UNIVERSITY OF CAPE COAST

EFFECTS OF WETLAND MANAGEMENT ON SOCIAL, CULTURAL AND ECONOMIC DEVELOPMENT IN THE ASSIN NORTH MUNICIPALITY

JOSEPH DARKO

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BY

JOSEPH DARKO

THESIS SUBMITTED TO THE INSTITUTE FOR DEVELOPMENT STUDIES, FACULTY OF SOCIAL SCIENCES, UNIVERSITY OF CAPE COAST IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR AWARD OF MASTER OF PHILOSOPHY DEGREE IN DEVELOPMENT STUDIES.

JUNE, 2014

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere

Candidate's Name: ……..……

Signature…….. Date……

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal supervisor's Name:……..…….

Signature…….. Date……

Co-supervisor's Name ……..……

Signature…….. Date……

ABSTRACT

The study was a case study framed in a descriptive research design intended to examine the effects of wetland management on the social, economic and cultural development of five communities in the Assin North Municipality in the Central Region. Probability and non-probability sampling techniques, namely simple random, purposive and quota, were used. Interview schedule was used on the respondents in the communities, while questionnaire was used to collect data from the Municipal Assembly, Forestry Commission and Wildlife Department. The Statistical Product and Service Solutions (SPSS) (Version16.0) and Microsoft Word softwares were used to facilitate data analysis. The results were presented in tables and charts

The Abunu, Abusa, periodic rent and long lease systems were the main forms of land tenure. The land tenure practised in the area was not structured, but widespread, with a lot of destructive tendencies. This had adversely affected the services the wetlands provided the people.The effect was such that sources for income generation, recreation and entertainment and performance of cultural rituals had reduced drastically and, in some cases, had been wiped out. The communities continued to derive economic, social and cultural benefits from the remaining wetlands. The constraints, inhibiting the wise and efficient use of the wetlands had allowed room for indiscriminate use of the wetlands without any punishment to offenders.

It is recommended that the government, Municipal Assembly, Wildlife Department, Forestry Commission and the community should work together to ensure that the challenges, which threaten wetlands, are removed to ensure sustainable wetland services.

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The successful completion of this work was due to the relentless effort and encouragement of professional academic associates and friends to whom I am greatly indebted. These people played instrumental roles at different stages of the study. Professor C. K. Brown, my principal supervisor, deserves special mention.His immense understanding of the topic and passion for sustained environmental development for rural development spurred him to critique, motivate and provide relevant suggestions for the completion of the task. A heartfelt appreciation is also extended to Professor J. V.Mensah for the work he did on coastal wetlands from which the idea for this work originated. I am also thankful to him for his suggestions and remarks during the preparation of the work. I also want to thank all the research fellows at the Institute for Development Studies who helped shape my ideas during my course work.

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Finally, I thank all the hard-working research assistants for the wonderful service and sacrifices they made during the data collection stage. To everyone who contributed to the success of the work, I say thank you.

DEDICATION

To my daughter, Nana Adwoa Korantema, Nana, Dorcas Mondeh, the Darko and Adu families of Akropong and Cape Coast respectively.

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CPR	Common Property Resource
DANIDA	Danish International Development Agency
DPSIR	Drivers Pressure State Impact Response framework
EPA	Environmental Protection Authority
EPC	Environmental Protection council
ERA	Ecological Risk Assessment
GEF	Global Environmental Fund
GRCA	Ground River Conservation Authority
IK	Indigenous Knowledge
MA	Municipal Authority
MEA	Millennium Ecological Assessment
MES	Ministry of Environment and Science
MMDAs	Metropolitan Municipal and District Assemblies
MOLG	Ministry of Local Government
NRM	Natural Resource Management
OECD	Organisation for Economic Cooperation and Development
PRSP	Poverty Reduction Strategy Programme
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WRI	Water Research Institute

CHAPTER ONE

INTRODUCTION

Background to the study

Wetlands are areas of land where there is a large percentage of water, such as a swamp. They are found all over the world, from the cold Tundra lands of the north and the south to the hot steamy rainforest of the Equator. Many of them contain freshwater: some are blackish and others are truly marine. Some wetlands are permanent, like the Amazon Basin, the Caroni, and Oropouche water systems in Trinidad. Other wetlands are temporary, for example wetlands formed after the onset of rain as found in the interior of Africa and Australia (Coughanowr, 1998; Waterfowl Trust, 2008).

Approximately 6 percent of the earth's total surface is considered to be occupied by wetlands. Out of this, 35,161000ha are found in the Americas, 3,271000ha in Europe, 9697000ha in Asia, 5,477000ha in Africa and 9,361000ha in Australia (Dacosta, 2009). Some of the world's notable wetlands are found around river floodplains and delta of the Amazon, Niger, Nile, Gange-Brahmaputa and the Mekong rivers. Others are found in the immense inland swamp of Brazil, Congo, the Great Lakes region, Everglades, Mississippi, and Okavango in the Kalahari.

Wetlands hold enormous potentials for economic, cultural and social development, especially in the rural communities. Economically, the Niger Delta overlies the majority of Nigeria's oils, while Brazil's floodplains support about five million cattle and agriculture, crop and fish production all year round.

Socially, wetlands supply water, fuelwood, thatch and materials for building and food. Culturally, wetlands, all over the world, have shaped the belief, custom and tradition of many cultures by providing the medium and means for performing traditional rituals and rites. In spite of these benefits, wetland habitats are being lost rapidly more than any other habitats in the world (AWG-KP6, 2008). With the destruction of diversity, the fisheries base in most regions of the world is on the verge of collapse (Shiva, 1986).

Fourteen years after the world had ratified various conventions and treaties governing wetland conservation and protection, wetlands continue to be drained. Today, 6 percent of the wetlands in America, 27 percent in Asia and 2 percent in Africa have been drained for agriculture alone (Campbell, 2000). At the moment, over half of the world's wetlands have been lost. In some situations, the degradation is haphazard and in piece-meal fashion, while in other instances it is supported by short-sighted development policies.

To address this problem, the international community, in 1971, adopted a resolution in Ramsar, Iraq, to convert important wetlands as historical sites (Ramsar sites). This decision was based on the recognition of the tremendous support that wetlands have contributed to the evolution of cultures and civilization in almost all parts of the world, including the so called primitive cultures in the Amazon. Besides this, the United Nations has designated the 2nd of February every year as World Wetlands Day. The rationale is to drum home the importance of wetlands to social, cultural and economic development of societies and the need to preserve this fragile ecological resource.

Three of the most extensive wetlands are in West Africa. They are the Senegal, the Niger and the Lake Chad systems, covering a total area of 6,780,000ha (Dacosta, 2009). However, owing to the effects of drought, water projects and associated land use, more than 50 percent of the wetland area has been lost during the last four decades. Further losses are envisaged from the effects of climate change and numerous dam projects in the sub-region, which has already reduced the traditional wetland functions. Much damage has been done to agricultural production. As a result, rice growers, cattle farmers and fishermen have been impoverished (Oyebande, Mahe & Diop, 2002).

Wetlands in the West African sub-region are drying up, with serious implications for the rich biodiversity associated with these systems making their sustainability and use for the future generation highly questionable. The estimated losses are attributed to increased demand for wetland resources for construction, fish smoking and agriculture. These phenomena, coupled with severe drought particularly in the northern part of the sub-region, has led to vast wetlands being degraded (Yillia, Dogora & Donkor, 2003)

Wetlands constitute about 10 percent of the total land mass of Ghana, providing feeding, roosting, and nesting ground for thousands of migratory and resident birds (Anku, 2006). It also provides a major source of income, especially for poor communities. Some of the notable wetlands in Ghana are the Amansuri wetlands, Winneba wetlands, the Wetlands of Accra Metro, floodplains of the north east and west, Lake Bosomtwi and the Volta and Bui artificial ponds.

Ghana's wetlands have already been destroyed, while those listed as Ramsar sites continue to face onslaught from natural and human disturbances, such as fires, refuse disposal, human settlements, sand winning, garages, car washing bays and farming. Crops are cultivated, using the bush-fallow system in both coastal and inland wetlands (Wetland International, 2007).

Ghana's strategy to protect wetlands was heavily tilted in favour of industrial use, ignoring the contribution wetlands make to local livelihoods (Anderson, 2008). The numerous problems confronting institutions designated to protect wetlands, such as ineffective and incomprehensive water policies, inadequate staffing, inadequate finance, absence of modern technology and equipment and lack of clear roles and responsibilities, have led to excessive pollution levels, degradation and encroachment (Anderson, 2007).

Ghana's resolve to deal with this problem, after the 1972 Stockholm Conference on Human Environment, led to the establishment of the Environmental Protection Council (EPC) which, after amendment and redesign of its mandate, had its name changed to Environmental Protection Agency (EPA). This institution was charged with the responsibility of ensuring the adherence to the regulation which seeks to protect the environment. Apart from this, Ghana has established various commissions, departments, and agencies with the responsibility of protecting wetlands. In 2004, the Ministry of Fisheries was formed. The primary objective was to protect wildlife and water resources (rivers, streams and wetlands) to ensure that they first produce enough fish for domestic

consumption to cut down on fish imports and subsequently protect the resources from misuse and abuse (ISSER, 2006).

Like many developing nations, Ghana's environmental development and protection programmes have been undermined extensively and continuously by unfair international trade and terms of Economic Partnership Agreements (EPA) she signed with her development partners. Generally, the level of a country's economic development or economic policies determines, to a large extent, the level at which such a country could protect its environment (Kendie, 1995). This ties in with the poverty, resource depletion and environmental degradation nexus, which assumes that poverty continuously breeds the conditions that sustain and worsen environmental degradation.

The Assin North Municipality is drained by rivers such as Pra, Offin, Betinsin and Fum, creating a lot of flood plains. Swamps abound in the Municipality which serves as a potential for fish farming and dry season vegetable and rice farming. The size of the wetland in Assin North Municipality is not known (Agyeman, 1993). However, wetlands are found in individual lands which makes it difficult to control the way it is used (Agyeman, 1993).This is, especially when the resource constitutes the major land space on which the poor landowners depend for their livelihood (Mensah, 2002; World Bank, 2002).

Because of the contribution wetlands provide in the Assin North Municipality, communities have evolved their own practices which have helped in the management of wetlands over the years (Mensah, 2003). Some of these practices include taboos, myths and superstitious beliefs. However, Ghana's

environmental regulations have not been forthright with the role of traditional leadership in the management of natural resources through the use of traditional sanctions, customary laws, and taboo systems (Gadzirayi et al, 2006; Campbell & Cox, 1997).

The United Nations Agenda 21 calls for the judicious management of community resources, with the indigenes contributing to the decisions designed to govern community resources. Contemporary development thought also emphasizes the need to empower communities to identify their needs, set their goals and champion their own development agenda to alleviate poverty. Indeed, how the resources, especially water bodies and plants, are managed will, to a large extent, determine the status of the livelihoods and survival of communities in the future. This will affect the developmental process of developing countries in two ways. First, it will help initiatives at the grassroots level to fight poverty, and second, it will help free some money at the national level to initiate and maintain national infrastructural development.

Statement of the problem

Wetlands are often regarded as valueless lands that must be reclaimed because they breed mosquitoes and inhibit very dangerous reptiles. Despite Ghana's commitment to the Ramsar Convention of 1971, very little has been attained in protecting the wetlands. Most of the wetlands in the country are seriously threatened with high levels of contamination. The Fosu Lagoon in Cape Coast, Kole and Chemu Lagoons in Accra are contaminated to the extent that if

the fish in the lagoons are eaten it might cause heart complication (Daily Graphic, 2008, February 19th).

Wetlands provide important functions for the people living in the Assin Municipality, providing food, safe drinking water and job opportunities. The wetlands also serve as sponges regulating the hydraulic cycle and offering buffer against storms. Their ability to contain a variety of rare fish species provides nutritious supplements for the people.

Inspite of this, a large portion of the wetlands, which serve as grounds for fish trapping, turtle laying and birds watching sites, are being reclaimed for human settlements. Despite the innumerable services that the wetlands provide for the people, the reclamation phenomenon seems to be escalating as the years pass by. Such activities have impacted on fish and wildlife habitats, natural floodwater storage, and increased the erosion potential of surface water (EPA, 2001).

Despite the wetlands' ability to support vegetable farming, animal rearing, fish farming and many crop productions throughout the year, the UNDP (2005) classifies the central region as one of the poverty endemic areas in the country (UN Habitat, 2007). The question is: Could the misuse of this resource be a contributing factor for the plight of the people?

Wetlands in the Assin North Municipality are mostly found on privately owned property. This makes the management and protection very difficult, especially when such endangered resources are also the means of livelihood for owners who, in many instances, happen to be very poor families. Wetlands

management is hampered in Assin North because "It is difficult to go and tell poor people to change their economic way of life" (Mensah, 2002 p2). The traditional slash and burn farming methods, grazing by domestic animals, sand winning and other environmentally degrading activities have changed the vegetation, rendering portions of the land infertile and resulting in some rivers in the district drying up (Ministry of Local Government, 2006).

In the Municipality, only 8.2% of the households have internal toilet facilities. However, about 60% of these toilet facilities are the withdrawal type which often ends up in the wetlands (MOLG, 2006). Refuse disposal in the Municipality is generally surface dumping. Under this system, no specific sites are allotted for dumping, resulting in indiscriminate dumping in the wetlands considered as waste lands.

The indication is that the wetlands phenomenon in the Municipality is not only a loss of livelihood options for the local communities, but also a loss of biological diversity, such as flora and fauna, which is a potential threat to research and socio-economic development. If nothing is done to correct the anomaly, the situation could become a great setback to the social and economic development of the municipality. This is because the fish base is depleting rapidly and arable land for farming is rapidly being lost to sand winning and erosion.

The size of wetlands in the Assin North Municipality is not known. However, it is being converted into different uses. If wetlands and other water bodies, which constitute one of the major sources of safe and accessible water, are not managed well, there could be severe water problems in the Municipality in the

near future. Already, potable water supply in the district is inadequate and people often contract water-related diseases, such as typhoid and cholera. There is the need to ensure the provision of safe drinking water, if social and economic development is to be achieved in the Municipality.

Objectives of the study

The main objective of the study was to examine the effects of wetland management on the social, cultural and economic development of five communities in Assin North Municipality in the Central Region.

The specific objectives were to:

1. Explore land ownership patterns and management practices in the Assin North Municipality;
2. Examine how land ownership patterns and management practices have affected wetland management in the Assin North Municipality;
3. Determine the effects of human activities in the wetlands on social, economic and cultural development of the people in the communities;
4. Identify the benefits that the communities derive from the wetlands; and
5. Make recommendations for the effective management of wetlands in the municipality.

