the nonhuman world is excessive, and the situation is rapidly worsening.
6. Policies must therefore be changed. These policies affect basic economic, technological, and ideological structures. The resulting state of affairs will be deeply different from the present.
7. The ideological change is mainly that of appreciating *life quality* (dwelling in situations of inherent value) rather than adhering to an increasingly higher standard of living. There will be a profound awareness of the difference between big and great.
8. Those who subscribe to the foregoing points have an obligation to directly or indirectly try to implement the necessary changes

There is still a lot of debate concerning the various categorisations of environmental values, as to whether such strict divisions really exist in nature. The question of the intrinsic value in nature continue to generate the divisive categories of anthropocentrism/ nonanthropocentrism, shallow/ deep ecology, and individualism/ holism.There is also the

issue of how relevant these are in the environmental degradation debate especially in different the cultural contexts. Guha (1989) for example critiques the anthropocentric/non-anthropocentric/biocentric divides from the perspective of the developing world and offers that these categorisations do not solve the problems of environmental degradation. In addition, the Western concepts of the value of wilderness rather have negative impacts on indigenous populations (Guha, 1989). The emphasis of wilderness preservation as the only alternative to exploitation and abuse seems impractical in many areas (Hettinger, 2002; Costanza, 2000). Indeed nature is incapable of valuing itself; it is humans that confer value on nature be it aesthetic or therapeutic.

2.5.1.1 The interplay of environmental attitudes and values with behaviour

One of the difficulties of researching into environmental attitudes and values is their relationships with actual behaviour. Research on attitudes in the early part of the 20th Century, predominantly in the field of psychology, concluded that attitudes were very poor predictors of actual behaviour. However, later on, quite a substantial volume of studies that have attempted to explain the connection between basic values and beliefs and attitudes toward specific policies have in one way or the other depended on the Theory of Reasoned Action (Fishbein and Ajzen, 1975) later revised as the Theory of Planned Behaviour (Ajzen and Driver, 1992). The Theory of Planned Behaviour includes the concept of behavioural control. The theory postulates that a behavioural intention or human action is predicted by three major factors: a favourable or unfavourable valuation of the behaviour (attitude toward the behaviour), perceived social pressure to support or perform the behaviour (subjective norm), and self efficacy in relation to the behaviour or the perceived difficulty of performing the behaviour (perceived behavioural control) (Figure 2.3) All three together are hypothesised to predict behavioural intention and actual behaviour (Booth, 2000; Ajzen and Madden, 1986).

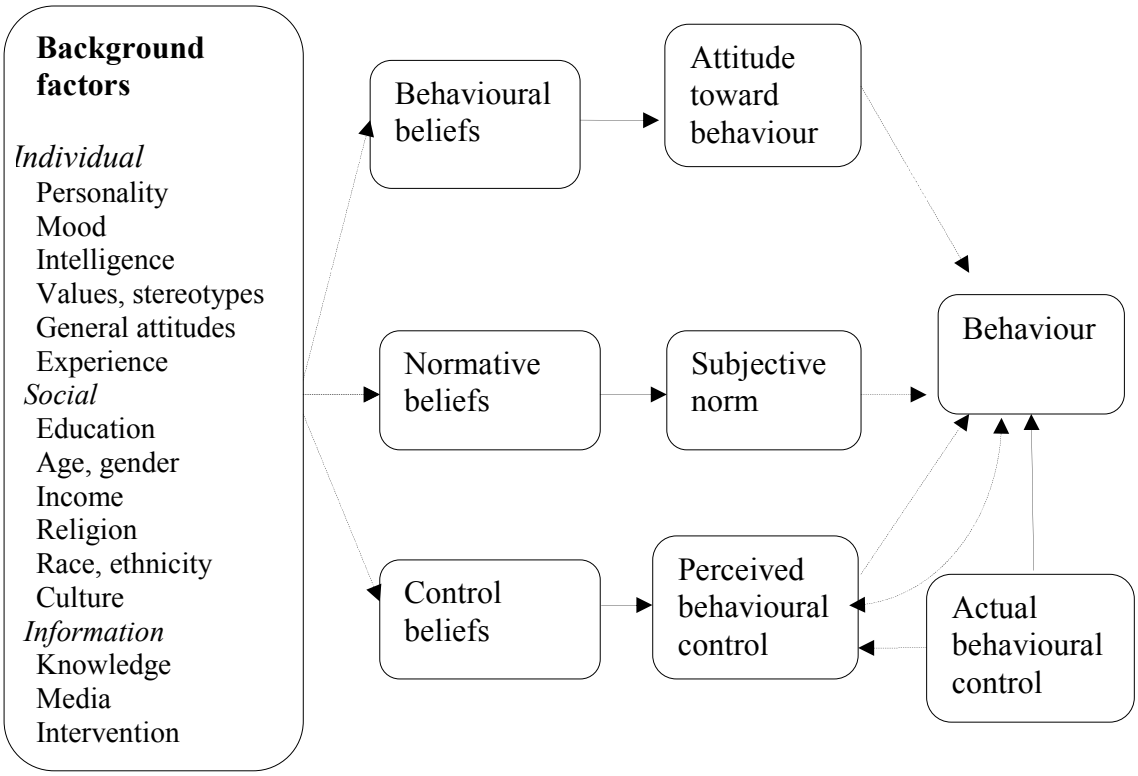


Figure 2.3 The Theory of Planned Behaviour

Source: Ajzen and Driver (1992)

This theory has been applied to environmental behaviour. Presumably, those who hold biocentric ethical values would be more ready to support environmental protection as compared to those who hold strictly anthropocentric values and may well be willing to pay whatever they can afford without sacrificing their other moral obligations (Booth, 2000). Winter et al. (2003) are of the view that environmental attitudes and behaviour are related to people's values. As such, examining people's values may provide a basis for the formation of attitudes and act as guidelines for behaviour. This means people consider implications of behavioural choices for the things they value. Thus when environmental problems arise, which often is the result of a conflict between individual and collective interests, the kind of values they hold may play an important role is solving the problem (Axelrod, 1994).

Hence environmental values and attitudes, despite their importance, often do not translate directly into actual behaviour. Such research studies have identified critical gaps and barriers between expressed values or attitudes and actual behaviours, both at the individual and collective levels (Kollmuss and Agyeman, 2002; Leiserowitz et al. 2004).

2.5.1.2 Environmental values in economics

Economists rarely venture beyond the bounds of assigned value based on individual preferences and expressed in monetary terms. The environment is valued based on the type of uses it has to humanity, namely use and non-use values (Figure 2.4). Use values are defined as the value derived from the actual use of a good or service. They result from current use of the resource and encompass the values humans extract from natural areas (Adamowicz, 1995). Use values can be direct or indirect. The direct use values are those that can be easily measured in monetary terms and are derived from the economic uses of the natural system's resources and services. Direct use values may be consumptive (fishing) and non-consumptive (admiring nature). The indirect use values are the indirect support and protection provided to economic activity and property by the resource system's natural functions or environmental services (Barbier, 1994).

Non-use values are frequently overlooked despite the fact that there are significant social and economic benefits (Czarnezki, and Zahner, 2005). They do not usually involve market purchases and may not involve direct participation. These values are sometimes referred to as “passive use” values representing a resource’s value to those who have not used, and may never use, the resources (Heyde, 1995; Chuenpagdee, 2003). These include option, existence and bequest values.

Option value is based on how much people, who are not currently using a resource, are willing to sacrifice (or pay) today to preserve the option to use that resource in the future (Munasinghe and Lutz, 1993). Existence value is the type of non-use value that people place on simply knowing that something exists, even if they will never see it or use it (King and Mazzotta, 2001). It represents an individual’s willingness to pay to ensure that some resource exists (even if the individual never visits or uses the resource) and this is unrelated to either current or future use. On the other hand, bequest value is the non use

value that measures the expectation that a resource will be of value to future generations and hence must be conserved for them. For example many people value the Kakum forest in Ghana although they may never go there. On the whole, non-use value is the most difficult type of value to estimate.

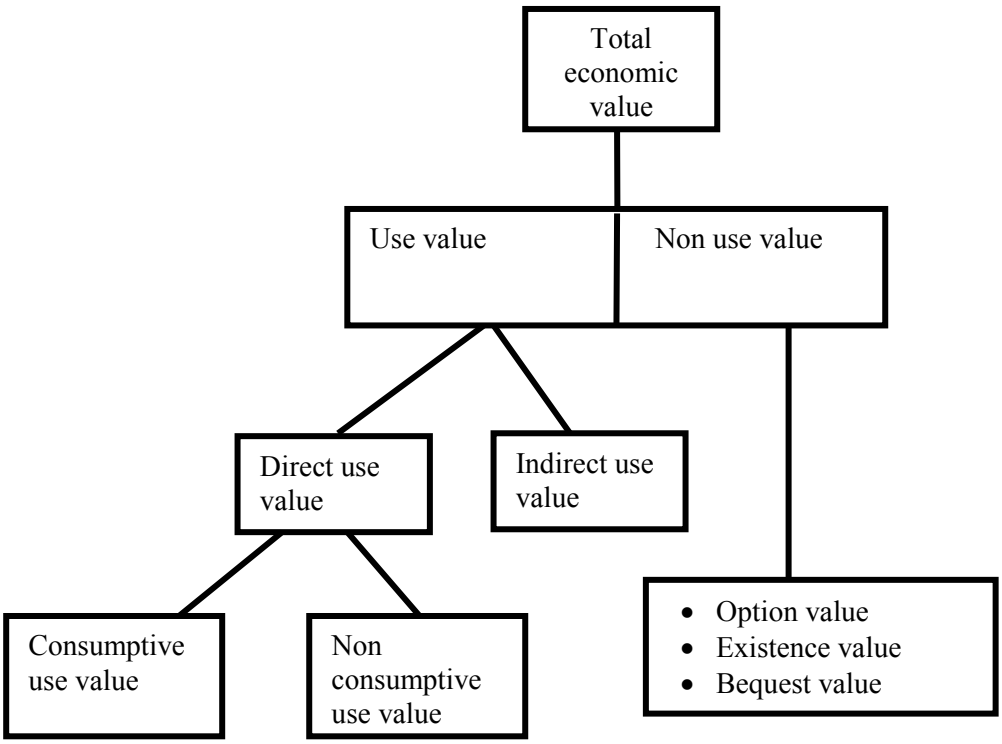


Figure 2.4 Total economic value of the environment

2.5.2 Evaluation of environmental attitudes

The use of attitudinal scales and a form of self-report questionnaires are two of the common ways of assessing environmental attitudes. The questions are generally targeted at assessing thoughts, feelings, and likely actions toward the attitude object. To assess attitudes quantitatively, each person's opinion can be represented by a numerical score. With these scales however a number of assumptions need to be made. For example it must be assumed that person's attitude can be measured by asking questions about thoughts, feelings, and likely actions toward the attitude object (Ajzen, 1982). In addition

a particular test item, or other behaviour indicating an attitude, has the same meaning for all respondents, so that a given response is scored identically for everyone making it. Finally it must be assumed that attitudes are arranged along an evaluative continuum ranging from favourable to unfavourable ones (Hogg and Vaughan, 1995). Examples of attitudinal scales include Thurstone Scales, Semantic differential scaling, Guttman scales, Semantic differential scaling, Likert Scales.

Thurstone Scales

This was developed by Thurstone in the 1930s as a method of equal-appearing intervals. Here the respondent or subject either agrees or disagrees with a large number of statements about an issue. A total score can then be computed which gives a measure of that person's attitude towards the attitude object. One identified draw back is that the scales are time consuming and expensive.

Guttman scales

These scales were developed by Guttman in 1944 in order to determine if a relationship existed within a group of items. They are however rarely used in studies because they are difficult to construct. The scales are cumulative with the items are ordered from low to high according to difficulty so that to approve or correctly answer the last item implies approval or success of all prior ones (Hogg and Vaughan, 1995). The respondent selects an item that best applies. The list contains items that are cumulative, so the respondent either agrees or disagrees, if he/she agrees to one, he/she probably agrees to the previous statements.

Semantic differential scaling

According to Osgood et al. (1957) people evaluated objects or concepts (including attitudes) along three dimensions- evaluative factor (such as good-bad, pleasant-unpleasant, kind-cruel); the potency factor (strong-weak, thick-thin, hard-soft and so on); the activity factor (active-passive, slow-fast, hot-cold and so on). To assess attitudes, the respondent is required to mark the scale between the bipolar adjectives.

Likert Scale

Likert scales are about the most frequently used attitude measure in social sciences. Developed in 1932 they attempt to simplify the process of assessing attitudes by allowing the respondent to make a number of possible responses to a series of statements which are related to a person's attitude. The scales are usually 5-7 points. They are also called summated scales because the digit next to each response becomes the value for that response. The total score which represents the attitudes is obtained by summing up the values for each response.

Likert scales have been adapted in many ways. For example the New Environmental Paradigm (NEP) developed by Dunlap and Van Liere (1978) employ the use of Likert scales. The NEP has been used especially in the United States and some developed countries to predict environmentally relevant behaviour such as recycling (Schultz and Zelezny, 1999). Historically the orthodox view of the human-nature relationship has been one in which there is a belief in economic growth, material abundance, and humans as above and exempt from the rest of nature or "Dominant Social Paradigm" (DSP) coined by Pirages and Erhlich (1974). Dunlap and Van Liere (1978) argued that this kind thinking hurts the environment and propose ideas such as "limits to growth" and the importance of preserving the "balance of nature" represented a challenge to previously held beliefs. The New Environmental Paradigm Scale which consisted of 12 items was revised into the 15 items New Ecological Paradigm Scale to improve it in that the new one offers a more balanced set of pro- and anti NEP items and avoids the use of outmoded terminology. It consists of including six items from the original NEP Scale. The NEP Scale has been used for years to measure as a measure of environmental attitudes, beliefs and even sometimes values reflects (Dunlop et al. 2000).

2.5.3 Evaluation of environmental values

Researchers have developed a number of methodologies aimed at assessing environmental values. The method used often depends on the type of values being assessed. This some make a distinction between held or personal values and assigned values. These approaches tend to represent the philosophical/ethical themes,

anthropological/sociological themes and judgement/decision making themes. It involves expressed preference dominated by Contingent Valuation (CV) surveys using Willingness to Accept (WTA) and Willingness to Pay (WTP) protocols, and alternate non monetary studies of values emphasising values held (Kalof and Satterfield, 2005).

A number of scales have also been developed that are more broad-based in terms of environmental values or socially responsible consumption values (Antil, 1984). An example is the value scales of Rokeach (1973). It is a 36 item questionnaire that was designed to measure specific belief systems or value orientations which relate to 18 end states of existence (personal goals or terminal values) followed by 18 modes of conduct (instrumental values or basic approaches and individual might take to reach end-state values). Another is the scales of Schwartz (1994) which have been widely used for explaining general environmental concern as well as more specific environmental attitudes and beliefs (Schultz and Zelegny, 1999). Schwartz's scale involves a broad model for classifying the dimensions of values, with 56 value items representing 10 universal value types (Table 2.4). However, these value scales were not developed to explain environmental behaviour, and consequently environmental values are underrepresented (Schultz and Zelegny, 1999).

Table 2.4 Value-items from Schwartz' values instrument

Self transcendence	*Self enhancement*	*Openness*	*Tradition*
Universalism	**Power**	**Self direction**	**Tradition**
Protecting the environment	Social power	Creativity	Devout
A world of beauty	Authority	Curious	Respect for tradition
Unity with nature	Wealth	Freedom	Humble
Broad minded	Preserving my public image	Choosing own goals	Moderate
Social justice	Social recognition	Independent	Accepting portion in life
Wisdom			Detachment
Equality	**Achievement**	**Stimulation**	
A world at peace	Successful	Daring	**Conformity**
Inner harmony	Capable	A varied life	Politeness
Benevolence	Ambitious	An exciting life	Honouring parents & elders
Helpful	Influential		Obedient
Honest	Intelligent	**Hedonism**	Self discipline
Forgiving	Self-respect	Pleasure	
Loyal		Enjoying life	**Security**
Responsible			Clean
True friendship			National security
A spiritual life			Social order
Mature love			Family security
Meaning in life			Sense of belonging
			Reciprocation of favours
			Healthy

Source: Schwartz (1994)

To highlight respondents' specific values towards the environment, many other value typologies have been developed, some of which have been developed to suit specific ecosystems. Most of these have considered the actual values of the specific environments, providing a framework for understanding what nature provides *regardless* of whether people perceive those benefits (Tables 2.5 and 2.6). Most of the valuation articles are not empirical and assume the value structure. Others have also assessed the values from a set

of human attitudes *about* nature (Table 2.7). For example Driver et al. (1996) provide information on personal, social and intrinsic benefits of wilderness. According to them, values were divided into three main benefits namely personal, social and intrinsic benefits (Table 2.5).

Table 2.5 Wilderness values

Personal benefits	**Social benefits**	**Intrinsic benefits**
A. Developmental • Self-concept • Self-actualisation • Skill development B. Therapeutic/healing C. Physical health D. Self-sufficiency E. Social identity F. Educational G. Spiritual H. Aesthetic/creativity I. Symbolic J. Other recreation benefits K. Commodity-related L. Nurturance	A. Aggregate personal B. Spinoff benefits C. Historical/cultural D. Preservation-related • Representative ecosystems • Species diversity • Air quality • Unique landforms • Historic sites • Educational • Scientific • Stewardship E. Quality of life F. Commodity uses G. Economic	Benefits to nonhuman organisms

Source: Driver et al. (1996)

Rolston (1981; 1985) developed environmental value typologies towards nature and wildlands (Table 2.6). He lists what he considered to be wildland values without creating broad category groupings, arguing that for example nature provides aesthetic, scientific, historical, religious/philosophical and life-support benefits to all people.

Table 2.6 Environmental values towards wildlands and nature

Nature	Wildlands
1. Economic	1. Market
2. Life support	2. Life support
3. Recreational	3. Recreational
4. Scientific	4. Scientific
5. Aesthetic	5. Genetic diversity
6. Life value	6. Aesthetic
7. Diversity/unity value	7. Culturally symbolic
8. Stability value	8. Historical
9. Spontaneity value	9. Character building
10. Dialectical value	10. Therapeutic
11. Sacramental value	11. Religious
	12. Intrinsic natural

Source: Rolston (1981; 1985)

On the other hand Kellert (1993; 1996) developed a typology of biophilia values made up of nine biologically based human attitudes or valuations of nature. Kellert believes that his measures of attitudes, values, knowledge, and behaviours toward animals are a reflection of the relationship between humans and nature (Table 2.7). Although Kellert's original typology was developed to as a result of investigation into human attitudes toward animals, he later applied the model to "nature" in general. A "symbolic" value was added later in the literature. There are some similarities between his typology and the "Personal benefits" category suggested by Driver et al. (1996), probably because Kellert's typology is supposed to be an expression of values of nature from the individual's point of view.

Table 2.7 Kellert's classification of values

Term	Definition	Function
Utilitarian	Practical and material exploitation of nature	Physical sustenance/security
Naturalistic	Satisfaction from direct experience/contact with nature	Curiosity, outdoor skills, mental/physical development
Ecologistic-Scientific	Systematic study of structure, function and relationship in nature	Knowledge, understanding, observational skills
Aesthetic	Physical appeal and beauty of nature.	Inspiration, harmony, peace security.
Symbolic	Use of nature for metaphorical expression, language, expressive thought.	Communication, mental development.
Humanistic	Strong affection, emotional attachment, love for nature.	Group bonding, sharing, cooperation, companionship
Moralistic	Strong affinity, spiritual reverence, ethical concern for nature	Order and meaning in life, kinship and affiliation ties.
Dominionistic	Mastery, physical control, dominance of nature	Mechanical skills, physical prowess, ability to subdue
Negativistic	Fear , aversion, alienation from nature	Security, protection, safety

Source: Kellert (1993)

There are many more typologies that have been developed over the years. Environmental economists however provide a different way of assessing environmental values. The method used is determined by whether there are explicit markets for the services or not. Examples are:

Market price method: Estimates economic values for ecosystem products or services that are bought and sold in commercial markets. For example, a cultural site could be valued based on the entrance fees collected.

Productivity method: Estimates economic values for ecosystem products or services that contribute to the production of commercially marketed goods. For example, the benefits of different levels of water quality improvement would be compared to the costs of reductions in polluting runoff (Winpenny, 1991).

Hedonic pricing method: Estimates economic values for ecosystem or environmental services that directly affect market prices of some other good. It is most commonly applied to variations in housing prices that reflect the value of local environmental attributes. Housing location for many people often depends directly on local environmental factors (Munasinghe, 1992).

Travel cost method: Estimates economic values associated with ecosystems or sites that are especially used for recreation. It assumes that the value of a site is reflected in how much people are willing to pay to travel to visit it. For example, adding up the costs people would expend to travel and recreate at a particular area (Angelsen et al. 1994).

Contingent valuation method: This is a survey-based method, widely used for determining economic values of natural and environmental resources in the absence of market prices. The method uses hypothetical questions to assess how respondents value the resource in question. The questions could be about how much compensation they would be willing to accept to give up specific environmental services. It is called "contingent" valuation, because the scenarios are hypothetical and how much they are willing to pay is contingent on these scenarios (Chuenpagdee, 1998).

Although the contingent valuation method is normally used to asses the value of non-use environmental resources, it is not fully accepted in some policy circles and among some economists (Portney, 1994; Carson, 2004). Generally there is a lot of debate on the use of economic methods of valuation to assess environmental values due to the difficulty in attaching corresponding monetary values to some environmental goods (Carson et al. 2001).

2.5.4 The paired comparison methodology

An important method for assessing the environmental values of stakeholders is by eliciting the values they place on environmental resources through their judgments of importance. After their judgments have been elicited, there is the need to prioritise them to determine which are the most significant. This way the vital issues can be addressed first. One way prioritise the importance or values resource users place on natural resources is the paired comparison methodology.

With this method the environmental values are clearly ordered since the data is based a series of specific comparisons which respondents would be asked to make between pairs of values (Chuenpagdee, 1998). It was first developed in the late 1920s as one of several psychometric scaling methods by psychologists to evaluate psychological phenomena (such as attitudes, preferences) for which there were no physical stimuli on which to base measurement (Guilford, 1928 cited in Waston, 1991).

A unique aspect of the paired comparison technique is that it allows for apparent preference intransitivities or inconsistent choice patterns. Preference intransitivities can occur in the form of circular triads. An example of a circular triad or inconsistency could be shown as follows: A is preferred to B, which is preferred to C, which is preferred to A. To be consistent with preferences in this example, A should always be preferred to C.

A is preferred to B, which is preferred to C, which is preferred to A.

$$A > B > C;\ A>C \qquad (1)$$

However, apparent intransitivities could occur because there is no valid ordering of these three items (Chuenpagdee, 2003). It could also be because the items may be so similar that it is not possible for the respondents to distinguish reliably among them. Inconsistencies however sometimes occur and maybe due to systematic intransitive choice, incompetence of the respondent, random choice when the pairs are too close to call or simply due to pure errors (Clark et al. 1999).

The method involves presenting a given set of objects independently in pairs as binary choices to each respondent (or judge) who chooses one member of each pair (Chuenpagdee, 2003; Chuenpagdee et al. 2001). The set of objects could be gains, losses, activities, environmental resources or whatever is being prioritised. The total number of possible pairs of n objects is:

$$P = n\,\frac{(n-1)}{2} \qquad (2)$$

Where n is the number of objects.

The total number of pairs for k judges is kxP.

Since each object is paired an equal number of times it has the same probability of being selected. For example, for any three objects, x, y, z, there are three possible pairs: (x z), (x z) and (x z).

This method has been used in many disciplines. Its use in assessing environmental values though relatively new has been modified and used in many ways and has been applied to public goods such as natural resources and environmental assets (Neuman and Watson, 1993). Some elicit values that stakeholders place on environmental resources through their judgment of severity of loss. For example, if they consider a loss to mangrove forests more severe than a loss to sandy beach, it can be implied that they place higher value on mangroves than on beach (Chuenpagdee, 1998). Others however elicit these values directly. Below are a few examples of how some researchers have used the method.

In 1991, the Canadian Department of Forestry (Forestry Canada) commissioned a national public opinion study to assess the relative importance which Canadians place on different forest values, such as those involving economic, recreational and environmental benefits (Neuman and Watson, 1993). Paired comparison methods were considered a potentially effective means of obtaining a clear discrimination among importantly-held forest values. The values used in this study consisted of six broadly-defined values, or types of benefits, which Canadians attach to their forests. A set of six forest values was developed, representing traditional timber values, as well as recreational values and the emerging environmental values. The results showed a clear ordering of forest values within the Canadian population. They were consistent with other data (on this survey and on others) reflecting the importance placed on environmental issues importance on the forest value of protecting the country's water, air, and soil (Neuman and Watson, 1993).

Rutherford et al. (1998) applied paired comparisons in their study of the ability of individuals to choose between pairs of environmental losses as a result of oil spills. In particular, survey respondents are made to choose between pairs of non-pecuniary environmental losses whereby the results are then used to construct an interval scale of relative importance of these losses which can be developed into an interim damage

schedule. Fifty-two graduate students were given a questionnaire whereby four different environmental losses resulting from oil spills were presented in pairs. For any given pair, respondents were required to select the loss which would warrant a greater sum of compensation. The majority of the respondents made consistent choices between all the pairs presented, implying that rational and consistent choices can be made among such non-pecuniary losses (Rutherford et al. 1998).

Chuenpagdee (1998) investigated the applicability of two kinds of damage schedules i.e. a loss schedule and an activity schedule in each of the two coastal areas of Thailand. She studied two different groups of respondents, namely formal experts and lay experts. The results showed a significant agreement among respondents, both in the total sample and in all sub-groups, in the rankings of importance of resource losses and activities. The scale values and rankings were insensitive to the level of intransitivity. Overall, her study showed that meaningful scales of relative importance of resource losses and impacting activities could be obtained based on people's judgments (Chuenpagdee, 1998).

Clark et al. (1999) examined contextual influences on paired comparison assessment of the value of environmental public goods (Clarke, 1996). One contextual factor was the social responsibility effect reported by Peterson et al. (1994). A participant was told either that his or her choices would determine the outcome for the entire group, or that his or her choices would represent one of many votes that would determine a collective outcome. After the paired comparison task, participants were also asked about their environmental attitudes.

Quah et al. (2003) conducted a survey in which respondents were made to choose between pairs of non-pecuniary environmental losses. The results are then used to construct an interval scale of relative importance of these losses which can be developed into an interim damage schedule community judgments of the relative importance of the potential losses.

In searching for a simple, easily duplicated and yet robust method for assessing environmental attitudes and values the Likert scales and paired comparison methodologies were opted for. Likert scales were chosen because they are the most

widely used to assess environmental attitudes. The paired comparison methodology was opted for because of its simplicity. It is also adaptable to suit local situation and easily replicated in other areas. The fact that they were easy to translate into the local languages was another plus. It involved using the views of the respondents to estimate the relative priority which they place on coastal natural resources in their area. In addition it involved everyday activities and issues they were familiar with so each respondent could voice an opinion. Further details and benefits of these methods will be discussed in Chapters 4 and 7.

CHAPTER THREE
STUDY AREAS

3. Introduction to chapter

This chapter provides brief background information on the study areas. It begins by presenting general information on Ghana, its coastal zone before narrowing down to the study areas. It also provides information on the location, socio-economic and some physical characteristics of the study areas.

3.1 Brief background of Ghana

The total area covered by Ghana is about 238,539 km^2 (GSS, NMIMR, and ORC Macro, 2004) including inland water bodies. It is located on the coast of West Africa. The country shares common borders in the east, north and west with the Republics of Togo, Burkina Faso and Côte d'Ivoire respectively (Figure 3.1). About 70% of the total land area of Ghana is reportedly drained by the Volta river system.

Ghana is divided into ten administrative regions (Figure 3.1). Each region is sub-divided into Metropolitan, Municipal and District Assemblies (MMDAs). There are currently 169 MMDAs. The national census in 2000 put Ghana's population at 18.8 million with a growth rate of 1.25% (Ghana Statistical Service, 2002). The percentages of the major ethnic groups in Ghana are as follows: Akan 49.1%, Mole-Dagomba 16.5%, Ewe 12.7%, Ga-Dangme 8% (Ghana Statistical Service, 2002).

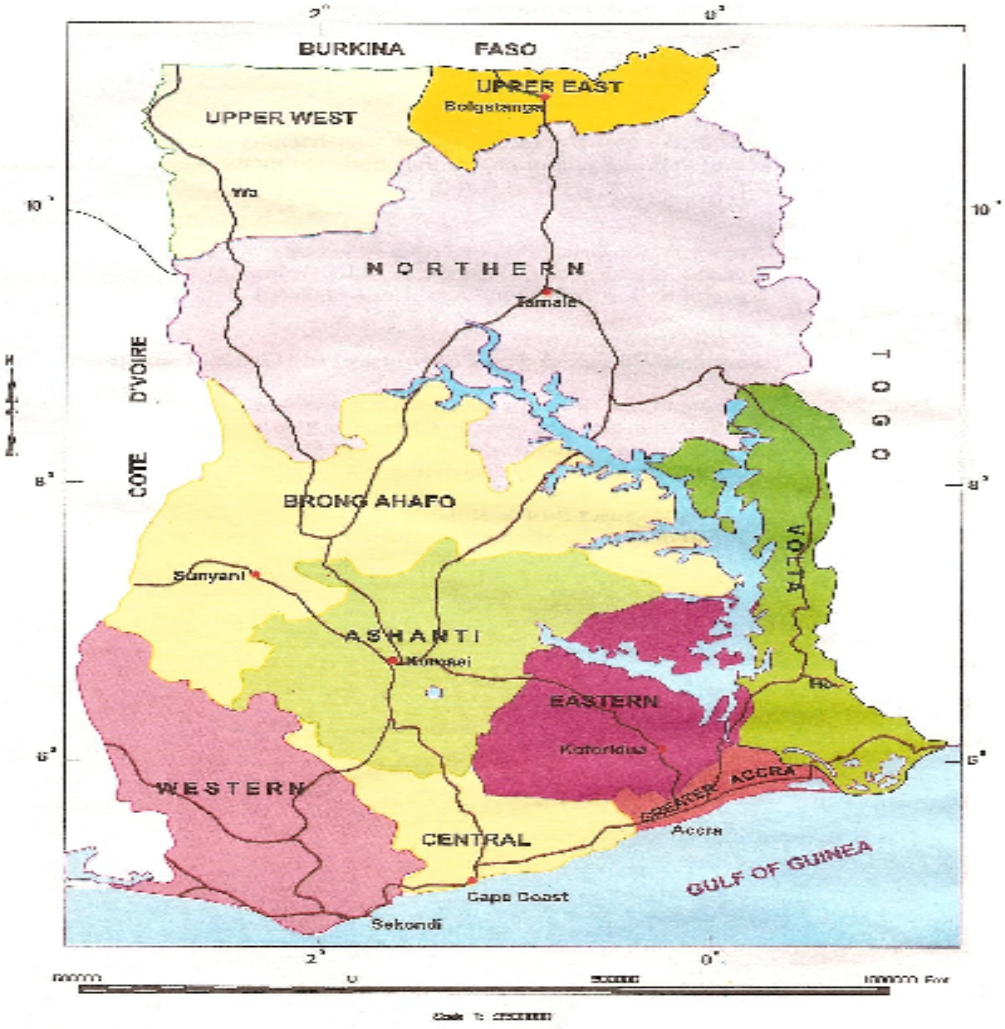


Figure 3.1 Administrative map of Ghana

Source: Ghana Statistical Service, 2002

The current system of formal education was introduced in 1989 and reformed in 2007. Universal Basic Education is 11 years, made up of two years of kindergarten, six years of primary school and three years of Junior High School (JHS). At the basic level, emphasis is placed on literacy, numeracy, creative arts and problem solving skills.