Research questions

1. What land ownership patterns and management practices prevail in the municipality?

2. How have land ownership patterns and practices affected wetland management?
3. How have the different human activities in the wetlands affected social, economic and cultural development in the Municipality?
4. What benefits do the people living in the wetlands derive from the wetlands?

Scope of the study

The study is primarily concerned with examining the effects of wetland management on the social, economic and cultural development of the people living in five communities in Assin North Municipality in the Central Region of Ghana. The research concentrated on describing the physiological changes that had occurred as a result of the activities of the people in the wetlands. It also emphasized the pattern of land ownership and the conceptual issue associated with such resource exploitation and management.

Although there are a lot of activities and factors that interplay with wetland status, those that were directly seen as associated with the phenomenon, such as farming, population growth, housing demands, the activity of sand winning, sanitation and disposal of refuse from both industrial and domestic sources, were given premium attention.

Significance of the study

This research is to contribute to the debate on the importance of wetlands in the social, cultural and economic development of the people living in communities near or in wetlands.

The research is intended to influence appropriate policy development and execution towards proper management of natural resources to avoid the mistakes of the past. The study's finding will help policy makers to develop appropriate programmes to avert the 2025 water crisis predicted by the UNDP (2005).

This study is to highlight the nature of wetlands, the challenges the wetlands are facing and measures to protect the wetlands from extinction. The research findings will also serve as a motivation to others who will want to conduct further investigation into some of the issues raised in the research report.

Limitations of the study

The major limitation to the research was finance. This hindered the ability to travel extensively in the municipality to observe how other wetlands were being used. Given the size of the population of the Municipality and the number of wetland communities in the area, the selection of five communities and a sample size of 280 was questionable. However, the training given to the five research assistants and their attention to details during data collection made the results credible, irrespective of the sample size.

Organization of the thesis

The thesis is organized in five chapters. Chapter One deals with the background to the study, statement of the problem, objectives of the study, research questions, the scope of the study, significance of the study, limitations of the study and organization of the thesis.

Chapter Two reviews the relevant literature on wetlands. It covers theories, frameworks, international contribution to wetland management, impact of government and traditional institutions on environmental management, contributions of traditional knowledge to wetland management, the effects of landholding on community development, importance of wetlands, impediments to effective wetland management, strategies for effective wetland management and Ghana's environmental policy. The chapter ends with the conceptual framework for the study.

The third chapter discusses the methodology used for the study. It covers the research design, study area, study population, sampling procedures, sources of data, instruments used for data collection, the fieldwork and data processing and analysis. The fourth chapter deals with the presentation and the discussion of the results of the study. The final chapter provides the summary, conclusions and recommendations.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

This chapter reviews the relevant literature on wetland management for social, cultural and economic development. It covers: theoretical issues; frameworks for wetland management; international contributions to wetland management; government, traditional institutions and wetland management; and the contribution of traditional knowledge to wetland management. The effects of landholding on community development, importance of wetlands, impediments to effective wetland management, strategies for effective wetland management, Ghana's land and water policy and sustainable development are also discussed. It concludes with a conceptual framework for effective wetland management.

Theories of wetland management

Many theories have been developed to explain why wetlands are disappearing. These theories include; Renewable and Non-renewable Resource Theory; Tragedy of the Commons Theory; Ecological Restoration Theory; Ecological Economy Theory; Collective Action Theory; Utilization Theory; and Open Access Theory. Four of these theories are reviewed. They are Tragedy of the Commons Theory, Renewable and Non-renewable Resource Theory, Ecological Restoration Theory, and Ecological Economy Theory.

Tragedy of the commons theory

The tragedy of the commons is a theory that explains the connection between collectively or communally owned properties and deterioration. Although the theory has been propounded long ago, the reasons that it assigns to resource degradation are relevant even today. Some of the proponents of this theory are: Hardin (1968); Ostrom, (1990); Varughese, (1998); Adhikari, (2001); and DeAlessi, (2004) .

Hardin (1968), a renowned ecologist in the late 1960s, coined the phrase "tragedy of the commons" to sum up the explanation that economists, at that time, ascribed to why public-managed natural resources, in particular, tend toward depletion. DeAlessi (2004) used the expression to describe a situation where resources get depleted because they are free for the taking (as is the case in open-access and common pool property resources)

In a situation where individuals capture the rewards (from natural resources whether wetlands or forests), but the cost is borne by the group, destruction becomes the destination of all natural resources. Though Hardin (1968) used the example of a pasture and ocean fishing in his theorizing, Varughese (1998) used it to describe the political distribution of environmental amenities, whether timber in the wilderness or hiking trails.

Hardin (1968) further states that, when extractability exceeds either natural or artificial replacement, the result is degradation. Ostrome (1990) argues that, when rules and regulations are discriminatory and breach the ideals of equity in distribution of common resources, such resources could suffer degradation. The problem of internalization of negative externalities could be dealt with through

the establishment of laws and private property ownership, to serve as an incentive to maintain their own property. This should encourage landowners to agree on performance indicators to recover endangered species and protect specific habitat type (Adhikari, 2001).

DeAlessi (2004) suggests that assets that are everyone's property are often left unprotected, leading to a free for all, first capture management. Overharvesting is commonly associated with common or open-access property, making common properties inherently unstable, vulnerable and constantly under pressure from inevitable free-riders, leading to their depletion. Therefore, "the tragedy of the commons" arises not because of the failure of common property. Rather, it is due to the institutional failure to control access to resources and enforce internal decision for collective use. The failure of common property is the result of the political and social characteristics of users and how they relate to the larger political system. This arrangement affects the ability of local groups to organize and regulate or manage communal or common pool resources (Ostrom, 1990).

Renewable and non-renewable resource theory

The renewable and non-renewable resource theory has been applied to wetlands. The theory incorporates economic theory of tradeoff in dealing with wetland development as a natural resource. The theory considers wetlands as a non-renewable resource, while wetland preservation seeks to preserve fisheries habitat. It suggests that economic development activities, such as drainage of

wetlands, may impose external losses on renewable resource production, such as commercial or recreational fisheries.

The theory points to the fact that wetland value and status at any time may be the result of the alternative land use under consideration or, in practice, at a particular area. It points out that, the conservation of wetlands for agricultural purpose is marginally profitable. However, such a practice remains the dominant threat to wetlands (Heimlich & Longoer, 1996).

According to the theory, the economic tradeoff of converting wetlands to agriculture, as opposed to conservation, alters wetland vegetation and hydrology, causing a decline in salinity levels. It also suggests that developed wetlands take a long time to regenerate (at least a millennium for peat bogs). Thus, developed wetlands become irreversible and, because of this phenomenon, wetlands may be categorized as a non-renewable resource. Other proponents of this theory, such as Robert, Hilderbran, Adam and April (2005), have indicated that wetland losses continue to exceed gains and even gains are not functionally equivalent to losses.

Finally, the theory posits that, in the face of current economic prospects, wetland development tradeoff will seem more plausible, especially in the face of population growth and scarcity of resources. However, it suggests that an antidote to this lies in either altering our consumption or relying on our ability to create, restore and enhance the ecosystem and its services.

Ecological restoration theory

This school of thought began in the early 20th Century with personalities like Clement (1916) and Gleason (1926) spearheading the crusade. The restoration theory does not endorse the ecological theory. However, it draws inspiration from it. The restorationists believe that wetland disturbance is interference in a progressive movement of a community towards its climax. Inspite of this, it does not encourage the practice of absolutely maintaining wetland in its pristine and static condition.

The restorationists' assumption, which emanated from reductionism, is divided into two: the Clementian and Gleasonian theories or what has now been recast as the Self-Design and Design theories. The Gleasonian or design tenets claim that succession or vegetation change is subjected to the responses of distinct species to the environment within the constraints of their life histories. It, therefore, sees disturbance as integral part of the design process. This is grounded in the assumption that species act more or less independently (Gleason, 1926).

On the other hand, the Clementian theory claims that wetland goes through various distinct stages towards reaching its climax, and the disturbance interrupts this process. Contrary to the design or Gleasonism theory, it believes that species act more or less independently. Rather, it upholds that species are linked within each stage of its development. As a result, any unnecessary interruption will cause retardation and degradation. The argument as to whether to allow developed wetland sites to regenerate on their own or to replant them has become the heart of the design versus the self-design controversy.

Opponents to the restorationists' ideals, such as Mistch (2004), claim that the thought of having the technology to restore wetlands has led to the rampant draining and disturbance of wetlands. The opponents suggest that the thought of controlling nature rather than working with it has led to high losses of wetlands worldwide (Mistch & Gosselink, 2000). They opine that it is impossible to restore on human timelines what nature has taken decades or centuries under natural conditions to construct. They argue that the reliance on technology to restore ecology is a failure to recognize the limitation that tacit assumptions can lead to failure because of the over-application of over-simplified concepts to complex systems (Hollings, 1995; Kusler, 2007)

The theory suggests that the widespread alteration of the natural system that is happening currently is an indication that conservation measures alone will not suffice to protect ecosystem function, service and habitat for a large number of species in the future. Therefore, simple maintenance, as opposed to enhancement of ecosystem, may often leave ecosystem and species vulnerable. Our actions, both intentionally and unwittingly, alter the goods and services of many ecosystems, on which we rely. By entering into such a relationship of altering the ecosystem, we incur responsibility to our neighbors and to the future generation. However, such responsibility is reneged and relegated to the background, making natural resources and the ecosystem vulnerable and constantly exposed to threats of extinction. This devastating threat will continue to be with us because of the expectation and confidence reposed in conservation in particular ecological restoration.

Ecological economy theory

The ecological economy theory emanated from conventional resource economics theory and suggests that relative scarcity of resources is the underlying cause of loss of so many wetlands (Turnner & Jones, 1990). The theory suggests that wetland conversion to other alternative activities results in the opportunity cost of forgone benefits that would otherwise have been derived from the conserved wetland. The theory claims that the over-reliance on rigorous econometrics, relating to cost-benefit analysis, economic efficiency criterion and economic development without recourse to equity, employment, zero-net wetland loss and biodiversity conservation concerns in itself, encourages natural resource degradation.

The theory suggests that the flat, fertile and relatively easy access characteristics of wetland put it under pressure for other use, such as agriculture, industry, and even urbanization. It posits that the imminent threat facing wetlands can be attributed to the failure of interrelated market and intervention, which is derived from the fundamental failure of information and lack of understanding of the multitude of value that may be associated with wetlands. As a result, wetlands have frequently been lost to activities, resulting in only limited benefits or, on occasions, even lost to society.

The ecological economy theory argues that wetlands must be managed judiciously to ensure that current activities do not impose an access cost and loss of option burden on future generations. Wetlands must, therefore, be conserved as an integrated ecosystem rather than developing segments of the components.

Although the theory has adopted some aspects of conventional economic assumptions, it, however, suggests that conventional economics has the capacity to deal with systems dominated by market processes directed towards economic welfare change. It, however, lacks the tools to address locally stable rules and norms, effects of non-market forces, such as state-government systems common property and open access feature.

Frameworks for wetland management

Different frameworks have been used to explain how human activities have caused wetland depletion. These frameworks include: Millennium ecological assessment framework, Natural resource management framework, Ecological risk assessment framework, The Drivers, Pressure, State, Impact and Response (DPSIR) framework, and Environmental evaluation framework. Four of these frameworks are reviewed. They are: The Drivers, Pressure, State, Impact and Response (DPSIR) framework; Natural resource management framework; Ecological risk assessment framework; and Millennium ecological assessment framework.

DPSIR framework

The Drivers, Pressure, State, Impact and Response (DPSIR) framework is a five-tier format arranged from the top to the bottom in a linear fashion that takes into consideration various environmental, economic and social factors and on a balanced scale. The framework was first developed and used by the Organization

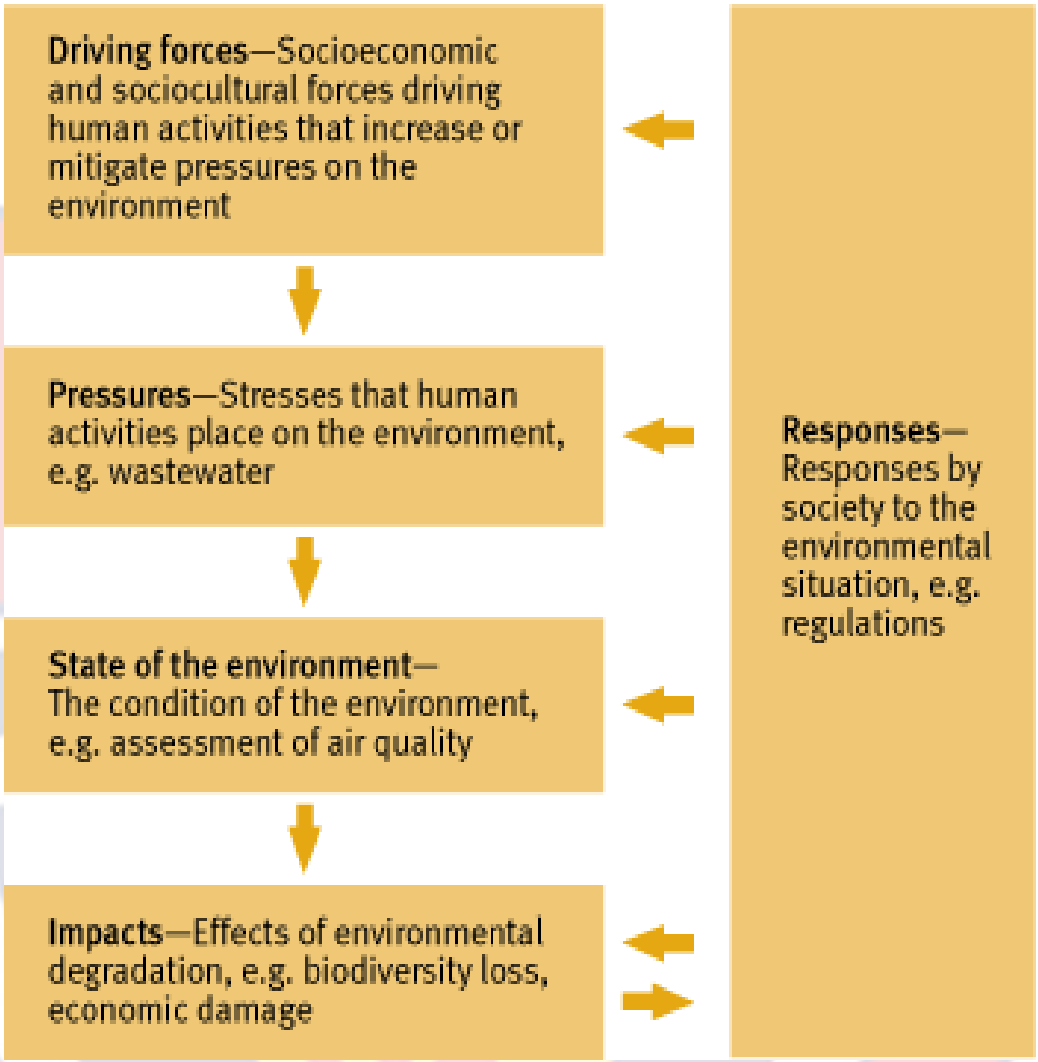

Figure 1 : Driver pressure state impact and response framework

Source: UNDP, 2005

for Economic Cooperation and Development (OECD). It was later adopted by the World Health Organization to analyse the effects of the environment on human health. The framework is versatile and can easily be applied to the study of mining, forest resources, wetlands and water resources. The framework suggests that interaction occurs at different levels. However, the effects of these interactions are felt at each level and extended to other tiers.

The first tier of the framework (driving force) points out that trade and fiscal policies may directly impact on the environment by impacting on income levels and distribution, and agricultural policies may impact on land and water resources. It also states that economic development, population increase and technological change play an important role in maintaining a healthy environment and promoting well-being. It suggests that, as the population grows, the desire for government to increase production increases. These variables together create intense pressure on the environment.

The second tier of the framework reveals the pressure that can occur from resource extraction, processing of materials and production, distribution and consumption and the release of waste products as a result of increased population. It shows that, depending on the kind of technology and environmental policy that is available, the state of the environment could be seriously affected.

The third tier states that the environment may change through inappropriate waste disposal, poor environmental policies and practices, leading to complex and widespread environmental effects, such as desertification and climate change. While some may be more localized, such as pollution and contamination of local water supply, others could cause the frequency or magnitude of natural hazards, such as flood and soil erosion, to increase. When these problems are not addressed appropriately it can impact the income of people and create a cycle of continuous environmental degradation.

The fourth tier of the framework points to the fact that the previous three tiers have the propensity to create a variety of environmental effects. These

effects could range from pollution of water resources, soil degradation, soil erosion to desertification. This worsens the plight of people, resulting in the diversion of attention of such people to forest reserves and wetlands to get their resource needs met. This has led to the loss of many wetlands and forest reserves all over the world.

The fifth and last tier of the framework (response or action) suggests an integrated approach to solving the environmental problems that are arising as a result of the four previously described dimensions of human activities that led to environmental degradation. The framework acknowledges that, reducing all environmental exposures to zero is impossible. However, any preventive measures must target the short, medium and long term. It warns that, whatever measures that are adopted to address the environmental problems must not be restrictive. The measures should also be revised periodically in accordance with new scientific knowledge to ensure the introduction of more stringent standards.

The DPSIR further points out the various actions which could be implemented to address issues to include policy development, standards setting, technical control measures and environmental education. The DPSIR framework has been criticized as being linear and uni-directional. Inspite of this, the feedback loop in a circular fashion has proven useful.

Natural resource management framework

The natural resource management (NRM) framework provides direction for the development of wetlands. The framework offers an integrated option for

natural resource management. The goal of the framework is to prevent, stabilize, and reverse trends in salinity and improve wetlands and water quality. It suggests that there should always be a continuing reference point against which the appropriateness and effectiveness of natural resource policies, strategies and progress must be judged. The NRM stresses that wetlands must be identified and prioritized based on value and service. Apart from these outcomes, objectives and goals must be set for them.

The framework, as presented in Figure 1, points out that there is a link between the components of the wetland ecosystem (land, water and biodiversity). Therefore, any programme directed at wetlands must take into consideration these components as a unit rather than having different sets of regulation for separate components. In the absence of this, nature will suffer a great deal of environmental threats. The NRM framework indicates that, because of the inconsistencies that exist in policy and practice, assets and their service are threatened and these are worsened by changing environmental, social and economic condition.

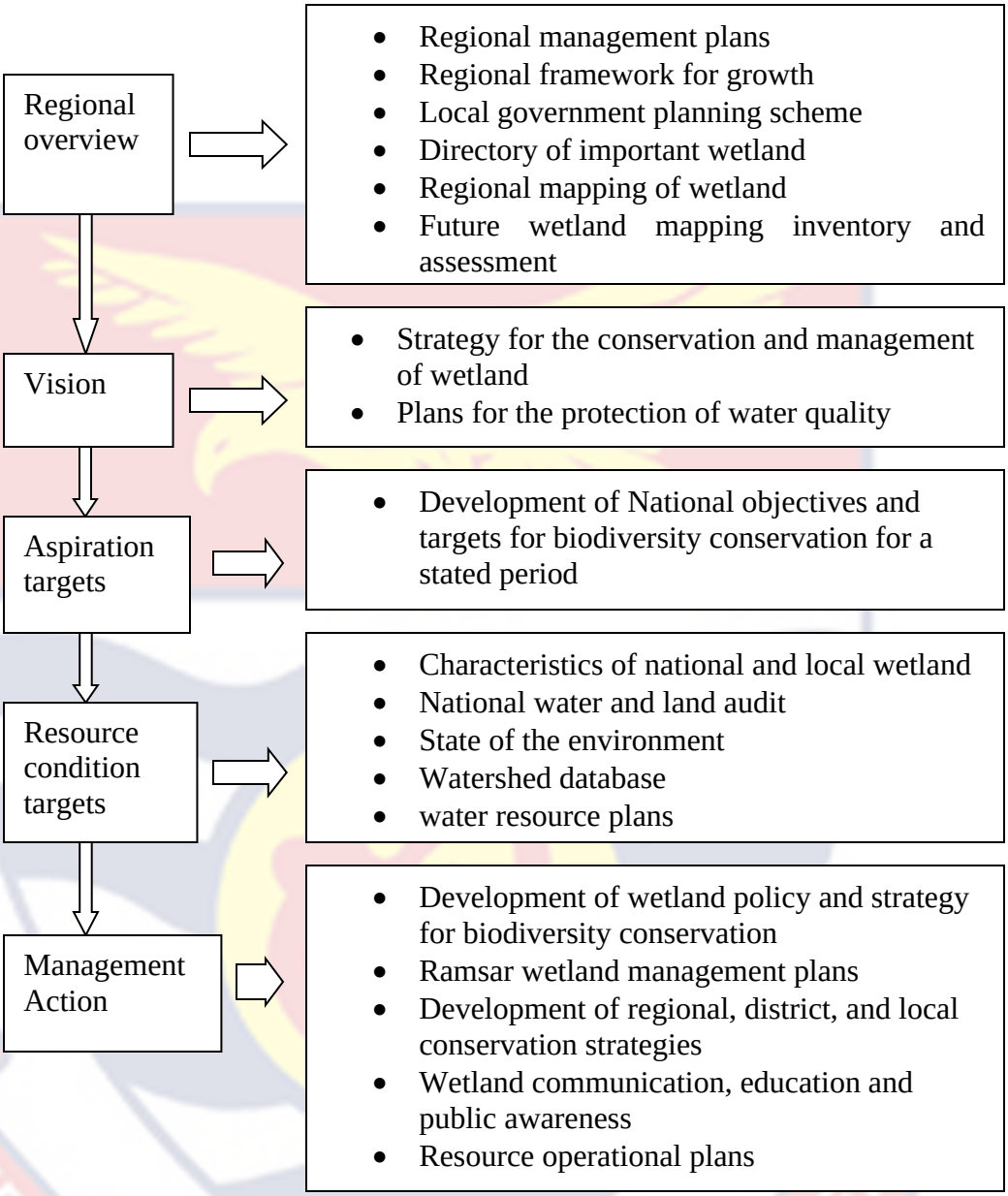

Figure 2: Natural resource management framework

Source: Australia EPA, (2004)

The framework points out that there is the need for a thorough decentralization of decision-making on natural resources to ensure that local area needs are efficiently addressed.

It stresses that decisions must be formulated at regional levels and discussed to ensure linkages and contribution of views from all levels of power. It

recommends that resource management policies must be harmonized at regional, national, provincial and local levels. The NRM framework suggests that wetlands will be better managed under a clearly established participatory management regime. A policy and legislative framework that legitimizes the involvement of local people in resource management is required. The participatory management regime will succeed, if issues of tenure, resource access, resource ownership and co-management are thoroughly addressed. Again, rules governing rights and access should be left in the hands of the local indigenes or those who are directly affected by the resources, with government agencies providing technical support. This is because government agencies are often slow to embrace participatory wetland management, and their support for co-management may be only lip-service.

The NRM framework dictates that there should be inter-community conservation committee to ensure effective management of up and down stream and enhance the participation of neighbouring communities. This is to ensure exchange of viewpoints, decision making and coordination of development work of the various committees. Communication flow within the framework intends to build a climate of trust between the people and the authorities to bring infractions on wetlands to zero.

Ecological risk assessment framework

The ecological risk assessment (ERA) framework stresses that adverse ecological effects may occur or are occurring as a result of exposure to one or

more stressors. It points to the fact that stressors have inherent ability to cause one or more adverse effects concurrently to ecological components (organism, population, communities or ecosystems). The ecological assessment framework identifies environmental problems, establishes priorities and provides a scientific basis for regulatory action.

The ERA is based on two elements: characterization of exposure, and characterization of ecological effects. Despite the fact that these two elements are prominent during the analysis phase, aspects of both exposure and effects are also considered during the problem formulation.

The first phase of the framework is problem formulation, which includes a preliminary characterization of exposure and effects, as well as examination of scientific data and data needs, policy and regulatory issues, and site-specific factors to define the feasibility, scope, and objectives for the ecological risk assessment. This systematic planning phase is proposed because there may be many ways a stressor can elicit adverse effects.

The second phase of the framework is termed analysis and consists of two activities: characterization of exposure; and characterization of ecological effects. The purpose of characterization of exposure is to predict or measure the spatial and temporal distribution of a stressor and its concurrence or contact with the ecological components of concern, while the purpose of characterization of ecological effects is to identify and quantify the adverse effects elicited by a stressor and evaluate cause-and-effect relationships (Warne & Smith, 1995).

The third phase of the framework is risk characterization. At this stage, the analyses of the results of the exposure and ecological effects are used to evaluate the likelihood of adverse ecological effects associated with exposure to a stressor. It includes a summary of the assumptions used, the scientific uncertainties, and the strengths and weaknesses of the analyses. In addition, the ecological significance of the risks is discussed with consideration of the types and magnitudes of the effects, their spatial and temporal patterns, and the likelihood of recovery. The purpose is to provide a complete picture of the analysis and results.

The framework suggests that it is important for stressors to be categorized since it will direct the bearing for assessing. The risk categorization will help determine the type of stressors, either chemical or physical, which includes inorganic and organic substances, temperature, hydrological change habitat alteration or destruction respectively.

The ecological risk assessment framework combines regulatory need, public concerns as well as scientifically valid notions. The two-way dialogue that exists in between risk assessors and managers in the ERA is a very constructive means of achieving both societal and scientific goals. Both perspectives are appropriate for the judicious utilization of resources, effective management decisions and resolution of public concerns.

Millennium ecological assessment framework

The millennium ecological assessment (MEA) framework, lays a solid foundation for performing a critical analysis of the impact of the environment on

human well-being. Proponents of this approach, such as Finlayson and D'Cruz (2005), point out the flexibility of the framework in addressing the inadequate linkages that are mostly absent from traditional participatory methodologies. The MEA recognizes that the maintenance of wetlands is intertwined with the provision of ecosystem service and wellbeing of people, which is the central focus.

The framework suggests the dependency of all variables on each other, therefore, presenting a holistic analysis of environmental challenge. This implies that there should be an integrated program to address the individual components of the framework at multiple scales. The challenges that the framework presents require wetland managers, users, owners in collaboration with state and traditional institutions to collaborate to address the problems (Carbonel, Nathai-Gyan & Finlayson, 2001). Van Dam and Finlayson (2004) point out that the connection in the framework is to provide inventory, assessment and monitoring across common scales to avoid information being collected at one scale without being used to make a decision.

Lowry and Finlayson (2004) point out that the framework is based on the guidance presented by the Ramsar Secretariat in 2004 which encourages greater involvement of local people in the collection of information on wetlands. The framework has the strength to ascertain the likely effects of local, social, cultural and economic variables on wetland management and preservation. On the contrary, Rea and Storrs (1999) contend that, if new paradigms in government procedures are not adopted, then there is no assurance that these laudable

concepts will have any effect at the local level where immediate economic factors are likely to be considered.

International contribution to wetland management

Over the last 20 years, more pressure has been brought to bear on governments at the national level to ensure the protection of water bodies, biological diversity and ecological systems. The recent rise in atmospheric temperature, feared to be the result from lack of ecological balance, has promulgated international action through the adoption of international treaties to protect ecological function (UNDP, 2004)

The emphasis now has been to develop and produce best practices which will lead to the preservation of safe drinking water resources in all nations (Gadzirayi et al, 2006). The United Nations' Millennium Development Goal 7 considers the protection of the physical environment as a major priority for all nations. Nations are expected to adopt development plans that guaranteed ecological function and balance for the protection of endangered species and threatened natural resources, such as wetlands (UNDP, 2005).

There are various international, continental and sub-continental treaties that nations all over the world, including Ghana, have ratified. Some of these conventions include: the African Convention on the Conservation of Nature and Natural Resources signed in 1968 and the Bonn Convention in 1988 on protection of migratory species and their habitats. In the same year, the Ramsar Convention on Wetlands Protection and Conservation was also signed. These treaties should

have helped the countries involved to develop a more appropriate and comprehensive wetland policy to ensure the protection of such threatened resources. On the contrary, it has not been the case (Campbell & Cox, 1997).

Many years after countries all over the world had ratified various treaties to protect wetlands and endangered resources, 27 percent of Asia's wetlands, 6 percent of South America's and 2 percent of Africa's wetlands have been drained for intensive agriculture alone. "Wetlands are disappearing at a disturbing rate. They are under pressure from unprecedented 20th Century population growth, pollution, drainage, tourism; dams … overexploitation of wetlands species, products and unregulated national agricultural development" (Campbell, 2000, p3). These new disturbing developments have evolved irrespective of the huge funds and commitments organizations, such as Global Environmental Fund (GEF) and United Nations Environment Program (UNEP) have pumped into creating awareness and developing capacity.

In the rush by many governments to reduce poverty and increase food supply and achieve their poverty reduction strategies (PRS), they have consciously enacted laws backing projects and programmes that encourage wetlands draining. The argument which has been used to support this is that, in this time of erratic rainfall, wetlands cultivation can transform rural livelihoods, if people receive the requisite information, extensive service and technology. Some of these laudable programmes are executed without an appropriate supporting strategic management framework (Gadzirayi et al, 2006). In Uganda, for example, the government encourages the draining of swamps for agricultural purposes

without any regulatory provision regarding wetlands drainage. This is ironical considering the fact that Uganda ratified the Ramsar Treaty in 1988 (Apunyo, 2007). Many African countries, like Tanzania and Uganda currently do not have specific legal and policy framework regarding wetlands management and protection. However, wetlands-related issues have been partially addressed through a variety of laws, policies and strategies. Some of these issues are weakly and ambiguously captured in wildlife, fisheries, agriculture, forestry and mineral Acts of some specific countries (DANIDA, 2003).