After JHS, students may then choose enter the Senior High School (SHS), Vocational and Agricultural and Training (TVET) or enter into an apprenticeship scheme with some support from the Government.

The Ministry of Education, Science and Sports (MOESS) together with the MMDAs are responsible for the infrastructure, supervision and ensuring quality education in the schools. Basic education is free under the Free Compulsory Universal Basic Education (FCUBE).

According to the 2003 Core Welfare Indicators Questionnaire (CWIQ) Survey about 50% of the population aged 15 years and older can read and write (53.4%), with males having a higher literacy rate (65.8%) than females (42.3%). There is a 30% point gap between urban (69.6%) and rural (39.8%) areas. Among the population aged 15-24 years or the youth, the proportion that can read and write was 68.7% in 2003. Again the literacy rate for urban youth (81.7%) is considerably higher than that of the rural youth (56.4%). Seven in ten children aged 6 to 11 years are enrolled in primary school (Ghana Statistical Service, 2003). Overall, enrolment at the secondary level declined marginally, from 40% in 1997 to 38.1% in 2003. The rate however declined appreciably for males (from 43.6% to 37.9%) but increased slightly for females (from 36.4% to 38.4%) over the five year period (Ghana Statistical Service, 2003).

With regard to economic activities, about 77% of the adult population (aged 15+) is currently economically active. The activity rates for males and females differ, with the rate for women in the age group (15-64) lower than those for men, but in the younger age group (7-14) and the older age group (65+) the rates for females exceed those for males. For each age group the activity rates for males and females are higher in rural areas (apart from rural savannah) than in urban areas (Ghana Statistical Service, 2000). The majority of the working population is employed in agricultural activities (55%), followed by trading (18.3%) and then manufacturing (11.7%). The highest hourly wage rates are obtained in mining and quarrying, followed by financial services and then trading (Ghana Statistical Service, 2000).

About 8% of the currently active population can be classified as unemployed, but there is also a high degree of underemployment, with some people having a job but wanting to do more work. In many households, particularly in rural areas, family members (especially women) spend a great deal of their time on household activities such as cooking and cleaning (Ghana Statistical Service, 2000).

Concerning access to health facilities, households in Greater Accra are reported to have the most favourable access to health facilities with more than 80% living within 30 minutes of the nearest health facility, compared to 57.6% for the entire country. The access to a health facility was lowest (26.7%) in Upper East (Ghana Statistical Service, 2003).

3.2 The coastal zone of Ghana

The coastal zone of Ghana comprises the sandy east coast, the central coast comprising mainly rocky beaches interspersed with short sections of sandy beaches between and west coast (Armah and Amlalo, 1998). Two main types of coastal lagoons are can be found in Ghana. These are "open" and "closed" lagoons (Armah, 1991). The open lagoons have a permanent opening to the sea and are normally fed by rivers that flow all year round. The can be found mostly on the central and western parts of the coastline where higher rainfall results in a more continuous flow of the rivers and streams.

3.2.1 Geology

It is believed that the coastal geological formations of Ghana were likely determined by continental drift during the Cretaceous period (about 135 million years ago), when Africa broke away from South America (Allersma and Tilmans, 1993). The geological composition consists of hard granites, granodiorites, metamorphosed lava, and pyroclastic rock. Some coastal areas are covered by Ordovician, Silurian, and Devonian sandstone and shales (Allersma and Tilmans, 1993).

The coastal zone is composed of extremely old marine sediments, which occur along the coast between Takoradi and Cape Coast and around Accra. Fresh water sediments occur in the Saltpond area, whilst much younger marine series of shale, sand stones and

limestones are found in the extreme southwest and southeast of the country (Agyepong et al. 1990). The area of most rapid erosion occurs in the weaker geological forms. The area is underlain by very ancient rocks belonging to the Precambrian and Palaeozoic eras. The general topography is characterised by moderate relief. The occurrence of rock outcrops along the Ghanaian shoreline appears to be largely due to relief and change of climate (Dei, 1972).

3.2.2 Climate

Climate in the coastal zone is varied. Total annual rainfall varies from less than 875 mm in the eastern to more than 2000 mm in the western part. Minimum temperatures of about 25 degrees Celsius occur in July and August, where as the maximum occurs in February to March preceding the main rainfall season (Agyepong et al. 1990).

3.2.3 Habitats

Six coastal ecosystem types occur in Ghana, namely: sandy shore, rocky shore, coastal lagoons, mangrove/tidal forests, estuarine wetlands and depression wetlands. Ecosystems found along the coast include mangroves, estuaries, lagoons beaches, mudflats, sand flats, and sea grass systems. As mentioned in Chapter one, these habitats have very important ecological and social functions. There are five coastal wetlands of international importance - Anlo-Keta, Songor, Sakumo, Densu Salt Pans and Muni. Four others may also be similarly protected: the Keta, Korle, and Amazuri wetlands and the Elmina salt pans. The coastal wetlands are traditionally exploited for agriculture, fishing, salt-winning, and natural products such as reeds (Gordon, 1998).

3.2.4 Vegetation

The vegetation types of the coastal zone from east to west and reflect the rainfall gradient (Agyepong et al. 1990). They range from coastal shrub and savannah to marginal forest to dry semi-deciduous and moist semi-deciduous forest and finally to wet evergreen forest in the extreme southwest of the country. The immediate coastal zone comprises the strand vegetation, the lagoons and marshes (Agyepong et al. 1990). The western part from the frontier with Côte d'Ivoire to Cape Coast is dominated by semi-deciduous and

evergreen secondary tropical forest. The area from Cape Coast to the eastern border with Togo comprises a relatively dry zone with low-lying thickets, shrubs and savannah grassland (Armah and Amlalo, 1998). Important factors that affect the survival of vegetation in his area are wind, excessive evaporation, salt spray, saline conditions and looseness of substratum. Examples of terrestrial plants communities in the coastal zone are *Ipomoea spp, Canavalia rosea*, and *Thespesia populnea* (Agyepong et al. 1990).

3.2.5 Animal life

Turtles and manatees: Many parts of the coastal zone such as Ada and Shama are important nesting sites for marine turtles. Occurring species include the Leatherback (*Dermochelys coriacea)*, the Olive Ridley (*Lepidochelys olivacea)* and the Green turtles *(Chelonia mydas*). The West Africa manatee (*Trichechus senegalensis*) has also been sighted in some coastal areas such as those around the lower Volta.

Birds: Sandy beaches, estuaries, lagoons and flood plains along the coast of Ghana provide feeding and roosting sites for many birds, including migratory birds. Over 80% of total number of shoreline bird species recorded in Ghana is reportedly Palaearctic migrants (Ntiamoa-Baidu and Hepburn, 1988).

Fish: As has been established in Chapter one, fish in not only an important source of protein but also a source of livelihood and employment along the coast of Ghana. Marine landings are made in the Western, Central, Greater Accra and Volta Regions (Directorate of Fisheries, 2003). The marine fisheries fleets are classed as artisanal, inshore or semi-industrial and industrial (Mensah et al. 2001).

Artisanal fishery contributes most of the domestic marine fish supply such as small pelagics, especially the round sardinella, flat sardinella, anchovy and club mackerel (Directorate of Fisheries, 2003). It is responsible for over 80% of the total annual catch of small pelagic fish species (Bannerman et al. 2001). According to the 2001 census there were 9,981 artisanal wooden dugout canoes operating, most of which use 40 horse power outboard motors. The introduction of outboard engines to the canoes started in the 1950s and enables the fishermen to move further out to sea from the coast and to make bigger

catches (Mensah et al. 2001). The Ghana Canoe Frame Survey estimates that there are about 124,000 fishermen operating from 334 landing sites in 195 fishing villages along the marine coast (Bannerman et al. 2001). Commonly used fishing gears are purse seines, beach seines, set nets, drift gill nets and hook and line. Different gears are used at different times of the year to exploit different species of fish (Mensah et al. 2001). Fishing in the coastal zone by the canoe fleet is directly related to seasonal upwelling that occurs in the coastal waters of Ghana. The major fishing season which stretches from June to October coincides with the major upwelling whilst the minor fishing season which is from December to February coincides with the minor up-welling. For the rest of the year fishing is poor.

The semi-industrial/inshore fleet consists of locally built wooden vessels of 8 to 37m in length with inboard engines of between 90 and 400 horse power. Most vessels can either use trawl or purse seine nets. In 2000 there were 169 inshore vessels (MOFI, 2006; Mensah et al. 2001).

The industrial vessels are generally large, steel-hulled foreign built vessels that fish for shrimp, tuna and other species, mainly sea bream, cuttle fish and cassava fish. They include freezer trawlers and purse seiners (Directorate of Fisheries, 2003). Industrial vessels operate from Tema and also from Takoradi. About 30% of tuna landed by the tuna vessels is intended for the domestic market and 70% is exported. In 1996 there were 35 tuna vessels operating in Ghanaian waters (Mensah et al. 2001) and 9 shrimp vessels in 1998. Due to the high level of investment required, many vessels operate on a joint venture basis between Ghanaians and outside investors from Korea, France and other countries (Directorate of Fisheries, 2003).

Fishing also takes place in all the coastal wetlands, especially in lagoons, and also in the brackish-water marshes in depressions (Directorate of Fisheries, 2003). The species caught in the coastal lagoons and estuaries are tilapia (Cichloidae) mostly the black chinned tilapia (*Saratherodon melanotheron),* horse mackerel and the mullets. Oyster and crabs (*Callinectes) are also caught here* (Agyepong et al. 1990). The most important

lagoon fish, tilapia (*Saratherodon melanotheron*), accounts for about 98% of the catch (Directorate of Fisheries, 2003).

3.2.6 Salt production

Salt collection is an important activity along the coast of Ghana (Agyepong et al. 1990). It is carried out in the flat areas along the coast especially in the Keta and Songor lagoons, Ada, Ningo, Weija-Accra, Prampram, Apam, Cape Coast, Iture and Elmina areas. In most cases the salt is collected from the lagoon floors during the dry season when high evaporation leads to the precipitation of salt (Directorate of Fisheries, 2003). The salt is marketed locally and in neighbouring countries. Commercial exploitation is being encouraged especially under the government's economic drive of Presidential Special Initiative on Salt.

3.2.7 Mineral resources

Deposits of limestone, silica, feldspar, kaolin and other minerals have been identified within the coastal belt (Laing, 1991). However these minerals do not occur in commercial quantities. On the other hand, crude oil has been discovered in potentially commercial quantities in the Central Region of Ghana. Its exploration is to begin in 2010.

3.2.8 Tourism

Since the late 1980s, tourism has received significant consideration in the economic development strategy of Ghana. The coastal zone has played a crucial role in attracting both local and international tourists (Kuma, 2004) (Figures 3.2 and 3.3). Tourist attractions include the animal life, beaches, physical infrastructure such as hotels, beach resorts and forts and castles, cultural events and festivals (Tweneboah, 2001).

Figure 3.2 The Elmina castle found off the western coast of Ghana
Source: Tweneboah, 2001

Figure 3.3 The coconut grove beach resort

Source: Tweneboah, 2001

3.3 Description of study sites

3.3.1 Bortianor

3.3.1.1 Location

Bortianor is found in the Greater Accra Region of Ghana. This region is the smallest of the administrative regions in terms of area (Figure 3.4). In terms of population, however, it is the second most populated region, after the Ashanti Region, with a population of 2,905,726 in 2000, accounting for 15.4% of Ghana's total population (Ghana Districts, undated).

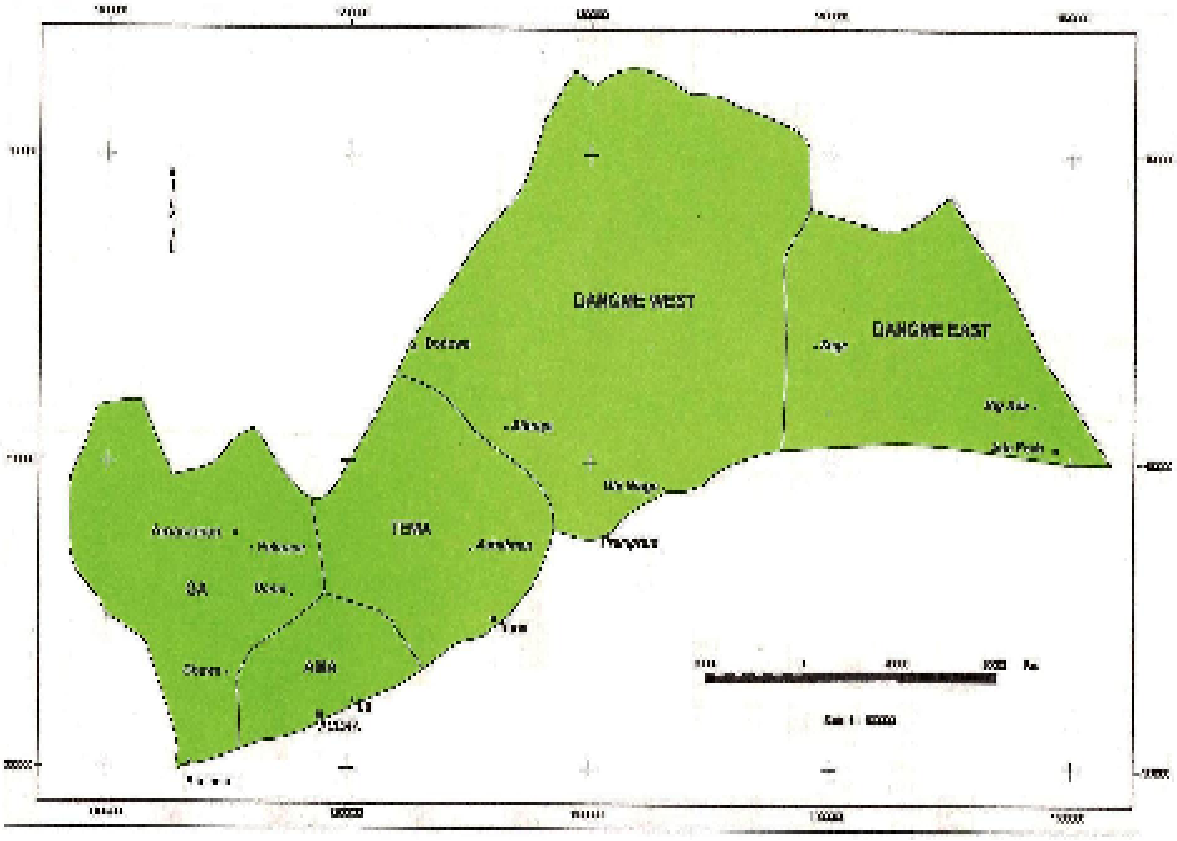


Figure 3.4 Map of the Greater Accra Region of Ghana

Source: Ghana Statistical Service, 2002

The political administration of the region is through the local government system. Under this administration system, the region is currently divided into six districts namely:

- Accra Metropolis
- Dangme East
- Dangme West
- Ga East
- Ga West
- Tema Municipal

The major ethnic groups are the Akan (39.8%), Ga-Dangme (29.7%) and Ewe (18%). The Ga speaking people however form the largest single sub-ethnic grouping, accounting for 18.9% (Ghana Districts, undated).

Analysis of the demographic characteristics of the region shows that it has remained the most densely populated region in the country since 1960. The intercensal growth rate of 4.4% between 1984 and 2000 is much in excess of the national average of 2.7% per annum and implies a doubling time of 16 years (Ghana Districts, undated). The region's age structure is a youthful one. There is however evidence of a downward trend in the rather high fertility rates. The proportion of persons under 15 years has decreased sharply from 41.5% in 1984 to 33% in 2000, giving rise to a corresponding rise in the proportion of the aged (65 years and older) from 2.6% in 1984 to 3.9% in 2000 (Ghana Districts, undated).

Bortianor is located in the Ga West District[6]. This district was created when the Ga district was divided into Ga East and Ga West. The coastline within the district is estimated to be about 10km long and provides a wide range of fish, including tuna, sardines, tiger fish, shrimps and lobsters. Most of the fishing is done by canoe fishermen and the women along the coast are engaged in processing and sale of fish. The major fishing communities are Bortianor, Oshiye and Kokrobite. The climatic condition of the district highly favours the production of livestock such as cattle, sheep, pigs and poultry (Ghana Districts, undated).

[6] Plans are already underway to create a new district from the Ga West District

According to the 2000 National Population and Housing Census, the population of Ga West District is estimated at 348,926, with intercesal growth rate of 3.4%. In 2007 the district's population had risen to 531,810 spreading over 1,043 communities and nine area councils (Ghana Districts, undated). The growth rate could be attributed to the districts closeness to the capital city Accra where there is a lot of inflow of migrant workers. The female population as at 2000 is 174,030 representing 49.9% of the total population; Males make up the other 50.1% that is 174,896. The population is mainly concentrated along the peri-urban areas of the district particularly on the border with the Accra Metropolitan Assembly and Ga East District Assembly.

3.3.1.2 Physical characteristics of area

Bortianor is a fishing community with a total population estimated in the 2000 Census to be 5,446 (Figure 3.5). Out of this 2,683 are males whilst 2,763 are females. The total number of households is estimated at 1,052 living in 644 houses whilst the average household size is 5.2 (Ghana Statistical Service, 2002).

Majority of community members depend on the sea for their livelihood. In many coastal communities marriage and kinship still tend to influence the day to day activities and Bortianor is no exception. They affect the degree to which women are able to cross over into the fisheries pre-harvest sector, which is almost completely dominated by men. The people of Bortianor follow the patrilineal system of inheritance. Here relations between siblings originating from the same father are considered the most basic and important (Overå, 2003). In patrilineal systems, the transfer of kinship from father to child through substances like control of sisters and wives (especially their sexuality) is stronger (Overå, 2003).

Figure 3.5 The coast of Bortianor
Source: E. Tweneboah

Poor sanitation, poor access potable water, illegal sand winning, land litigation and chieftaincy issues are some of the major problems confronting the area.

3.3.2 Moree

3.3.2.1 Location

Moree is also a traditional fishing community found on a rocky headland overlooking the Atlantic ocean. It is located about 8km west of Cape Coast, which is the capital of the Central Region (Figure 3.6). In the socio-economic and environmental context, it is the third most urbanised region in Ghana, following the Greater Accra (87.7% urban) and Ashanti (51.3%) (Ghana Statistical Service, 2002). The area is primarily inhabited by those of Fante ethnicity as well as other smaller ethnic groups (such as Ewe and Ga-Dangme). Nationally, it is estimated that the Fante speaking people comprise about 10% of Ghana's total population.

The region is made up of the following districts:

- Komenda-Edina-Eguafo-Abirem (K-E-E-A);
- Cape Coast Municipality;
- The Abura-Asebu-Kwa.mankese (A-A-K);
- Mfanstiman;
- Gomoa;
- Awutu-Efutu-Senya;
- Agona;
- Asikuma-Odoben-Brakwa;
- Ajumako-Enyan-Esiam;
- Assin North;
- Assin South.

Moree is found in the Abura-Asebu-Kwamankese (A-A-K) District. The 2000 census puts the population of the district at 89,260 representing 5.6% of the regional population and 0.47% of the national population including 41,939 males and 47,330 females (Ghana Statistical Service, 2002). With a short coastal strip of 5.2km along the Gulf of Guinea and stretching inland, the district shares boundary with Cape Coast and Twifo-Herman-Lower Denkyira Districts on the west Assin South District in the north and with Mfantseman district on the east. Moree is the largest settlement in the A-A-K District (Ghana Districts, undated).

Figure 3.6 Map of the Central Region of Ghana
Source: Ghana Statistical Service, 2002

3.3.2.2 Physical characteristics of area

Moree is one of eight town councils in the Abura-Asebu-Kwamankese (A-A-K) District Assembly. According to the 2000 population Census, Moree has a total population of 17,761. Out of this, 8,577 are males whilst 9,184 are females. The total number of households is 4,510 occupying 1,224 with an average household size of 3.9 (Ghana Statistical Service, 2002). Social amenities in the community include a Post office, telephone facilities (mostly mobile phone networks), a hospital as well as a clinic a primary, Junior High school as well as a Senior High School. Moree however, has a small settler population made up of Ada and Ewe fishers living in the Twuwiim area of the town (Overå, 1998).

Marine fishing and fish processing are the main occupations in the community, though as the town has grown the services industry including retailing and informal artisanal activities, have expanded considerably (Marquette et al. 2002).

Figure 3.7 The coast of Moree
Source: E. Tweneboah

Generally, fish has been a principal commodity in the coastal Fanti area of Ghana since at least 1471, when European explorers first arrived on the shores of the Gulf of Guinea and noted the existence of thriving fishing settlements in their logs (Pereira, 1937 in Walker, 2002). More than 50% of the town's population are involved in the fishing industry. Flat sardinella (*Sardinella maderensis*) constitutes over 60% of the landing in Moree.

The people of Moree follow the matrilineal system of inheritance (Overå, 2003). In this system, kinship bonds are transferred from mother to child through her blood (Overå, 2003). Hence in the matrilineal system it is not necessary for husbands to control women's sexual (and economic) activities since the interests of men are focused on their

mother's lineage and the continuity of the matrilineage through the children of his sisters. Like Bortianor, Moree is grappling with a wide range of environmental and socio-economic issues. These include high unemployment, poverty, poor sanitation and access to potable water.

CHAPTER FOUR
RESEARCH DESIGN AND METHODOLOGY

4. Introduction to chapter

The research design and the methodology of the study can be found in this chapter. The methodological pathways followed are based on a common approach which entails building on prior knowledge in addition to primary data collection. The research methodology discusses the data sources, sampling techniques, data collection and analysis. This chapter also outlines the procedures used to design and implement the Likert scales and the scales of relative importance that were fundamental to this study.

4.1 Data sources

Research into humans and the environment demands a multidisciplinary approach to link an individual's values and attitudes to environmental concern (Stern et al. 1991). The two main sources of data were primary and secondary. The main focus of the primary data was to empirically substantiate or dispute information gathered during the literature review process and to address the objectives set out in the beginning of the study. Secondary data included written documents, published and unpublished documents, maps and other reference material. All secondary materials used have been accordingly acknowledged.

4.2 Sampling procedure

A purposive non-probability sampling technique was used. This method was used because the aim of the study was to reach a specialised population, namely women. Limited use was made of probability sample design given the difficulty in obtaining household records that would serve as a valid sampling frame for Bortianor and Moree. In addition, a qualitative participatory method and in-depth case study approach was found to be appropriate for this type of study, where the reasons attached by respondents

to certain actions need to be understood. Since the case study approach was used, the generalisations of findings are theoretical rather than statistical. According to Yin (1994) case studies cannot be generalised to populations in general. Eisenhardt (1989) further explains that in case studies random selection is neither necessary nor even preferable.

The target population or the specific group relevant to the project, was coastal women above sixteen years (16) years. The size of the target population was large. Because of time and logistic constraints, a sample or a smaller number of the population that had to be drawn. The sample frame or working population for this study was determined by two main factors. First of all, in line with the objectives of the study, they had to be coastal women. Secondly, due to high cost of transportation, the poor road networks, the limited budget and the fact that personal interviews had to be conducted it was practical to choose coastal communities that were easily accessible to facilitate as many trips as possible to the study sites. To reduce the impacts of whatever limitation this would cause, the two communities were selected from two different regions namely the Greater Accra and Central Regions. These communities are inhabited by people of different ethnic backgrounds and languages as mentioned in Chapter three. The people in both areas however have a high dependence on coastal natural resources and strong cultural bonds.

4.3 Data collection

Attitudes and values, which formed the main thrust of the research, are complex and difficult to assess and measure. A flexible approach using a number of data collection techniques was therefore essential. It was also important to design an instrument that respondents could easily understand and that would elicit values for key natural resources in the study areas (Chuenpagdee, 1998). A summary of the steps taken in the methodology can be found in Figure 4.1.

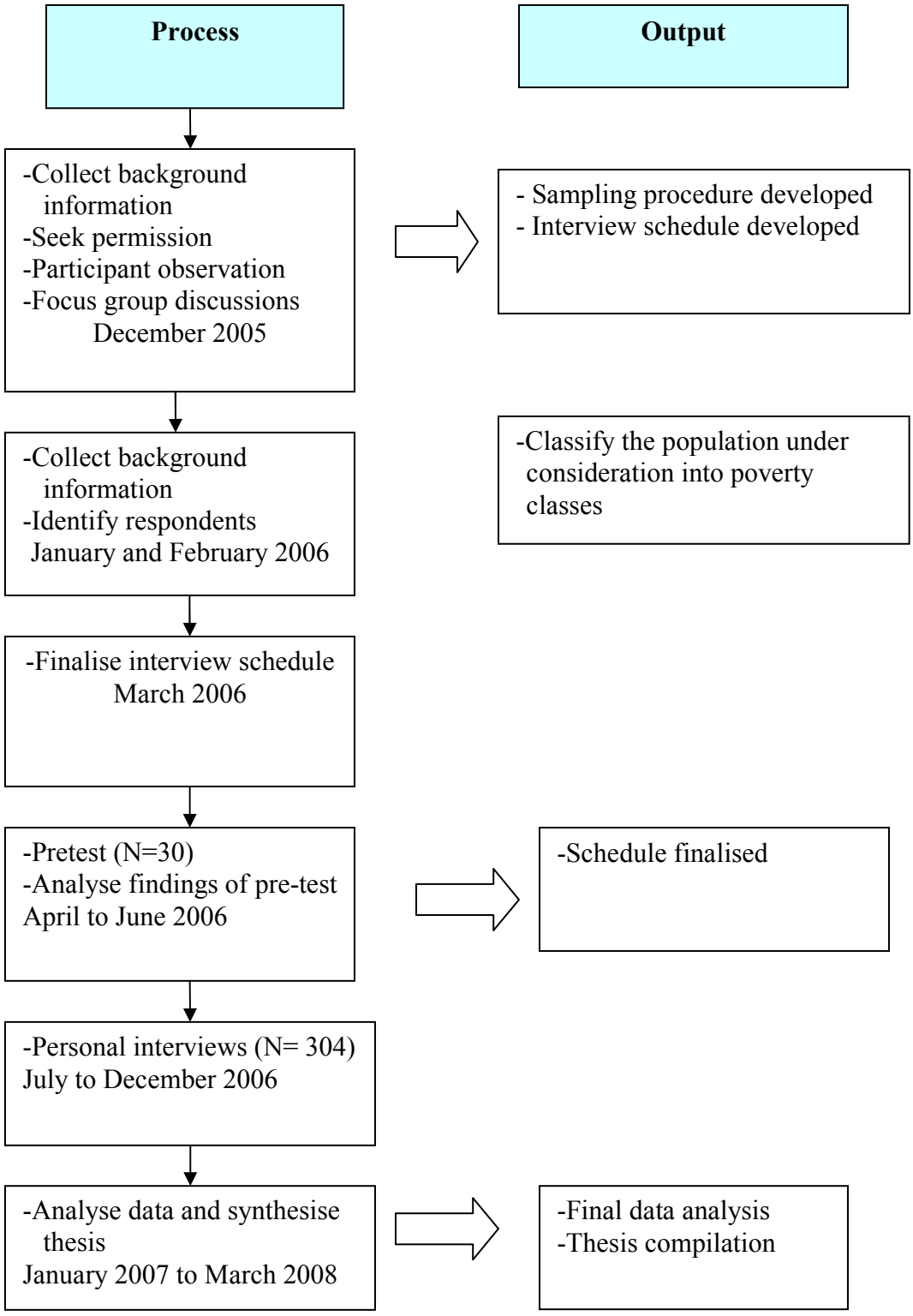


Figure 4.1 Steps taken in data collection

Primary data was collected by means of focus group discussions, personal interviews and participant observations. Personal interviews were opted for in place of self-administered questionnaires because of the following reasons.

- Majority of the respondents had little or no formal education;
- There was a lack of efficient postal services in the communities, which ruled out a mail survey;
- The lack of stable electricity and telephone services also ruled out telephone interviews, fax, Internet and E-mail surveys.

Several trips were made to the study areas. After introductions, almost all potential respondents contacted were willing to take part in the study showing how important the issues at stake were to them.

4.3.1 Background information

The first three months spent in Ghana were used to gather available published data about the study sites from the relevant Ministries, Departments and Agencies, research institutions and Non-Governmental Organisations (NGOs).

4.3.2 Focus group discussions

A focus group discussion is an important way of obtaining respondents' knowledge and perceptions in a simple, flexible yet effective manner. Its purpose is to develop a broad and deep understanding rather than a quantitative summary of the issues at stake. Two focus group discussions were organised within each of the study communities at the very beginning of the study, in December 2005 (Appendix C1 and C2). Separate discussions were organised for men and women. The reason for separating the sexes was to ensure that the presence of the men did not intimidate the women thereby affecting their responses and *vice versa*.

A focus group was also organised with some representatives of government at the local level. Due to their busy schedules, the discussions lasted about twenty minutes and were made up of a maximum of four discussants, one male and two females in Bortianor and four males in Moree. Information from all the focus groups was important in creating

questions for the Likert Scales and value items for the paired comparison (Tables 4.1 to 4.3).

The questions for the focus group discussions were generated based on extensive study of secondary data such as newspapers and other reports on the study areas and also through participant observation. Some of the questions were also developed or altered as the discussions progressed. During the focus group discussions with the local residents, discussants were asked key yet simple questions such as “Why is the coastal zone important to you?” “Which aspect of the coastal zone is important to you?” and “What are the environmental problems and problems affecting natural resources here?” These generated lot of qualitative data which was carefully sifted through.

Similar statements were grouped together and the first six statements for each area were selected for the paired comparison assessment based on their frequency of occurrence. This way the categories of value were derived by the discussants themselves. The statements were aesthetic, ecological, economic/utilitarian, sense of place, cultural identity, spiritual/religious (occurred in Bortianor only) and moralistic values (occurred in Moree) (Table 4.1).

Table 4.1 Examples of value statements and their corresponding values

Statements by discussants	**Value classification**
A place to relax with family and friends. Even now that there is rubbish all over it is still a beautiful place. I like the sea and the beach. There is fresh air here. Sometimes I go and sit by the stream with friends and chat, it is beautiful and peaceful.	Aesthetic
There are all sorts of animals living here, some we eat some we cannot eat. The trees protect us from the sea. It is home to the animals and plants. The sea washes away all the filth; that is important.	Ecological
Most of food I eat is from around. Fish from the sea, cassava, maize and so on from my farm. We depend on the natural resources for food. When there is no fish we all starve. It provides us with jobs and money.	Economic
It was given to us by God to protect. We need to take good care of it for our children and grand children. I want my children to live in a healthy, pleasant environment so I need to use the natural resources wisely. We need to protect it for the next generation.	Moralistic
This is our home. My grandparents all lived here. I have no where else to go.	Sense of place
It was named after a god so we need to protect it It brings us peace and good fortune Only the priest is supposed to enter that forest. If we cut the trees there we will die	Spiritual/Religious
Sometimes we use the beaches for retreats and prayers. The atmosphere is good. My grandmother knows a lot of plants here that can be used to cure malaria, snake bite and so on.	Healing
We are coastal people and we need the sea and the coast to survive.	Cultural identity
The coast gives us so many things.	Appreciative

In addition, a list of general environmental concerns was obtained from the focus group discussions (Tables 4.2 and 4.3). Since there was a maximum number of pairs that could be used for the comparison, the first six based on the frequency of occurrence were chosen.