Government, traditional institutions and wetland management

Government efforts at managing wetlands in some countries are remarkable, without which wetlands would have disappeared rather faster than they are now. Let it be pointed out that, though wetlands are disappearing, the rate of wetlands disappearance cannot be generalized for all nations, since different legislative and institutional structures exist for different countries. Through effective legislation, enforcement and the respect for good governance many advanced nations, such as USA and Britain, have been able to achieve net wetland loss over the last 20 years (New South Wales, Department of Land and Conservation, 2003)

The state is responsible for the most significant impact on wetland ecosystem, with mostly negative consequences for the natural resources and the local population (Hailer, 2002). The state's role in deciding who, how, and when access to resources is given by distributing licenses and permit to those who are

able to pay the highest price is a disincentive to wetland management, maintenance and conservation. This is because such practices run contrary to the traditional management practices situated in the communal system and, therefore, have resulted in wetland degradation. Apart from that, such practices also run counter to government policies on poverty reduction and create a problem of double standards.

Much of the wetlands belong to the central government. However, traditional institutions play a vital role in ensuring its protection and sustainable management (Apunyo, 2007). Inspite of the role traditional institutions play in managing wetland, the central government's interference has reduced their power substantially. The current central government arrangements for wetland management, which neglect local institutions, which are the missing link in the people and environmental management interface, must be frowned upon as a tragedy and a threat to human health and survival (Mazzucato & Niemeyer, 2002).

Though the indigenous people naturally own the wetlands, government arrangements have sidelined them from the processes of making and developing decisions which are intended to govern the wise use of the wetlands. This kind of property ownership arrangement creates a vacuum which opens resources to mismanagement, overexploitation and degradation. Developing countries are noted for possessing the potential to enact robust and comprehensive environmental laws. However, their laws have not yielded the expected outcomes of net loss of wetlands (Grand River Conservation Authority, 2003). It is

worrying to realize in developing countries that, though institutional and legal systems may be present, often they are poorly structured and implemented, poorly enforced, under-resourced and not accessible to those poor communities who suffer most from their ineffectiveness (Mehta & Ntsohma,2004; Philips, 2006; Van Dam et al, 2006).

Such property ownership regimes deprive the poor of resources, thereby forcing them to switch over to marginal resources which are then over-exploited in order to make a living. It is never the intention of the poor to deliberately resort to behaviors which are detrimental to the environment (Shvakumar, 2002). The predicament of the poor and the subsequent destructive practices they indulge in is rooted in the inability of the government institutions to protect the poor. Generally, state institutions have interfered with traditional resource management to the extent that, in certain instances as in Niger Inland Delta, traditional resource management was banned. In many instances, the state laws were not able to disband traditional systems completely. They also failed to propose an alternative and efficient natural resource management system. The result was an overlapping of the local, traditional systems and state rules which led to insecurity of property rights and the establishment of an open-access situation to natural resources (Beeler, 2006).

The innuendos that serve as locally arranged rules for use and access of community resources are so intricate, cumbersome and complex that no single governmental institution or policy arrangement could have the capacity to address these seasonal arrangements. In view of this, any attempt to switch control from

the traditional regime to a centralized institutional regime would demand careful planning and the application of different laws to deal separately with specific arrangements. The inability of the centralized institutions to address such issues has led to the destruction of the flood plains.

Besides the frequently mentioned logistical and staff constraints, which make local government institutions and agencies incapable of performing their mandate, they also lack the appropriate technology. National institutions, designated for environmental protection, lack the standardized methods and framework for describing their ecosystem and the competence to develop and employ comprehensive and consistent approaches to prepare land inventories, interpretations and mapping of wetlands and water units. The absence of an ecological land classification methodology will not provide a better understanding of the type and value of wetlands a community possesses (GRCA, 2003).

Contribution of traditional knowledge to wetland management

The effective use of indigenous knowledge (IK) in wetland management has serious implications for food security and safe drinking water for both communities living in wetlands and those inland. The weaknesses in IK could have immense consequence on wetlands conservation and the possible provision of future needs, such as food, water and materials. To avert this, there should be an avenue to incorporate new knowledge in IK to ensure that the system for protecting wetlands and natural resource is innovative and dynamic to guarantee continuity (Dixon, 2000).

Traditional or indigenous knowledge has contributed to the efficient management of wetlands. This has been possible through its acquisition, evolution and dissemination to facilitate sustainable wetlands use. However, the communities' inability to adapt to changing circumstances has raised suspicion and questions about the sustainability of traditional management practices in natural resource management (Chambers, 1983)

The sustainability of knowledge through time depends on the values that generated and influenced the existing knowledge and how such knowledge is preserved, enhanced, and perpetuated. If the knowledge that the people have is not based on something factual and relevant to the ideals that the people cherish, such knowledge will not thrive and will easily become susceptible to knowledge emanating from foreign influences (Dixon, 2005)

The question is not just a matter of what the knowledge of the population is, but how it was developed and on what information such capacity was developed. If such capacity were developed on a particular knowledge, then its adaptation and use will also be accompanied by its underpinnings. Different trends of result are, therefore, expected always, depending on the environment and existing circumstances (Dixon & Wood, 2001; Haller, 2002).

Progressive change in attitudes and generational gap contribute greatly to the degradation or effective management of resources. In the event whereby old systems for controlling behaviour are not changed or modified, but adapted to govern current social function, deterioration will occur. When such unmodified knowledge is used to govern natural resources, people find it difficult to associate

their understanding, values and aspirations with such rules and norms resulting in the possibility of degrading (Philips, 2006). If nothing is done to close the gap that could exist between time and knowledge, traditional knowledge will collapse or fizzle out.

The rate at which wetlands are being drained for agricultural and other purposes is an indication that the knowledge which protected wetlands has waned. It is virtually impossible to do away with traditional knowledge because it forms the basis of the health, social, economic, and cultural life of every society. Any action to dislodge these processes implies the disintegration of the system that governs the life of the people, especially when it is clear that wetlands hold tremendous potential for improving the social, cultural and economic life of the people (Kibwage, Onyango & Bakamwesiga, 2008)

Chambers (1983) postulates that indigenous knowledge is dynamic, evolving over time within a particular culture and, as a result, provides local communities the capacity to adapt to changing circumstances. Traditional resource management systems have the capacity to succeed, but they can only thrive if the process that supports the generation of such knowledge is strengthened and protected from capitalism or forces of the market. The moment the economic-driven aspect of life that thrives on individualism is allowed to infiltrate into the communal system founded on communality and collectivity, traditional rules governing natural resource conservation will disappear. Natural resource degradation has generally occurred because the traditional system lacks

the tenacity to cope with, adapt or accommodate current trends and pressures (Dixon, 2005).

Landholding arrangements and community development

The relationship between development, land ownership patterns and any kind of natural resources, and how these complex relationships are handled could lead to degradation. The reason is that excluding others from crucial resources, following changes in property right regimes, acts as a catalyst for increasing deprivations, vulnerability and ultimately natural resources degradation (Adhikari, 2001).

Land ownership by open-access and unregulated common property regimes do not provide the appropriate incentives for individuals to act in socially efficient ways. One property right school of thought suggests that, for the individuals to be made responsible, and provide an efficient way of internalizing the externalities that arise when access is unregulated, property should be transferred into private ownership. The expected results will be achieved when right of ownership and management is situated in a local level collective action (Ostrom et al, 2001).

The option of collective action property ownership management proposed by others will be long enduring and successful under conditions of well defined boundaries. Such boundaries should be fashioned to ensure congruence between appropriation and provision rules, effective monitoring, graduated sanctions, efficient conflict-resolution mechanisms and minimal recognition of rights to

organize. A new arrangement like this has the potential to offset privatization and correct the socio-economic differentiations which normally occur when private property-rights regimes are established (Ostrom, 1990).

Despite the proposition of alternative landholding and management strategies, sustainable environmental resource management is considered not dependent on any particular structures of ownership right regime and a congruent of that property regime's ecological and social context (Hanna and Munasinghe, 1995; Bromley, 1991). Property rights do not by themselves provide adequate and appropriate incentive and conditions for sustainable management, especially when appropriate cost-benefit sharing arrangement, together with empowerment, technical assistance and strengthened local organizational capacities for sustainable management and conservation efforts, are not considered (Adhikari, 2001). The success of any ownership right regime hinges on: congruence of ecosystem and governance boundaries; specification and representation of interest; matching of governance structure to ecosystem characteristics; containment of transactional loss and establishment of monitoring, enforcement and adoption process at the appropriate scale (Eggertsson, 1990; Ostrom, 1990; Bromley, 1991; Hanna, 1992; Hanna & Munasinghe, 1995).

There is no single land regulatory or ownership regime that could be considered as perfect since, in any situation, these regulations have been established to address specific needs of the people who have made these arrangements. What is important, therefore, is that these regulations should be flexible and amendable to the emerging trends and sophistication of societal

demands. The important thing is that clearer roles for government and the community should be stated in other to strengthen the cooperation between government and the communities who are the owners or co-owners of the resources (Kasanga, 1990).

Some studies on poverty and natural resource management have indicated that, since poor people depend more heavily on a limited natural resource base, they attach greater value to its conservation and, therefore, devise sustainable management strategies (Jodha, 1986). Although poor people's dependence on common property resources is crucial, the nature of existing land ownership regimes and distribution access to natural resources do not only affect the levels of poverty in any specific region, but it is also the cause of the problem (Adhikari, 2001).

Dasgupta and Maler (1995) suggest that the distribution of wealth and political power inherent in private property rights regimes have often been the source of poverty and dispute rather than just the redefinition of the property rights. Different institutional arrangements in Common Property Right (CPR) will have different implication on access, management and sustainability of natural resources (Smith, 2001; Terborgh, 2000; Brechin et al, 2002; DANIDA, 2003.). There is, therefore, the need to investigate the linkage between property ownership types, equity, access, distribution and existing strategies put forth by institutions for managing CPR under conditions of increasing inequality in the distribution of assets and opportunities.

Importance of wetlands to the community

Many reasons have been given why it is important for wetlands to be protected from arbitrary abuse and depletion. These reasons are often discussed under ecological, hydrological, social, cultural and economic dimensions. However, for the purposes of this review, the emphasis will be on the contributions that wetlands make to the social, cultural and economic development of communities.

Social importance of wetlands to the community

According to Kalawole (2007), the effective management of wetlands has been identified as important in safeguarding human health and welfare. Wetlands are nature's own way of filtering underground water for human consumption to facilitate quality life, free from water-related diseases. Wetlands help to maintain the base flow in rivers during the dry season to sustain sources of safe drinking water all year round. Apart from that, wetlands serve as habitats for rare species of fish and crustaceans providing food for the people (Knudsen, 2007). Also, wetlands serve as breeding grounds and nurseries for many marine, estuarine and fresh water species during part or all of their life cycle. Wetlands are, therefore, a source of nutritious protein supplements for the people to ensure that their nutritional dietary needs are met.

Many forestry products are harvested from wetlands, especially tropical wetlands. These products include: fuel wood, (often used to make charcoal), timber, thatching, reeds and medicines. In Uganda, papyrus stems are harvested

regularly for making sleeping mats. Wetlands provide socially essential goods and services to impoverished and wealthy communities which could not be duplicated or replaced in the current economic climate (Simouth, 2007; Coughanowr, 1998).

Communities in wetland areas depend on the wetlands for their housing needs. They collect twigs, sticks, clay and sand, date palm, and many other resources, including grass to meet their housing needs. The social functions of wetlands are very important to poor people. This is not to suggest that those in the developed countries do not benefit from wetlands, only that they derive their benefits in different ways. The rich in the developed countries tend to live in the wetlands for pleasure, whereas the poor in the developing countries tend to depend on the resource for their basic survival (Rawi, 2008).

Wetlands serve as grounds for scientific research and recreational activities, such as photography, bird watching, aesthetic beautiful scenes for hotels and beach resorts, eco-tourism and art. Some wetlands also serve as grounds for sports, such as boat racing and golf. Wetlands have the ability to support livelihood strategies, such as agriculture, fishing, pastoralism, and craft material for art (Dixon & Wood, 2001).

Wetlands provide for the maintenance of the health needs of rural communities. Apart from the obvious nutritional value that it provides to ensure that protein-related diseases are prevented, the variety of flora and fauna in the wetlands serves as a source of medicine for the communities (Apunyo, 2007). The leaves, roots, backs and stems of different plants, and certain insects are used to cure different kinds of diseases. About 80 percent of the world's population

still depends on indigenous knowledge to meet their medicinal needs. It is important that these people closely watch and know how the resource are conserved and changed (Nanyunja, 2006). The health of the people will suffer in the case where government overemphasizes economic development, fuelled by industrialization and extensive agriculture, without an accompanying appropriate comprehensive proactive social policy to meet the health needs of the poor living in such areas.

According to Chinnak (2005), people and their wetland are closely linked. Their social wellbeing depends on how efficient or effective wetlands are managed. The social importance of wetlands in the development of the people in these times, when United Nations Agenda 21 is encouraging community participation and recognition of locals as partners in development cannot be underestimated. In this context, promoting an enhanced community natural resources management, including wetlands preservation, conservation and development, could be a major consideration especially when social development of the people is being planned (Hossain, 2008).

Cultural importance of wetlands to the community

Wetlands play significant roles in the social and cultural life of the people living in wetland areas. The rural communities are limited to the wetlands for religious reasons and other related ritual purposes. Owing to the myth that surrounds wetland, many communities worship or consider the resource as a god (Mensah, 2003). It is interesting to note that cultures and customs have developed

in different places and have been sustained by the bounty of goods and services that wetlands ecosystems provide.

Evidence from archaeological excavation supports the central role wetlands have played in developing and shaping the beliefs, customs, and traditions of different cultures all over the world. The kind of food, rituals, rites, housing, festivals, artifacts and even medicine the people have for curing their diseases have a strong linkage to the wetlands. It is suggested that the way people who live close to wetlands behave is, to some extent influenced, by the wetlands (Caliskan et al, 2008).

Wetlands support many traditional ceremonial rituals all over the world, especially in the developing countries. These rituals serve as a bond to strengthen the meaning of existence, symbol of endurance for the people and honor to their ancestors. Wetland, first of all, serve as grounds for performing many of the cultural rituals, and, second, serve as the medium which provides the means for the performance of such rituals (Dahlberg, 2005). They provide either special species of flora or fish for performing such rituals. Great civilizations at different places around the world have developed and evolved around rivers. Caliskan et al (2008) suggests that the diverse cultures that have evolved in Egypt over the years have been supported by the flooding that the wetlands seasonally created around River Nile.