Table 4.2 Simple ranking of environmental problems by discussants in Bortianor

List of environmental problems	Rank
Noisy environment	1
Loss of scenery	2
Sea erosion	3
Poor access to potable water	4
Poor sanitation	5
Loss of fisheries	6
Degradation of coastal and marine environment	7
Others (Loss of biodiversity, land degradation and indiscriminate sale of land to developers).	8

Table 4.3 Simple ranking of environmental problems by discussants in Moree

List of environmental problems	Rank
Loss of fisheries	1
Poor sanitation	2
Sea erosion	3
Noisy environment	4
Lack of potable water	5
Loss of scenery	6
Polluted water ways and surrounding seas	7
Loss of biodiversity	8
Others (Flooding, smoke, cutting of mangrove forests)	9

4.3.3 Description of fieldwork

4.3.3.1 Developing the questionnaire

Based on the background research, the responses and comments from the focus group discussions, a questionnaire was developed with the objectives of the study in mind and containing both open ended and closed questions. The three main objectives of investigating the relationship between women, poverty and coastal natural resources, and assessing women's environmental attitudes and values towards the coastal natural resources formed the themes around which the questions revolved. Excerpts of the questionnaire can be found in Appendix C3. The phrasing of each question was carefully

assessed since poor phrasing could cause the respondents to give incorrect information. This was especially important in this case where the questions were to be translated from English into Ga, Akan and in some cases Ewe.

The final questionnaire was divided in nine parts. The first part, Section A was used to obtain background and demographic information. This section also included some questions that would elucidate more on the indicators or levels of poverty of the respondents. The Sections B and C assessed the respondents' access to potable water and sanitation in the communities. Sections D and E were made up of open ended questions aimed at investigating the women's level of interaction with the coastal natural resources and their knowledge of institutions concerned with coastal NRM.

Section F and G used Likert scales to assess respondents' environmental attitudes and behaviour. This scaling technique used statements that required the respondents to indicate the extent to which they agreed or disagreed with the statements. Hence the statements ranged from "strongly agree" to "strongly disagree" on a five point Likert scale. A five point scale was used for comparability with other relevant studies into environmental attitudes. The measurement scale was explained to the respondents to avoid any confusion. The questions for this section were specifically developed to assess individual attitudes towards natural resources in the coastal zone were created using information from the focus group discussions and an extensive review of literature which resulted in the selection of three statements from the New Ecological Paradigm (Dunlop et al. 2000), which were relevant to the study. Initially 20 questioned were developed for this section. After testing for its reliability, five questions were deleted. Sections H and I contained paired comparison questions that were used assess environmental values. For both sections, 15 possible pairs were presented to the respondents.

4.3.3.2 Pre-testing the questionnaire

The months of April to June 2006 were used to pre-test (N = 30) and finalise the questionnaire. The pre-test was necessary to ensure that the questions and terms were comprehensible to respondents. It was also important to ensure that the contents of the questionnaire could easily be communicated to the respondents in the local languages.

Respondents for the pilot included eight women and two men from different backgrounds who spoke Ga and Akan very well. After the pilot study a few questions had to be taken out or refined.

4.3.3.3 Personal interviews

The study used an interview-administered questionnaire which lasted from July to December 2006. The reasons for using this method have already been explained in Section 4.3. The researcher together with three field assistants administered the questionnaire, through oral interviews in Fante, Ga and Ewe. In all 304 women were interviewed at their work places such as they were processing fish, in their homes and wherever they could be found. The actual dwelling compounds that were visited for the interviews were identified through purposive sampling, in an attempt to reach and to interview women with different backgrounds. Effort was also made not to interview more than one respondent per household. 30 men were also interviewed, 15 from each study area. Although they were not included in the final analysis, it was to provide insight to how they also felt about the issues at stake.

4.3.4 Participant observation

The method used was passive participation, which means that the researcher was present at the area of activity but was more of a bystander or spectator. From the beginning of the study, through out the study period many visits were made to both Bortianor and Moree. This enabled the researcher to identify who the key players of the community were and how to gain access into the communities. In order to understand the context in which to interpret people's comments, the researcher attended some local events, visited local markets and public places and also met with some local government employees. Good records on all observation were kept.

4.3.5 Photographs and other visual images

Digital photographs, maps and diagrams were utilised to highlight issues where necessary. Some respondents allowed their images to be captured as they undertook various activities. Images and maps taken from secondary sources were duly acknowledged.

4.4 Data analysis

Primary data was analysed both quantitatively and qualitatively. Qualitative research elicits respondents' accounts of experiences and perception in the form of descriptive data. It is mostly concerned with non- statistical methods and small purposively sampled populations into a not well researched subject (Polit and Hungler, 1997). On the other hand, quantitative research involves a formal systematic process of gathering information which is then translated into numeric information and analysed using statistical procedures (Polit and Hungler, 1995). Quantitative data is often summarised in maps, matrices, tables and charts. Statistical methods used to investigate the results of survey usually ignore the interpretative process. The combined use of qualitative and quantitative data was to identify relationships that may not be evident from the qualitative data, and *vice versa*. Qualitative data, which is often quickly dismissed as "anecdotal" by researchers who are used to seeing the world only through numbers, places the interpretative process at the centre of their practice (Huddleston and Pittaluga, 2000; Twumasi, 1986; Creswell, 1994; Mckie, 1996).

4.4.1 Quantitative approach

Simple frequencies and cross-tabulations dependent and independent variables were analysed quantitatively using SPSS 13.0 programme. Chi^2 have been used in many studies to determine environmental significance. For comparability, they were also used for this study. Data from the factual questions were presented in frequency tables showing the raw numbers and in terms of percentages of the total. Descriptive information was also presented in tables.

4.4.1.1 Likert scales

In developing Likert-style questions, each question must have a similar psychological weight and direction in the respondent's mind. This method has been used quite extensively in assessing attitudes, including environmental attitudes. The challenge however, is developing the right questions that can be easily understood by the respondents and at the same time effectively assess their environmental attitudes. For this study the respondents made a variety of responses in the form of a five point scale

ranging from strongly agree (SA), agree (A), indifferent (I), disagree (D), strongly disagree (SD). A numeric score was given to each item in order to reflect the degree to which the respondent agreed and disagreed with the item. The scores were totalled to measure the attitude of the respondent. The maximum score was 75 (5X15) and the minimum 15 (5X1), since no statements were left blank. The scores were then grouped into two categories. No middle attitudes were measured; scores ranging from 15 to 45 represented a negative attitude whilst scores from 46 to 75 a positive attitude.

The total score gave some idea of the strength of a respondent's attitude. The items of statements all had approximately the same level of importance (size) to the respondent, and are all more or less talking about the same concept (direction), which concept the scale is trying to measure. The "direction" of the statements was mixed up, to make sure statements were carefully read, and the informant had to consider their answers carefully.

4.4.1.2 Analysis of paired comparison data

A simple way of evaluating paired comparison data is to use the preference score for each item which is the number of times the respondent prefers that item over other items in the choice set (Peterson and Brown, 1998). In this study the paired comparison questions were analysed in a straight-forward fashion by examining a matrix of preferences and calculating an arithmetic average of the preference for each value across all other values with which it was paired. This is because scaling the scores would have not produced different results (Neuman and Watson, 1993). Where no circular triads were produced, the result showed a clear ordering of environmental values of women towards coastal natural resources. The values assessed are described in terms of relative importance or worth of an object to an individual or group in a given context.

4.4.2 Qualitative analysis

Open-ended questions from the interviews, results of the focus group discussions and the unstructured interviews were analysed qualitatively. The aim of using this method was to shed light on the respondents' subjective world in order to understand why they behave the way they do and understand the reasons they attach to certain actions. All tapes of interviews were transcribed and where necessary included in the results. Quotes from the

interviews and open ended questions remain as close to the original as possible (for instance, with "…" used to indicate pauses in the informant's responses). Some of these are presented in Chapters 5 to 8 as boxes. The process of transcription is a slow one and can be tedious, but listening to the tapes over and over again enabled the researcher keep the issues and responses in mind through out the length of the study.

4.5 Limitations of study

The study highlights women in the coastal zone of Ghana for three main reasons. Primary among these is the researcher's interest and academic background in women's interactions with the biophysical environment. In addition, current research trends in Ghana show that not much research is being done on the issue of women and the environment generally and specifically women's environmental values and how these impact on attempts to manage coastal natural resources. Finally since women form majority of the poor in Ghana, targeting them in a study like this provides rich information on poverty-NRM linkages. Although the sample was selected through a non-probability method and the results cannot be said to be representative of the whole of the costal zone on Ghana, it does provide insight and baseline information for subsequent larger surveys.

At this point it is also necessary to mention some biases that the study is subject to. It focuses on women, their activities and how these affect coastal natural resources. It assumes that women are closest to the coastal natural resources. The views of men which are also vital in considering the environmental values of coastal residents towards coastal natural resources are not emphasised. Since majority of the respondents were had little or no education, the interview method had to be used. The presence of interviewers during surveys could lead to some biases such as social desirability bias. Here those being interviewed, sometimes misrepresent a response in an attempt to make a more favourable impression on an interviewer or on others.

The paired comparison methodology and Likert scales may be subject to certain kinds of biases such as information bias. They assume that people make judgments and choices based on their knowledge of the resources, their experiences and their personal values

(Chuenpagdee, 1998). However people's knowledge could also be influenced by media, friends and family members which could result in the judgments that reflect what is "expected" of them rather than what they really value. In addition values depend, not only on the nature of the thing itself, but also on the environment in which the value is being assessed and on different circumstances of the people who evaluate it at that time (Randall, 1987 in Chuenpagdee, 1998). Section 4.6 deals with efforts made to minimise these biases.

4.6. Trustworthiness and reliability of study

The issue of the validity of qualitative methods of data collection and analysis continues to generate some debate. This method is concerned with textual data rather than numbers. Assessing trustworthiness in qualitative research refers to the rigor of the study (Sandelowski, 1993; Sandelowski and Barroso, 2002). Trustworthiness refers to the extent to which one can believe in the research findings. In this study, trustworthiness was achieved through the processes of credibility, fittingness and conformability (Table 4.4).

Table 4.4 Ways trustworthiness was achieved in the study

Principle	Strategy	Method used
Credibility	Refers to the process of ensuring that what the respondents say is represented as accurately as possible. Involves ensuring that the theoretical framework generated is understood and is based on the data from the study.	Direct quotes from respondents where enclosed in inverted commas (“ ”). Each interview was transcribed within 48 hours of it being conducted to avoid distortions and inaccuracies. Another method used was peer evaluation at PhD seminars.
Fittingness	Refers to how well the study’s findings fit outside the study situation. Also refers to the probability that the findings will have meaning to others in a similar situation (Streubert and Carpenter, 1999).	The research settings or context were thoroughly described.
Confirmability	This is concerned with the use of accountability and calls for the use of the audit trail. It includes a record of the research activities and diaries over time which can be easily followed by another person (Streubert and Carpenter, 1999).	All aspects of the data collected and the different steps of analysis to interpretation of data and the conclusions arrived at have been duly documented.

Concerning quantitative methods of data collection, for surveys to be useful, the survey instrument should meet certain requirements. The most outstanding of these requirements are reliability, objectivity and validity (Table 4.5).

Table 4.5 Ways reliability and validity were achieved in the study

Principle	Strategy	Method used
Reliability	The extent to which results are consistent over time and an accurate representation of the total population under study (Joppe, 2000). Describes how well the instrument measures what it was designed to measure.	The questionnaire was pre-tested and ambiguous statements removed. Statements designed for the Likert scale were deemed relevant to the attitudes being measured. The number of choices on the scale was evenly balanced to retain a continuum of positive and negative statements. Internal reliability was achieved by Cronbach's Alpha coefficient.
Objectivity	Indicates the extent to which the results are independent of the researcher.	Personal biases of the researcher were kept separate from the study. To reduce experimenter bias, effort was put in not to dress in a particular way or use expressions that could influence respondents.
Validity	Refers to the accuracy of instruments, data, and findings in research (Polit and Hungler, 1995). Face validity: The extent to which the instrument measures what it purports to measure. Content validity: Related to whether the questionnaire the pertinent questions for measuring the construct at stake. Construct validity: Assesses whether there is a close fit between the construct it supposedly measured and actual observations made with the instrument.	Face validity was obtained by an extensive review of literature on the subject of poverty, environmental attitudes and values. Experts in the area also critiqued the questionnaire. Content validity was achieved by allowing experts in the research area to assess and critique the questionnaire, especially whether the questions were capable of measuring or capturing the concept for which it was designed. Construct validity of the other hand was done by using multiple sources of data and ensuring that the theories behind the issue being researched were linked to the questions in the questionnaire. A pilot study was also used.

CHAPTER FIVE
BACKGROUND INFORMATION OF RESPONDENTS

5. Introduction to chapter

The results and discussion of the study can be found in Chapters 5 to 8. This chapter provides some basic information about the respondents. This is important in order to understand the backdrop against which the research is conducted. In addition, this information provides some insight into what motivates the respondents to think and act the way they do.

5.1 Socio-demographic characteristics of respondents

In all 304 women (151 from Bortianor and 153 from Moree) took part in the personal interviews.

5.1.1 Age of respondents

About half of the respondents that were interviewed were below the age of 40 years (Table 5.1). Some respondents did not know their ages, likely due to the low educational levels and lack of written records of their birthdates. Other respondents could only estimate their dates of birth, sometimes based on particular events at the time of their birth.

Table 5.1 Age, marital status and educational levels of respondents

	Bortianor		Moree	
Age	N	%	N	%
16-20 years	12	7.9	20	13.1
21-25 years	20	13.2	25	16.3
26-30 years	15	9.9	21	13.7
31-35 years	19	12.5	12	7.8
36-40 years	21	13.9	7	4.6
41-45 years	19	12.6	17	11.1
46-50 years	14	9.3	18	11.8
51-55 years	8	5.3	11	7.2
>56 years	11	7.3	19	12.4
don't know	12	7.9	3	2.0
Total	**151**	**100**	**153**	**100**
Marital Status				
Single	19	12.6	37	24.2
Married	114	75.5	93	60.8
Separated/Divorced	11	7.3	16	10.5
Widowed	7	4.6	7	4.6
Total	**151**	**100**	**153**	**100**
Education				
None	84	55.6	94	61.4
Primary	44	29.1	32	20.9
Middle school	8	5.3	6	3.9
JHS	8	5.3	16	10.5
SHS	2	1.3	4	2.6
Vocational/tech	3	2.0	1	0.7
University	2	1.3	-	-
Total	**151**	**100**	**153**	**100**

5.1.2 Marital Status

75.5% of women in Bortianor, as compared to 60.8% in Moree were married. Comparing this to the district level, 56% of the adult population in the AAK District are believed to be married while about 34% are single. As mentioned in Chapter 3, marriage and living arrangements are often influenced by kinship.

In many areas, with urbanisation and the adoption of western views concerning the family make up, the influence of kinship in waning. However in coastal communities this

is still quite strong. This has been well documented in Overå (2003). For example in both areas it was common to find married couples living apart. For women who lived apart from their husbands, unless the husband had migrated to another community to work or fish, they still undertook their marital duties, cooking, washing and cleaning for the husbands. There were days when they stayed with their husbands overnight and went back to their own homes in the morning. However there are marked differences between Bortianor and Moree.

Bortianor remains a typical Ga community. In most parts, the family homes are divided into male and female sections (Overå, 2003). Sons live with their mothers until they reach puberty. Then they move to their father's house and are trained to become skilled fishermen (Overå, 2003). This practice was common among the indigenous Ga-speaking people as compared to the settler communities in Bortianor.

On the other hand, in Moree, both women and men belonging to the same matrilineage live in the same house (for example a man with his sisters and the children of his sisters). Women often build their own houses where they live with their children (Overå, 2003). Children live with their mother. They belong to her lineage and do not inherit any of their father's property. The father however contributes to the up-keep of the children (Marquette et al. 2002).

There has been much discussion on why these patterns persist. Some authors such Overå (1998) refer to the demanding labour requirements of fishing activities, which made it convenient for work groups to stay together to be able to organise their activities at short notice. For women the sharing of responsibilities such as childcare, housekeeping and cooking is an added incentive (Odotei, 1991).

Marriage is also an inherent part of the fisheries, which is reflected in the gender division of labour: men fish and women trade. The right of a wife to buy fish through a husband or son is thus an important institution in the fishing economy (Marquette et al. 2002; Overå, 1998). Sometimes fish is bought on credit and the debt settled in cash or in exchange of other material items such as labour and food stuffs.

5.1.3 Number of children born

Fishing in Ghana is a highly labour intensive enterprise, right from the time when the catch is landed, through processing and marketing (Marquette et al. 2002). For many years high fertility served to guarantee this labour supply, and can almost be seen as an integral part of the fisheries industry (Directorate of Fisheries, 2003). The average number of children in Bortianor and Moree did not differ significantly.. The mean numbers of children were 3.93 and 3.40 for Bortianor and Moree respectively.

Children also played an active role in post-harvest activities. Male children in some communities begin to fish as apprentices at the age of 7 or 8 years (Campbell and Townsley, 1995). Young girls also undertake activities related to processing and trade. Having children is thus important to many of the respondents.

5.1.4 Educational attainment

57.7% of respondents in Bortianor and 61.4% in Moree said they have no formal education. Educational facilities in both areas are inadequate. Interestingly in the Ga West District where Bortianor can be found, there are 910 private schools compared to 349 public institutions in the various levels of education. Only 50 of these public basic schools of these are in the rural and deprived areas of the district (Ghana Districts, undated).

Comparatively, the A-A-K District as a whole had a total of 312 basic schools out of which 35 privately owned. At the district level, it is estimated that 47% of the adult population have completed the primary or Junior High School whilst 12% have completed Senior High School education. But 39% have not attended any school, revealing a formidable area to be addressed by non-formal education (Ghana Districts, undated). The identified causes of the low educational levels in the study areas are two-fold.

With the introduction and the implementation of the school feeding programme in some selected basic schools, basic school enrolment has improved somewhat. However, it is obvious that despite the introduction of the Free Compulsory Universal Basic Education

(FCUBE)[7] programme there continues to be not much motivation in the study areas for parents to send their children to school or for children to attend school. Many of the livelihood opportunities available in Bortianor and Moree such as the production, handling, processing and distribution of fish, demand low levels of skill and are labour intensive. In addition many children have to walk many kilometres to school.

Families that can afford the cost of educating their children send them to schools in near by towns. However due to the high poverty levels many parents cannot afford to do this and these children get involved in fishing activities. Hence at an early age children begin to take part in these activities initially to assist relatives and eventually to earn a living. In Bortianor, rather than go into fishing, many of the young boys work as "tour guides", offering to assist visitors and tourists move around the towns of Bortianor and Krokobite for a fee. Others also migrate to Accra.

An analysis of the relationship between education and environmental attitudes showed that education affected the attitudes of respondents towards coastal natural resources positively (Appendix A6). The low educational levels among respondents brings to the fore the importance of non-formal education. Adult education in Ghana dates back to 1948 when the colonial administration embarked on an experimental adult education programme in four regions, namely Ashanti, Central, Volta and Western. In 1987, the Non-Formal Education Division (NFED) was established within the then Ministry of Education. In addition to its broad responsibilities, the division was expected to co-ordinate all non-formal education related programmes in the country. NFED aims at improving the lives of those with little or no education, especially the rural poor and women by providing quality functional literacy. It is therefore important to note that 60% of the learners are women, with 72.5% of the classes in rural areas. The Basic Literacy component spans a period of 21 months. Some relevant topics studied include:

- Animal husbandry;
- Tree growing and energy saving;
- Basket weaving;

[7] Implemented in 1996 to focus on access and quality of basic education through improving the quality of teaching and learning, efficiency in management and increasing access and local participation.

- Environmental hygiene;
- Family planning;
- Book keeping
- Safe motherhood and child care
- Food preservation
- Farming and agricultural services
- Hygienic ways of preserving and selling fish
- Traditional fishing
- Community empowerment and development
- Health issues
- Traditional medicine

In Moree as compared to Bortianor, knowledge of the existence of non formal classes seemed high. Since 1992 Non Formal Education has provided learners in the A-A-K District with skills in literacy and numeracy in the Fante Language commonly spoken in the district as well as in development activities. The two-year programme is headed by a District Organiser located at the district headquarters and assisted by supervisors responsible for activities in the six zones of Aboase, Ayeldu, Nyanfeku Ekroful, Asebu, Abakrampa and Moree. Of the 2,697 learners, there are 2,065 females and 632 males; all aged more than 15 years. Thus the majority of the learners are female adults, accounting for over three-quarters of the learning population (Ghana Districts, undated).

In Moree other activities under the programme include the production of a District newspaper called *Oman Mere Yte*, a quarterly zonal community newspapers and group radio listening (Ghana Districts, undated). This programme could be an effective tool for environmental education aimed at changing the attitudes and behaviour of residents for effective public participation in decision-making and management of coastal natural resources. There has also been a lot of education in Moree (also by some NGOs) on the importance of planting woodlots for fuel wood rather than cutting down mangroves. Education is also critical for improving the capability of women to address environmental and other developmental issues which directly or indirectly impact on coastal natural resources. •

Changing environmental behaviour is a difficult process affected by social and economic factors. The Ministry of Education, Science and Sports in Ghana has included environmental education in the Basic school curricula in order to create a positive attitude towards the natural resources and the environment at an early age.

The implementation of the Child and Environment Programme aims at:

- Assisting children to acquire basic understanding of the functioning of the environment;
- Encourage children to contribute to the preservation of a clean environment;
- Assist children to develop concern for the environment and acquire positive attitude towards it;
- Use children as agents of change.

5.1.5 Housing and living conditions

In view of the limitation of purely economic indicators of poverty and standard of living, a range of other critical factors influencing poverty, including access to household assets and basic services are taken into account when accessing the standard of living of individuals in a community. Housing conditions can also be a measure of the quality of life of household members. Hence the study collected information on the type of housing facilities in which the respondents lived. The type of building materials did not differ significantly in both areas. The main construction materials used for the walls were mud and cement (Table 5.2). Increasingly more and more residents are re-building their homes with self-made cement blocks with sand obtained from the beach. The main roofing material was iron and zinc roofing sheets. Although the use of asbestos roofing material was in the minority, the fact that its use persists is troubling in view of its known potential health risks.

Table 5.2 Type of building materials of respondents' homes

Building material for outside walls	Bortianor (%)	Moree (%)
Cement only	35.4	33.0
Mud only	27.4	31.2
Cement and mud	20.6	25.4
Cement, mud and wood	2.0	-
Mud and wood	6.6	-
Wood only	6.0	6.3
Other	2.0	4.1
Total	**100**	**100**
Main roofing material		
Thatch	21.3	19.7
Iron / Zinc	55.1	59.4
Asbestos	22.2	19.9
Wood	1.0	-
Other	0.4	1.0
Total	**100**	**100**

Since respondents invariably have no access to mortgage facilities and have to rely on their own savings to build a house or own homes, ownership of housing and type of housing is another important expression of social status (Marquette et al. 2002) (Table 5.3).

Table 5.3 Ownership of house by respondents'

Type of Building Material	Bortianor (%)	Moree (%)
Self only	7.1	15.5
Self and husband	21.2	2.0
Husband only	18.2	11.2
Father	8.0	2.9
Mother	11.3	30.1
Other relative	10.6	19.0
Rented	23.6	19.3
Total	**100**	**100**

About 23.6% of respondents in Bortianor as compared to 19.3% in Moree lived in rented premises. The rest lived in homes owned by themselves or some relative. Of interest is the fact that more respondents owned houses in Moree whilst in Bortianor more houses were owned by the respondents with their husband or some male relative. Most of the respondents lived in multiple family homes, or "compound houses" as they are called. In Bortianor respondents who spoke Ewe dominantly were migrants or descendants of migrants from the Volta region of Ghana. Whilst they pointed out that on the whole they owned the houses they lived in, they were quick to point out that they were settlers in the area and could not own land.

5.1.6 Household size

In the 2003 Ghana Demographic Health Survey (GDHS), a "household is defined as a person or a group of persons, related or unrelated, who live together in the same house or compound, share the same housekeeping arrangements, and are catered for as one unit". This definition was also used in this study. The average household size for Bortianor was 7.9 whilst Moree was 6.2 which are higher than the national average of 5.1 and the 6 persons per household for the A-A-K District (Ghana Statistical Service, 2002). Overå (1998) explains how the housing compound tells a whole story about the careers and status of the people who live in it. She discusses extensively the complex relationships that bind members of the compound, usually belonging to the same patrilineage as is the case of Bortianor or matrilineage as is the case of Moree. At the same time one housing compound is linked to another through marriage. The largest household size of 20 was found in Bortianor, made of three generations sharing the same compound.

5.1.7 Economic status of respondents

Respondents were asked about ownership of particular household goods and also their access to electricity and telephone facilities. Both communities are served by electricity from the national grid. According to the GDHS, more than half (58%) of the households in Moree have access to electricity, 10% more than the 2003 national figure of 48% (GSS, NMIMR and ORC Macro, 2004). However, contrary to responses from

respondents, 65.2% in Bortianor as compared to 34.1% of the respondents in Moree had access to electricity in their homes (Figure 5.1).

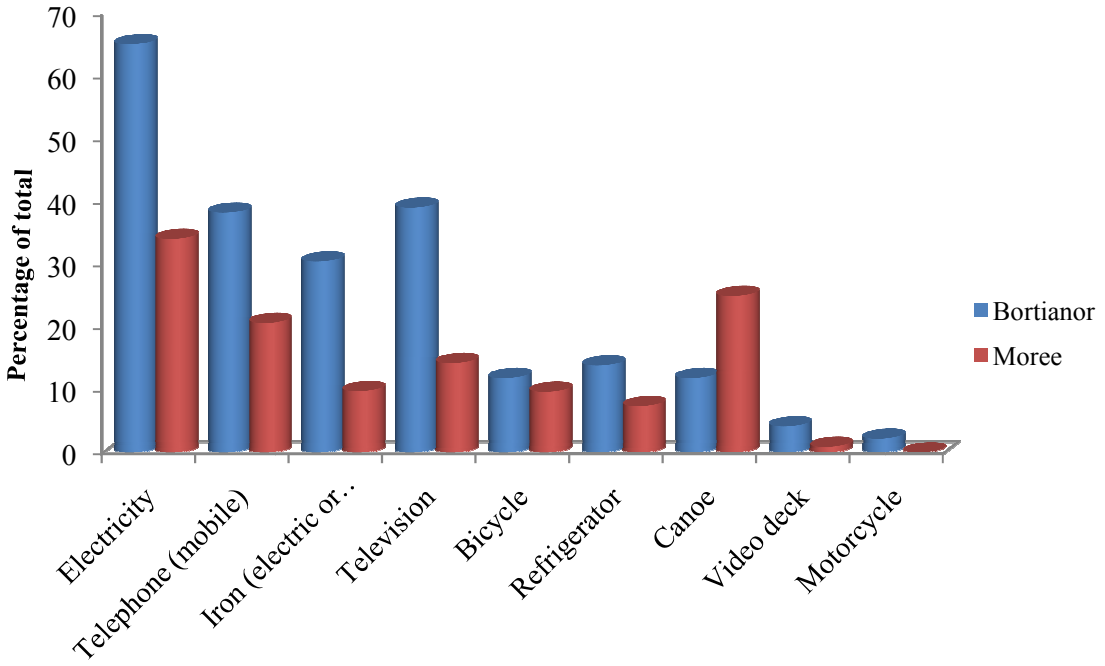


Figure 5.1 Access to electricity and possession of some household goods in Bortianor and Moree

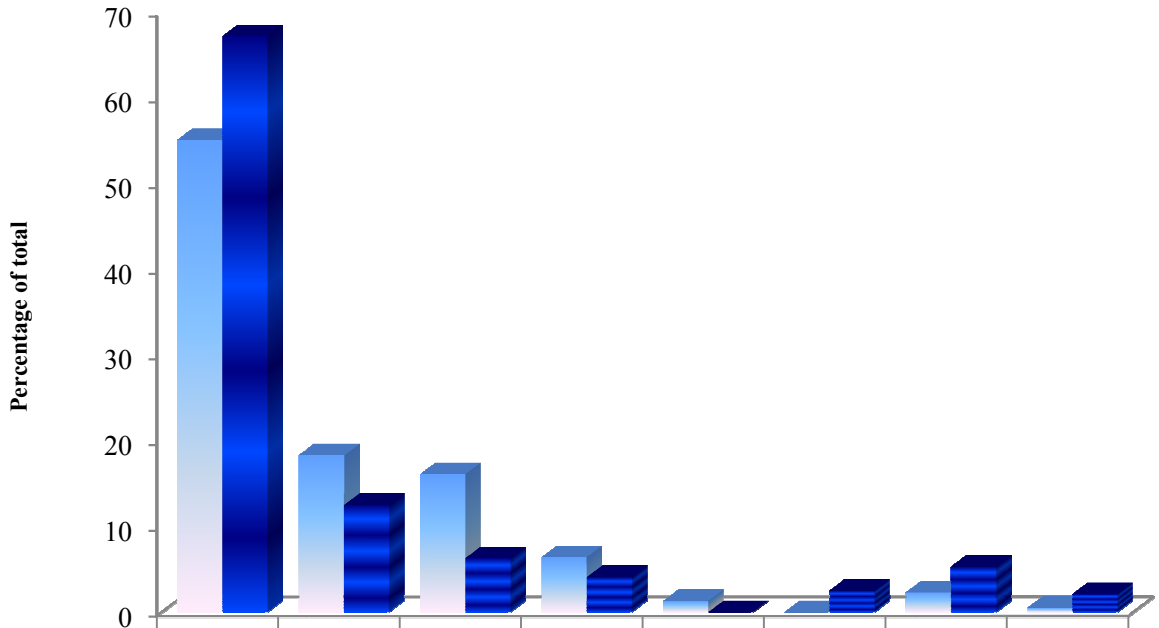
The better access to electricity in Bortianor could be attributed to the nearness of this community to the capital Accra and also to the increasing real estate projects springing up here. The prohibitive electricity tariffs however affect ownership of electrical household items. Moree has a comparatively higher proportion of female canoe owners which is consistent with the findings of Overå (1998). As at 1992, women reportedly owned 100 out of a total of 400 canoes in the fishing village of Moree (Overå, 1992).

Owning a canoe is a symbol of wealth and prestige for women (Odotei, 1991). In most cases the support of a male be it a husband or brother or son is crucial. According to Overå (2003), the extent to which women are able to cross over to the male dominated pre-harvest sector is influenced by kinship ideologies, post-marital residence patterns, and gender division of labour. Under the patrilineal system of inheritance the primary

interests of men are vested in their fathers' and/or fathers brothers' fishing company. In the matrilineal inheritance a man's interests are vested in both his mother's brother's canoe and/or his mother's canoe. So it is also in his interest to support his mother in owning fishing gear. In most cases the male children of the female canoe owners are the captains of the canoes (Odotei, 1991; Overå, 1998).