Wetlands play important roles by supporting the culture of the people who depend on the wetlands. Many wetland communities, like the Aborigines in Australia, perform ceremonies and rituals in the wetlands. In other places,

initiation rites are conducted in the wetlands. Studies have indicated that 30% of 603 Ramsar wetlands sites have archaeological, historical, cultural, religious, mythical, or artistic/creative significance (Schuyt & Brander, 2004).

The inter-dependence between people and the wetlands has evolved many cultures that have determined their beliefs and customs over the years (Bhandari, 2008). The potential of wetlands as cultural heritage to understanding the way of life of cultures in and around wetland areas culminated in UNESCO declaring many wetlands site all over the world as heritage site (Coughanowr, 1998; Schuyt & Brander, 2004). It is impossible to ignore culture as an important tool to be employed in the wise use and management of wetland resources and to promote development in the developing countries that are wallowing in squalor and poverty.

As wetlands continue to be degraded or lost, different cultures are also at risk of being lost. There is the tendency that festivals, rites, rituals, ceremonies, customs and certain ethnic traditional practices and beliefs will fade or face out. The worrying aspect of wetland loss is that many cultures associated with these most threatened resources all over the world might lose their identity. Some researchers believe that the identities of some people are being eroded. There are, as a matter of fact, many cultures which have been subsumed by the "national culture". Though they exist as tribes, their unique traditions, which are associated with them, have disappeared (Schuyt & Brander, 2004; Caliskan, et al, 2008; Dixon & Wood, 2001).

Durkheim (1969) has indicated that development comes through the evolution and innovation of culture. The constraints and the learning experiences, which are associated with the daily living of the people, lead to creativity, diversification and adaptations which ultimately lead to change and development in the lives of the people. Durkheim contends that when solutions are not found to the constraints which beset the smooth transitions of culture and knowledge which will result in development, it can lead to a situation called "anomie" or rootlessness.

Economic importance of wetlands to the community

Until recently wetlands were viewed as wastelands, useful only when drained or filled. Now the common wisdom has changed to the realization that wetlands have remarkable benefits for both humans and the natural world (NSW, 2006). Wetlands produce a number of valuable plants and animals which can be harvested to provide economic returns. Some of these are trees for lumber, pulp, fencing and firewood, wild rice, turtles, waterfowls, and fish. Wetlands provide majority of the people living in the local rural communities some form of employment. It must be realized that the economic benefits that wetlands yield do not accrue only to population living in its periphery, but also to communities living outside the wetland areas (Emerton, 1998; Mironga, 2008). However, the unsustainable use of wetlands' resources may result in loss of sustainable ways of life, loss of job opportunities, changes in social structures, traditions and eventual migration and displacement of people to large cities (World Bank, 2002).

There are many economically important species of fish and crustaceans, such as shrimps, which are harvested for sale either locally or for exports. Wetlands provide diverse economic activities, including agriculture, rearing of animals like sheep and cattle because of the foliage that it provides as pasture. It also supports crop cultivation throughout the year both during the wet and dry seasons.

Sustainable management of wetlands could directly contribute to poverty reduction and help nations to attain their Millennium Development Goals (MDGs) and Poverty Reduction Strategy Programs (PRSP). Kendie (1995) and Mensah (2003) point out that, though it is the poverty stricken populations whose lives are affected, they are the very people who often engineer such destruction. They believe that in a situation where poverty is prevalent but governments do nothing to address the issue, poor people's choices become dwindled and they tend to over exploit the limited resources that they have.

Economists and decision-makers have traditionally seen the economic value of wetlands in terms of the raw materials and physical products that they generate for human consumption (Emerton, 1998). However, the direct use benefits (physical products and raw materials), which are presented as the total economic benefit, represent only a small proportion of the total value of wetlands which can generate economic benefits (Schuyt & Brander 2004). Kusler (2007) has indicated that there are four dimensions from which the economic importance of wetlands could be assessed, evaluated or valued. These are: direct values; indirect values; optional values; and non-use values.

The direct values are those products which the wetlands produce as consumption goods. These include: fishing, firewood, building poles, thatch, water, wild food, medicine, agriculture, pasture, transport, and recreation. These are classified generally as physical products which are used directly for production, consumption and sale.

The indirect benefits are classified as those that are not physically used in direct production but facilitate the processes of production and provide the needed environment for economic activities to thrive. The indirect economic values of wetlands include: the ecological functioning which maintain and protect natural and human systems through services, such as maintenance of water quality flow and storage, flood control, storm protection, nutrient rotation and micro-climate stabilization and the production and consumption activities they support. These are most of the time underrated and not included in calculating the economic importance of wetlands.

The optional value is the premium placed on maintaining a pool of wetlands species and genetic resources for future possible use as leisure, commercial, industrial, agricultural, pharmaceutical, application and water-based development, some of which may not be known now.

The non-use value mostly refers to the intrinsic significance or value, such as cultural values, aesthetic values and heritage values. These benefits are obtained regardless of their current or future use possibilities, and they comprise cultural, aesthetic, heritage and other intangible but significant values.

It must be pointed out that the economic value of wetlands will be different, depending on the location, size, and position, relative to other water bodies, dominant plant species and other factors (White, 2006). This implies that the "true" value could best be estimated, depending on the functions, service and importance the wetlands provide or a community derives from it (Maryland, 2006). Depending on its composition, a wetland could have little value to a community living in it. In such a situation, the economic value is measured by valuing the wetlands usefulness to other communities around. This is on the backdrop that economic value is not assumed on holding capacity alone but on function, service and intrinsic value (Gawler, 2000).

It will, therefore, be inconceivable for the economic benefits of wetlands to be estimated based on biodiversity, regulation and socio-cultural importance alone (Schuyt & Brander, 2004; Bremen & Lu, 2006). This is because, despite the tremendous economic potential that wetlands possess for poverty alleviation, the economic value of most wetlands is not known and is, therefore, not included in decision-making. It will be erroneous then to have a common method for estimating the economic benefits of all wetlands. This is because the un-quantified social functions that such wetlands produce for its inhabitants cannot be compensated in any way, therefore making wetlands priceless (Gawler. 1998).

Impediments to effective wetland management

Wetlands are being drained in most countries mainly for agricultural purposes, such as grazing land for sheep, cattle, cereal cultivation and also as

land-fill sites, refuse dumps and garages. These activities in the wetlands have the potential of affecting the effective management of the wetlands to maintain its function within the ecosystem.

Urbanization and population growth inadvertently result in increased pressure on land for settlement and for subsistent and commercial agricultural purposes. This ultimately culminates in high exploitation and possible degradation, thereby resulting in encroachment into more natural resources, soil erosion, and sediments transportation which have the potential to threaten efficient wetland management (Philips, 2006). About 75 percent of wetland pollution comes from land-base human activities, such as dumping, urban and agricultural run-off, land-fill and sewage seepage. Only 22 percent comes from the rather heightened and much dreaded oil spills and direct ocean dumping, while 3% are due to other factors (Habitat International, 2008).

The United Nations (2007) predicts that majority of the world's population will be living in urban areas by 2015. This is a challenge for wetlands protection in all nations. It must, however, be pointed out that the effect of such growth will not be evenly distributed, neither will the effects impact all nations in the same way (Campbell & Clarkson, 2003). The possibility of a rapid destruction in the developing countries cannot be underestimated. This is because most of the countries do not have accurate data on their population and wetlands. Apart from this, they have very weak population and housing policies. These anomalies have already created a lot of settlements in wetlands and more of such

settlements are envisaged in the near possible future (Kaaya, 2008; Coughanowr, 1998; Wood et al, 2001).

It is important that a comprehensive inter-sectoral program, based on industry, population growth, and wetland degradation policy is adopted. Without this policy of linkages between sectors, the fight against global warming will be a mirage, even if all feuding parties on the cuts on global carbon emissions should agree to cut their levels and observe all the accords signed on global warming and gas emission (Gawler, 1998; Gawler, 2000). Climate change and population growth have had the greatest effect on wetlands by altering the hydrological function in wetlands systems, thereby affecting the socio-economic benefits for humans (Oquist & Sevenson, 1996).

Strategies for effective wetland management

Wetlands could be managed effectively for the benefit of the present and future generations. There is the need for governments to design and integrate or incorporate natural resource management and population-related issues into national development plans (EPA Australia, 2004). There are many ways of designing and implementing these wetland management policies to arrive at the desired results. Some of the identified paths for sustainable wetland management and conservation include: education and awareness creation: providing economic incentives: and regulation of activities and land use to ensure on-ground action to conserve and manage wetlands (Ravnborg, 2000). These strategies will not achieve the desired goal unless the identified strategies reflect regional issues and

address key threatening issues bordering land ownership and wetlands management.

Curbing wetland depletion or degradation requires sound information about the location and value of wetlands in the region, district or locality to formulate policies. Information will be needed to develop plans, policies and legislation that will provide national, state (Metropolitan, Municipal and District Assembly) direction (Domfeh, 1997b, Atipoe, 1996). These must be done by identifying and taking account of national and state planning policy frameworks to enhance conservation and management, including restoration of the wetlands.

The two suggestions are not independent of each other, since it is incomprehensible to think of having a single approach to wetlands management for many obvious reasons. This is due to the diversity of wetland functions, species and complex traditional regulations that encompass wetlands. It must be emphasized that, there is the need to incorporate the best traditional or indigenous and modern/scientific knowledge to manage wetlands. This is with the view that none of the two approaches will be sufficient to address the wetlands problems (Campbell, 2000; Kaaya, 2008; Dixon & Wood, 2001).

Establishing and strengthening the participatory process involving the communities, indigenous people and others with vested interest in wetlands management will provide the opportunity for making significant headway or head-start. As Gawler (1998, p.6) puts it "Evidence to date indicates that local people involvement in wetlands management can contribute significantly to maintaining or restoring ecological integrity and community wellbeing". This

idea is supported by the Ramsar Resolution of 1999 which stipulates that whatever arrangement is adopted for community participation in community resource management must fulfill five basic principles, namely: empowerment; equity; sustainability; system orientation; and gender fairness.

- The process of empowerment must actively and actually transfer economic and political power from a few to the impoverished majority and operationalise community management and control;
- The process must ensure equity, implying that the community as a whole, rather than a few individuals, should benefit and at the same time create room for sustainability;
- Sustainability must be made to take care of inter-governmental equity, based on the carrying and assimilating capacity of the ecosystem;
- System orientation must be guaranteed to ensure that the communities function in the context of other communities and stakeholders, just as resources are ecologically linked to wider ecosystems; and
- Gender fairness should ensure that provision is made to involve women in the control and management of community resources to address their practical and strategic needs. In the absence of such relations, it is unlikely that not even the simplest co-management regimes can survive.

Matiza (1993) also states that there is the need to promote and integrate gender roles research into wetlands conservation and management. This calls for policy makers, planners and wetland managers to be trained to perform critical and detailed gender-role analysis, and then integrate them into national wetland

policies and wetland project and management. This must be done at the planning, monitoring, and evaluation stages (Gawler, 2000)

Finally, potential conflicts that normally arise between individual culture and gender role empowerment must be resolved effectively. The approach is to encourage traditional authorities to adopt an expanded outlook to modify gender roles to enhance empowerment (Beeler, 2006). This is because empowerment creates a feeling of ownership which produces responsibility for the adoption and implementation of wetland programs (Wood et al, 2001).

Ghana's land and water policy and sustainable development

After the 1972 Stockholm conference on human environment, many governmental agencies were established in Ghana to decentralize the authority for protecting the environment. They included: the Forestry Commission, Wildlife Commission and Fisheries Commission. Apart from these, international days have been set aside to be commemorated to intensify public campaign and increase awareness to the ecological threats we face now (Campbell, 2000).

Hen and Boon (2006) have identified nine particular sectors of the environment that various environmental laws of Ghana are focused on. These are: land use; forestry and wildlife; human settlements; water quality; coast and wetlands; industrial pollution; mining; hazardous waste; chemicals and environmental displacement. These laws are good for the health of the environment. However, the general framework of these laws have their weaknesses, such as weak linkages with the other sectors of the economy,

fragmentation, weak institutional capacity and lack of staffing (Hailer, 2002; GRCA, 2003; NSW, 2003; Mehta & Ntsohma, 2004; Apunyo, 2007).

The country's laws on prohibition of hunting, fishing, and the use of inappropriate fishing gear, chemicals, charcoal burning and bushfire have been promulgated. However, they lack the enforcement capacity. The inability of the state and its implementing agencies to enforce the laws have resulted in the loss of about 90% of the country's original 8.22million hectors of natural woodland. One main challenge is that the population laws and policies run parallel to the sewage and waste management laws. As a result, pressure from increasing population, such as production of huge volumes of waste, is overwhelming for Municipal, Metropolitan and District Assemblies. The municipals, metropolitan and District Assemblies also lack the capacity to manage the rate of urbanization. As a result, resources, like wetlands, will continuously be under pressure (Atipoe, 1996).

Poor sanitation, inefficient urban water treatment plant and shortfalls in the regulations for the collection of solid waste are widely regarded as principal cause of wetlands pollution. Currently, there are no comprehensive, overall wetland management policy in Ghana. However, a number of sectoral water policies exists which, when put together, can provide guidance for the development and management of wetlands and water resources (Ayibotele, 1994; Campbell, 2000; Amuzu, 1997). Although the country has ratified the Abidjan Convention of 1994 on marine and coastal environments, this convention is partially included in the nation's environmental policies (Boon, 1998).

Long before the establishment of EPC (now EPA), there was multiplicity of legal enactment existing in the country which granted power to official bodies to exercise executive right with regard to environmental care and protection. These laws were scattered among the official bodies such that none of them could exercise exclusive right of control of significant portions of the environment (Domfeh, 1997b).

Ghana's wetland policy or strategy is symptomatic of the growing international recognition of both the importance and the vulnerability of wetlands (Campbell, 2000). For Ghana, though taking action on wetlands was more than following an international trend toward recognition of the emerging ecological problems, it was more of a response to a specific international obligation (Campbell, 2000).

Since independence in 1957, it was not until 1993 that Ghana developed its first Environmental Action Plan (EAP). The goal of the National Environmental Action Plan (NEAP) was to reconcile economic development and natural resources management to support the country's economic, social and cultural development. The main elements of the policy include: legislation; preparing and adapting sectional plans; preparing and adopting standards and regulations; institutional strengthening of EPA, the National Development Planning Commission (NDPC), District, Municipal and Metropolitan Assemblies, community groups, NGOs, selected agencies, and national structures for integrated land use planning (Hen & Boon, 2006).