5.1.8 Occupation

As is expected, fishing industry employed the highest number of women, although the percentage (67.2%) was higher in Moree (Figure 5.2). The vital role played by women can be especially seen during the lean fishing season. When there are problems with the effective processing of fish, there is a remarkable decrease in the availability of fish in the market and an increase in prices. 18.3% of respondents in Bortianor as compared to 12.5% in Moree considered themselves unemployed. Many of these used to be involved in the post harvest fishing industry and had lost their capital. There are more women in petty trading in Bortianor as compared to Moree. Whilst selling used to be a secondary occupation for most, with the declining fish stocks it is sometimes more profitable to sell along the main roads, to visitors and tourists and also to the construction workers undertaking various building projects than to depend on fish.



	Fishing industry	Unemploy-ed	Trader	Hair dresser	Teacher	Student	Farmer	Other
Bortianor	55.1	18.3	16.1	6.4	1.3	0	2.3	0.5
Moree	67.2	12.5	6.3	4.1	0	2.5	5.3	2.1

Figure 5.2 Respondents' occupation

As has been already established, women dominate post-harvest sector and are active in the supply of inputs, in processing and in trade (Campbell and Townsley, 1995). Each role is important in ensuring the continual supply of fish all year round. In Bortianor some respondents worked for female boat owners or as described by Overå (1998) as "fish mammies," for a specific period of time. After this period, they are given an amount of money, wax print and in some cases, helped to enrol to learn a trade as payment. These fish mammies are particularly important players in the supply and processing sectors. Their strong position is thought to have evolved as a result of the development of strong social networks and the acquisition of acute trading skills. They are relatively well off and are major investors, risk takers and employers in the post-harvest sector (Overå, 1998; Directorate of Fisheries, 2003).

At the landing sites on the beaches some women sold the fish in the fresh form (Figure 5.3). These were either the wife of the canoe owner or captain, a woman that the crew is

indebted to or the owner of the canoe (Overå, 1992). In some cases securing the sole right to buy fish from a particular canoe requires years of negotiations and trust.

Their role is essential in that they serve as intermediaries between the fishermen and the fish processors. Overå (1992) describes these women as "standing women", with each boat having a standing woman who acts in this capacity. They in turn may have their regular customers to whom they supply the fish.

Another important group in the industry are the "wholesalers" who process and distribute fish on a large scale. They also have large distribution networks all over Ghana. For example the smoked fish from Moree is sold in Mankesim, Agona Nkwanta, Swedru, Accra and Techiman depending on how far they can afford to go. Some women go as far as neighbouring African countries. The "retailers" sometimes also smoke fish, but on smaller scale. They may in addition get their supply of fish from the standing woman or they could get their supply from wholesalers in which case they act as agents for the wholesalers. The retailers sell more directly to the final consumers (Odotei, 1991). Other supporting groups include the porters who carry the fish to the various destinations and the traders who sell food at the beaches.

Figure 5.3 Waiting for the next canoe
Source: E. Tweneboah

Due to the unavailability of fish all year round or the seasonal nature of fish processing, most of the respondents had some form of secondary occupation. In the peak season they sold fish and in the lean season they did petty trading, selling foodstuffs and manufactured goods, as well as small-scale farming where possible. Others also turn to the use of imported frozen fish. For this they had to travel to bigger towns that had effective cold storage facilities. Relying on frozen fish is expensive since most of it is imported through the Tema and Takoradi ports. Popular types are the horse mackerel (*Trachurus trachurus*) and chub mackerel (*Scomber japonicus*) as well as sardinella (Directorate of Fisheries, 2003).

Processing fish by smoking is quite extensive throughout the coastal zone. Because they are easily stored, smoked fish provides traders with food and income all year round. It also prolongs the shelf life which is important especially for areas such as Moree without adequate cold storage facilities. The technology behind fish smoking has not changed much over the years. Smoking is generally by means of fuel wood. In Moree most of the wood used in the fish smoking industry comes from hinterland since apart from the fact that the mangrove sources are heavily depleted, it is illegal to cut them for fuel wood. There are various designs of ovens used and wood normally is burnt to provide heat and smoke. Below are a few designs of oven observed in Bortianor and Moree.

Cylindrical mud oven

As the name implies, this oven is cylindrical and made of mud. They are especially common among the Fantes in the Central and Western Regions of Ghana. Hence it is also called the Fante oven. It seemed to be the most used oven used in Moree (Figure 5.4). An obvious disadvantage of the oven is the inefficient use of fuel. It is also reported to produce a lot of smoke thereby affecting the health of women and children who work with it.

Cylindrical metal oven

This is similar to the *Fante* oven except that it is usually constructed by joining together the open ends of two metal oil drums and cutting a hole at the base for the wood.

Rectangular mud oven

This oven is rectangular in shape and constructed from mud. The fish are arranged on pieces of wire mesh and placed on the supporting iron rods. This oven is used both in Bortianor and Moree. A major draw back of this oven is the loss of heat and smoke through the stokehole and round the layers of fish, resulting in inefficient fuel use (Brownell, 1983).

Figure 5.4 Cylindrical mud ovens in Moree
Source: E. Tweneboah

The Chorkor Oven

The Chorkor ovens were popularised by the Food Research Institute (FRI), the Food and Agricultural Organisation (FAO) and other donors from the early 1970s. It was first tested in the Chorkor village in Accra, from where it got its name. It consists of a combustion chamber and a smoking unit with a set of trays on which fish are placed for smoking. The advantages of the Chorkor oven are that it can be used to smoke large quantities of fish, produces smoked fish of a better quality and is fuel efficient. Although this technology has been disseminated through demonstrations and training programmes

many processors still use traditional style ovens because of the initial cost in construction. This oven was quite widely used in Bortianor. One respondent in Bortianor who kindly allowed hers to be photographed (Figure 5.5) said they preferred to build it with cement so it lasts longer. However some respondents complained about their inability to afford the materials to construct the Chorkor improved ovens.

Other processing methods include drying, fermenting and frying. Drying is sometimes preceded by salting. Most small marine species are sun dried without the addition of salt. In fermentation, the fish undergo a degree of spoilage before salt is added to alter and control the spoilage process (Brownell, 1983).

Figure 5.5 A Chorkor oven in Bortianor

Source: E. Tweneboah

Farming also occupies an important place in the lives of respondents. Most of them practiced subsistence agriculture, growing food to meet the basic food needs of their families. The farms were also an important source of fuel wood. With decreasing fish

catches and increasing investment levels, one respondent who had smoked fish for 40 years concedes more women see themselves exploring other livelihood opportunities such as agriculture.

CHAPTER SIX
POVERTY AND COASTAL NATURAL RESOURCES

6. Introduction to chapter

This chapter sets out to examine the assertion that the availability or non availability of natural resources affects the well being of poor people immensely. It begins by acquiring definitions of poverty from the perspective of respondents. It then assesses the poverty–natural resources relationships.

6.1 Respondents' perceptions on poverty and vulnerability

It is estimated that more than 1.3 billion people depend on fisheries, forests and agriculture for employment, which is close to half of all jobs worldwide (FAO, 2004). Poverty levels among the post-harvest fisheries sector in Ghana is estimated to be 29%, which although lower than the food and export crops sectors, but still high (NDPC, 2003). In order to understand *their* perceptions of poverty, the respondents were first asked if they thought themselves as being poor. The results were remarkable (Figures 6.1 and 6.2).

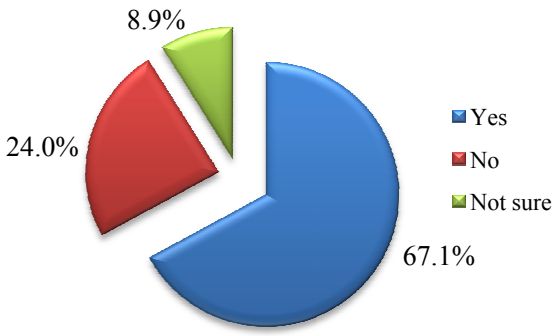


Figure 6.1 Percentage of respondents in Bortianor who perceived themselves poor.

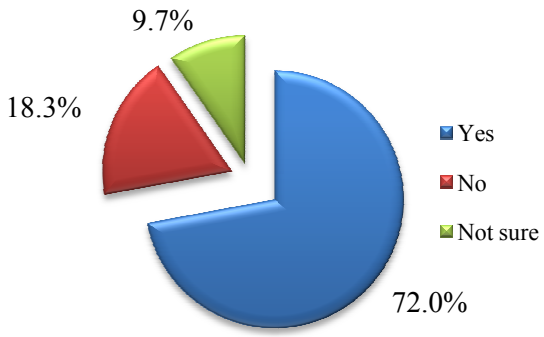


Figure 6.2 Percentage of respondents in Moree who perceived themselves poor.

Despite the fact that a larger percentage of respondents in Bortianor were unemployed a lower percentage here (67.1%) described themselves as poor. A qualitative method was then used to understand the reasoning behind this perception and to understand poverty from the standpoint of the respondents themselves. The reasons given did not differ much in both areas. They had to do with the ability to feed themselves and their families, access to some basic infrastructure, household assets and in some cases social exclusion (IFAD, 2001). A sample of their statements can be found in Box 1.

Box 1. Why respondents believe they are poor

"I don't have any work. I have to forage on the beaches to feed my children".
"I believe I am poor because I can't feed my children"
"I am not invited to special occasions such as traditional weddings and funerals. Only rich people are invited to such gatherings"
"The house I live in is crumbling down and I have no money to repair it"
"We have no jobs. We all depend on fish but now there is no fish. The government should give us jobs"

Some respondents in Bortianor

"Poverty is when someone is unable to find food to eat, has to beg for food, and cannot buy clothes".
"Not owning any wax prints, having to wear one 'kaba' every Sunday to church means I am poor"
"There are no jobs here. All we do is smoke and sell fish. Without fish we go hungry". "I don't have to explain... you can see it when you look at where I live, my clothes, my children, this work I am doing, everything else."

Some respondents in Moree

According to Norton et al. (1995) the criteria for assessing poverty and vulnerability at the level of the household and individual can be grouped into six categories.

- Physical assets: Includes physical assets for production such as animals, access to land and fishing.
- Human assets: The ability of persons to fend for themselves or possess networks of kin for support or possessing of marketable skills.
- Social assets: A person's social status and network, such as family networks.
- Activities: For example the necessity to engage in casual "by-day" labour could be indicative of the poor whilst the capacity to assist with community projects and to help disadvantaged kin was an indicator of wealth.
- Level of consumption: The levels of income, quality of food and clothing of an individual and his or her children could give insight of his or her poverty levels.
- Access to services: Such as being able to provide education and health for the family.

Since populations are heterogeneous different types of poverty exist within communities, with similar groups undertaking similar activities and having similar survival strategies (Béné et al. 2000). Whilst a number of poverty profiling methods have been used especially by the World Bank and the Department for International Development (DFID), most have been based on the Sustainable Livelihoods Approach (SLA). Adapting this method, respondents were asked to propose poverty groups, based on their perceptions of poverty and a using livelihood system available in the community (Pittaluga, 2004). No predetermined definition of poverty was provided to them rather they were to base their descriptions on their observations and experiences. The results were five main poverty classes based on livelihoods patterns, living conditions and access to and use of natural resources (Figure 6.3).

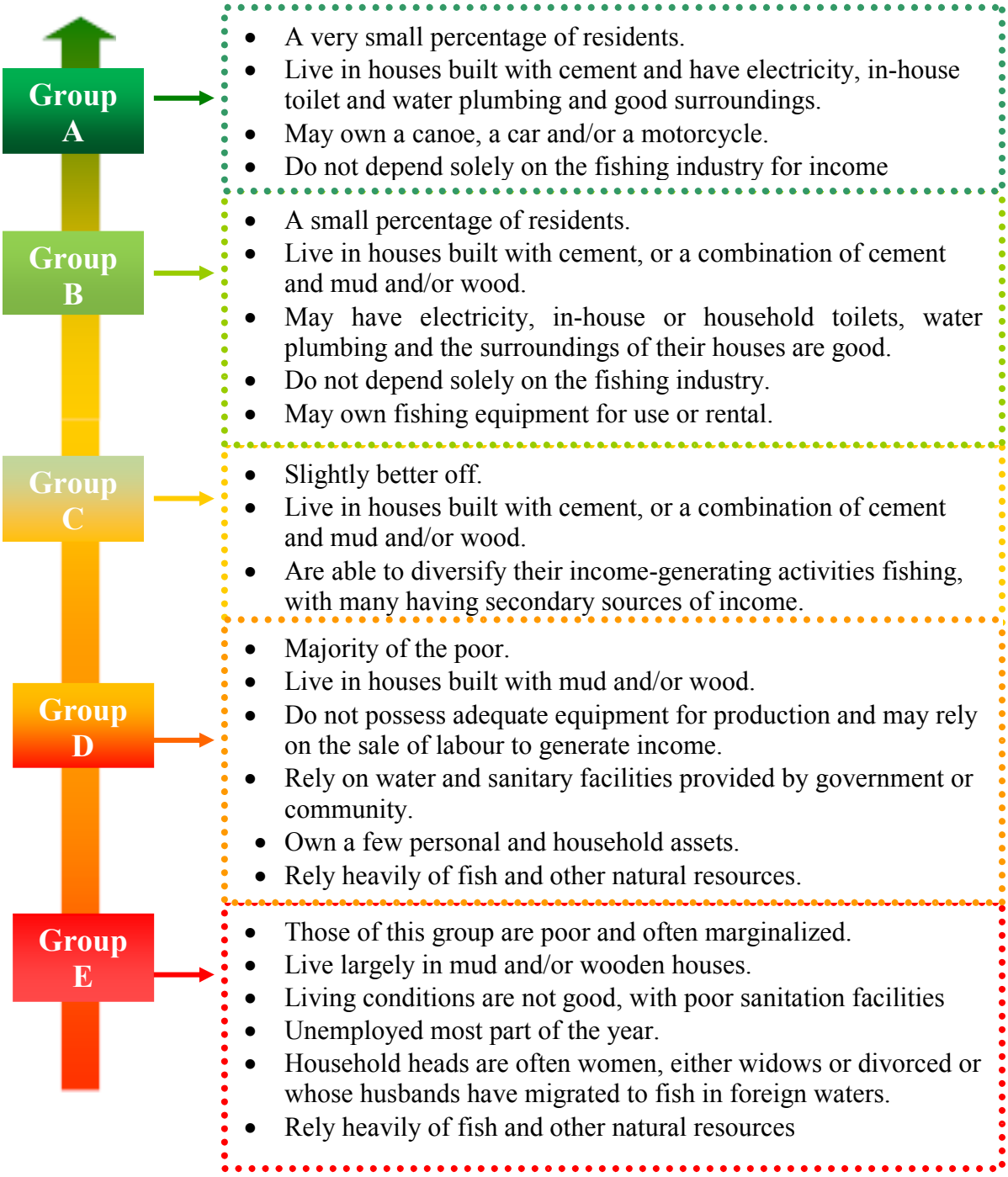


Figure 6.3 Continuum of poverty groups in Bortianor and Moree
Source: After Pittaluga et al. 2001; Pittaluga, 2004.

The study also asked residents to cite the four contributory factors of poverty. Interestingly, although issues relating to environment and natural resources did not seem to be priority issues, it was mentioned in both areas (Figure 6.4).

Decreasing fish catches and unemployment: Income is an important indicator of standard of living in most areas. It is not surprising that the current trend of low fish catches and unemployment rank highest in both Bortianor and Moree. In many coastal areas the local economy is virtually driven by the fishery sector and a decline in the ability of the sector to provide employment and income worsens poverty levels.

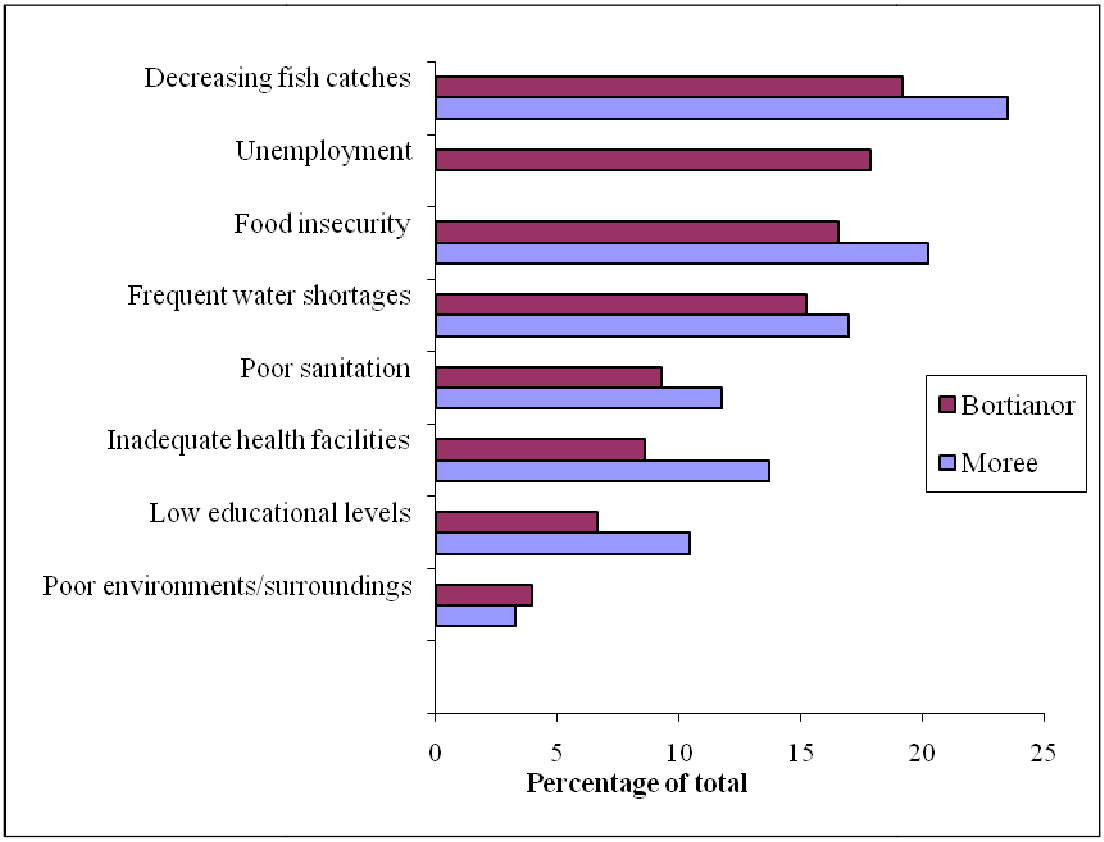


Figure 6.4 Reasons of poverty cited by respondents

The decrease is fish landed was attributed by respondents to "the light that has been put in the sea". This refers to the use of light attraction for fishing (Box 2). Other less cited but equally important reasons include the increase in the number of gears and boats, unauthorised fishing gear and pollution. The use of fishing nets with small mesh sizes, explosives and chemicals harvest juveniles and damage animal and plant life.

Box 2. "No fish"

"This year there is no fish. Last year by this time my (*Chorkor*) oven was full of fish. It is because of the machine people use to fish. All of us who live along the coast use it. It is not so big but it has light at its end. The light is used to attract the fish. Then suddenly the light is put off and the fish are caught. Some people also use chemicals and small nets. This catches even the small, small fish and now we are suffering. Among ourselves were trying to outlaw it and anyone using these practices is reported". "I smoke fish but there is no fish so I am unemployed".

A respondent in Bortianor

Food insecurity: According to the World Food Summit (1996) food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Fish is an important source of animal protein. Ironically those involved in post-harvest fisheries sector are among the poorest and most food insecure livelihood groups in Ghana (NDPC, 2003).

Frequent water shortages: Access to adequate supply of potable water for productive and domestic use is important especially for women, who generally take care of domestic issues in the home. The 2003 GDHS found that, nationally, only about 39% of Ghanaian households have access to piped water, whether piped directly into the dwelling or compound, or available via a public tap (GSS, MNIMR and ORC Macro, 2004). The percentage of rural population with access to safe drinking water increased marginally

from 52% in 2005 to 53.2% in 2006; access was much better for the urban population, which increased from 55% to 56% (NDPC, 2003).

Water supply has always been a basic problem of the Ga West District with a limited number of communities having access to potable water. This is despite the fact that the Weija water reservoir and treatment plant that serves about one-half the population of Accra is located in the Ga West District. Respondents in Bortianor agreed they had problems with water. Although most household had water connected to their homes, water flow is highly irregular (Table 6.1). Most residents had to buy water from private water vendors and tanker services. In Bortianor a highly popular source of water is a stream called Solo. The stream flows through this forest and is also a source of drinking water for surrounding villages. The water is clear in most parts. However some respondents complained that settlers (non-Ga speaking people) were allowed to fetch water only from the not so clear parts. Women were also not allowed in certain parts of the stream for cultural reasons. Many respondents preferred Solo because they liked the taste of the water as compared to that of tap water and also because it was free (Figure 6.5). The surrounding forest is a designated sacred grove called the Solo Forest Monkey Sanctuary.

On the other hand, it is estimated that 87% of residents in the A-A-K District obtain their water outside the home (externally) whilst 13% have theirs internally. Although participants in Moree generally answered that they had access to safe drinking water, further questions showed that only 5.2% had access in-house plumbing (Table 6.1). The nearest water source was between 5 to 30 minutes away. Water was also fetched from the neighbourhood or from a public tap. Secondary sources of water include well water and reservoirs.

Table 6.1. Water and sanitation descriptive statistics

Characteristic	Bortianor		Moree	
	Frequency	Percentage of total	Frequency	Percentage of total
Access to safe water				
Yes	64	42.4	103	67.3
No	87	57.6	50	32.7
Total	**151**	**100**	**153**	**100**
Water shortage				
Yes	113	74.8	129	84.3
No	38	25.2	24	15.7
Total	**151**	**100**	**153**	**100**
Main source of drinking water				
Piped into home	29	19.2	8	5.2
River/stream	48	31.8	10	6.5
Public tap	18	11.9	41	26.7
Tanker	30	19.8	5	3.3
From neighbourhood (Tap water)	15	10.0	36	23.5
Open well	-	-	12	7.8
Covered well/bore hole	-	-	2	1.3
Stored in reservoir	4	2.6	24	15.7
Other	7	4.6	15	9.8
Total	**151**	**100**	**153**	**100**
Access to toilet facilities (home/ compound)				
Yes	9	6.0	23	15.0
No	142	94.0	130	85.0
Total	**151**	**100**	**153**	**100**
Type of toilet facility (home/ compound)				
Flush toilet/WC	3	33.3	4	17.4
Pit latrine	4	44.4	7	30.4
KVIP	2	22.2	12	52.2
Total	**9**	**100**	**23**	**100**
Where defecate				
Own toilet	9	6.0	23	15.0
Bushes	52	34.3	7	4.6
Beach	40	26.4	95	62.1
Undeveloped plot	8	5.3	4	2.6
Public toilet	40	26.5	24	15.7
Others	2	1.3	-	-
Total	**151**	**100.0**	**153**	**100.0**
Anything wrong with outdoor defecation				
Yes	51	33.8	38	24.8
No	77	51.0	85	55.6
Not sure	6	4.0	9	5.9
Don’t know	17	11.2	21	13.7
Total	**151**	**100.0**	**153**	**100.0**

Figure 6.5 Fetching water from Solo
Source: E. Tweneboah

Poor sanitation: Like access to clean potable water, good sanitation is an indicator of well-being and sometimes wealth. Poor sanitation is a major environmental problem in all coastal communities (Armah and Amlalo, 1998). High levels of faecal coliforms have been reported on some beaches (Tweneboah, 2001). The most common of the municipal sources of pollution are faecal waste and garbage from the numerous settlements along the coast. Bortianor and Moree are no exception. Most parts of the beaches are littered with household refuse and human excreta. Toilet facilities were virtually absent in most of the housing compounds that were visited. Garbage was dumped at the beach and some respondents maintained that it was used to fill up eroded areas along the beach.

Only 6% of respondents in Bortianor and 15% of respondents in Moree had access to toilets in their homes or compounds. According to the district profile of the A-A-K District, 24.8% of houses have toilet facilities within their homes whilst the rest (75.2%) use public toilets. In the Densu Delta Ramsar site where Bortianor is found, the Ghana Coastal Wetlands Management Project[8] has constructed KVIPs for the community

[8] A Global Environmental Facility (GEF)-World Bank funded intervention.

through the Wildlife Division of the Forestry Commission. However most of the toilets have broken down and the few still functioning were inadequate. The study sought to understand respondent's perception of beach defecation and why it was so prevalent. Using a qualitative method of analysis, the reasons for outdoor defecation can be found in Boxes 3 and 4.

Box 3. Respondent's perception of beach defecation in Bortianor

- "It is not good because it is in the open and creates stench".
- "I don't like anything wrong with it. We are used to it".
- "It causes diseases, creates unpleasant stench and makes the surroundings dirty".
- "It is bad because we buy our fish from the beach".
- "It is bad because both men and women use the same place at the same time. Whilst you squat a man may be squatting directly opposite you".
- It is wrong but that is what we are used to. The public toilet in this town is not clean and for that matter I prefer to go to the nearby bushes".
- "The public toilet is so bad. The stench is so bad that I hardly breathe when I go there".
- "Sometimes when you go to the bush we are chased and we take to our heels. But the public toilet is not good so we go back down at night".
- "You can be bitten by a snake; however we just cannot use the public toilet because the place is just not clean".

Generally the beach fronts of many tourists' sites, which are kept under strict international standards, are clean and safe. However, the above mentioned practices still decrease the economic and aesthetic value of the beaches especially for tourism. Apart from domestic sources, solid waste was also from old boats and nets. The data obtained shows that a combination of lack of information about the impacts of poor sanitation in general and a lack of basic facilities and infrastructure are contributory factors. The kind

of environmental attitudes and values respondents had under these circumstances will be discussed in Chapter 7.

Box 4. Respondent's perception of beach defecation in Moree

- There is nothing wrong with it. The sea washes it away.
- The public toilet inadequate, the beach is nearer.
- That is what we have. It is also close. I don't have money to queue at public toilet.
- It makes the place dirty and the bad odour is not good.
- There are no toilets, have to pay and queue for long at the public toilet
- They say it is illegal. I am not too sure why.
- There is a demarcation of where we defecate and where the canoes are so there is nothing wrong with it
- We try to keep both female and male beaches clean
- We came to meet it. Moreover we have only one toilet.
- It is wrong because we eat fish from the sea.

Inadequate health facilities: The health of people generally influences their quality of life. Increasing level of poverty means decreasing quality of life and accessibility to health facilities. The major health facility nearest to Bortianor is located in located in Weija. Similarly, Moree town has a health post but no resident physician; serious cases are referred to Cape Coast Hospital.

Low educational levels: Education plays a vital role in poverty alleviation, in that it contributes to the development of human resources. It also plays an important role in women's empowerment as well as reproductive choice. As discussed in Chapter 5, the

majority of the people in both communities have low educational levels. Hence they have resorted to "traditional" activities such as fishing and farming. The educational sector in both Bortianor and Moree is plagued by inadequate and dilapidated classroom facilities, low female school enrolment but high drop out rates and the lack of teachers.

Poor environments and surroundings: Unhealthy surroundings reflect the vulnerable living and working conditions of many fisheries-based communities (Campbell and Townsley, 1995). The lack of drainage channels or gutters contributes to the frequent flooding in both areas, which destroys household property. Inadequate drainage, which is also a result of citing developments in waterways, can lead to stagnant water that exposes people to water-related diseases.

Eroding areas are clearly observable along the entire shoreline of both study areas despite the fact that they have different shoreline structures. The causes of erosion in Bortianor include the nature of the shoreline and sand extraction. Coastal erosion, which has been recognised as a major problem of coastal natural resource management for many decades, is worsened by vegetation loss and by sand winning associated with the growing demand for construction materials. The winning of sand and sea shells on the beach for terrazzo chippings is also extensive. This, respondents say is also a result of the lack of employment opportunities. Sand winning is also a serious threat to sea turtle nesting habits.

6.2 Poverty and coastal natural resources

Coastal natural resources are important for their socio-economic as well as environmental functions. Many of the respondents depend on the natural environment to maintain their families. The unavailability of natural resource impacted them in many ways. Primarily, their well being depended on the health of coastal natural resource production systems (Figure 6.6).

Figure 6.6 Fuel wood for sale in Moree

Source: E. Tweneboah

The study analysed the links between poverty and coastal natural resources in two ways:

- Respondents' dependence on coastal natural resources.
- Coastal natural resources and their livelihood strategies.

6.2.1 Respondents' dependence on coastal natural resources

As seen in Figure 6.4, issues concerning the environment and natural resources do not rank foremost among the concerns of the respondents in both areas. Most of their concerns have to do with their ability to take care of themselves and their families. However this is closely intertwined with the condition of coastal natural resources. For example depleting resources have led to an **increase in poverty**. Whilst fish is the most common example of respondents' dependence on coastal natural resources, another is their dependence on fuel wood for domestic purposes. The use of Liquefied Petroleum Gas (LPG) was popularised some years ago in Ghana, as a cleaner, more efficient energy sources especially for cooking. However, most women have returned to charcoal, which is produced from partially burnt wood, and fuel wood bought or

collected from farms or bushes. These are cheaper sources of fuel (Table 6.2). With increasing difficulty in obtaining wood, women now have to walk further and longer for fuel wood for cooking, spending more **time** and **energy**.

Table 6.2 Family source of energy for cooking

Energy type	Bortianor		Moree	
	Frequency	**Percent**	**Frequency**	**Percent**
Charcoal	23	15.2	91	59.4
Charcoal and kerosene	9	6.0	-	-
Charcoal and fuel wood	25	16.6	27	17.6
Charcoal, kerosene and fuel wood	59	39.9	-	-
Fuel wood only	22	14.5	30	19.6
LPG	3	2.0	-	-
Kerosene	2	1.3	5	3.2
All	8	5.3	-	-
Total	**151**	**100**	**153**	**100**

Fish smokers also depend on considerable amount of wood. For example it is estimated that approximately 1kg of wood is required to hard smoke 1 kg of fresh fish using a traditional style oven. Hardwood is generally preferred for smoking. In many coastal communities neem, red and white mangrove trees are common fuels in some coastal areas (Porter et al. undated). However in both study areas none of the respondents acknowledged cutting mangroves. As the available wood for fuel depletes, they have to walk further and further into bushes and forested areas in search of fuel wood for cooking and smoking fish. This sometimes sends them into **unsafe** and dangerous areas.

The non-availability of fuel wood also affects the income of respondents. This is because they have no option than to buy from other towns found hinterland and also from the market. This increases their **expenditure** and if they are not able to increase profits, further aggravates their poverty. Others also find it difficult to repay loans from friends, relatives and organisation. With the non availability of fuel wood

affecting income and expenditure, its influence on the **food security** of respondents cannot be over emphasised. The task of walking long distances carrying loads of fuel wood impacts the **health** of respondents. In addition the use of fuel wood in cooking and smoking of fish has potential long term impacts on their health. As the household food preparers, they are often exposed to high levels of smoke for long periods (McGranahan and Songsore, 1994). Harmful smoke associated pollutants include lead and carbon monoxide. If inhaled especially by pregnant women, it may threaten the growth and mental development of the foetus. Young children are also at risk since they are often at the sides of their mothers as they cook or smoke fish.

From the above respondents' dependence on coastal natural resources is high. The decline in most other natural resources such as water has similar impacts. Respondents' actions in relation to coastal natural resources are influenced by their poverty levels. From the words of the women, when these resources are in abundance their standard of living was better and they were better able to feed their families and to take care of their personal needs and wants.

6.2.2 Coastal natural resources and livelihoods systems of respondents

Poor rural families make use of a variety of sources of income with many of these sources being directly based on natural resources which maybe sold for money or used domestically. This can be classified as "environmental income." This places natural resources central to their livelihoods (WRI, 2005). A livelihood system includes the capabilities, material and assets, social resources, and activities required for a particular means of living (Pittaluga et al. 2001). It depends to a large extent on a combination of the natural, human, physical, financial and social capital of respondents.

Based on the study areas, four indicators of poverty were selected to represent three of the broad requirements for a livelihood system (Table 6.3):

- Education (human capital).
- Access to potable water (physical capital).
- Access to toilet and sanitation facilities (physical capital).

- Estimated monthly income in Ghanaian Cedis (financial capital).

Table 6.3 Exploring relationships between poverty and coastal natural resources

		Bortianor	**Moree**
Poverty variables	% of respondents with some form of education	52.3%	38.6%
	% of respondents with access to tap water	42.4%	67.3%
	% of respondents with toilet facilities in homes	6.0%	15.0%
	Average monthly income from fish in GH¢	31.8	36.1
Natural resource use	% of respondents directly dependent on natural fish for income	55.1%	67.2%
	% of respondents depending on charcoal and fuel wood for cooking	96.7%	98.6%

Rural households derive substantial environmental income - up to 35% of their total income – from goods and services freely provided by natural resources (Cavendish, 2000). Poverty levels in both areas are high. Detailing the various contributions to respondents' total household income was beyond the scope of the study. However as Table 6.3 indicates "fish income" constitutes about 55.1% to 67.2% of total household income and is the industry is the highest single employer.

Earlier in Figures 6.1 and 6.2, 5% more respondents in Moree believed they were poor despite the fact that the average monthly income from fish is higher here. As more women diversify their livelihood options these figures may fluctuate. Nevertheless, the table gives a fair idea the critical role played by natural resources in the livelihoods of

respondents in the coastal zone, as well as the nature of the threat posed by coastal natural resource degradation.

Coastal natural resources are thus vital to their livelihoods. For emphasis, they are dependent on fish as a primary source of income and food. They also depend on bio-mass for cooking, smoking fish and also as a source of income. For most respondents, greater control and security over the resources on which their livelihoods depend was seen as key to overcoming poverty. Secondly, their multiple roles and responsibilities depend on natural resources. With a decrease in their availability respondents have to put in more effort fulfil their financial obligations in and out of the home.

The link between poverty and coastal natural resources is direct with natural resources levels affecting levels of poverty and vice versa (Figure 6.7). Factors that affect poverty levels include climatic conditions, poor access to basic necessities and cultural factors such as gender. However local institutions and policies are important in determining how poverty and coastal natural resources are managed. These include fishing policies, good coastal NRM systems and Poverty Reduction Strategies (PRSPs). They not only reduce poverty levels but when effective also create greater entitlement especially for the poor providing them greater control to the benefits of coastal natural resources. This will in turn promote the wise and efficient use of natural resources thereby reducing the degradation of coastal natural resources.

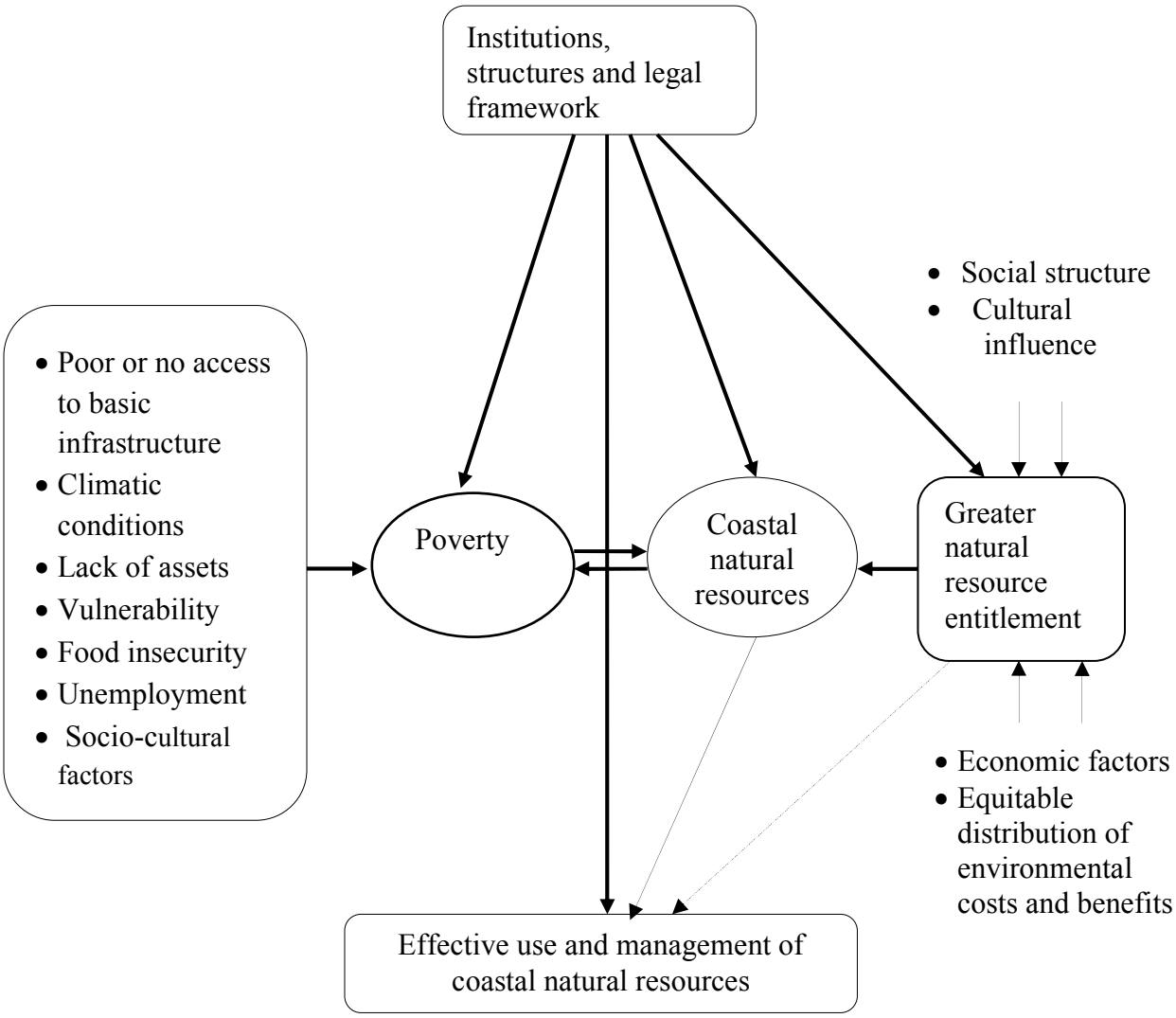


Figure 6.7 Micro level rural coastal poverty and NRM linkages

Tenure or ownership of coastal natural resources could motivate users to invest in their sustainable use. This is important since the degradation of natural resources in general and coastal natural resources in particular are a stumbling block to meeting the Millennium Development Goals, particularly the goal of halving extreme poverty.

CHAPTER SEVEN
ENVIRONMENTAL VALUES AND ATTITUDES

7. Introduction to chapter

The aims of this chapter are two-fold. Environmental attitudes were investigated through the development of a scale, which comprises a variety of survey questions investigating a range of issues affecting coastal natural resources. Secondly, it assesses respondents' environmental values using the paired comparison methodology. Policy implications of the findings are also discussed.

7.1 Attitudes of respondents towards trends of natural resource degradation

In order to advocate environmental behaviour changes, knowledge of environmental attitudes are important. Attitudes are complex to measure and there have been quite a number of methodologies developed, some of which are mentioned in Chapter 2. A common method tested over decades is an attitudinal scale which uses a series of statements to directly assess the perceptions and behaviour of respondents. For this study the constructions of the attitudinal questions were based on specific, identified problems affecting natural resources in the area (Appendices A3 and A4).

In addition, 3 of the 15 statements were adapted from the New Ecological Paradigm (Dunlop et al. 2000) to suit the local setting (Tables 7.1 and 7.2). The statements assess attitudes towards natural resources through:

- Sanitation, pollution, loss of fish and natural resource use (Questions 1, 2, 3, 6, 8, 9, 10, 11 and 13).
- Anti anthropocentric[9] attitudes (Questions 5, 12 and 15).
- Institutions for managing coastal natural resources (Questions 4, 7 and 14).

The scale achieved adequate internal consistency with a Cronbach's (1951) Alpha reliability coefficients 0.729 in Bortianor and 0.735 in Moree. This showed that the scales developed were reliable and valid (Appendices A3 and A4).

Table 7.1 shows that the general tendency was for respondents in both areas to endorse pro-environmental beliefs. There were few exceptions however. For example in Bortianor more than half of respondents agreed with the statement that it is okay to throw rubbish on the beach if you are poor. Their strong disagreement to the statement that plants and animals have as much right to exist as humans is also noteworthy. More than 20% were undecided concerning the questions humans have a right to modify the natural environment to suit their needs, the natural resources cannot get depleted, people who pollute the beaches and the surrounding mangroves should pay to clean it.

[9] This encompasses the view that destructiveness is rooted in anthropocentrism, an arrogant view that we are separate from and superior to nature, which exists to serve our needs (Barnhill et al. 2006).

Table 7.1 Environmental attitudes of respondents in Bortianor

Items in scale	SA (%)	A (%)	I (%)	D (%)	SD (%)
1. The coastal zone is being degraded by indiscriminate dumping of refuse and defecation.	39.7	45.0	5.3	9.3	0.7
2. It is okay to throw rubbish on the beach if you are poor.	10.9	34.4	9.9	29.5	15.3
3. All households in the communities should have toilets and bathrooms.	56.3	35.1	3.3	4.6	0.7
4. Resource users should be involved in the management of coastal natural resources.	41.1	31.8	7.3	18.5	1.3
5. Humans have a right to modify the natural environment to suit their needs.	26.5	42.4	22.5	6.6	2.0
6. Outdoor defecation and indiscriminate waste disposal along the beach cause diseases.	59.6	27.2	4.6	7.3	1.3
7. Management of coastal natural resources is the sole responsibility of the government	29.8	39.1	15.9	14.6	0.7
8. Only unconcerned and uncommitted citizens dump garbage and defecate along the beaches.	5.6	30.4	7.3	39.5	17.3
9. People who pollute the beaches and the surrounding mangroves should pay to clean it.	6.0	31.1	21.9	34.4	6.6
10. Fishing with dynamite and nets with small mesh size is not good	58.3	24.5	2.0	13.9	1.3
11. The natural resources cannot get depleted	4.0	41.7	26.5	27.8	0
12. Plants and animals have as much right to exist as humans.	2.0	23.2	7.3	53.6	13.9
13. If the current degradation of natural resources continues we will soon experience a major ecological catastrophe.	29.8	54.3	10.6	4.6	0.7
14. Priority in resource allocation should be given to activities that create greatest economic returns even if it may harm the environment.	9.9	47.5	9.3	32.5	0.8
15. Humans were meant to rule over the rest of nature.	4.0	53.6	11.3	28.8	1.3

SA- Strongly agree, A- agree, I- indifferent, D- disagree, SD- strongly disagree

Table 7.2 Environmental attitudes of respondents in Moree

Items in scale	SA (%)	A (%)	I (%)	D (%)	SD (%)
1. The coastal zone is being degraded by indiscriminate dumping of refuse and defecation.	40.5	43.1	5.2	10.5	0.5
2. It is okay to throw rubbish on the beach if you are poor.	13.7	35.8	10.4	25.5	14.6
3. All households in the communities should have toilets and bathrooms.	16.3	35.1	13.3	34.6	0.7
4. Resource users should be involved in the management of coastal natural resources.	38.6	32.7	7.2	20.3	1.3
5. Humans have a right to modify the natural environment to suit their needs.	24.2	42.5	23.5	7.8	2.0
6. Outdoor defecation and indiscriminate waste disposal along the beach cause diseases.	58.8	27.5	4.6	7.8	1.3
7. Management of coastal natural resources is the sole responsibility of the government	27.5	41.2	15.0	15.7	0.7
8. Only unconcerned and uncommitted citizens dump garbage and defecate along the beaches.	11.1	47.1	7.2	24.2	10.5
9. People who pollute the beaches and the surrounding mangroves should pay to clean it.	5.2	35.3	19.6	33.3	6.5
10. Fishing with dynamite and nets with small mesh size is not good	56.2	28.1	2.0	12.4	1.3
11. The natural resources cannot get depleted	5.2	39.9	26.1	28.8	0.0
12. Plants and animals have as much right to exist as humans.	10.7	29.0	9.8	39.8	10.7
13. If the current degradation of natural resources continues we will soon experience a major ecological catastrophe.	28.1	54.9	11.1	5.2	0.7
14. Priority in resource allocation should be given to activities that create greatest economic returns even if it may harm the environment.	1.3	23.5	17.8	44.2	13.2
15. Humans were meant to rule over the rest of nature.	4.6	54.9	10.5	28.1	2.0

SA- Strongly agree, A- agree, I- indifferent, D- disagree, SD- strongly disagree

The trend was similar in both areas. For example in both areas agreed overwhelmingly that outdoor defecation and indiscriminate waste disposal along the beach cause diseases. However more respondents in Moree agreed that plants and animals have as much right to exist as humans whilst more respondents in Bortianor

agreed that priority in resource allocation should be given to activities that create greatest economic returns.

The scales reflect negative and positive environmental attitudes; with 15 to 45 being negative attitudes and 46 to 75 positive attitudes (Table 7.3; Appendix A5). The higher the number, the stronger is the intention to perform the behaviour. Hence in this study a person with a negative attitude has low score and is least ready to support natural resources management initiatives. The environmental attitudes of respondents in both areas towards natural resource degradation were overwhelmingly positive.

Table 7.3 Attitude of respondents towards natural resource degradation

	Score	**Attitude**	**Frequency**	**% of total**
Bortianor	15-45	Negative	8	5.3
	46-75	Positive	143	94.7
Moree	15-45	Negative	14	9.5
	46-75	Positive	139	90.8

7.1.1 Actual participation in some environmental behaviours

Actual behaviours were measured with respondents indicating their how often they participated in five activities (Table 7.4). To make this as practical as possible, the selected behaviours were simple everyday activities easily understood by the respondents. A four point Likert scale was used with no middle point. The middle point was removed since these are actual behaviours and respondents had to have either participated in them or not. Some of these were also rephrased from the questions in Table 7.1.

Table 7.4 Respondents' participation in actual environmental behaviours

Behaviour	Bortianor				Moree			
Do you…	**Y**	**S**	**R**	**N**	**Y**	**S**	**R**	**N**
1. Throw rubbish in gutters, bushes and on the beach?	56.3	35.7	4.9	3.1	64.8	18.5	5.2	11.5
2. Defecate in on the beach and its surroundings?	58.6	29.3	6.2	5.9	61.0	27.1	10.2	1.7
3. Encourage friends and family to keep their surroundings clean?	20.4	21.3	26.5	31.8	17.5	35.0	32.6	14.9
4. Participate in tree planting and clean up exercises?	22.7	34.5	17.0	25.8	27.2	40.8	20.7	11.3
5. Buy fish you know is caught with small nets or dynamite?	31.1	20.3	31.0	17.6	37.1	23.2	11.4	28.3
6. Cut mangroves and other trees along the beaches for fuel wood?	22.1	28.2	19.1	30.6	15.1	20.0	28.3	36.6

Y- yes; S -sometimes; R- rarely; N- no.

More than 80% of respondents in both areas disposed of their domestic and human waste on the beaches. In addition more than half had at one time or the other bought fish that they knew was caught by unapproved means. Generally their behaviours were in conflict with their professed attitudes (Kollmuss and Agyeman, 2002).

The findings of this study are similar with Kotey (1998) who studied the attitudes of residents of Cape Coast towards beach sanitation. She also found out that that generally people expressed positive attitudes. These positive attitudes did not necessarily translate into good conservation practices; people's beliefs are sometimes in conflict with their actions. According to Schultz and Zelezny (1999), one viable explanation for why positive environmental attitudes exist in a "developing" setting is that culture (defined as knowledge, attitudes, values, beliefs, and behaviours shared by a group of people that are communicated from one generation to the next), and held values play an important role in determining environmental attitudes. This could cause a significant discrepancy between people's attitudes and their actual behaviour (Chan, 1996). An understanding of the complexities of the interrelationships between human activity and the natural environment is therefore necessary for the improvement of environmental quality. Section 7.2 will deal with this further.

7.1.2 Respondents' knowledge and perception of some global environmental problems

Education is important in shaping the attitudes of respondents (Appendix A6) hence the study also sought to appreciate their knowledge of some global environmental problems and the sources of this knowledge. The study limited this to their knowledge of climate change and global warming. This was prompted by the concern and high media attention these topics have attracted in Ghana and over the world in the last decade or so. In Ghana changing weather patterns over the last few years have sparked concerns about the unpreparedness of the country to deal with current and future potential impacts of climate change. In addition, since women form more than 51% of the Ghanaian population and control most of the productive and agricultural sector, they are also highly vulnerable to the impacts of climate change. Living in the coastal zone increases this vulnerability.

Most parts of the coastal zone, especially the eastern coastline of Ghana, are at risk from flooding, erosion and sea water level rises as a result of climate change. This is followed by the western coastline and some parts of the central coastline. As already explained in Chapter 1, many key industries, communities, tourism and historical monuments can be found in the coastal zone. Especially since the problems of flooding and erosion came up often in both areas during the focus group discussion, the opportunity to assess respondent's knowledge of climate change and its ensuing impacts had to be used.

Awareness was measured by directly asking respondents if they had heard of climate change and the source of information. This simple and direct method was quite efficient in producing enlightening answers. Percentages can be found in Table 7.4. The results show that in Bortianor 39.1% as compared to 30.7% of respondents in Moree had definitely heard about climate change and global warming although they could not fully explain the phenomenon or its impacts. Those in the "not sure" category were those who could not remember hearing about it or who confused it with something else. Interesting though is the fact that almost all respondents noted that there were changes in weather patterns over the years which affected the availability of certain coastal natural resources.

Table 7.4 Knowledge of global warming and climate change

	Yes, definitely	Not at all	Not sure	Total
	N (% of total)	N (% of total)	N (% of total)	N (% of total)
Bortianor	59 (39.1)	31 (20.5)	61 (40.4)	**151 (100)**
Moree	47 (30.7)	51 (33.3)	55 (35.9)	**153 (100)**
Total	**106 (34.9)**	**82 (26.9)**	**116 (38.2)**	**304 (100)**

In White et al. (2004), it was easier for respondents to voice an opinion about the quality of the natural environment in their local area but this ability diminished with distance from the local area. Another factor affecting the ability of some respondents to comment on global environmental problems could be the difficulty in translating some of the words from English into the local languages. In any case, the low knowledge levels about climate change is worrying since this phenomenon could have considerable socioeconomic impacts, with the impacts being felt most by the poor. In addition adaptation is important in responding to the impacts of climate change, for this knowledge is central.

In the coastal zone, the most obvious potential impact is sea level rise with its accompanying loss of land by erosion and a resultant displacement of residents. Another potential impact of climate change could be the loss of water bodies, which serve as sources of drinking water and water for irrigation. According to Klein and Nicholls (1999), from a societal perspective, the six most important biogeophysical (or natural system) effects are:

- Increasing flood-frequency probabilities;
- Erosion;
- Inundation;
- Rising water tables;
- Saltwater intrusion; and,
- Biological effects.

The sources of their knowledge about climatic changes were also assessed (Table 7.5). It is clear that radios were the most common sources of information. In view of the lack of electricity in many rural areas this could be an important tool in environmental education. Radio programmes, especially in rural areas, which are designed with special attention to local or vernacular languages, can be essential tools in the protection of natural resources. Such programmes could disclose major threats to coastal natural resources and encourage the participation of individuals and coastal communities to deal with these threats. Apart from women, some of these programmes could target local decision makers and leaders, entrepreneurs, students and other social groups, increasing their level of awareness about the threats to coastal natural resources.

Table 7.5 Sources of information on global warming and climate change

Source	**Bortianor N (%)**	**Moree N (%)**
Radio and "wireless" sets	25 (42.4)	20 (42.6)
Television	12 (20.3)	8 (17.0)
Other groups • Church • FAO group • NGOs	10 (16.9)	8 (17.0)
Family	6 (10.2)	7 (14.9)
Friends	5 (8.5)	4 (8.5)
News papers	1 (1.7)	-
Total	**59 (100)**	**47 (100)**

Some conflicts over environmental and natural resource management issues are impossible to avoid. Having more insight about environmental attitudes may at the very least help guide communication and education efforts and hopefully lead to more thoughtful, informed and effective discussions.

7.2 Environmental values

This section assesses the environmental values of respondents through the relative importance they place on different benefits obtained from coastal natural resources. It also prioritises environmental issues or concerns in Bortianor and Moree. Rather than use a simple ordinal ranking of all objects, the paired comparison approach was used. As mentioned in Chapter 2, this method is best when the differences between the compared objects are subtle. Generally, the construction of the scales of relative importance is derived using people's judgements about what is being studied. These judgements are believed to reflect the values that people place on resources in consideration (Chuenpagdee et al. 2001). The values in this study are comparable with Brown's definition of assigned value (Brown, 1984) and are relative, indicating the importance of the object by implicit or explicit comparison.

Rather than depending solely on secondary data, the value classification was an interpretation of the analysis of the underlying concepts of the answers from the focus group discussion, grouped under six main values types for each area. These were aesthetic, ecological, economic/utilitarian, sense of place, spiritual/religious (Bortianor), cultural identity and moralistic values (Moree). Each group of 6 environmental values comparison resulted in 15 possible pairs (Table 7.6). The choices made by respondents were analysed in a straight-forward fashion by examining a matrix of preferences and calculating an arithmetic average of the preference for each value across all other values with which it was paired (Neuman and Watson, 1993). This expressed the values as a function of the frequency with which an object is preferred to other objects in the choice set (Chuenpagdee et al. 2001).

Table 7.6 List of values in study areas

Value type	Bortianor	Moree
Aesthetic	**X**	**X**
Ecological	**X**	**X**
Economic/utilitarian	**X**	**X**
Moralistic	-	**X**
Sense of place	**X**	**X**
Spiritual/religious	**X**	-
Cultural identity	**X**	**X**

Another useful feature of the paired comparison methodology is that intransitivity can be detected through the number of circular triads. An interpretation of the number of circular triads is that one set of judgments may be regarded as more consistent than another set if it includes fewer circular triads (David, 1988). For this section, a test of transitivity conducted showed that in 12% of respondents in Bortianor as compared to 14% of respondents in Moree were intransitive. Hence the results were consistent and could be used.

The results show that in both areas respondents place the greatest importance on the coastal natural resources as a source of wealth creation and source of food (economic/utilitarian). As already mentioned, majority of the respondents are involved in the fisheries and/or post-harvest livelihoods. Employment opportunities range from full-time employment to seasonal, occasional or opportunistic involvement in different stages of the post-harvest chain.

The coastal zone was least valued by respondents for ecological reasons. However in Bortianor aesthetic values ranked second (18.4%). The coast in this area is increasingly becoming an important destination for tourists and holiday makers seeking less crowded beaches not far from the capital. Indeed the beaches of Kokrobite, Bortianor and Langma have one of the largest concentrations of beach resorts probably because of its nearness (about 25 to 30 km) from the capital Accra. The Solo Forest Monkey Sanctuary is also gaining popularity among tourists, bird and monkey lovers. This monkey sanctuary could also be the result of the occurrence of

spiritual/religious values, which was cited especially in relation to the river Solo. The residents believe it is the dwelling place of a deity. Fewer losses of natural resources occur here than in the other unprotected areas. The occurrence of these values here could provide strong incentives for some community members to protect coastal natural resources (Ntiamoa-Baidu, 1995).

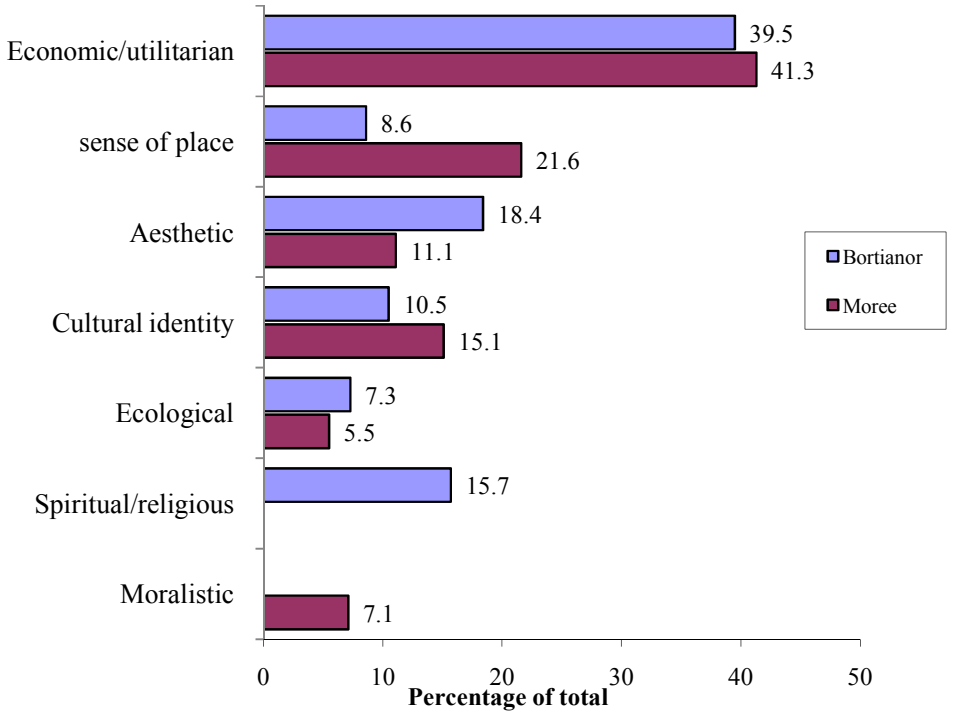


Figure 7.1 Relative importance of environmental values

In Moree sense of place values ranked second (21.6%) followed by cultural identity (15.1%). Tables 7.7 and 7.8 show that more than 30% more respondents in Moree as compared to Bortianor were born and grew up in Moree. Indeed there was a considerable population of settlers from the Volta Region of Ghana in Bortianor who do not own land and still saw themselves as "settlers."

Table 7.7 Percentage of respondents born in community

	Bortianor		Moree	
	Frequency	Percent	Frequency	Percent
Yes	80	52.9	129	85
No	71	47.1	24	15
	151	100	153	100

Table 7.8 Respondents' place of birth

	Bortianor		**Moree**	
	Frequency	**Percent**	**Frequency**	**Percent**
Indigenes	80	52.9	129	85
Greater Accra	15	9.9	2	1.3
Central	4	2.6	8	4.3
Western	5	3.3	2	1.3
Ashanti	1	0.6	6	3.9
Eastern	2	1.3	0	0
Volta	44	29.1	0	0
Liberia	-	-	4	2.6
Côte d'Ivoire	-	-	2	1.3
Total	**151**	**100.0**	**153**	**100.0**

According to Preston (2003) values associated with how people individually and collectively *feel* about natural resources, whereby the environment is seen as a "place" could facilitate the roles of people in the conservation of its natural resources. An emotional attachment to place could be an asset in developing the respect and responsibility towards an environment which characterises stewardship (Carr, 2002). People born in a place could have greater people's emotional connections that arise through experience (Manzo, 2005). However from the results, the role of residence history seemed negligible. Some researchers believe that migrants to an area, especially those with a long history of ties to a locality, may have less concern for valuing local natural resources. The study did not find this to be the case. Both migrants or settlers and residents expressed similar concerns about the decrease in the availability of some natural resources such as fish.

7.2.1 Environmental concerns

Individual expression of environmental concern is often influenced by their perception of the biophysical environment. Respondent's local environmental concern was high. The study prioritised respondents' environmental concerns through the judgment of severity placed by respondents on certain environmental issues (Quah et al. 2003). Again the choices made by respondents were analysed in a straight-forward fashion. 20.0% of the results in Bortianor as compared to 16.0% of the results in Moree were inconsistent. The results could thus be used (Figure 7.2).

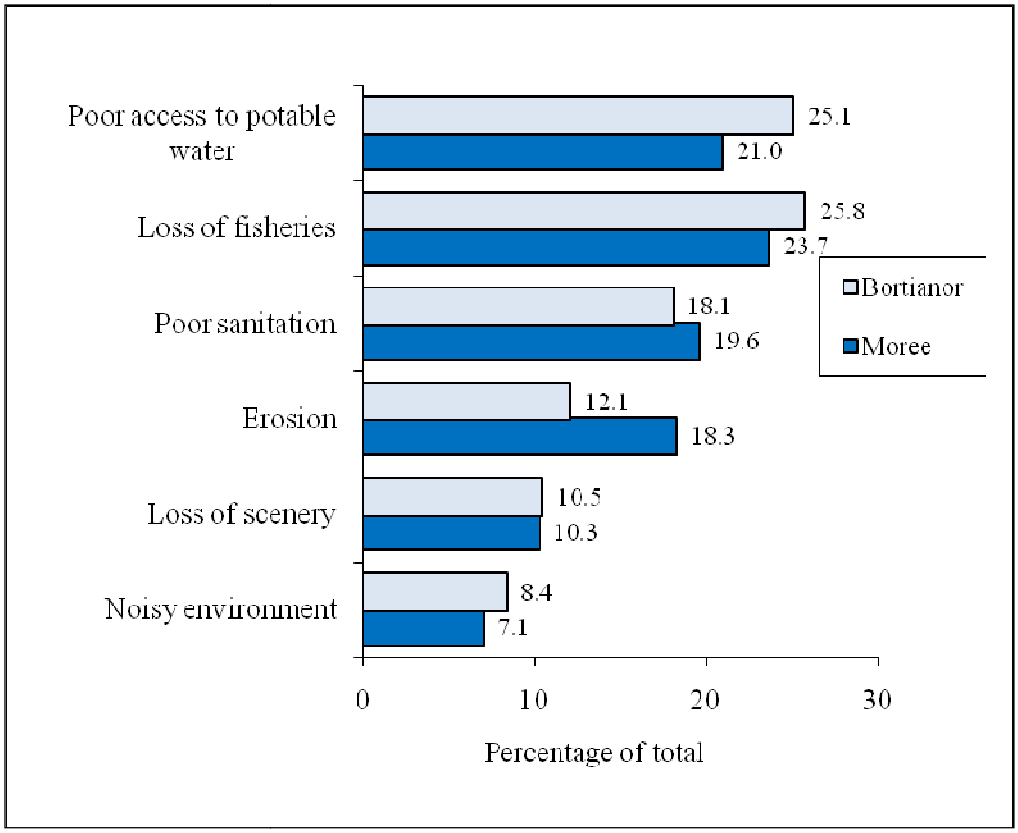


Figure 7.2 Environmental concerns in Bortianor and Moree

Poor access to potable water and the loss of fisheries were both high priority areas in both communities. These were followed by poor sanitation which has already been extensively dealt with in this thesis. Erosion was judged as a bigger environmental problem in Moree as compared to Bortianor.