The NEAP failed to recognize the intense pressure of urbanization and lumped all resource regulations together, without designating specific or special laws to govern wetlands, especially those found in municipal and metropolitan areas (EPA, 1996). The specific objectives of the NEAP were:

- Maintaining the ecosystem and ecological process essential for the functioning of the atmosphere;
- Ensuring sound management of the natural resources and the environment;
- Adequately protecting humans, animals and plants, their biological community and (their) habitats against harmful impacts; and destructive practices and preserve biodiversity:
- Guiding development in accordance with quality requirements to prevent, reduce, and, as far as possible, eliminate pollution and nuisance;
- Integrating environmental consideration in sectoral structures and socio-economic planning at the national, regional, district and grassroots level; and
- Seeking common solutions to environmental problems in West Africa.

This looks promising on the outside. But internally, there seem to be some generalizations which could erode the responsibility to act in desired ways leading to mediocrity in standards and ultimate loss of resources. There were no specific targets to be achieved on pollution, although international bodies had called for specific cuts especially on industrial pollution. The policy only indicated that "as far as possible", the nation will reduce pollution. The question is how far? All these laws are there, but we still have bad practices being

perpetrated in Ghanaian wetlands and waters by both locals and international culprits (Hen & Boon, 2006; Domfeh, 1997b).

In Ghana, the Ministry of Environment and Science (MES) is in charge of the environment. The Metropolitan, Municipal District and the Assemblies (MMDAs), the Ministry of Food and Agriculture, and the Forestry Department also have some environmental functions to perform. The National Energy Board, the Ministry of Works and Housing, the Department of Parks and Gardens, the Architecture and Engineering Services Corporation and some research institutes, such as the Water Research Institute (WRI), have been mandated with certain environmental responsibilities. All these bodies have statutorily been given some sort of obligation to protect the environment. However, it is only the Environmental Protection Agency (EPA) which has been given the statutory, regulatory and enforcement functions under Act 490. Clearly, any effective implementation of the policy and programs requires a good degree of co-ordination amongst these institutions.

Ghana's environmental policy reveals a top-down approach. The roles of the local communities are not elaborate enough, not even at the municipal level. Although Act 429 mandates the Assemblies to take charge of the environment, there are other institutions performing the same or similar functions at the national and local levels. Most of these intuitions do their work without consulting the MMDAs. Act 490, which empowers the EPA, recognizes District Assemblies as the organ through which national policies and programs on the environment will be translated into action at the local and district levels. The Act places the

responsibility of awareness creation at the grassroots level in order to ensure improved quality of life for the broad masses in the MMDAs (Hen & Boon, 2004; EPA, 1996). The reality is that most of these institutions, charged with environmental protection and management responsibility, bypass the MMDAs to plan and implement their own programmes.

Conceptual framework for effective wetland management

The Millennium Ecological Assessment (MEA) Framework has been adopted as the conceptual framework for the study. As indicated in Figure 2, the framework has four components: indirect drivers; direct drivers; ecosystem services; and human wellbeing and poverty reduction.

The first component of the MEA framework identifies the indirect drivers, such as population growth, harsh economic policies mostly initiated by the international organizations, unfair trade, trade liberalization and economic specialization (the world economic order) as factors which determine the status of natural resources and how they are managed. The assumption of the MEA framework is that the general economic policy framework forces people and government to act or implement policies which are detrimental to the environment

The second component, the direct drivers of change, shows that the lack of employment opportunities resulting from the indirect drivers and the desire for people to meet their daily needs put pressure on them to find alternative ways for survival. Such people would do anything to survive. The pressure exerted, coupled with climate change, then creates an unfavorable trend in local land use

and land cover. This results in excessive injection of fertilizer and pesticides, and extensive application of inappropriate and inefficient technology, which lead to excessive contamination of water bodies.

The third component, ecosystem services, of the MEA framework suggests that, when the land use patterns and land cover have changed, the ecosystem's natural ability to provide food and fuel for the population to consume also changes, leading to insecure social life styles. Changes in land use and land cover affect climatic conditions (drought, reduced rainfall) water and disease regulation. This means that more effort, energy and space would have to be used in order to satisfy some needs. When this happens resource cover, quality and quantity are also affected tremendously. These reduce the importance of cultural function through the reduction in spiritual and aesthetic significances of the wetlands.

The fourth component of the framework centers on human well-being and poverty reduction. This component shows that the connections that exist in the first three components of the MEA framework cumulatively affect the livelihoods support system, and human well-being. It argues that, ultimately, the ability to fight poverty and improve well-being is affected immensely, in the sense that the pressures and the change, that have occurred, affect the ability to provide resources to support minimum standards of living, and reduce the possibility of attaining the quality of life, such as improved health and economic security. Freedom of choice, good social relations, perpetuation of heritage, and environmental protection are compromised.

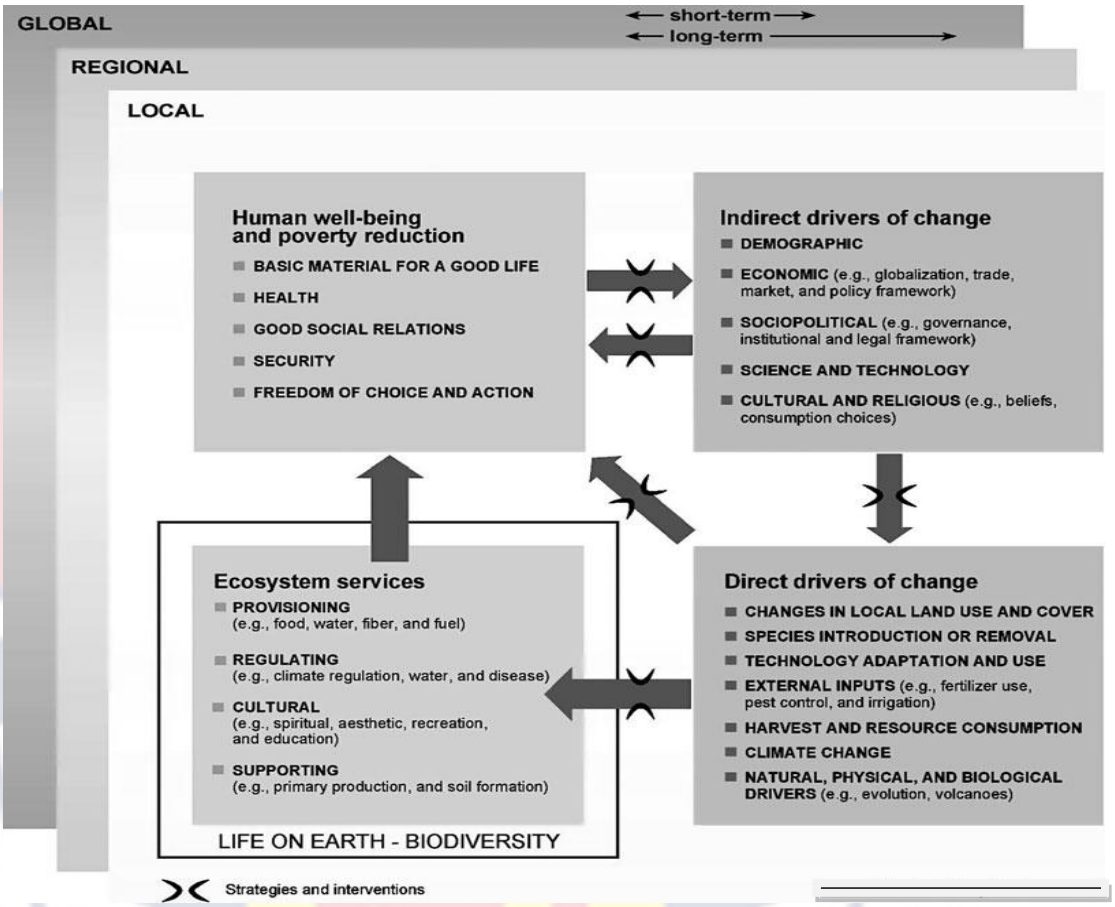

Figure 3: The millennium ecological assessment framework

Source: World Resource Institute, 1992

The lack of political will, over-centralized planning, and historical land tenure legacies (primary); lack of technology, population increase, weak institutional and legal framework (indirect); human and natural induced land use and cover, unsustainable harvest and consumption of resources, and climate change (direct drivers) should be addressed at the same time. These require extensive collaboration with stakeholders across the social spectrum who themselves may not be aware of the value of wetlands and the reason for

maintaining or restoring them. Communication, education and public awareness, important components of the partnership, are required to ensure success. These are critical underlying factors to support restoration, wetlands monitoring, risk assessment, and other management interventions.

The MEA framework recognizes that the maintenance of wetlands is intertwined with the provision of ecosystem services that support the wellbeing of people. Therefore, intervention programmes, developed to address any of the four components or individual issues, require more integration at multiple scales. Weakness in the composition of state environmental institutions, the disrespect for good governance and the rule of law, coupled with the inconsistencies in poorly drafted environmental laws, provide opportunity for rapid abuse and degradation of natural resources.

Finally, a conceptual shift in attitudes is required to guarantee that the wider implications for human wellbeing are considered alongside the traditionally considered ecological components of any specific wetlands or complex of wetlands. This involves incorporating the local communities in such programmes (Finlayson, 2005)

CHAPTER THREE

METHODOLOGY

Introduction

This chapter presents the methodology used in the study. It covers: the research design, study area, study population, sampling procedures, data sources, instrumentation, fieldwork and data processing and analysis.

Research design

The study used the descriptive, evaluative and case study research designs, with Assin North Municipality in the Central Region as a case study. Through observation, interviews and recording of stories, the descriptive design is capable of unveiling the underlying causes and relationships of a phenomenon and how it has influenced the lives of the people (Jagerskog, 2003). The research design was, therefore, selected to allow inquiry about the understanding and perception of events and status of wetlands in the study area.

The descriptive design has been critiqued for its inability to accurately make predictions on its own, its inability to allow for rigorous statistical manipulations and analysis and the likelihood of allowing the researcher's biases to infiltrate into the final findings due to its subjectivity. However, it is an appropriate research technique when combined with some quantitative techniques. The descriptive design is significant, especially when analyzing issues of contemporary nature, such as that of wetlands and water resources qualitatively (Mohammed, 2004).

The evaluative research design allows for more rigorous statistical analysis and it is creative in communicating descriptive data visually. The design was used in this study to track the attitudes, values, perceptions and behavior of the respondents and the changes that have occurred over time, and present them graphically. The design was selected to encourage the collection of data which were amendable to statistical tests to deal with the weakness inherent in the descriptive design.

The case study allows for the in-depth analysis of issues. Although it has been criticized for its inability to determine the extent to which a researcher can produce a definitive account of a case, through observation, interviewing and informal conversations, it can present a rich description of a phenomenon. Its illuminating, inductive and descriptive abilities help to enhance readers' understanding of issues (Parllet & Hamilton, 1972).

Study area

The study was conducted in the Assin North Municipality, one of the 13 districts and municipalities in the Central Region of Ghana. The Assin North Municipality lies within longitudes 1º 05' east and 1º 25' west and latitudes 6º 05' north and 6º 40' south. It shares common boundaries with five districts in the Central Region and part of the Ashanti Region: Twifo-Hemang-Lower Denkyira to the west; Assin South District to the south; Asikuma-Odobeng-Brakwa and Ajumako-Enyan-Esiam districts to the east; and Upper Denkyira East

Municipality to the north-west; while Ashanti Region borders on the north (Ministry of Local Government, 2006) (figure 3).

The Assin North Municipality is characterized by undulating topography and has an average height of about 200m above sea level. Flood-prone plains of rivers and streams lay below sea level. The Municipality is drained by numerous small rivers and streams. The main rivers include the Pra, Offin, Betinsin and Fum. Swamps also abound in the district which serves as potential for fish farming and dry season vegetable and rice farming (MOLG, 2006).

The Municipality falls within the moist semi-deciduous tropical forest, which has a bi-modal rainfall pattern (two rain seasons: the major and the minor rain seasons. The major rainfall season falls within April and July, while the minor rain season falls between September and November). The amount of rainfall received annually in the area ranges between 1200mm and 1500mm. The area is normally warm; maximum temperatures could reach 30ºC in March and April and 20ºC in August, with relative humidity ranging from 60% to 70% (Ministry of Local Government, 2006).

There is a high incidence of bush fires in the Municipality, especially during the dry season when farmers start clearing new farmlands. According to the Department of Fire Service (2007) in Assin Fosu, the main cause of bush fires are group hunting, indiscriminate burning of farmlands without creating fire belts by farmers, failure to seek fire volunteers' assistance during burning, and careless handling of fagots by palm-wine tapers. The area used to be a thick forest area.

However, the vegetation has been altered to a secondary forest, patches of grassland and shrubs mainly due to the adverse effects of bush fires. To some extent, this has rendered a greater proportion of the land infertile and also caused the dryness of some of the smaller rivers and streams that drain the Municipality.

The housing environment in the Municipality is characterized by poor drains, heaps of refuse dumps, unkempt surroundings, exposed foundations due to pronounced erosion, and cracked walls, especially in the villages. The only method of refuse disposal is the surface dumping. Under this system, no specific site has been allotted to any particular refuse labourer to manage. The Municipality, the Assin North Municipal Assembly is bedeviled with the problem of land acquisition for final disposal sites, and this has created a lot of health hazards, such as cholera and other sanitation-related diseases in the Municipality. This, however, has negative effects on the health of the people, and needs urgent attention ((Ministry of Local Government, 2006).

The Assin North Municipality is rapidly becoming urbanized. Most settlements, which were considered rural during the 1984 Population Census, have now assumed urban status. These towns lack social amenities to make them function as urban centres. The population increase in the Municipality has brought immense pressure on the limited available amenities in the various communities.

The Ghana Statistical Service (2001a) puts the population of Assin North Municipality at 116,349 this was made up of 59,338 females (51%) and 57,011 males (49%). This figure shows an increase of 37.1 percent over the 1984 population of 73,184 and gives an inter-censual growth rate of 2.9 percent. The

rate is one of the lowest in the Central Region (Ghana Statistical Service, 2005). It is, however, higher than the national average of 2.7 percent. The Municipality has 7.3 percent share in the total regional population of 1,593,823.

Table 1 shows the population projection for Assin North Municipality from 2006 to 2010. The population density of 68 persons per square kilometer was estimated in 2006 to increase to 84, 86, 89 and 91 persons per square kilometre in 2007, 2008, 2009 and 2010 respectively (Ghana Statistical Service, 2001a).