7.2.2 Linking environmental attitudes, values and concerns

In relating environmental attitudes, values and concerns, it is important to understand the background of the respondents. Chapter 6 of this study established that majority of the respondents saw themselves as poor. Hence they are most concerned about providing the basic necessities of life such as food, water, clothing and shelter to themselves and their dependants. Respondents expressed generally positive attitudes towards coastal natural resources. However these did not always translate to positive environmental practices. Although other environmental values such as aesthetic and moralistic values also featured, their environmental values were generally utilitarian valuing coastal natural resources most as sources of income and food. Despite their low performance with respect to global environmental issues, their concern on local environmental issues was high. Issues of safe drinking water, available fish and good sanitation were most important to respondents. Erosion was an important environmental concern to the respondents from Moree especially because of its associated impacts which directly or indirectly influence their standard of living.

An important question is why the generally positive environmental attitudes did not always translate to positive environmental practices. Most respondents admitted they used the beaches as places of convenience and rubbish disposal although they knew it was wrong. However they still did it, sometimes because of the lack of other options (see Box 3). Others strongly disagreed that those who dump rubbish indiscriminately should be punished, at least not until there were suitable facilities provided by the District Assemblies. Some disagreed that sand winning should be illegal because they argued there were no jobs. There were also some who professed that it was wrong to fish with dynamite or other illegal means and yet still bought fish caught this way because they still had to feed their families. Such respondents would generally exhibit positive environmental attitudes yet negative environmental behaviour. Hence positive environmental attitudes do not always result in pro-environmental behaviour. In the study areas poverty, low educational levels and other social and cultural practices could also influence the ability of respondents to translate the generally positive environmental attitudes into positive environmental action. Hence the motivation or the driving force behind coastal natural resource degradation is important and should form the basis of education programmes, laws and policies.

On the other hand how important are environmental attitudes and values in determining good environmental practices? (Figure 7.3). In this study respondents' environmental values (assigned values) were measured by the relative importance they place on coastal natural resources. These can be influenced by held values (including culture and certain social belief systems- myths, taboos and local customs) and environmental attitudes. For good conservatory practices, knowledge and motivation as well the various options available to users are all important in the management of natural resources. Finally, questions as to who controls the benefits of ecosystems also affect the extent to which environmental values influence environmental behaviour.

Certain constructive belief systems and taboos which protected natural coastal resources are being eroded. In the past these promoted the development of intrinsic values among community members. As rural communities become increasingly modern and yet sink deeper into poverty, the coming together of the traditional and modern has become more and more complicated and contradictory. Whilst basic value orientations are important to the formulation of environmental concern (Stern and Dietz, 1994), such concern has other socio-economic correlates. Again the high poverty level, lack of alternative livelihoods, poor access to some basic amenities like potable water and electricity all influence the environmental values of respondents and natural resource degradation.

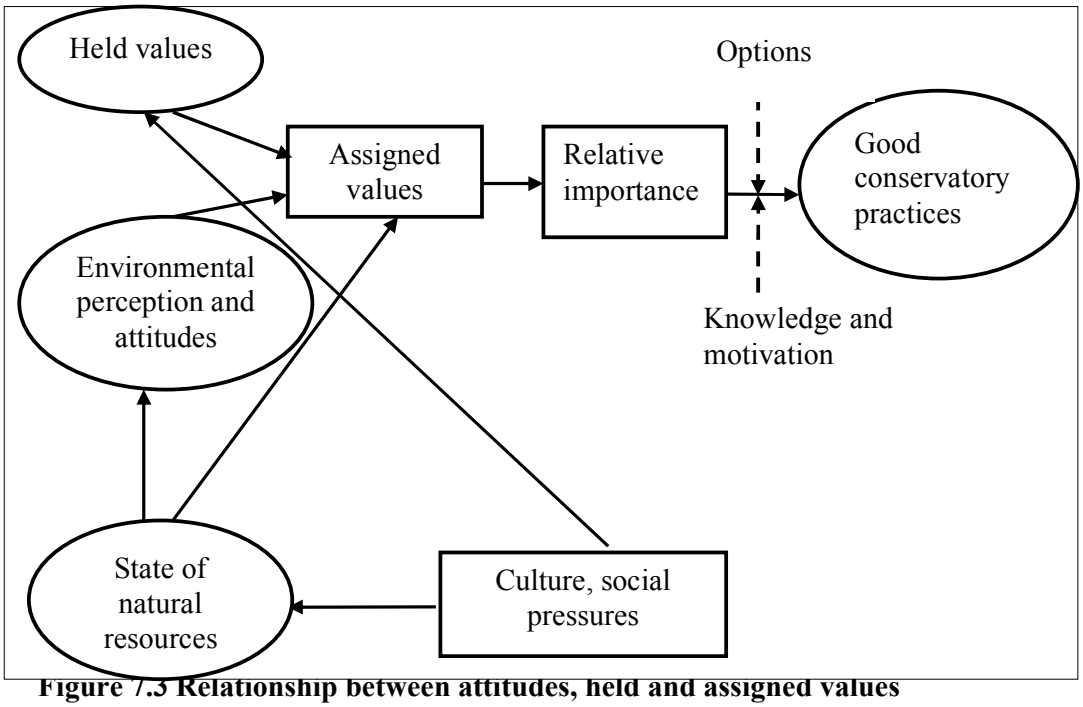


Figure 7.3 Relationship between attitudes, held and assigned values

7.3 Policy implications of findings

In implementing coastal NRM programmes, especially those funded by foreign NGOs, international conservation organisations and donor institutions, priorities are often set to reflect global values of coastal natural resources (ecological, scientific, educational, existence, and intrinsic values (Ntiamoa-Baidu et al. 2000). These priorities usually tend to reflect western conservationist values. On the other hand national governments may see natural resources more in terms of economic values related to consumptive uses, such as timber exploitation and wild animal trade, and nonconsumptive uses, such as tourism, rural inhabitants tend to be more concerned with the direct subsistence values of biodiversity .and tend to conflict with the values of local resource users (Ntiamoa-Baidu et al. 2000). However these priorities and values are often in conflict with those of the people who often rely on these resources for their livelihoods.

The choices from the paired comparison studies can be used to guide resource allocation decisions and aid policymakers and stakeholders in their decision making

process in the same way as direct environmental valuation. This is because the priorities obtained reflect the respondent's values of the resource.

First of all the results are helpful, in that they provide policy makers with a clear ordering of values, from a methodology that is comparatively simple to replicate in other areas and does not force respondents to assign monetary value to coastal natural resources. Secondly, since in both areas coastal natural resources as sources of food and income ranks highest, basing natural resource management on the argument that reducing the resource base now would be to the detriment of future generations might not be enough to motivate users into action.

Developing activities that add value to the fishery industry, generate income and improve the standard of living of respondents would be most effective. For example having discovered that the ecological value placed on natural resources is low, the projects that could win the support of people would be those that link the livelihood and wellbeing or specifically, the availability of non availability of fish and/or fuel wood, and the availability of clean drinking water to coastal NRM. Immediate examples would be the development of woodlots, stricter enforcement of the ban on illegal methods of fishing and the use of inappropriate mesh size and protecting water resources. Improving their standard of living could shift their focus from more utilitarian values to that of more pro natural resource values. For instance in September 2008 chief fishermen from the Western and Central regions appealed to the Fisheries Ministry of Ghana to consider adopting "regulated fishing" under which there will be official "close seasons" to help save the fishing industry.

Pressures on coastal natural resources include indirect (such as those related to culture and demographic change) or direct human-induced pressure (such as land degradation and exploitative human use of natural resources). These affect the state of the coastal natural resources and require the appropriate response measures (Figure 7.4). An effective policy/social response is one that changes the drivers, having ripple effects throughout the framework. The measures put in place to improve the quality of the ecosystems maybe policy directives, management initiatives or changes in the institutional frame work (MEST, 2004).

Emphasising environmental attitudes and values of resource users during environmental education and in policy development could help transform their environmental behavioural patterns (knowledge). Taking into consideration the environmental values of users and consumers in the decision making process also makes them accountable and make them more responsible towards the environment.

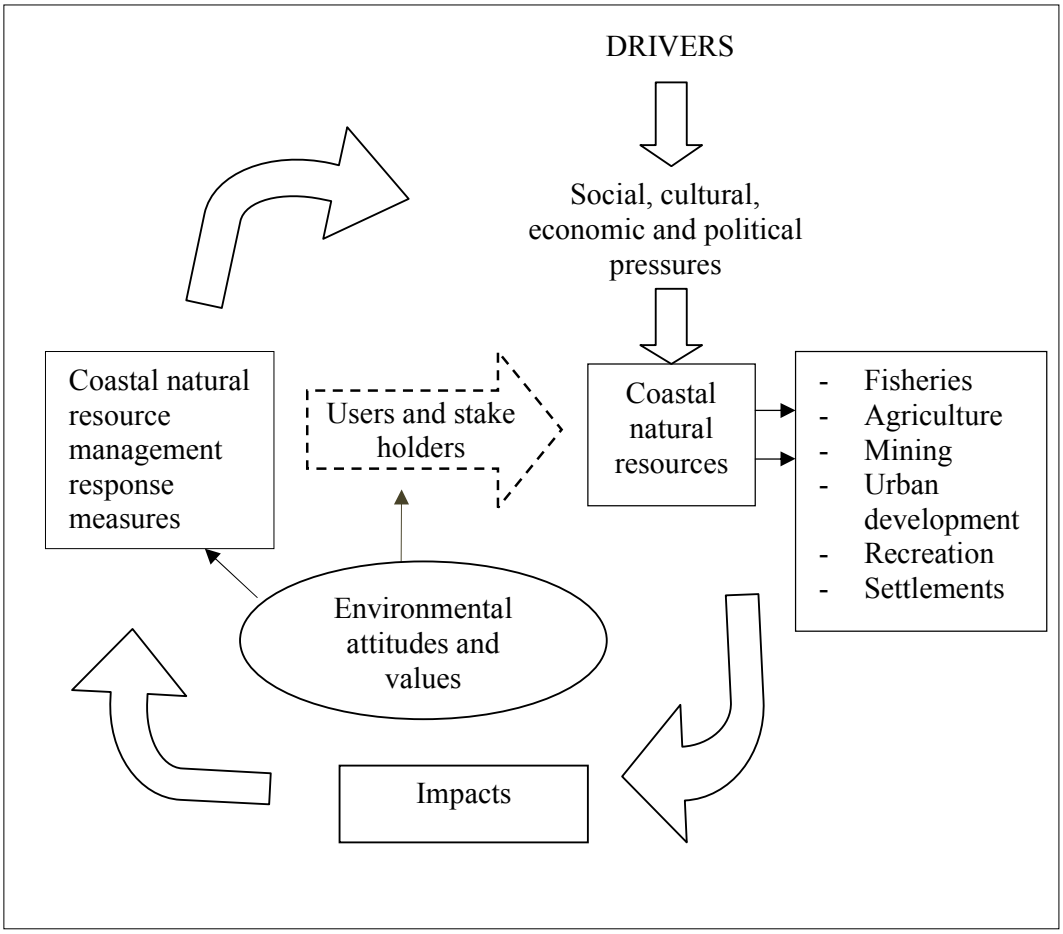


Figure 7.4 Value based coastal Natural Resource Management

Care must be taken though that emphasis on fish as a resource is not to the detriment of other coastal natural resources. The point is that with the existence of prevalent perceptions that the role of natural resources is to provide for human needs (anthropocentric value orientation), community members will have to be convinced that coastal NRM will directly benefit them since they also depend on them and will not be willing to set them aside. With careful planning, developing the right partnerships between local people and coastal NRM agencies, and education, their

needs can be met whilst at the same time they participate actively coastal NRM (Box 5).

In most policies, environmental values expressed by resource users are often ignored by policy makers in favour of economic values (Caldwell and Shrader-Frechette, 1993). However as already mentioned people and their social systems impact on coastal natural resources and the problems created cannot be completely resolved by science or technology because they are partly a result of the diversity in human perceptions, expectations, and values (Caldwell, 1993).

Box 5. Questions to be answered for the implementation of ecosystem-based management

- What are the guiding principles and the vision for management?
- What are the goals and general objectives?
- How intense should the planning process be?
- Who should belong to the planning team?
- What are the available sources of information?
- What is the current situation and what are the key issues in the management unit?
- What are the specific management objectives?
- What alternative courses of action could be used?
- What are the mid- and long-term effects on the defined criteria and indicators of each alternative?
- Which management alternatives should we choose and how should they be designed?
- Which are the priorities?
- Plan the implementation
- Plan the monitoring and the assessment
- Inform the concerned organizations and persons
- Execution, monitoring, and assessment
- Adapt the management
- Presentation of benefits

Source: Schlaepfer, 1997

CHAPTER EIGHT
COASTAL NATURAL RESOURCE MANAGEMENT AND ENVIRONMENTAL GOVERNANCE

8. Introduction to chapter

Environmental governance varies from region to region and with the natural resources being managed. Its definition often depends on how governance is defined. Agenda 21, chapters 18 and 28 recommend the development of strategies for the environmentally sound management of freshwater and related coastal ecosystems as well as involving people in the process. This chapter sets out to review the various institutions related to environmental governance structures and coastal NRM in Ghana. The purpose is to shed more light on existing institutional and legislative capacities and also on the weaknesses which may have prevented the effective management of coastal natural resources. It also examines the perception of respondents as to who has the responsibility of managing coastal natural resources. Finally it recommends ways to improve stakeholder participation in coastal NRM, especially at the local level.

8.1 Institutions for environmental governance and coastal NRM

Governance can be defined as the exercise of authority – the decisions, sets of laws and their enforcement that determine how people act and who will benefit. It includes policies, institutional structures and decision-making processes that embody this authority (WRI, 2005). The United Nations defines good governance as governance that is participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive and follows the rule of law (UNESCAP, 2006).

Management of natural resources, according to the ecosystem approach, calls for increased intersectoral communication and cooperation at a range of levels (government ministries, departments and agencies) (UNEP, 2000). Environmental governance in this dissertation involves the formulation of policies and regulations to manage the environment and the ensuing relationships at the local, regional, national

and global level, and the institutions that are used to implement these measures. Effective environmental governance is not only crucial to meeting the tenets of the MDGs but also encourages increased local level participation of resource users. It is also important in poverty reduction and citizen empowerment. Incidentally, those who are most dependent on natural resources form the majority of the poor and include marginalised groups such as women, the aged and children. These "poorest of the poor" have little say in how those resources are used, but suffer the consequences when the decisions are corrupt and the use is destructive (WRI, 2005; Tweneboah, 2003).

Institutions are defined as written and unwritten rules or principles that govern and constrain behaviour, thus facilitating assess what others will do and giving individuals orientation and security in their social dealings (Fuest et al. 2005). Institutions impose restrictions on human behaviour by defining legal, moral, and cultural boundaries setting off legitimate from illegitimate activities. Theoretically, in Ghana institutions comprise

1. Statutory laws, legal instruments and regulations
2. National policy frameworks,
3. Bye-laws of District Assemblies or local groups,
4. Local law / self-regulation by either explicit or implicit rules and norms,
5. "Project law" including procedures of financial disbursement and procurement.

The Organisation for Economic Co-operation and Development (OECD) defines institutional frameworks as the different procedures that groups of people must go through to make collective decisions that govern the group (OECD, 1993). A countries' institutional framework plays a crucial role in the way national and international environmental laws are implemented.

Institutions involved in the governance of coastal natural resources include the Government of Ghana and its Ministries, Departments and Agencies (MDAs), Non-Government Organisations (NGOs), the private sector, Community Based Organisations (CBOs) and civil society, as well as traditional authorities. In the presence of effective environmental governance, institutions respond to environmental degradation and management by advocating for the passage of environmental laws or ensuring the enforcement of existing ones (UNESCAP, 2006).

Finally, in the development of environmental policies, contributions must come from various actors: politicians, public authorities, Non-Governmental Organisations, local community members and other stakeholders (Box 6).

Box 6. Seven rules of environmental governance

Institutions and laws: Who makes and enforces the rules for using natural resources? What are the rules and the penalties for breaking them? Who resolves disputes?

Participation rights and representation: How can the public influence or contest the rules over natural resources? Who represents those who use or depend on natural resources when decisions on these resources are made?

Authority level: At what level or scale-local, regional, national, international-does the authority over resources reside?

Accountability and transparency: How do those who control and manage natural resources answer for their decisions, and to whom? How open to scrutiny is the decision-making process?

Property rights and tenure: Who owns a natural resource or has the legal right to control it?

Markets and financial flows: How do financial practices, economic policies, and market behavior influence authority over natural resources?
Science and risk: How are ecological and social science incorporated into decisions on natural resource use to reduce risks to people and ecosystems and identify new opportunities?

Source: World Resources Institute, 2003

8.1.1 Government and the public sector

The successful management of coastal natural resources in Ghana largely depends on the efficiency of the institutional arrangements put in place by government. A

Ministry of Environment, Science and Technology[10] was created in 1993. Its mandates include:

- Protecting the environment through policy formulation and economic, scientific, technological interventions needed to mitigate any harmful impacts caused by development activities;
- Setting standards and regulating the activities concerning the application of science and technology in managing the environment for sustainable development;
- Promoting activities needed to underpin the standards and policies required for planning and implementation of development activities; and,
- Coordinating, supervise, monitor and evaluate activities that support goals and targets of the ministry and national sustainable development.

To achieve this, the erstwhile ministry operates through other agencies which in the past have included:

- The Council for Scientific and Industrial Research (CSIR) with its institutes such as Animal Research, Crops Research, Soil Research, Water Research and Food Research;
- The Ghana Atomic Energy Commission (GAEC);
- The Environmental Protection Agency (EPA) of Ghana; and
- The Town and Country Planning Department (TCPD).

The ministry coordinates the implementation of Agenda 21 through a National Advisory Committee for the Implementation of Agenda 21 (NACIA 21), which works closely with other government ministries and departments. The NACIA 21 has the mandate for policy formulation, advice and coordination[11]. Through the ministry, Ghana has ratified a number of Multilateral Environmental Agreements. These agreements enable country to strengthen international cooperation whilst improving the management of the built and natural environment (Hens and Boon, 1999).

[10] The functions of this ministry, which remain the same, are currently under the Ministry of Local Government, Rural Development and Environment (MLGRDE).
[11] Http://www.ghana.gov.gh/governing/ministires/social/environment.php.

The Environmental Protection Council (EPC) was established in 1974, following the United Nations Stockholm Conference on Human Environment with advisory, research and coordinating functions. It was also to network with national and international bodies on environmental matters. However, as an advisory body it lacked the requisite powers to enforce its policies (Okley, 2004), and this affected its operations.

The Environmental Protection Agency (EPA) replaced the EPC in 1994 with full mandate to regulate the environment and ensure implementation of government policies on the environment. The EPA is a corporate body with legal personality. Its mandates include creating environmental standards and providing guidelines on good practice, ensuring that the government's environmental regulations are implemented. To be able to enforce the environmental legislation, the EPA promotes compliance by working in partnership with other stakeholders, especially those state organisations with an equal mandate to enforce certain legislation. The blue prints for environmental management are the National Environmental Action Plan (NEAP) and a National Environmental Policy (NEP). Act 490 establishing the EPA makes provisions for a National Environmental Fund to provide funding to the EPA's activities. The Fund is financed by the central government; levies collected by the Agency in the performance of its functions; donations from the general public institutions and organisations.

Managing coastal natural resources requires a multi-ministerial approach. For example the Ministry of Fisheries[12] is responsible for providing overall guidance for the development of the fishery sector. Its objectives are to increase domestic food supply, particularly protein sources, through more effective use of available fisheries resource at all levels and to make the fishery sector an avenue for employment. The ministry has set up Marine Management System in charge of the marine sub sector and the Volta lake Management System responsible for managing the inland sector. To ensure compliance to management measures, the Ministry of Fisheries collaborates with the Ghana Navy, the Air force, Ministry of Defence and the Ministry of Justice to arrest and prosecute offenders. Measures employed include arrests, detention and imposition of fines, seizure of equipment, temporary bans.

[12] Http://ghana.gov.gh/ministry_of_fisheris

On the other hand, co-ordination of Ghana's forest and wildlife policies and the monitoring of the performance the Forestry and Wildlife Division are under the domain of the Forestry Commission whilst the Forestry Services Division is responsible for protecting water catchment areas and forest reserves as well as issuing permits for the provision of logs for canoe building. The Wildlife Division of the Forestry Commission is the managing authority for wildlife resources both within and outside wildlife protected areas in the country. The hunting of wild vertebrate animal species in the coastal zone is controlled by the Wild Animals Preservation Act 1961 (Act 43).

Another government agency that works closely with the MLGRDE is the National Development Planning Commission (NDPC) which was set up under the National Development Planning Law, 1989 (Laing, 1991).

Its main functions among others are to:

- Formulate and advise government on comprehensive national development strategies and ensure that they are carried out;
- Undertake studies and make recommendations to government on development issues;
- Ensure that all development strategies and programmes are in conformity with sound environmental principles.

Poverty reduction policy is also coordinated by the NDPC, together with the Ministry of Finance. Finally, the NDPC is also mandated to provide guidance on policy development and planning to government institutions. Other institutions important directly or indirectly involved in the management of coastal natural resources in Ghana include:

- Ministry of Education, Science and Sports;
- Ministry of Food and Agriculture;
- Ministry of Health;
- Ministry of Lands, Forestry and Mines;
- Ministry of Tourism and Diasporan Relations;
- Ministry of Water Resources, Works and Housing;
- Ministry of Women and Children's Affairs.

Environment desks have been established by many sector ministries and other stakeholders as focal points for ensuring that development programmes and policies take due cognisance of environmental concerns (EPA, 2001).

More and more developing countries are implementing decentralisation policies. Here political power is transferred from a central government to institutions and actors at a local level. This way the community, local institutions are likely to have better access the needs and problems, which can then be relayed to the regional and national levels. The decentralisation process in Ghana was initiated in 1988 when the PNDC Law 207 provided legal and institutional direction to constitute the first District Assemblies. In order to make use of the decentralised approach of governance, the Ghana's decentralisation system is backed by the 1992 Constitution, under Act 240 and the National Decentralisation Action Plan (NDAP). It aims at providing the necessary framework for reinforcing participation in local political decision-making processes and improving government services at local level. Unit committees are the lowest level of local government (Figure 8.1).

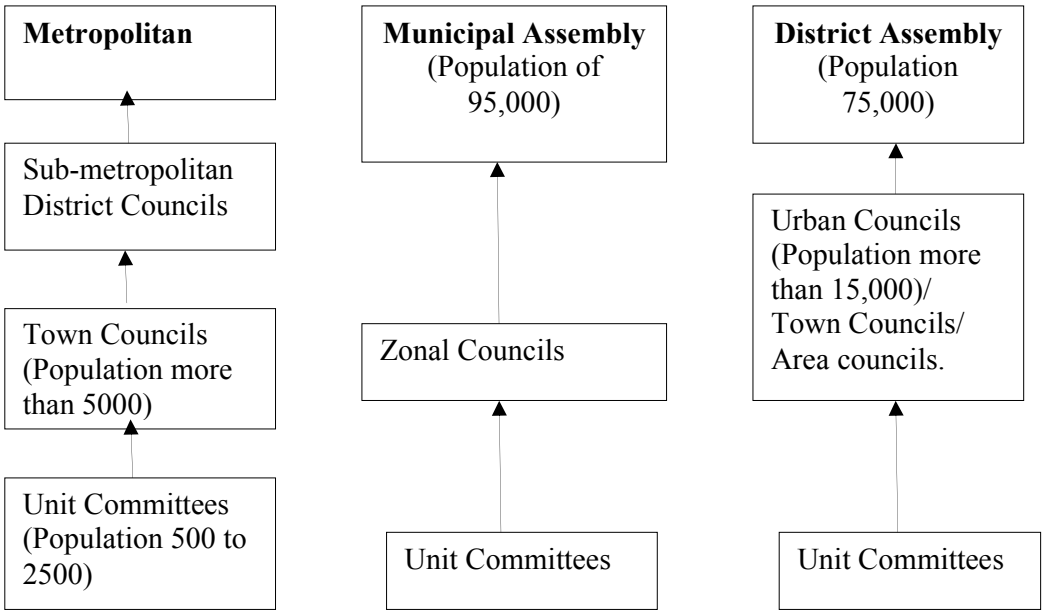


Figure 8.1 The decentralisation process in Ghana

Source: After Ghana Districts, undated.

The number of districts has increased from 65 originally, to 110 at the time of the 2000 population census, to 138 in 2004. As at the time of synthesising this thesis, there were 169 MMDAs, district administrative set ups and assemblies. This number continues to grow with increasing urbanisation and migration. The districts are administered by assemblies of directly elected and appointed members. District Chief Executives (DCE's) who head the assemblies are however appointed by the President of Ghana and approved by the District Assembly.

Local institutions have a vital role to play in coastal NRM, especially in the implementation of national environmental policies and programmes at the local and district levels. For example, the District Environmental Management Committees (DEMCs) of the District Assemblies have the responsibility for monitoring and coordinating environmental protection and improvement activities at the district level. They also assist in the creation of Community Environmental Committees (CECs) (Porter and Young, 1998).

The DEMCs are to be made up of about 15 members (Porter and Young, 1998). In constituting the DEMCs, representatives of a number of groups are to be involved. Among these include:

- The regional programme officer of the EPA;
- Two representatives of environmental NGOs;
- Five Assembly men or women (at least two of whom should be women);
- The district education officer;
- The National Council on Women and Development;
- The department of Parks and Gardens; the Town and Country Planning officer;
- The District Medical Officer.

At the district level, District Assemblies are able to pass their own bye laws. For example the Abura-Asebu-Kwamankese District Assembly (the district in which Moree is found) has passed its own bye laws to protect fishery resources and improve sanitation in the town (Koranteng, 2000). These include a ban on the use of dynamite (also illegal throughout Ghana) and other explosives in fishing as well as the use of other illegal fishing gears. In Moree, fish processors are only allowed to dump their

fish waste at the beach and nowhere else (Koranteng, 2000). Winning of sand and terrazzo chippings is also illegal in Bortianor. Besides, 14 out of the 17 coastal districts have passed their bye-laws on fishing, while three of these Districts which have passed their bye-laws have also gazetted them. However in most cases, the laws passed by the District Assemblies are not complied with.

There are other governmental organisations at the district level dealing with the management of coastal natural resources. These include regional and district staff of the EPA, Department of Town and Country Planning, Regional Coordinating Councils (RCCs), Regional and District Planning Co-ordinating Units (R & DPCU) and Community Based Organisations (CBOs). The central government supports coastal management issues by funding some of its activities. The CECs serve as the organs through which the environmental programmes of the District Assemblies are carried out (Porter and Young, 1998).

8.1.1.1 Challenges

The greatest challenges facing the governmental institutions involved in the management of coastal natural resources remain funding and institutional capacity to effectively implement their programmes and enforce legislation. These problems exist at all levels: from the national to the district levels. Another challenge is the general lack of political will, regarding the environment as a national priority area. For example, the environment sector received relative minor allocation of government and donor funds in the 2005 National Budget. The trend was similar in 2006 and 2007.

The level of priority of environmental issues is also seen in the way the portfolio for environment is shifted around. For example, it started as a standalone ministry then was added to science and technology to create the Ministry of Environment, Science and Technology. It later became the Ministry of Environment and Science and it is now merged with the Ministry of Local Government and Rural Development to form the Ministry of Local Government, Rural Development and Environment. The Ministry of Local Government and Rural Development was set up to formulate, implement, monitor and co-ordinate reform policies and programmes to democratise governance and decentralise the machinery of government. Obviously these are issues

requiring extensive budgetary and human resource needs. As a result, environmental and NRM needs are often over shadowed.

Another problem is the enforcement of laws. Although, Ghana has various laws and policies relating to environmental management, their enforcement generally remains a problem. The EPA, which is the main enforcement body on environment, is saddled with many problems such as funding and administrative capacity.

The large number of ministries involved in the management coastal natural resources and the lack of proper coordination means that there is sometimes duplication of efforts leading to a waste of financial resources that could have been useful in other areas. Finally issues of corruption and good governance, which underlie all budgetary allocation and use of financial resources, both internally and externally generated, loans and grants also play a vital part in how the coastal zone is managed. Corruption and/ or the perception of corruption in government institutions supposes the actual or alleged diversion funds to unauthorised sources and drives away foreign investment. Transparency International defines corruption as the misuse of entrusted power for private gain (Transparency International, undated). Corruption takes many forms, from bribes to extortion to patronage and tends to flourish where there are few institutional checks on power and where poverty is widespread. Corruption affects coastal NRM in that it prevents institutions and structures put in place to manage coastal natural resource from functioning effectively.

The decentralised system in Ghana when well implemented provides opportunities for greater accountability and civil society participation in decision making. There is the need to strengthen the linkages and proper information flows between the Unit Committees, Area Councils and the District Assemblies (Porter and Young, 1998).

8.1.2 NGOs, the private sector and development partners

Whilst the government remains the most significant stakeholder in the management of coastal natural resources, the contribution of NGOs, both local and international and other development partners cannot be over emphasised. Some NGOs have supported efforts to manage coastal activities, protect habitats, and meet some institutionally set goals. At the national level local NGO activities are harmonised under umbrella organisation such as Ghana Association of Private Voluntary Organisations in Development (GAPVOD). In addition, there is an umbrella body, the National

Union of Environmental NGOs (NUENGO) which embraces only the NGOs engaged in environmental activities (Laing, 1991). However it is sometimes difficult to keep track of the activities of all the NGOs.

The private sector in Ghana presents a largely untapped resource for the management of coastal natural resources. The private sector has the ability to contribute funding, expertise, training programmes and so on. Considering the fact that many businesses and industries are sited within the coastal zone they should be actively involved in the management of its natural resources. It should be targeted in the formation of partnerships which could involve two or more parties or stakeholders depending on the partnership's basis of unity. Partnership formation helps mobilise resources and funding for implementing the various activities.

A number of external agencies and development partners such as the Japanese International Co-operation Agency (JICA), Department For International Development (DFID), the Chinese Government, the Danish International Development Agency (DANIDA), the World Bank and Multi-lateral agencies such as the United Nations Agencies have funded some strategies and projects aimed at managing coastal natural resources effectively. The World Bank has been instrumental in funding several major fisheries initiatives aimed at institutional strengthening and capacity building. Among these is the five year Fisheries Sub-sector Capacity Building Project (FSCBP) which focused on institutional strengthening and policy reform to improve resource management and encourage private sector investment and strengthen the policy and regulatory framework for fisheries in Ghana. Significant among these are:

- Completion of a new Fisheries Policy for Ghana;
- The preparation of a Demersal Fishery Management Plan (FMP); and
- The passing of bye-laws by a number of District Assemblies to legalise and operationalise the Community-Based Fisheries Management Committees (CBFMC) formed under the project.

According to Koranteng (2000), the CBFMC concept assists communities on issues dealing with the fishing industry. Sanitation has apparently improved following the establishment of the CBFMC. 133 out of 173 CBFMCS formed along the marine coast are in place and are at various stages of operation. The Food and Agricultural

Organisation of the United Nations has also funded a Code of Conduct for Responsible Fisheries.

The European Union has also supported initiatives concerned with the development of the inshore fishery and the export sector. The United Nations Office of Project Services (UNOPS) promotes gender equality in Ghana and has links with the Ministry for Women and Children's Affairs. The Food and Agriculture Organization of the United Nations (FAO) works to alleviate poverty and hunger by promoting agricultural development, improved nutrition and food security. DFID and FAO are working jointly together in the implementation of the Sustainable Fisheries Livelihoods Programme (SFLP). A West Africa wide initiative aimed at reducing poverty in the fisheries sector using a sustainable livelihoods approach and the Code of Conduct for Responsible Fisheries (CCRF) (Koranteng, 2000). The SFLP for example helped the women in Moree establish their own woodlot to supply them with fuel wood.

8.1.2.1 Challenges

A major problem is the development of self-supporting programmes and projects which can be sustained by the local community after external funding is diminished or ended. Another problem is that NGO activities at both the regional and district levels sometimes appear to be haphazard, uncoordinated, and therefore ineffective, with duplication of efforts. In addition most of the international NGOs and development partners have their own agenda and interests which are sometimes not a priority of local residents and community members or do not incorporate their values and needs. Finally there are sometimes different levels of distrust especially among international NGOs and development partners on one hand and local and governmental institutions on another hand.

8.1.3 Traditional authorities and community groups

It is almost impossible to examine environmental governance structures in the coastal zone without mentioning the traditional authorities. Most coastal communities have age old traditional laws and structures in place primarily to govern the fishery industry but their influence tend to affects all aspects of the lives of community members (Walker, 2002). For example there is a chief *Omanhene* (Akan) and *Mantse*

(Ga) who may not be directly involved in fishing activities but they are important stakeholders because they wield considerable power in terms of resource allocation and decision making at the local level. They rule with assistance from a council of elders and sub-chiefs (Overå, 1998).

Traditionally, each fishing community has a chief fisherman who governs the fishermen. He is also assisted by his council of elders. The roles of the chief fisherman include coordination of rescue operations in the event of accidents at sea, participation in religious rituals connected to the sea, and settlement of disputes. Furthermore, he is involved in mediation with migrant fishers, and represents their fishermen's association in the affairs of the National Association of Canoe Fishermen (Marquette et al. 2002; Koranteng, 2000, Odotei, 1991) The chief fisherman *Apofohene* (Fante) and *Woleiatse* (Ga) acts as a focal point for links between the community and outside institutions as well as being responsible for dealing with accidents at sea, crew and company conflicts, conflicts between fishermen and fishmongers, allocation of inputs supplied by government, mediation between migrants and traditional authority and religious rituals (Marquette et al. 2002).

The leader of the female traders is the fish queen mother is a mature woman with extensive knowledge of the fisheries trade. Her main role is to be a negotiator and mediator when there are problems and conflicts concerning fish trade between the women, for example over the quantity or quality of fish. She is also to oversee occasional cleaning of landing sites with her council (Overå, 1998; Overå, 2003).

There are traditional methods of managing coastal natural resources through the use of customary governance systems-taboos and regulation of various kinds. However, these cannot cope with the pressures now being imposed and are in many cases no longer respected (Ntiamoa-Baidu and Gordon, 1991). There are instances however when traditional laws have worked better at conserving natural resources than laws passed by the government. This is because most of these traditional laws are still linked to traditional beliefs and practices, some of which are based on superstition. For example in 1990 when all efforts to end the use of dynamite in fishing failed, the government involved the traditional rulers. The fishermen led by the various chief fishermen swore oaths that they would not use dynamite in fishing and that was

successful to a large extent. Currently efforts are underway to solve the problem of the use of night fishing with lights using traditional authority figures.

Locally evolved institutions and governance arrangements have been suggested as critical elements in natural resource management (Dietz, Ostrom, and Stern, 2003). Hence, managing coastal natural resources involves all stakeholders. It is also requires a partnership between users and managers. An effective way is to encourage the coastal communities to form groups which combine the efforts of local residents, interest groups, industries and government agencies. To this effect, there are a number of civil society institutions at community and national level which contribute to the livelihoods of coastal people, and some of which also contribute to NRM initiatives. Examples are the CBFMCs (Mensah et al. 2001). A model constitutional framework for the operations of CBFMCs and draft bye-laws have been prepared and operational in some districts. Membership of the committee comprises representatives of stakeholders with the Chief Fisherman as the chairmen. Others are representatives of all ethnic groups involved in fishing in a community, representative of fishmongers/leader of fish processors, representative of Ghana National Canoe Fishermen Council, and two representatives of Unit Committees of the DAs, one being a woman (Mensah et al. 2001). There are also a number of long established associations which represent the interests of fishermen and processors. These include:

- Fish Processors Association of Ghana;
- Ghana Inshore Fisheries Association;
- National Association of Canoe Fishermen;
- Ghana National Association of Farmers and Fishermen
- National Canoe Fishermen's Council; and
- National Fisheries Association of Ghana.

The Ghana National Association of Farmers and Fishermen educates farmers and fishermen on government policies and provides advocacy and livelihood support (Directorate of Fisheries, 2003).

8.1.3.1 Challenges

A major challenge is the disharmony between statutory and customary governance systems. Traditional leaders for example believe they are the custodians of land and other natural resources. Local norms sometimes conflict with those set by the

government and in cases where the economic interest of the central government is at stake local norms are put aside. However indigenous knowledge systems can complement conventional knowledge of fisheries management.

Again it is important to create rules of operation with a central coordination body to streamline the operations of the numerous CBOs operating at the community level. Finally, local decentralised bodies sometimes lack the resources, capacity and experience either to enforce national environmental policy or to create effective local bye-laws.

8.2. Legal Framework for coastal Natural Resource Management and environmental governance

Coastal and marine areas have various uses, which often lead to conflict among users. In order to avoid conflicts, institutions and laws have been put in place. Most environmental issues are transboundary in nature. To address this, the international community has developed Multilateral Environmental Agreements (MEAs) as one of the means of establishing common frameworks and actions among countries.

The Stockholm Conference on Human Environment was in organised in 1972 by the UN in order to tackle global and regional problems. This was followed by the United Nations Conference on Environment and Development (also known as the Rio conference) in 1992. Since these conferences, there have been many other MEAs (Okley, 2004). It is estimated that more than 300 agreements related to the environment have been negotiated since the Stockholm Conference (UNEP, 2001). African countries also in their efforts to promote environmental quality have adopted many MEAs under the aegis of the African Union and other regional bodies such as the Economic Community of West African States (ECOWAS).

As mentioned earlier, the Stockholm Conference in 1972 galvanised Ghana to create the EPC (EPA, 1999). Subsequent to the Rio Conference Ghana redefined its environmental policy to achieve sustainable development. Some international agreements are self executing, meaning they do not require domestic legislation to become effective. However, most Multilateral Environmental Agreements require states to enact legislations and regulations to implement them. Box 7 provides a list of some international conventions ratified by Ghana that relate to coastal NRM. These tackle a wide range of issues such as the over-exploitation of coastal and marine

natural resources, pollution, sustainable use of natural resources, international rights over high seas and the involvement of stakeholders at all levels in the decision-making process.

Ghana has a common law system and follows the English dualist concept. Consequently, for a Treaty to be useful in Ghana it has to be enacted into legislation before it can have effect and the courts can only enforce it when it has been enacted into legislation (Okley, 2004). In order to facilitate the investigation and prosecution of environmental offences, the EPA has developed guidelines for use by its staff. It includes guidance on what to look for, how to collect evidence, establishing chain of custody, presentation of evidence, and other aspects of investigation and prosecution.

It is also important to develop the capability of institutions responsible for law enforcement. In this aspect the judiciary and police play an active role. Hence the EPA has also developed a training syllabus for the judiciary on environmental laws and the need to comply with MEAs. These are to be incorporated into Ghana's continuous Judicial Education Programme. The EPA in collaboration with the police administration is also to introduce environmental management and environmental law in the syllabus of police recruits and cadet officers.

Generally, the Ghana Environmental Action Plan (volume 1, 1991 and volume 2, 1994) form the blue print for the management and sustainable exploitation of Ghana's environmental resources (Laing, 1991; 1994). In addition, Ghana has taken the NEAP further than the "planning" stage, and as such has put in place a number of strategic initiatives for environmental management, as well as the production of key documentation (MEST, 2004). These include:

- Ghana Environmental Resource Management Project (GERMP);
- Natural Resources Management Project (NRMP);
- National Framework for Geographic Information (NAFGIM);
- Cleaner Production Technologies;
- Ghana's Initial National Communication under the United Nations Framework Convention on Climate Change;
- Persistent Organic Pollutants, 2003 (on-going);
- Renewable Energy Services Project (RESPRO);
- Food and Agriculture Sector Development Programme (FASDEP 2002);

- Development of a National Biosafety Framework for Ghana 2002;
- Strategic Environmental Assessment of the GPRS 2003;
- National Capacity Self-Assessment for Climate Change, Biodiversity and Desertification;
- Capacity 21(aimed at strengthening the capacities of institutions involved in environmental management);
- National Biodiversity Conservation Strategy /Plan;
- National Action Plan (NAP) to Combat Desertification (drafting stage);
- National Strategy on Ozone Depleting Substances;
- Legal Framework on Waste Management in Ghana.

Based on this a National Environmental Policy (NEP) was also drawn. It seeks to ensure a balance between economic development and natural resource conservation (Hens and Boon, 1999). The main elements of the policy include:

- Preparing and adopting sectoral plans;
- Preparing and adopting standards and regulations;
- Institutional strengthening of the EPA, the National Development Planning Commission (NDPC), District Assemblies, Community Groups, NGOs, selected sectoral agencies; interagency co-ordination, and an institutional structure for integrated land-use planning.

The specific objectives of the NEP are:

- Maintaining ecosystems and ecological processes essential for the functioning of the biosphere;
- Ensuring sound management of natural resources and the environment;
- Adequately protecting humans, animals and plants, their biological communities and habitats against harmful impacts and destructive practices, and preserve biological diversity;
- Guiding development in accordance with quality requirements to prevent, reduce, and as far as possible, eliminate pollution and nuisances; integrating environmental considerations in sectoral structural and socio-economic planning at the national, regional, district and grassroots levels;
- Seeking common solutions to environmental problems in West Africa, Africa and the world at large.

The legal framework in relation to coastal NRM involves the use of laws, policies, regulations and so on, which influence how humans interact with coastal natural resources. Especially because of the problems facing the coastal zone the NEAP identified the following policy actions for marine and coastal ecosystems:

- Adoption of a fisheries management policy;
- Adoption of proposed legislation and regulations on coastal zone management;
- Establishment of protected areas in coastal wetlands.

Since there is no national coastal zone management policy management of the coastal environment depends on laws and policies from other sectors (Amlalo and Ahiadeke, 2004) (Table 8.1).

Table 8.1 Some laws and policies pertaining to the coastal zone of Ghana

Wildlife Conservation	Wildlife Conservation Regulations, 1971 (revised 1999 LI 685) Wildlife Reserves Regulations, 1971 (LI 710) Wildlife Conservation Policy, 1974
Fisheries Resources Protection	Fisheries Law 1991 (PNDC L 256) Fisheries Commission Act 1993 (Act 457) Fisheries Development and Management Bill, 1996 Fisheries Decree, 1972 (amended 1977, 1984)
Oil and Gas Development	Petroleum (Exploration and Production) Law, 1984 (PNDC L 84) Minerals (Oil and Gas) Regulations 1963 (L.I. 258) Oil in Navigable Waters Act, 1964 (Act 233)
Environmental Management	Beaches Obstruction Ordinance 1897 (Cap 240) Environmental Protection Agency Act, 1994 (Act 490) Land Planning and Soil Conservation Ordinance, 1953 (No. 32) Water Resources Act 1997 Water Resources Commission Act, 1996 *(*Act 522) National Land Policy, Ministry of Lands and Forestry, 1999

Source: MEST, 2004

Specifically concerning the coastal zone, in an attempt to improve conditions in the coastal zone, efforts at an integrated approach to coastal zone management have been made. These can be found in the following:

- Coastal Zone Indicative Management Plan (CZIMP), 1990;
- Biodiversity Strategy and Action Plan (Draft);
- National Wetlands Management Strategy, 1999;
- National Oil Spill Contingency Plan with specific reference to the marine environment, 2002;
- Environmental sensitivity map of the coastal areas of Ghana, 1999 and 2004.

The main thrust and orientation of national policies on the protection, management and development of the marine and coastal environment is based on the following:

- Integrated coastal zone management and sustainable development;
- Marine environmental protection, both from land-based activities and from sea-based activities; and
- Sustainable use and conservation of marine living resources (both of the high seas and under national jurisdiction).

Box 7. Environmentally related international conventions ratified by Ghana

- International Convention for the Prevention of Pollution of the sea by Oil: 21 October 1962.
- International Convention for the Conservation of Atlantic Tunas: 4 May 1966.
- Africa Convention on the Conservation of Nature and Natural Resources: 15 September 1968.
- International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Causalities.
- Convention on Wetlands of International Importance, Especially as Waterfowl Habitats: 2 February 1971.
- Treaty and Prohibition of the Emplacement of Nuclear Weapons of Mass Destruction on the Seabed and the Ocean Floor and in the Subsoil Thereof: 11 January 1971.
- Convention Concerning the Protection of World Cultural and Natural Heritage: 16 November 1972.
- Convention on International Trade on Endangered Species of Wild Fauna and Flora: 3 March 1973.
- Convention on the Conservation of Migratory Species of Wild Animals: 23 June 1979.
- Convention for the Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, 1981 (Abidjan Convention).
- United Nation Convention on the Law of the Sea: 10 December 1982.
- Montreal Protocol on Substances that Deplete the Ozone Layer: 24 July 1989.
- Convention to Combat Drought and Desertification.
- Framework Convention on Climate Change: June 1992.
- Convention on Biological Diversity,1992
- Kyoto Protocol March 2003.

8.3 Responsibility for managing coastal natural resources

Having identified key institutional and legal framework for the management of coastal natural resources, the study sought to identify respondents' perceptions of who has the responsibility of taking managing coastal natural resources (Figure 8.2). The general sentiment was that natural resources found in the communities belonged to the people of the community who could use it to satisfy their needs. They should enjoy a

substantial portion of whatever economic benefits accruing from their exploitation. However when it came to who was to take the lead in managing natural resources more than 50% said they were not sure. The general belief of those who could voice an opinion on this matter was that the management of coastal natural resources is the responsibility of the Government of Ghana its representatives such as the District Assemblies and the area/town councils. They believed that since they paid some form of tax directly or indirectly these monies should be used in cleaning the communities, for coastal NRM programmes and to provide basic infrastructure. The infrastructures include toilets, bathrooms, roads, markets, wharf and harbour (mentioned especially in Moree). Some also believed that traditional leaders such as the chief fisherman and the elders of the community had this responsibility. Only a small fraction believed they the community members had to be actively involved in this process.

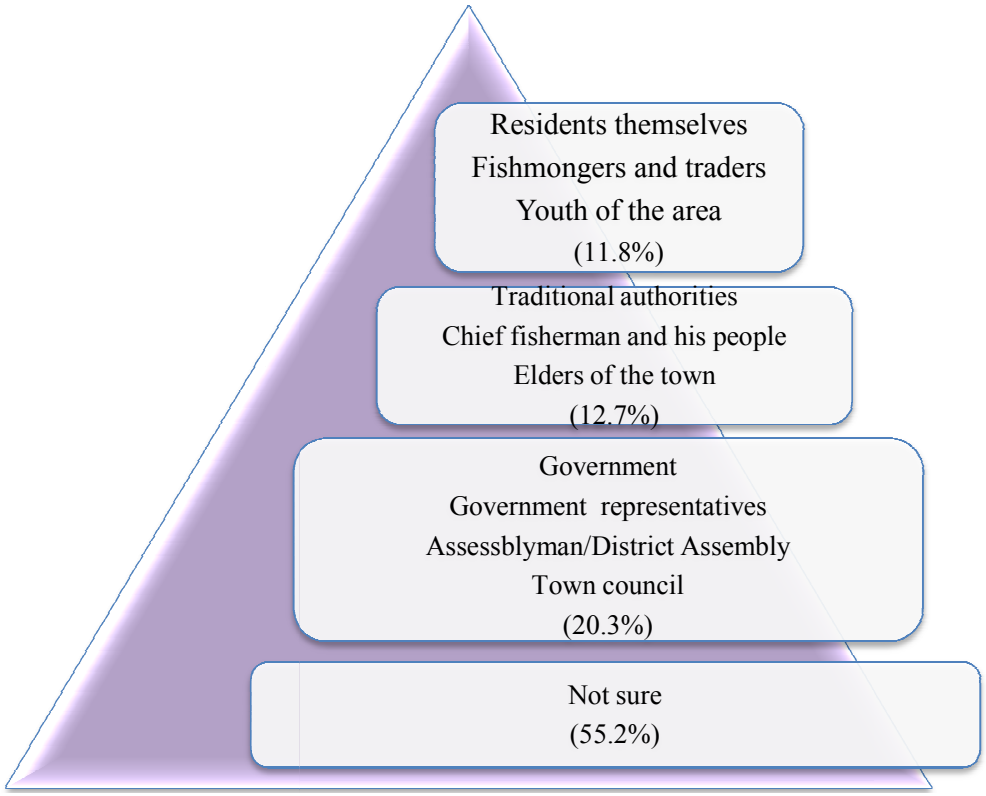


Figure 8.2 Respondents' view of who should manage coastal natural resources in study areas

Some of the respondents had joined a number of community groups such as traders and fish smokers' associations that regulate the activities of women in the fishing business, hair dressers associations, welfare groups that provided assistance during bereavement or financial difficulty and various microfinance groups. Whilst general hygiene and homemaking were sometimes discussed, issues of coastal NRM and environmental education were rarely discussed.

The legal and policy framework availability and effective deployment of human and material resources plays an important role in coastal NRM. Whilst the government continues to be a major stakeholder in the management of coastal natural resources, in putting in place effective environmental governance systems, the involvement and participation of community members is crucial for success. This is especially so for community-based natural resource management. For an external actor entering a community, there are a number of ways to ensure local participation in coastal NRM. The study categorises six steps as being most important (Figure 8.3).

Assess existing coastal NRM: It is important to assess the current state of natural resources, NRM interventions and levels of community participation to ensure that there is really a need for new NRM plans or interventions. Local institutions and any NGOs already in existence also need to be consulted. Whether an Integrated Coastal Zone Management Plan or Community Based Natural Resource Management plan is being developed, an Information, Education and Communication (IEC) programme then needs to be included. Education, training, and effective communication are the vital for effective stakeholder participation and empowerment coastal NRM.

Seek required permission: When the need has been identified, efforts to enter the community can be made. In many local communities, especially those in the rural areas, the consent and support of traditional and local community leaders are vital. Depending on the nature of the intervention, permission might be sought also from the appropriate national agencies.

Create awareness in the community about the need for coastal NRM plans: There is the need to create awareness in the community about the importance of the issues to be tackled. This can be done using workshops, preparation and distribution of print materials, meetings, presentations at local forums, durbars depending of the area. Community members in addition to other stakeholders need to contribute to the issues

and problems at stake. At this stage volunteers can be gathered to form core local coastal NRM groups, trainers or committees who will eventually take the lead in expanding the programmes. These will also liaise with local institutions and other stake holders, assist in the collection of data needed for the implementation stage, disseminate the results of research programmes and finally, play a lead role in mobilising the people in the community. The potential of using existing groups such as fish smoking groups and welfare groups can also be explored. Sometimes the development and implementation of coastal NRM plans require specialised knowledge and some level of scientific and ecological expertise as they relate to environmental issues in the community. Hence the capacity of these local NRM groups/committees will need to be strengthened using training and educational programmes adapted to suit the local situation.

Implementation stage: As seen Chapter 7, in most coastal areas, respondents are likely to support NRM activities that link the livelihood and wellbeing to coastal NRM. Efforts to involve local people in the conservation of biological diversity will not succeed in the long term unless local people believe those efforts contribute to their welfare. Hence coastal NRM plans should also take into consideration local environmental values and include economic and livelihood generation projects. Incorporating local values also helps ensure that conservation initiatives are compatible with local concerns and builds mutual respect and trust. Tools for community implementation are varied and depend on the local setting. For example radio and training programmes which advocate for the adoption of the coastal NRM plan, workshops, local newspapers available in local languages that educate the communities about the status of natural resources and the need for behaviour changes can all be used. Formal educational structures and school curriculum can also be used when possible.

Evaluation and Monitoring: Once implementation begins, an effective monitoring and evaluation program should be maintained. Conditions prior to implementation, current conditions and possible future impacts need to be assessed for future recommendations. Without an effective monitoring programme, it is difficult to make any conclusive statements about outcomes of the implementation stage. It also helps to identify the need for changes and modifications to the approach used. Finally monitoring and evaluation is important for financial accounting. One way it can be

achieved is through regular reporting procedure for those implementing the NRM plan.

Exit stage: At this stage the community should be ready to manage the coastal NRM programme on its own. They should recognise their contribution to the problem and take collective responsibility for managing and protecting these resources. Local stakeholders should be able to share benefits from natural resources. The community should also be able to organise itself and to solve issues to so with environmental and natural resource degradation in a communal manner.

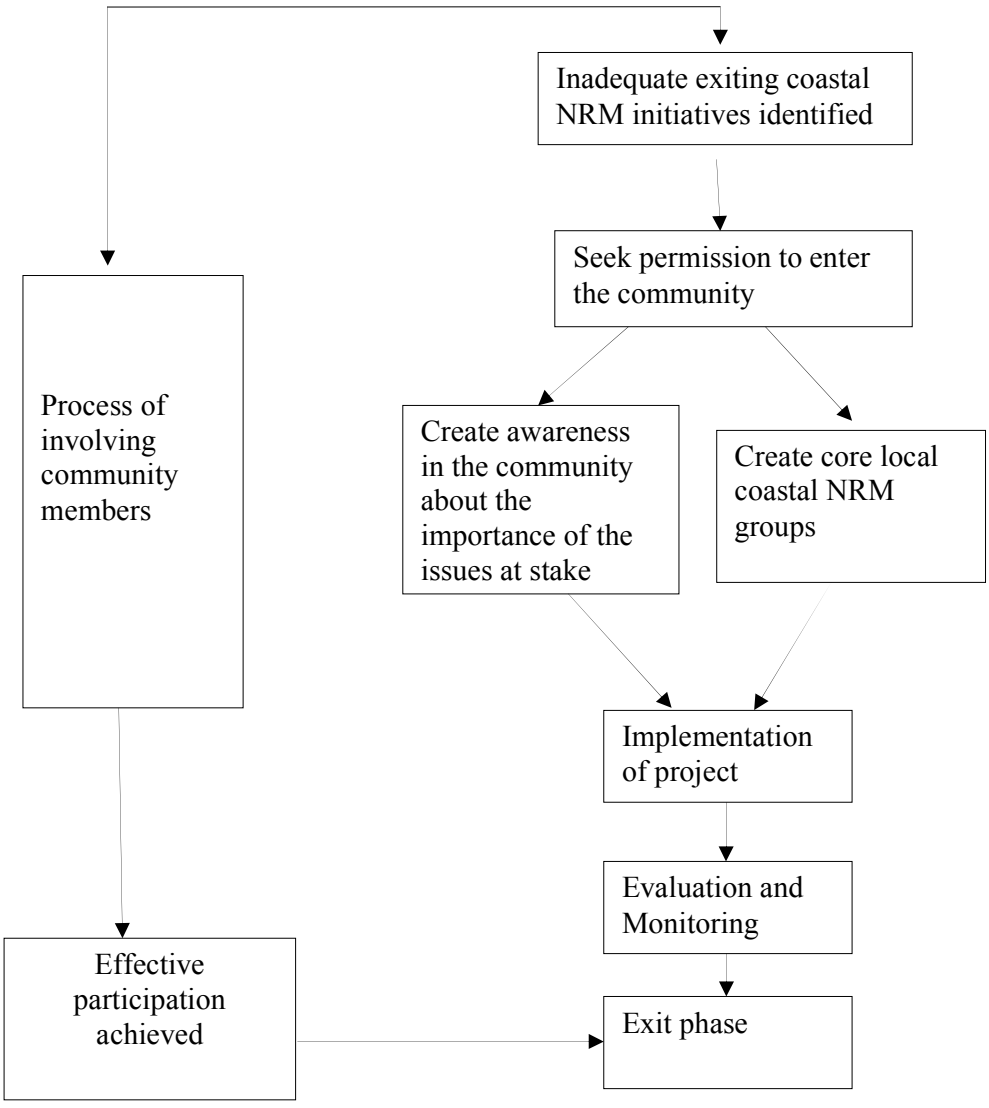


Figure 8.3 Framework for involving the local community in coastal NRM
Source: White et al. 1994.

It is important that local community members are acknowledged as the key stakeholders who play a central role in the management of coastal natural resources. Whilst the fate of natural resources in many developing countries in truth cannot be separated from the broader context of economic and development challenges, in the same way economic and development future of these countries is dependent on its natural resources.

CHAPTER NINE
CONCLUSION AND POLICY RECOMMENDATIONS

9. Introduction to chapter

This chapter concludes the study. In addition to the conclusions it contains policy recommendations on how to use the information gained by this study on environmental attitudes and values of coastal women to effectively manage coastal natural resources in Ghana.

9.1 Conclusions: objectives of study re-visited

9.1.1 Poverty and coastal NRM

9.1.1.1 How respondents construct and perceive poverty in their community

The research shows that majority of the respondents described themselves as poor. Factors cited as deepening their poverty levels include low income levels and unemployment as a result of decreasing fish yields, food insecurity and poor access to basic infrastructure.

9.1.1.2 Linkages between poverty and NRM in coastal environments

The study also showed that respondents depend directly on coastal natural resources. Hence depleting resources have led to an increase in poverty, expenditure and food insecurity. Pertaining to their livelihood strategies, coastal natural resources are central to their livelihoods. For most respondents, greater control and security over the resources on which their livelihoods depend was seen as key to overcoming poverty. Secondly, their multiple roles and responsibilities depend on natural resources. With a decrease in their availability respondents have to put in more effort fulfil their financial obligations in and out of the home. Hence the dependence of resource users on natural resources and its impact on their livelihoods should be a key consideration when designing and implementing conservation and NRM projects.

9.1.1.3 Environmental attitudes of respondents

Environmental attitudes of respondents were generally positive, which did not reflect the general state of natural resources and the general environment in the areas. In addition, respondents' expressed environmental attitudes often conflicted with selected behaviours. Finally, although respondents' knowledge and perception of their local environment was more readily expressed, that concerning climate change and global warming was lower, with radios being the most common sources of information.

9.1.1.4 Environmental values

The study set out to study environmental values by means of respondents' judgments of the relative importance of coastal natural resources using the paired comparison method. This method provides a comprehensive understanding of the importance of the coastal natural resources especially in the chosen setting where accurate monetary valuations may be difficult to estimate. The approach was found to be particularly useful and promising that could provide information necessary for improving the management of coastal natural resources. For example, the results on environmental values using the paired comparison analysis showed that respondents were able to provide a clear picture of the relative priority they place on the value of coastal natural resources without much difficulty. The high transitivity shows the questions were well understood.

The results show that in both areas respondents place the greatest importance on the coastal natural resources as a source of wealth creation and source of food (utilitarian values). Primary environmental and natural resource concerns were loss of fisheries, lack of potable water and poor sanitation.

9.1.1.5 Propose specific policy options for managing the coastal environment

The results on environmental attitudes and values showed that positive attitudes do not always result in pro-environmental or conservatory behaviour. It also demonstrated that coastal NRM cannot take place in a vacuum- it needs to involve the people who use and interact with it daily. Their socio-economic needs such as access to education, health facilities and livelihood options need to be factored into management plans. The motivation or the driving force behind coastal natural

resource degradation on the part of resource users is important tool that can be tapped in developing education programmes, laws and policies. For example, are the coastal natural resources being degraded because of ignorance of their ecological functions? Are they being degraded because of poverty or due to the lack of the right facilities? Are there some existing cultural practices that permit the people to use the coastal resources in an unsustainable way? These are all questions that need to be answered. Hence coastal NRM is not only an ecology issue but also a social, political, and economic one as well. The findings were also used in policy recommendations. Further recommendations can be found in the next section.

9.2 Implications for the future- recommendations

The study on the role of environmental attitudes and values of some Ghanaian coastal women in NRM has brought to the fore a number of issues that need to be dealt with, and at the same time opportunities as to how to improve the status quo. Whilst there maybe a number of possibilities, under the socio-economic circumstances the study finds five areas most relevant. These are:

- Decreasing poverty and improving livelihood options;
- Capacity building of stakeholders involved;
- Funding;
- Effective policy and legal framework;
- Community participation.

9.2.1 Decreasing poverty and improving livelihood options

Education is an important tool in poverty alleviation. The provision of adequate structures in addition to the enforcement of the principles of FCUBE and the Non-formal education will ensure that the future generation are better educated. It will also ensure that the current generation also have a chance at improving their educational levels. The target of promoting gender equity in enrolment and retention is also important. Education, training and awareness raising will also empower more women by increasing their capacity to effectively participate in policy-making and decision-making especially at the local level.

To effectively manage coastal natural resources, these need to be integrated into other development plans and strategies. For example, the recommendations of the Strategic

Environmental Assessment of the GPRS need to be implemented. Policies and programmes that reduce poverty levels to the peril of natural resources and the general environment tend to have limited success.

The fish stocks in Ghana are generally thought to be at or nearing their maximum levels of exploitation. Hence it is possible future catch per unit effort may continue to decline. There is hence the need to assist coastal residents to diversify their livelihoods and decrease their reliance on marine fishing as a main source of income. Since most already have the requisite skills in fish harvesting and processing, aquaculture could be a good alternative source of income. However this needs research, investment and support from policy makers and also the training of interested resource users.

The provision of basic infrastructure such as potable drinking water, electricity, roads, and drainage also improves the well-being of community members, enabling them to concentrate efforts at other endeavours. This brings up the topic of climate change. Since there seems to be very low levels of awareness about this very important global issue there the need for more education on its potential impacts and adaptation measures. At the national level there is the need for more research on other suitable energy sources such as wind and solar and bio fuel systems.

9.2.2 Capacity building

Capacity building in coastal NRM involves further developing the ability of institutions, communities and individuals to effectively carry out activities that protect coastal natural resources. Various activities can be undertaken under capacity building depending on the target organisation. It includes skills development and training aimed at specific performance and behaviour changes, and support be it administrative, financial or logistical.

As mentioned in Chapter 8, most of the government institutions dealing with coastal NRM are ill-equipped and understaffed. Strengthening their capacities at all levels- local to national- will involve among others staff training programmes to help requisite staff members keep in touch with trends and developments on the global environmental management scene. Capacity needs vary for the various institutions

and these will have to be identified for them to function efficiently and for proper enforcement of laws.

The availability of data is also important in the development of institutional capacity. The lack of detailed scientific and Geographic Information Systems (GIS) data on the coastal and marine environments is another set back in the development of NRM strategies. The availability of social data, including gender disaggregated data also at the local levels is also important. This highlights the need to invest in Research and Development (R&D) not only by the government and its institutions but to also create an enabling environment for the private sector to invest in this area.

Corruption affects the capacity of institutions to function effectively, affects the implementation of NRM strategies and shows weaknesses in governance structures. Frequent audits by third party institutions can be one way of decreasing its occurrences.

At the community level, since most households own at least a wireless radio set, this could be an important tool for capacity building. Advantage can be taken of community groupings such as festivals, durbars and other formal and informal educational programmes. Basic skills in numeracy and literacy as well as in economic skills such as marketing and accounting can benefit the community members broadly. Since women make up the majority of poor and are dependent on natural resources, their needs and anxieties must be mainstreamed in projects and programmes aimed at managing coastal natural resources. An empowered community is an asset.