Table 1: The projected population and population density for Assin North Municipality

Year	Projected population	Population density
2006	116,349	68
2007	142,124	84
2008	146,247	86
2009	150,487	89
2010	154,852	91

Source: Ghana Statistical Service, (2005)

Study population

The study population was made up of all the adult members aged between 21 and 50 years in wetland communities of the Assin North Municipality. The wetland communities as identified by the Ministry of Food and Agriculture Assin North are: Praso, Dansame, Akonfudi, Bereku, Akropong, Wurakese, Dompim,

Gangan, Obrawomiamu, Anto Abaasa, Anhwiaso, Bremang, Chirano and Kushea. Table 2 provides information on the adult population of the communities in the wetland areas of the Municipality.

Table 2: Adult population of wetland communities in Assin North Municipality (2011)

Town	Adult population
Assin Fosu	7,536
Assin Akonfudi	1,241
Assin Akropong	1,076
Anto Abaasa	83
Anhwiaso	90
Bereku	1,975
Bremang	132
Chirano	126
Dansame	845
Dompim	730
Gangan	264
Obrawomiamu	112
Praso	94
Wurakese	597
Total	14,901

Source: Ministry of Food and Agriculture, Assin Fosu, (2011)

Sampling procedures

Two main sampling techniques were used in the study. They were the probability and non-probability sampling techniques. The simple random sampling method was used for the probability technique, while the purposive and quota sampling techniques formed the non-probability techniques.

The purposive sampling technique was used to select five communities from the list of 14 wetland communities obtained from the Ministry of Food and Agriculture. The communities were: Assin Akropong, a rice farming community; Assin Bereku, one of the rapidly expanding communities; Assin Akonfudi, a maize farming community; Assin Wurakese, a maize farming community; and Assin Fosu, a commercial town. The purposive sampling technique was used to ensure that the selected communities had different activities and use for their wetlands. It was also used to ensure the reflection of the demographic composition of the communities of the Municipality in the study and reduce the cost involved in covering the entire municipality since the communities were widespread. The purposive sampling technique was also used to select three personnel from the Forestry Department, the Municipal Assembly and the Ministry of Food and Agriculture.

The quota sampling technique was used to select the number of households that were to be interviewed in each of the selected communities. The technique was used to allocate quotas to each of the study communities. This was calculated, based on the proportion of people each community contributes to the population of the study area. This was done to make sure that as much

information as possible was drawn from the communities. Proportional sampling was also used to take care of the proportion of males and females. The combined population of the five communities was 12, 425 and a representative sample of 280 respondents was selected for the study, using the table for selection of sample size designed by Krejcie and Morgan (1970).

The house numbering data of the Municipal Mutual Health Insurance Scheme was used as the sampling frame for the selection of the heads of households or responsible adult members of the household. The simple random sampling technique, specifically the lottery method, was then used to select the heads of households or respondents. This was done to ensure that all the households in the communities had an equal chance of being selected. The sampling distribution of the respondents is presented in Table 3

Table 3: Sampling distribution of the respondents by community

Towns	Frequency	Percentage
Assin Fosu	170	60.1
Akonfudi	28	10.1
Assin Akropong	24	8.4
Bereku	45	16.0
Wurakese	13	4.5
Ministry of Food and Agriculture	1	0.3
Department of Forestry	1	0.3
The Municipal assembly	1	0.3
Total	283	100.0

Source: Fieldwork, 2011

Sources of data

The data gathered for the research came from both primary and secondary sources. The secondary data sources were textbooks, journals, articles, and relevant legislation such as the Municipal Assembly's environmental bye-laws and Ghana's environmental policy documents. The primary data used in the research was collected from the respondents in the study area.

Data collection instruments

The main research tools used in collecting information from different categories of the respondents were the interview schedule and questionnaire. The interview schedule was used on the communities because some of them could not read and write. The interview schedule had seven sections addressing issues on: demographic characteristics; land ownership and practices; activities in the wetlands; benefits of the wetlands to the community; responsibility for the protection of the wetlands; existing wetland management and sustainability strategies; and strategies to improve or protect the wetlands.

The questionnaire was administered to the respondents from the Municipal Assembly, the Ministry of Food and Agriculture, and the Forestry Department, because of their tight schedule and their high literacy level. The questionnaires had six sections: land ownership and practices; activities in the wetlands; importance of the wetlands; responsibility for the protection of the wetlands; existing wetland management and protective strategies; and strategies to improve or protect the wetlands.

Fieldwork

With the assistance of 10 research assistants, the fieldwork lasted three days, from March 12 to March 14, 2011. Preliminary visits were paid to all the communities a week before the fieldwork. This was to come to terms with the change that might have occurred, especially in transportation fares and accommodation charges. The chiefs, Assemblymen and leaders of identified associations connected to the wetlands, such as the rice and sugarcane farmers, were met and the purpose of the fieldwork explained to them at different times in all the communities.

The researcher visited the five selected communities to find out the status of the wetlands. Opportunity was taken to talk to some farmers and the Assemblymen of the various communities on their observation and opinion on the wetlands in the communities. On 12th March, 2011, the whole research team worked in Assin Fosu because of the large sample size, while on the 13th and 14th, the team was divided to interview the respondents in Akonfudi, Bereku, Akropong and Wurakese respectively. During the fieldwork, some community members at Akropong thought the researcher was a journalist, especially when questions were asked about the current projects being undertaken in the wetlands. People were fatigued with questions, especially when the fieldwork came just after the national census. This notwithstanding, all the respondents who were contacted were willing to participate in the study. All the structured interview sent out were returned answered.

Data processing and analysis

All the data collected were edited to ensure completeness and accuracy. The interview schedule were coded and fed into the computer. The Statistical Product and Service Solutions (SPSS) (Version 16.0) and Microsoft Word softwares were used in analyzing the data. The results were presented in frequency tables, percentages and charts.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter discusses the results of the study. The analysis begins with the background characteristics of respondents, followed by land ownership and practices in the Assin North Municipality, activities in the wetlands, benefits of wetlands to the communities, responsibility for the protection of the wetlands, existing wetland management sustainability strategies, effects of existing wetland strategies on social, cultural and economic development, and suggestions to preserve the wetlands.

Background characteristics of respondents

This section discusses the sex, age, education and occupation of the respondents in the five communities. With regard to the sex distribution of the respondents in the five communities, the results in Table 4 show that men formed 66.4 percent, while women formed 33.6 percent. The majority (60%) of the women respondents were from Fosu the Municipal capital. The least were from Wurakese (5.3%) and Akonfudi (7.5%) the two rural communities. The research team observed that households headed by females in these two communities nominated their male child or member of the family to speak on their behalf. This was not very common in the other towns which were slightly urban. This explains why more men than women participated in this research in all the communities.

Table 4: Sex distribution of the respondents by community

Communities	Male		Female		Total	
	Freq	%	Freq	%	Freq	%
Assin Fosu	113	60.8	57	60.6	170	60.8
Assin Akonfudi	21	11.3	7	7.5	28	10.0
Assin Akropong	14	7.5	10	10.6	24	8.6
Assin Bereku	30	16.1	15	16.0	45	16.0
Assin Wurakese	8	4.3	5	5.3	13	4.6
Total	186	100.0	94	100.0	280	100.0

Source: Fieldwork, 2011

With regard to the age of the respondents, the results in Table 5 show that the ages of the respondents ranged between 20 and 50 years. The mean age of the respondents was 37.5 years. Fosu recorded the lowest mean age of 36.4 years. Akonfudi had the highest (40.8 years), followed by Wurakese (39.8 years), Bereku (38.9 years) and Akropong (37.8) years. The unattractive nature of agriculture in the villages, the hopelessness that the village conditions provided for the young people and the desire to seek greener pastures had driven the youth from the villages to Fosu to engage in all manner of work, resulting in the intense pressure on the inadequate amenities. The effects of the age distribution on the communities were evident in the status of the vegetative cover.

Table 5: Age distribution of respondents by community

Age-group	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
21 – 25	11	6.5	1	3.6	2	8.3	6	13.3	1	7.7	21	7.5
26 – 30	39	22.9	1	3.6	6	25.0	5	11.1	1	7.7	52	18.6
31 – 35	26	15.3	5	17.8	1	4.2	2	4.4	0	0	34	12.1
36 – 40	44	25.9	4	14.3	4	16.7	9	20.0	5	38.5	66	23.6
41 – 45	17	10.0	8	28.6	4	16.7	7	15.6	2	15.4	38	13.6
46 – 50	33	19.4	9	32.1	7	29.1	16	35.6	4	30.4	69	24.6
Total	170	100.0	28	100.0	24	100.0	45	100.0	13	100.0	280	100.0
Mean age		36.4		40.8		37.8		38.9		39.8		37.5

Source: Field work, 2011

The mean age of 37.5 mean the population is young coupled with limited opportunities mean young people may over use wetland and this could have serious impact on wetland management.

The educational backgrounds of the respondents were explored. The responses from the respondents on education in Table 6 suggest that 66.1 percent and 23.5 percent of the respondents had attained primary and secondary education, 9.3 percent had never been to school, while 1.1 percent had had tertiary education.

Table 6: Educational level of respondents in the communities

Level of education	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Never been to sch.	4	3.5	6	21.4	5	20.8	7	15.6	4	30.8	26	9.3
Primary edu.	117	68.8	16	57.2	15	62.5	30	66.6	7	53.8	185	66.1
Secondary edu.	46	27.0	6	21.4	4	16.7	8	11.8	2	15.4	66	23.5
Tertiary edu.	3	1.7	0	0	0	0	0	0	0		3	1.1
Total	170	100.0	28	100.0	24	100.0	45	100.0	13	100.0	280	100.0

Source: Fieldwork, 2011

An attempt was made to find out whether people with different educational backgrounds would behave differently toward wetlands, especially the way resources were extracted from the wetlands. As indicated in Table 7, 35.0 percent of the respondents indicated that they extracted resources seasonally from the wetland, 34.5 percent indicated that they extracted resources always from the wetlands, while 30.5 percent said they sometimes extracted resources from the

wetlands. They had been harvesting traditional medicinal plants, vegetables, bamboo, date palm for fencing and sand for plastering and the molding of blocks.

Table 7: Educational status and resource extraction from the wetlands

Extraction	Education							
	Never		Primary		Secondary		Total	
	Freq	%	Freq	%	Freq	%	Freq	%
Always	8	30.8	43	39.8	27	29.4	78	34.5
Sometimes	11	42.3	31	28.7	27	29.4	69	30.5
Seasonal	7	26.9	34	31.5	38	41.2	79	35.0
Total	26	100.0	108	100.0	92	100.0	226*	100.0

*Less than the total number of respondents because of non-response

Source: Fieldwork, 2011

Table 7 shows that many of the respondents had had primary and secondary education, implying that there should have been some differences in the way they behaved towards resource use. However, this was not the case. It was surprising to see that 100 percent of the respondents who had attained primary and secondary education respectively engaged in practices that the 100 percent who had never been to school engaged in. The results of the study are consistent with the assertion by Ostrom (1990) that the level of education alone was not an enough incentive to prevent wetland degradation or ensure wetland development.

The occupations of the respondents were explored since the nature of the occupation that prevails in an area determines, to some extent, the status of the

environment. Most of the respondents had more than one occupation, a phenomenon that cut across all the communities. As a result, the occupations recorded were those that provided the respondents with the highest income among many other occupations they had.

Table 8 indicates that both males and females in all the communities had some kind of connection to the wetlands either directly or indirectly. In all, 45.4 percent of the respondents were farmers. Other occupations recorded were trading, (16.1%), teaching (12.5%), hairdressing (6.0%), carpentry (5.4%), masonry (4.6%) driving (4.3%), pastoring (2.5%), tailoring, (2.5%), and nursing (0.7%).

Agriculture formed the most common occupation in the villages: Wurakese (84.6%), Akropong (83.3%), Bereku (62.0%) and Akonfudi (60.7%). The occupations of the respondents in Fosu were diverse. They engaged in activities, such as teaching, driving, hairdressing, carpentry, trading, pastoring, and nursing. This not withstanding, farming was still the dominant occupation in Fosu, with 30.0 percent. The main crops grown were maize, root and tuber, and vegetables. Vegetables were the most commonly cultivated crop in the wetlands. Unfortunately, they were treated with heavy doses of chemicals, such as fertilizer and pesticides. This affects the wetlands ecosystem, reduces biodiversity activity and in the long run weakens or wipeout the capacity of the wetland to sustain the kind of services it provides. The millennium ecosystem framework argument of how the quest for people to improve their wellbeing can negatively impact the wetland when insufficient policies that cushion the people are implemented.

Table 8: The major occupations of the respondents in the communities

Occupation	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Farming	51	30.0	17	60.7	20	83.3	28	62.2	11	84.6	127	45.4
Pastor	4	2.4	1	3.6	0	0	2	4.4	0	0	7	2.5
Hairdressing	16	9.4	0	0	0	0	1	2.2	0	0	17	6.0
Teaching	28	16.5	2	7.1	1	4.2	4	9.0	1	7.7	35	12.5
Carpentry	14	8.2	0	0	1	4.2	0	0	0	0	15	5.4
Driving	8	4.7	0	0	0	04	9.0	0	0	0	12	4.3
Trading	31	18.2	7	25.0	0	0	6	13.2	1	7.7	45	16.1
Tailoring	7	4.1	0	0	0	0	0	0	0	0	7	2.5
Masonry	9	5.3	1	3.6	2	8.3	0	0	0	0	13	4.6
Nursing	2	1.2	0	0	0	0	0	0	0	0	2	0.7
Total	170	100.0	28	100.0	24	100.0	45	100.0	13	100.0	280	100.0

Source: Fieldwork, 2011

Land ownership patterns and practices in Assin North Municipality

The kind of land ownership patterns, the natural resources and the complex relationships in land ownership could determine the status of particular resources (Adhikari, 2001; Eggertsson, 1990; Ostrom, 1990; Bromley, 1991; Hanna, 1992; Hanna & Munasinghe, 1995).