9.2.3 Funding

Like most African countries, Ghana has limited budgetary resources, even with the help of external donors. Most offices of government MDAs are poorly funded and staffed. Funding is important to the success of coastal NRM. The implementation of laws, policies and projects depend on the availability of funds. Funding is needed for example for the payment of administrative costs, fuel, implementation of programmes and payment of staff. At the local level, projects are abandoned because of the lack of funds and in most cases the amounts available to the DEMCs depend on the District Assemblies and their priority areas.

Considering the decreasing availability of funds for the implementation of NRM programmes each year, a number of recommendations can be made. It is important for the government to establish the contribution of the natural environment in economic development and assign more budgetary allocation to the sector. This could also attract more investment from international NGOs and external supporters to the sector. It is also important to mention that to encourage funding and investment in coastal NRM there should be investor confidence and the belief that monies will be used for the intended purposes. To increase accountability especially within MDAs and NGOs, periodic audits and the submission of periodic reports on their activities can be made.

On the other hand, the encouragement of volunteers from the communities in the implementation of programmes and the development of self sustaining projects will decrease dependence on government funding and developing other source of funding such as local businesses and community donations and levies (where practical).

9.2.4 Policy

Many of the existing legislature and policies and ratified international agreements and conventions concerning coastal NRM when effectively enforced offer opportunities for the protection of coastal natural resources. The above discussion has shown that Ghana has to some extent existing constitutional, institutional and legislative framework to undertake its commitments under the various Multilateral Environmental Agreements it has ratified.

By-laws, legislation and regulations are important management tools that can be harnessed. It however must be able to address local issues and concerns. District Assemblies must be encouraged to develop by-laws that tackle specific NRM problems in their locality. Local residents need to be aware of these, through educational programmes, durbars and so on. Often laws and legislation are unnecessarily complicated and not accessible to and understandable by who are supposed to abide by them. Where necessary, relevant regulations and policies developed should be simplified and translated to local languages and made available to the public. This is also important to close the gap between research findings and dissemination.

In order to develop successful policies and legislature that lead to behaviour change, communities and stakeholders must be included in policy development and implementation right from the general consultation stage. This way the values of the target population are taken into consideration. Finally, there is the need for communication and feed back between the policy makers and resource users. Letting resource users know that their values and opinions are part of decisions made could be an incentive to encourage conformity and compliance.

9.2.5 Community participation

Public participation in decision-making is an important element of Agenda 21 and is a fundamental concept of sustainable development. Community support is central to the success of any project and/or policy. This is especially so for projects implemented at the community level. Support can be built when locals understand its importance and the impacts of their activity or inactivity. Environmental education and awareness will thus play an important role. In the NEAP it is proposed that environmental studies should be included in the syllabus at both the first and second cycle education levels. The formulation and implementation of informal education strategies is also important.

The participation and empowerment of women has led to the success of NRM programmes in many parts of Africa. The return on investment in women's groups such as through micro finance schemes is often high. Considering the fact that coastal communities are highly gendered, some of the problems experienced here have gender dimensions to it, which are most of the time ignored. Women and not only men need to be consulted and involved actively in environmental decision making process.

"Co-management" which involves local people and other institutions sharing responsibility for decision-making about access to national and use of natural resources, should be encouraged. When local values, in addition to national and international, are incorporated into projects and programmes, the conservation of coastal NRM will address local concerns and help develop respect and trust between local communities and the authorities.

9.3 Prospects of environmental attitudes and values in coastal NRM research

This study emphasises the roles of the local environmental attitudes and values of women in the management of coastal natural resources. The study takes on the innovative task of examining the applicability of the using the paired comparison methodology in a developing setting using empirical data. Since this was a case study, conducted within the usual time and financial constraints of a doctoral thesis, it has certain limitations. Nevertheless the results are indeed promising. However, by way of suggesting further research, it would be interesting to see the paired comparison methodology replicated in a larger more diverse sample or in a different ecological zone such as the high forest zone, and with more variables for the paired comparison. It can also be compared to other elicitation methods such as contingent ranking. A gender analysis comparing the impact of gender on the results will also be meaningful.

As a finale it is worthy to say that the natural environment, society and the economy are basically interconnected. The natural environment serves as a source of well-being and livelihood especially for many rural dwellers. Hence our future depends on how effective we are in maintaining healthy ecosystems, including coastal ecosystems. To this effect NRM plans must be designed and implemented in partnership with major groups such as local communities. These communities are not gender neutral and as such the needs of both women and men must be taken into consideration. Rural communities must not be seen only as caretakers of natural resources, but also sharers in the benefits accruing from them. This is because if they do not see resource management options improving their welfare they will be less likely to adopt them or get involved in them, hence the success of these initiatives will be highly unlikely.

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APPENDICES

Appendix A1: Attitudinal scores, frequencies and percentages of respondents in Bortianor

Score	Frequency	Percent	Valid Percent	Cumulative Percent
38	1	0.662252	0.662252	0.662252
39	1	0.662252	0.662252	1.324503
42	1	0.662252	0.662252	1.986755
43	2	1.324503	1.324503	3.311258
44	1	0.662252	0.662252	3.97351
45	2	1.324503	1.324503	5.298013
46	2	1.324503	1.324503	6.622517
47	8	5.298013	5.298013	11.92053
48	11	7.284768	7.284768	19.2053
49	5	3.311258	3.311258	22.51656
50	7	4.635762	4.635762	27.15232
51	6	3.97351	3.97351	31.12583
52	7	4.635762	4.635762	35.76159
53	8	5.298013	5.298013	41.0596
54	11	7.284768	7.284768	48.34437
55	10	6.622517	6.622517	54.96689
56	5	3.311258	3.311258	58.27815
57	2	1.324503	1.324503	59.60265
58	7	4.635762	4.635762	64.23841
59	4	2.649007	2.649007	66.88742
60	1	0.662252	0.662252	67.54967
61	8	5.298013	5.298013	72.84768
62	19	12.58278	12.58278	85.43046
63	3	1.986755	1.986755	87.41722
64	8	5.298013	5.298013	92.71523
66	1	0.662252	0.662252	93.37748
68	8	5.298013	5.298013	98.6755
69	1	0.662252	0.662252	99.33775
70	1	0.662252	0.662252	**100**
Total	**151**	**100**	**100**	

Appendix A2: Attitudinal scores, frequencies and percentages of respondents in Moree

Score	Frequency	Percent	Valid Percent	Cumulative Percent
39	2	1.30719	1.30719	1.30719
42	2	1.30719	1.30719	2.614379
43	1	1.30719	1.30719	3.921569
44	2	1.30719	1.30719	5.228758
45	6	3.921569	3.921569	9.150327
46	1	1.30719	1.30719	3.921569
47	6	3.921569	3.921569	31.37255
48	9	5.882353	5.882353	19.60784
49	5	3.267974	3.267974	22.87582
50	7	4.575163	4.575163	27.45098
51	6	3.921569	3.921569	31.37255
52	9	5.882353	5.882353	37.2549
53	10	6.535948	6.535948	43.79085
54	10	6.535948	6.535948	50.3268
55	9	5.882353	5.882353	56.20915
56	4	2.614379	2.614379	58.82353
57	3	1.960784	1.960784	60.78431
58	7	4.575163	4.575163	65.35948
59	5	3.267974	3.267974	68.62745
60	2	1.30719	1.30719	69.93464
61	6	3.921569	3.921569	73.85621
62	17	11.11111	11.11111	84.96732
63	3	1.960784	1.960784	86.9281
64	9	5.882353	5.882353	92.81046
68	8	5.228758	5.228758	98.03922
69	2	1.30719	1.30719	99.34641
70	1	0.653595	0.653595	**100**
	153	**100**	**100**	

Appendix A3: Reliability analysis – scale (Alpha) for Bortianor

		Mean	Std Dev	Cases
1.	Q1	4.1391	0.9312	151.0
2.	Q2	3.3510	1.1673	151.0
3.	Q3	4.4172	0.8194	151.0
4.	Q4	3.9272	1.1610	151.0
5.	Q5	3.8477	0.9574	151.0
6.	Q6	4.3642	0.9625	151.0
7.	Q7	3.8278	1.0377	151.0
8.	Q8	3.2053	1.2454	151.0
9.	Q9	2.9536	1.0791	151.0
10.	Q10	4.2450	1.1074	151.0
11.	Q11	3.2185	0.9011	151.0
12.	Q12	4.0132	0.9380	151.0
13.	Q13	4.0795	0.8043	151.0
14.	Q14	2.4570	1.0566	151.0
15.	Q15	3.2914	0.9838	151.0

	Mean	Variance	Std Dev	N of Variables
Statistics for scale	55.3377	48.5985	6.9713	15

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q1	51.1987	41.0536	0.5596	0.6922
Q2	51.9868	43.5998	0.2359	0.7269
Q3	50.9205	44.7136	0.2932	0.7190
Q4	51.4106	42.7370	0.2973	0.7195
Q5	51.4901	47.4516	0.0175	0.7452
Q6	50.9735	42.3993	0.4206	0.7059
Q7	51.5099	44.8516	0.1921	0.7298
Q8	52.1325	39.5023	0.4820	0.6957
Q9	52.3841	40.7848	0.4824	0.6975
Q10	51.0927	41.5513	0.4077	0.7061
Q11	52.1192	43.0257	0.4028	0.7084
Q12	51.3245	41.0207	0.5575	0.6922
Q13	51.2583	45.8062	0.1970	0.7269
Q14	52.8808	44.3057	0.2258	0.7265
Q15	52.0464	44.5112	0.2376	0.7245

Reliability Coefficients

N of cases	151.0	N of Items	15
Alpha	0.7290		

Appendix A4: Reliability analysis – scale (Alpha) for Moree

		Mean	Std Dev	Cases
1.	Q1	4.1242	0.9619	153.0
2.	Q2	3.3856	1.1420	153.0
3.	Q3	4.4052	0.7983	153.0
4.	Q4	3.8693	1.1737	153.0
5.	Q5	3.7908	0.9642	153.0
6.	Q6	4.3464	0.9755	153.0
7.	Q7	3.7908	1.0365	153.0
8.	Q8	3.2418	1.2356	153.0
9.	Q9	2.9935	1.0791	153.0
10.	Q10	4.2549	1.0670	153.0
11.	Q11	3.2157	0.9244	153.0
12.	Q12	3.9935	0.9283	153.0
13.	Q13	4.0458	0.8139	153.0
14.	Q14	2.4575	1.0323	153.0
15.	Q15	3.3203	0.9977	153.0

	Mean	Variance	Std Dev	N of Variables
Statistics for scale	55.2353	492206	7.0157	15

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Q1	51.1111	41.0994	0.5835	0.6958
Q2	51.8497	44.3654	0.2334	0.7331
Q3	50.8301	45.5104	0.2853	0.7259
Q4	51.3660	42.7994	0.3284	0.7223
Q5	51.4444	48.1038	0.0140	0.7514
Q6	50.8889	43.3494	0.3830	0.7163
Q7	51.4444	45.2354	0.2088	0.7342
Q8	51.9935	40.3486	0.4679	0.7048
Q9	52.2418	41.7240	0.4542	0.7077
Q10	50.9804	42.7693	0.3807	0.7161
Q11	52.0196	42.9141	0.4502	0.7102
Q12	51.2418	41.8161	0.5449	0.7007
Q13	51.1895	46.1415	0.2186	0.7313
Q14	52.7778	44.8319	0.2404	0.7309
Q15	51.9150	44.3283	0.2933	0.7253

Reliability Coefficients

N of cases	153.0	N of Items	15
Alpha	0.7347		

Appendix A5: Determining environmental significance

To determine if differences in the attitudes of respondents in the two areas was statistically significant, the results of the attitude tests were subjected to Chi-squared (X^2) tests. This test confirms the differences between the observed frequencies (fo) and expected frequencies (fe). For this study, the decision rule was that a difference in the attitudes of respondents in the two communities towards natural resource degradation was significant if computed p was less than 0.05 ($p< 0.05$). From the chi-squared computed p-value obtained was 0.271. This means computed p was greater than 0.05 ($p > 0.05$). Thus there is no statistical significant difference between the attitudes of the respondents in Bortianor and Moree towards natural resource degradation.

			Attitude		Total
			1	2	
Community	1	Count	8	14	22
		Expected Count	10.4	10.6	21.0
	2	Count	143	139	282
		Expected Count	140.6	142.4	283.0
Total		Count	151	153	304
		Expected Count	151.0	153.0	304.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.209	1	0.271		
Continuity Correction	0.763	1	0.382		
Likelihood Ratio	1.221	1	0.269		
Fisher's Exact Test				0.366	0.191
Linear-by-Linear Association	1.205	1	0.272		
N of Valid Cases	304				

a Computed only for a 2x2 table
b 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.43.

Appendix A6: Relationship between Age and Education and Environmental attitudes of respondents

Bortianor

Educational levels	**Negative (N)**	**Positive (N)**	**Total (N)**
None	2	70	72
Primary	3	53	56
Middle school	2	6	8
JSS	1	7	8
SSS	0	2	2
Vocational/tech	0	3	3
University	0	2	2
Total	**8**	**143**	**151**

Moree

Educational levels	**Negative (N)**	**Positive (N)**	**Total (N)**
None	8	86	94
Primary	3	29	32
Middle school	2	4	6
JSS	1	15	16
SSS	0	4	4
Vocational/tech	0	1	1
Total	**14**	**139**	**153**

Crosstabulation- Age * Attitude

			Attitudes				Total
			1	2	3	4	
Age	1	Count	1	9	5	1	16
		Expected Count	1.2	7.9	6.2	0.8	16.0
	2	Count	21	141	112	14	288
		Expected Count	20.8	142.1	110.8	14.2	288.0
Total		Count	22	150	117	15	304
		Expected Count	22.0	150.0	117.0	15.0	304.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.475	3	0.924
Likelihood Ratio	0.480	3	0.923
Linear-by-Linear Association	0.045	1	0.831
N of Valid Cases	304		

a 2 cells (25.0%) have expected count less than 5. The minimum expected count is 0.79.

Crosstabulation - Education * Attitudes

			Attitudes							Total
			1	2	3	4	5	6	7	
Education	1	Count	6	6	2	2	1	1	1	19
		Expected Count	10.4	5.5	0.9	1.5	0.4	0.3	0.1	19.0
	2	Count	160	82	12	22	5	3	1	285
		Expected Count	155.6	82.5	13.1	22.5	5.6	3.8	1.9	285.0
Total		Count	166	88	14	24	6	4	2	304
		Expected Count	166.0	88.0	14.0	24.0	6.0	4.0	2.0	304.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.781	6	.032
Likelihood Ratio	8.785	6	.186
Linear-by-Linear Association	9.764	1	.002
N of Valid Cases	304		

a 7 cells (50.0%) have expected count less than 5. The minimum expected count is 0.13.

Appendix B1: Sample of environmental values scores of respondents in Bortianor

	Cultural identity	Economic/ utilitarian	Aesthetic	Sense of place	Spiritual/ religious	Ecological
b1*[13]	2	2	3	2	3	3
b2	2	5	4	1	3	0
b3	0	5	5	2	1	2
b4	3	4	5	0	1	2
b5	3	5	4	0	2	1
b6	2	5	4	0	1	3
b7	4	5	3	1	2	0
b8	0	5	4	1	3	2
b9	5	4	0	3	2	1
b10	0	4	5	2	3	1
b11	3	0	5	0	5	2
b12	0	4	5	3	2	1
b13	3	5	4	1	2	0
b14	3	4	5	0	2	1
b15	3	5	4	1	2	0
b16	3	4	5	2	1	0
b17	0	5	2	1	4	3
b18	0	1	3	4	5	2
b19	4	5	3	3	0	0
b20	5	3	1	4	0	2
b21	0	0	3	5	5	2
b22	0	5	3	4	2	1
b23	0	5	5	0	3	2
b24	1	3	5	0	4	2
b25	4	5	3	3	0	0
b26	4	5	3	0	2	1
b27	4	3	5	0	2	1
b28	0	5	4	3	1	2
b29	2	5	4	3	1	0
b30	0	4	5	3	1	2
b31	4	5	3	3	0	0
b32	3	4	5	2	1	0
b33	0	4	5	3	1	2
b34	5	4	3	0	2	1
b35	0	4	0	3	3	3
b36	3	4	5	2	1	0
b37	1	4	5	2	2	3
b38	3	4	5	2	1	0
:						
b151						

Appendix B2: Sample of environmental values scores of respondents in Moree

[13] Examples of circular triads

	Cultural identity	Economic/ utilitarian	Aesthetic	Sense of place	Moralistic	Ecological
m1	0	5	2	3	4	1
m2	0	5	1	4	3	2
m3	0	5	2	5	1	2
m4	3	4	0	5	1	2
m5	3	5	1	4	2	0
m6	5	4	2	3	1	0
m7	1	5	3	4	2	0
m8	0	5	4	1	3	2
m9	4	3	2	5	1	0
m10	2	4	0	5	3	1
m11	5	0	0	3	5	2
m12	4	5	0	3	2	1
m13	5	2	2	0	4	2
m14	5	4	0	3	2	1
m15	3	5	4	1	1	2
m16	0	4	5	3	1	2
m17	0	5	2	3	3	3
m18	0	3	5	5	2	0
m19	3	5	3	4	0	0
m20	4	3	1	0	5	2
m21	0	0	3	5	5	2
m22	0	5	4	3	2	1
m23	0	5	0	5	3	2
m24	2	2	0	3	4	3
m25	4	5	0	3	0	3
m26	0	5	4	3	2	1
m27	4	3	0	5	2	1
m28	0	4	2	3	4	2
m29	0	5	1	3	4	2
m30	0	4	3	5	1	2
m31	4	5	0	3	0	3
m32	1	4	2	2	3	3
m33	0	4	3	5	1	2
m34	5	4	3	0	2	1
m35	0	5	3	1	4	2
m36	3	5	4	0	2	1
m37	0	4	2	5	1	3
m38	1	4	5	0	2	3
m39	0	4	5	3	1	2
m40	3	2	4	5	1	0
: **:**						
m153	2	3	5	4	1	2

Appendix B3: Aggregate preference scores (sum of preference scores and % of total)

	Bortianor	Moree
Spiritual/religious	**356** (15.7)	
Ecological	**167** (7.3)	**124** (5.5)
Aesthetic	**417** (18.4)	**250** (11.1)
Sense of place	**196** (8.6)	**487** (21.6)
Economic/utilitarian	**896** (39.5)	**931** (41.3)
Cultural identity	**238** (10.5)	**340** (15.1)
Moralistic		**160** (7.1)
Total	**2270 (100)**	**2290 (100)**

	Bortianor	**Moree**
Poor access to potable water	570 (25.1)	479 (21.0)
Loss of scenery	239 (10.5)	236 (10.3)
Loss of fisheries	585 (25.8)	540 (23.7)
Poor sanitation	408 (18.1)	448 (19.6)
Erosion	273 (12.1)	419 (18.3)
Noisy environment	191 (8.4)	160 (7.1)
Total	**2266 (100)**	**2282 (100)**

Appendix C1: Focus group schedule and questionnaire

Note: The focus group schedule for the respondents and government officials, and the interview schedule can be found in this section. The questionnaire shows the sections A to G, which were common for both areas. Only examples of the paired comparison questions are included. The paired comparison question for section H differed for both study areas since the value judgments were different.

Focus group schedule for respondents

Welcome and thank you for coming. The purpose of the focus group is to gather evidence about how natural resources in this area are managed and how you as primary resource users interact with these natural resources. We will also obtain some information on the other environmental and socioeconomic issues here. Please know that opinions expressed will be treated in confidence and will be used only for academic purposes. All responses will remain anonymous. Everyone's idea is important and everyone has an opportunity to speak. There are no right or wrong answers; even negative comments are useful in gaining insight about the topic under discussion. The session will be recorded on tape and notes will be taken during the session. Please let us know if there are any objections to the use of the audio recorder.

1. Views on poverty in the area. Who are those described as poor? Please give reasons for saying so. Is it possible to group residents into some poverty groupings?
2. What are the coping strategies being adopted in dealing with poverty; how does this affect the use of coastal natural resources?
3. What are some general socio-economic problems here?
4. What are the general environmental problems in area?
5. Which of the coastal natural resources are most important to you and why?
6. Which of the coastal natural resources do you depend on most; what do you use it for? (Probe further; for food, livelihood options etc)
7. Have access and use of these natural resources changed over the years? What are the changes and what are the causes of these changes? (Look out for

mention of changes in weather patterns and probe knowledge of climate change).

8. Which organisations are involved in managing natural resources here? (Probe level of involvement of government and local NGOs)
9. What are your perceptions about and participation in programmes to manage coastal natural resources (if these exist) Have they been successful? What could be done to improve them?
10. In your view what are women's contribution to coastal natural resource use and management?
11. Do you know of other environmental problems facing other towns in the district, region, in Ghana?
12. Is there anything else you would like to share with us?

Focus Group Schedule for government officials

1. What are some of the general environmental problems here?
2. Which of the coastal natural resources are most important to the community and why?
3. How are residents here able to cope with the current economic, social and cultural problems?
4. Is it possible to create poverty groups here (Discuss poverty profiling if necessary)
5. What strategies are in place in reducing/ preventing general environmental degradation in the area? (What are the impediments/possible limitations to these strategies?)
6. Are the local residents involved in these initiatives (If so how and at what level?)
7. Do these projects/plans/initiatives empower the people economically? How are they funded (Government, International NGOs etc).
8. What problems do you encounter whilst managing coastal natural resources in this area?
9. In general what are your perceptions about the environmental attitudes of the local residents? (If comment negative, what can be done to change these attitudes?)
10. Other relevant and related issues that have not been mentioned.

Appendix C3: Excerpts of the interview schedule

The role of environmental values and attitudes of Ghanaian coastal women and natural resource management

The information you will provide will be confidential and will be used for academic purpose only. If you can, please read the through the questions carefully and tick in a box or write your response on the dotted lines. In you are unable to, myself and the Research Assistants are here to help. Thank you.

SECTION A: BACKGROUND INFORMATION

Name of community……. Gender of household head ……

Respondent number……..

1. Age a. 16-20 years ( ) b. 21-25 years ( ) c. 26-30 years ( )
   d. 31-35years ( ) e. 36-40 years ( ) f. 41-45 years ( ) g.46-50 years ( ) h. 50-55 years ( ) i. >56 years ( )
2. Were you born in this town? If no, where were you born?.....
3. Do you have children? If yes how many? .....……
4. What is your highest level of education?
   a. No education ( ) b. Primary ( ) c. Middle school ( ) d. JSS ( )
   e. Secondary/SSS ( ) f. Higher ……...(Please specify)
5. Occupation ……..
6. Do you live alone? If not how many people live here? .....
7. How are the surroundings of the place you live?
   a. Very good ( ) b. Quite good ( ) c. Bad ( ) d. Very bad ( )
   e. Don't know ( )
8. What kind of house does respondent live in? (Interviewer observe if possible)
   ……
   ……
   ……
   ……
9. Do you own this house?.....…….

10. Does your household have:

a. Electricity? ( ) b. A telephone? ( ) c. A television? ( ) d. A radio? ( )
e. A video deck? ( ) f. A refrigerator? ( ) g. An Iron ( )

11. What type of fuel does your household mainly use for cooking?

a. Kerosene( ) b. Charcoal ( ) c. LPG ( ) d. Firewood ( ) e. Other ( )
(Source……
)

12. Does your family own:

a. A tractor? ( ) b. A car? ( ) c. A motorcycle/scooter? ( ) d. A bicycle? ( )
e. A canoe? ( )

SECTION B: ACCESS TO POTABLE WATER

13. What is your main source of drinking water?

a. Piped water into home ( ) b. Open well ( ) c. Covered well or borehole ( ) d. River/stream ( )
e. Public tap ( ) f. Other…….....

14. Do you have a secondary source of water?

……

15. Approximately how long does it take for you to go there, get water, and come back?

a. Hours…… b. Minutes ..... c. In house…… d. Don't know…….....

16. In the last two weeks, how frequently has water been available from the main source? a. 1 day a week ( ) b. 3 days a week ( ) c. 5 days a week ( ) d. All the time ( ) e. Less frequently ( ) f. Not at all ( ) g. Don't know ( )

17. What is the cost per bucket a. Nothing ( ) b. Other (please specify)…….

18. Do you experience acute water shortage? a. Yes ( ) b. No( )

19. Who fetches the water (Sex of person, age and position in house)…….……...

SECTION C: SANITATION

20. Do you have access to a toilet in your house? a. Yes ( ) b. No ( )

21. If yes, what kind of toilet facilities does your household have?

a. Flush toilet or WC ( ) b. Pit toilet/latrine ( ) c. Traditional pit toilet ( ) d. KVIP latrine ( )

e. Bucket/ pan ( ) f. Other ……

23. Do you share these facilities with other households? If so how many?

a. Yes ..... b. No .....

24. If you do not have a toilet where do you defecate?

a. Bushes ( ) b. On the beach ( ) c. Field / undeveloped plot ( ) d. other…

25. Do you find anything wrong with this? Why do you so answer?

……

……

26. How do you dispose of solid waste?

a. Burn ( ) b. Official collection point ( ) c. beaches ( ) d. water body ( )

e. other……

SECTION D: WOMEN'S INTERACTION WITH THE COASTAL NATURAL RESOURCES, KNOWLEDGE OF GLOBAL ENVIRONMENTAL PROBLEMS

27. What do you understand by the term "environment"?

……

28. Do you know of any environmental problems?

.....

.....

29. Do you earn a living? If yes what do you do?

.....

30. For how long have you been doing this?

…….....

31. What does it involve?

……

……

32. Is business good?

a. Yes ( ) b. No ( ) c. Not bad ( )

33. Are there any reasons for your answer?

……

34. Do you use depend on natural resources at work and at home? If Yes which one(s)?

……

……

35. In your view which are the 4 most critical problems in the coastal zone?

1……

2……

3……

4……

36. Do you know of any measures in place to solve this problem?

.....

.....

37. What animals can be found here? a. Turtles ( ) b. Fish (Specify if you can)…… c. Crabs ( ) d. Shrimps ( ) e. Birds( ) f. Others (Specify)

38. Do you think there has been a degrading in the kind of natural resources found here? a. Yes ( ) b. No ( ) c. Don't know ( )

39. Why do you so answer?

……

……

40. Do you think the natural resources found here is important?

a. Yes ( ) b. No ( ) c. Don't know ( )

41. Have you heard of climate change?

a. Yes b. Not at all c. Not sure

42. If yes how?.....

43. Do you think there are changes in the weather patterns in this area?.....

44. Does the community have any rules and regulations with respect to the use of natural resources?

.....

.....

45. Do you think communities need a code of conduct to regulate use of natural resources such as fish? Or we can use them which ever way to suit our needs?

……

46. Do you think the physical condition of our coasts and its natural resources should be improved for the sake of nature itself of for the sake of humans?

.....

47. Why do you so answer?

.....

.....

48. Have you always felt like this?

a. Yes ( ) b. No ( ) c. Not sure ( )

49. If not, what changed?

.....

50. What do you think is most important when thinking about the coastal zone, what would you tell me?

.....

.....

51. Do you see yourself as poor? Why do you so answer? .....

52. What are 4 contributory factors to poverty in the area?

.....

SECTION E: FORMAL AND INFORMAL INSTITUTIONS FOR ENVIRONMENTAL MANAGEMENT WITHIN THE STUDY AREAS

53. Do you have any groups and associations that you belong to? Do these talk about the environment?

……

54. Do you have specific organisations here that deal with environmental conservation? If so please name them…….....

55. Are you aware of any community based natural resources programmes?

a. Yes ( ) b. No ( )

56. Are there any local community institutions that would guide CBNRM programmes in your area?

…….....

57. Do you think communities have capacity to implement CBNRM programmes?

.....

58. Do you hold any influential and decision-making positions in any environmental group or organisation?

……

59. Which organisation should take care of natural resources and the environment here?

……

60. Is there any other thing you would want to say to us?

SECTION F: ENVIRONMENTAL ATTITUDES

Please indicate whether you strongly agree (SA); agree (A); are indifferent (I); disagree (D) or strongly disagree (SD) with the following statements.

1. The coastal zone is being degraded by indiscriminate dumping of refuse and defecation.	**SA**	**A**	**I**	**D**	**SD**
2. It is okay to throw rubbish on the beach if you are poor.	**SA**	**A**	**I**	**D**	**SD**
3. All households in the communities should have toilets and bathrooms.	**SA**	**A**	**I**	**D**	**SD**
4. Resource users should be involved in the management of coastal natural resources.	**SA**	**A**	**I**	**D**	**SD**
5. Humans have a right to modify the natural environment to suit their needs.	**SA**	**A**	**I**	**D**	**SD**
6. Outdoor defecation and indiscriminate waste disposal along the beach cause diseases.	**SA**	**A**	**I**	**D**	**SD**
7. Management of coastal natural resources is the sole responsibility of the government	**SA**	**A**	**I**	**D**	**SD**
8. Only unconcerned and uncommitted citizens dump garbage and defecate along the beaches.	**SA**	**A**	**I**	**D**	**SD**
9. People who pollute the beaches and the surrounding mangroves should pay to clean it.	**SA**	**A**	**I**	**D**	**SD**
10. Fishing with dynamite and nets with small mesh size is not good	**SA**	**A**	**I**	**D**	**SD**
11. The natural resources cannot get depleted	**SA**	**A**	**I**	**D**	**SD**
12. Plants and animals have as much right to exist as humans.	**SA**	**A**	**I**	**D**	**SD**
13. If the current degradation of natural resources continues we will soon experience a major ecological catastrophe.	**SA**	**A**	**I**	**D**	**SD**
14. Priority in resource allocation should be given to activities that create greatest economic returns even if it may harm the environment.	**SA**	**A**	**I**	**D**	**SD**
15. Humans were meant to rule over the rest of nature.	**SA**	**A**	**I**	**D**	**SD**

SECTION G ENVIRONMENTAL BEHAVIOUR QUESTIONS

Please indicate the extent to which you have participated in the following activities

	Behaviour			
Do you…	**Y**	**S**	**R**	**N**
Throw rubbish in gutters, bushes and on the beach?	**Y**	**S**	**R**	**N**
Defecate in on the beach and its surroundings?	**Y**	**S**	**R**	**N**
Encourage friends and family to keep their surroundings clean?	**Y**	**S**	**R**	**N**
Participate in tree planting and clean up exercises?	**Y**	**S**	**R**	**N**
Buy fish you know is caught with small nets or dynamite?	**Y**	**S**	**R**	**N**
Cut mangroves and other trees along the beaches for fuel wood?	**Y**	**S**	**R**	**N**

Y- yes; S, -sometimes; R- rarely; N- no.

SECTION H: RELATIVE IMPORTANCE OF NATURAL RESOURCES

This part will assesses your environmental values through the relative importance you place on different benefits obtained from coastal natural resources. It consists of pairs of environmental values. For each pair please choose one that is most important to you in terms of the benefits you obtain from coastal natural resources. Please choose only ONE as more important even if you feel they are almost equally important.

A	B
Cultural identity	Aesthetic
A	**B**
Economic/utilitarian	Sense of place
A	**B**
Aesthetic	Economic/utilitarian

SECTION I: ENVIRONMENTAL CONCERNS

This part consists of 15 pairs of environmental concerns in your area. For each pair please choose the environmental concern that in your view is most critical and which you do not want to see happening. Please choose only ONE concern even if you feel they are almost equally important.

A	**B**
Poor access to potable water	Loss of scenery
A	**B**
Sea erosion	Lack of potable water
A	**B**
Loss of scenery	Loss of fisheries