The results of the study indicated that, in all 61.4 percent of the respondents owned land in the study area. Female respondents who owned land were 68.1 percent while 58.1 percent of male respondents owned land. Figure 4 gives a distribution of the respondent who owned land in the communities. The result show that 76.9 percent of the respondents in Wurakese owned land. This is

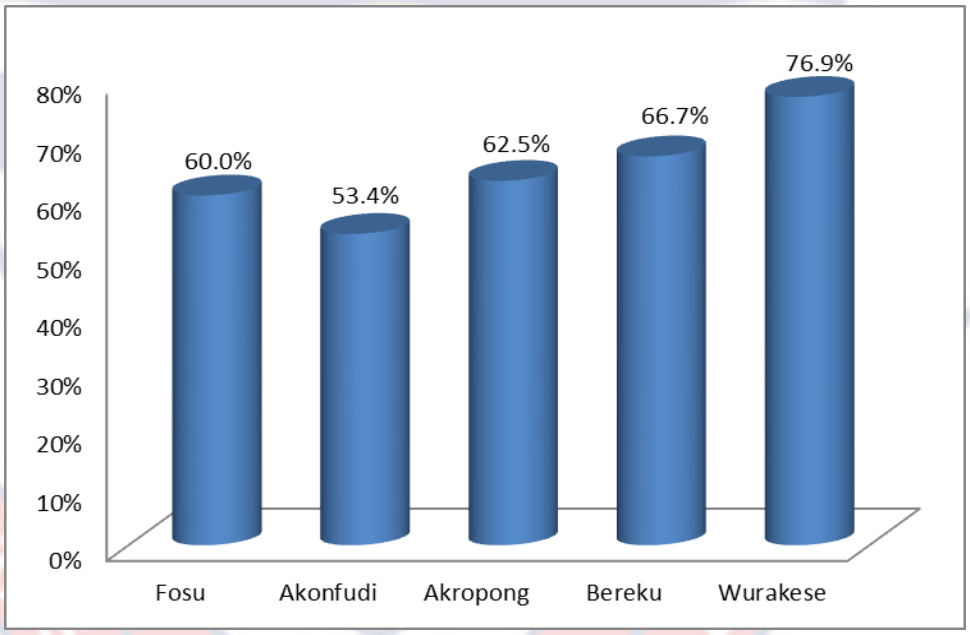

Figure 5: Respondents who owned land in the communities

Source: Fieldwork, 2011

followed by Bereku (66.7%), Akropong (62.5%) Fosu (60%) and Akonfudi (53.4%). The results thus indicate that individuals in the communities owned and controlled the land. It is difficult to control the way wetland is used especially

when the wetland constitute the major land space on which the poor landowners depend on for livelihood (Agyeman,1993; Mensah, 2002; world Bank, 2002)

Table 9 further points out that 63.9 percent of the respondents, both male and female, above 35years owned land, while only 36.1 percent below 36 years owned land. The skewedness in land ownership was a confirmation of traditional values where land is always vested in elderly male or male members of the family. The women and male who owned land gave out land, specifically wetlands, to prospective farmers. Those who owned land but had not given out land to others to use, however, indicated that they might give out land in the future, if the need arose.

Table 9: Land ownership by age-group and sex

Age group	Male		Female		Total	
	Freq	%	Freq	%	Freq	%
20 – 25	9	8.3	10	15.6	19	11.1
26 – 30	14	13.0	7	10.9	21	12.2
31 – 35	14	13.0	8	12.5	22	12.8
36 – 40	24	22.2	12	18.8	36	20.9
41 – 45	16	14.8	12	18. 8	28	16.3
46 – 50	31	28.7	15	23.4	46	26.7
Total	108	100.0	64	100.0	172*	100.0

* Less than the number of respondents because it shows only those who owned land

Source: Fieldwork, 2011.

Land tenure arrangements and practices in Assin North Municipality

With regard to land tenure arrangements in the study area, the results in Table 10 show that 22.1 percent of the respondents did not give out land but used it to make their own farms. Another 20.3 percent of respondents relied on the Abusa system, whereas 19.2 percent of the respondents gave out land through the Abunu system. Another 14.5 percent rented land on a periodic basis, 14.0 percent leased land for a long period, and 9.9 percent owned land but they neither used it nor gave it out for any purpose.

Table 10: Common land tenure arrangements in the communities

Town	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Abunu	18	17.6	4	26.7	3	20.0	7	23.3	2	20.0	33	19.2
Abusa	22	21.6	1	6.7	3	20.0	6	20.0	2	20.0	35	20.3
HTOF	21	20.6	3	20.0	4	26.7	8	26.7	2	20.0	38	22.1
PR	17	16.7	2	13.3	2	13.3	3	10.0	1	10.0	25	14.5
L L	15	14.7	3	20.0	2	13.3	2	6.7	2	20.0	24	14.0
DGOL	9	8.8	2	13.3	1	6.7	4	13.3	1	10.0	17	9.9
Total	102	100.0	15	100.0	15	100.0	30	100.0	10	100.0	172*	100.0

*Less than the number of respondents because it shows only those who owned land

DGOL- don't give out land; HTOF- have their own farms; PR- Periodic rent; LL- Long lease

Source: Fieldwork, 2011.

On the question of how long land owners gave out land to prospective land tenants, respondents gave varied responses. The results in Table 11 show that land owners gave out land for long lease 31.7 percent. In addition to this they also gave out land for short season cultivation activities spanning two farming seasons 30.7 percent, a farming season 22.7 percent, and a crop cycle 14.9 percent. The rampantly and haphazardly manner in which land was given out ensured that there is always some activity in the wetland. This prevent the wetland own ability to recover and therefore exposes it to degradation.

Table 11: Period for land tenure in the communities

Period	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Farming season	14	25.9	2	20.0	2	15.4	4	22.2	1	16.7	23	22.7
Two farm Seasons	15	27.8	3	30.0	4	30.8	6	33.3	3	50.0	30	30.7
Crop cycle	2	3.7	2	20.0	5	38.4	5	27.8	1	16.7	15	14.9
Long lease	23	42.6	3	30.0	2	15.4	3	16.7	1	16.6	32	31.7
Total	54	100.0	10	100.0	13	100.0	18	100.0	6	100.0	101*	100.0

*Less than the number of respondents because it shows only those who gave out land.

Source: Fieldwork, 2011.

People depend on resources for survival. However the rate at which resources are extracted could be detrimental to the environment. The respondents were asked how often they extracted resources from the wetlands. The results in Table 12 show that those who gave out land either by the Abunu, Abusa or other arrangements did extract resources from the wetlands at various times. The results show that (27.9%) said they extracted resources always from the wetland, 25.6 percent indicated they did that bi-annually, 20.9 percent said they did that sometimes, 15.7 percent said they did so seasonally, and 9.9 said they did that annually. Those who extracted resources bi-annually were those who had established woodlots. They, however, intimated that the wetlands were not providing the economic opportunities as they did in the past. As a result, more

Table 12 Land tenure system and period of resource extraction from the wetlands

Period of extraction	Abunu		Abusa		Others		Total	
	Freq	%	Freq	%	Freq	%	Freq	%
Always	20	24.3	10	27.8	16	29.6	48	27.9
Sometimes	24	29.3	8	22.2	12	22.2	36	20.9
Seasonally	18	22.0	6	16.7	8	14.8	27	15.7
Annually	12	14.6	7	19.4	4	7.4	17	9.9
Bi-annually	8	9.8	5	13.9	14	26.0	44	25.6
Total	82	100.0	36	100.0	54	100.0	172*	100.0

*Less than the number because it affected only those who owned land

Source: Fieldwork, 2011

people had to engage the land more often in order to eke a living from the wetlands. Those who harvested resources seasonally, whether by Abunu, Abusa or other forms of arrangements from the wetlands, pointed out that different resources reached maturity to be harvested at different times. Resources extracted from the wetland are date palm, trees and sand. Date palm and trees in the wetland are almost extinct few of them are found around sacred grooves. Besides this huge pits have developed haphazardly as a result of sand winning denying the farmers arable land for cultivation. This implied that resources were always extracted from the wetlands throughout the year, since there is some kind of resource extraction activity going on in the wetlands all the time. This is consistent with Harding's theory which suggests that, when extractability exceeds either natural or artificial replacement, the danger is degradation which inherently makes wetlands unstable, vulnerable, and constantly under pressure from free-riders, leading to their depletion (Harding, 1968).

The nature of the land tenure arrangement ensured persistent use of the land for some activity all the time. This phenomenon and its consequence had succinctly been highlighted by the MEA conceptual framework adopted for this work, namely, that the pressure exerted on land creates an unfavorable trend in local land use and land cover, resulting in excessive and intense application of inappropriate and inefficient technology, and leading to excessive contamination and ultimate loss of wetlands. This is an assumption to which the renewable resource theory also subscribes (Heimlich & Longoer, 1996).

The effects of human activities in the wetlands on social, economic and cultural development of the people in the communities

Human activities are considered to be one single threat to the sustenance of wetlands everywhere. The survival of the wetlands, therefore, hinges on how efficient these activities are managed. The results in Table 13 show that all kinds of activities went on in the wetlands in all the study communities. Observations captured in the research team's report and corroborated by the respondents showed that farming, settlements, sand winning, garages, refuse dumps and other permanent projects were taking place in the wetlands. As indicated in Table 13, farming headed the list of activities in the wetlands with 37.8 percent. This was followed by settlement (22.5%), sand winning (17.6%), garages and car washing bays (11.4 %) and refuse dumps (10.4 %). The results in Table13 show that farming was the major wetland activity in all the communities with the exception of Assin Fosu where the main activity was settlement.

The types of activities that took place in the wetlands raised concerns as they could cause devastating and irrecoverable harm to the wetland. The introduction of chemicals in clearing the land in place of the use of the cutlass, and the use of chemical fertilizers to increase yields and its related run-off could harm bioorganic activity in the soil. The people were genuinely eking a living and had no intention of deliberately destroying the wetlands. Thus, Shvakumar (2007) is vindicated by saying that it is never the intention of the poor to deliberately resort to behaviors which are detrimental to the environment.

Table 13: The most common activities in the wetlands in the communities

Activities	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Farming	36	21.2	17	60.7	16	66.7	26	57.8	11	84.6	106	37.8
Sand winning	41	24.1	4	14.3	0	0	3	6.7	2	15.4	50	17.9
Garages and car washing	24	14.1	0	0	3	12.5	5	11.1	0	0	32	11.4
Settlement	51	30.0	5	17.9	0	0	7	15.6	0	0	63	22.5
Refuse dump	18	10.6	2	7.1	5	20.8	4	8.6	0	0	29	10.4
Total	170	100.0	28	100.0	24	100.0	45	100.0	13	100.0	280	100.0

Source: Fieldwork, 2011

Respondents were asked whether there had been an increase in the activities in the wetlands. The majority (67.9%) of the respondents were of the view that there had been an increase in the activities in the wetlands. The results in Table 14 give the reasons why there were more people involved in wetland activities than in the past. The reasons the respondents gave for the increase in human activities in the wetlands were: inadequate land for farming (24.9%); the ability of the wetland to support dry season farming (21.1%), population increase (19.7%); ability to obtain extra income (17.4%); more opportunities for economic activity (11.3%) and lucrative sand winning business (5.6 %). Thus, the assertion by Simouth, (2007), Coughanowr, (1998), Rawi, (2002) and Dixon & Wood (2007) that wetlands have the ability to support diverse activities to provide essential goods to impoverished and wealthy communities is corroborated by the

results of the study. However, when more effort, energy and space are consumed, resource cover, quality and quantity are also tremendously affected. This observation is consistent with the ecological restoration theory's position on the effect of economic activities on wetlands (Holling, 1995; Kusler, 2005).

The responses from the communities indicated that social, cultural and economic activities, being practised in the communities, had affected the status of the wetlands. In the farming communities, where there was no need to undertake housing development as a result of increased population, dry season farming remained the major reason for increased wetland activities. However, in the communities, where complex socio-cultural and economic dynamics were predominant, the activities in the wetlands tended to be varied and complex. This is a vindication of the renewable and nonrenewable resource theory that economic prospect, population growth and scarcity of resources could make wetland development tradeoff seem more feasible (April, 2005).

Table 14: Reasons for the increase in activities in the wetlands

Reason	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Inadequate land for farming	25	21.6	11	40.7	3	15.0	4	10.8	10	76.9	53	24.9
Support for dry season farming	20	17.2	3	11.1	4	20.0	18	48.7	0	0	45	21.1
Sand winning is lucrative	9	7.8	0	0	0	0	3	8.1	0	0	12	5.6
Population increase	27	23.3	6	22.1	1	5.0	7	18.9	1	7.7	42	19.7
More economic opportunities	8	6.8	7	25.9	4	20.0	5	13.5	0	0	24	11.3
The desire for extra income	27	23.3	0	0	8	40.0	0	0	2	15.4	37	17.4
Total	116	100.0	27	100.0	20	100.0	37	100.0	13	100.0	213*	100.0

*Less than the number of respondents because of non response

Source: fieldwork, 2011.

The results in Figure 5 show the activities that had contributed most to the rapid reduction of wetlands in the study area. They reveal that farming headed the list of major activities that had contributed to the rapid reduction of the wetlands with (40.7%). This was followed by settlement (22.9%), sand winning (22.9) and refuse dumping (13.6).

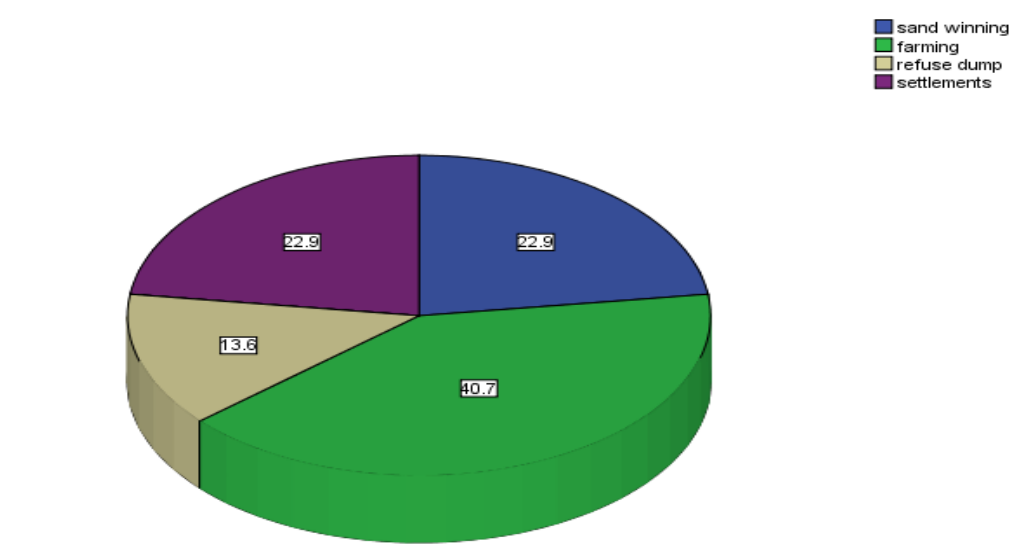

Figure 6: Activities that contributed to wetland reduction in the communities

Source: Fieldwork, 2011

The benefits communities derived from the wetlands

The respondents were asked to indicate the benefits they had derived from the wetlands in their communities. Tables 15, 16 and 17 present the views of the respondents on the benefits they had derived from the wetlands. The results show that 82.5 percent said they had benefited, while 17.5 percent said they had not derived any benefit from the wetlands. For the purposes of the discussion, the

benefits which had been derived from the wetlands in the communities have been grouped under social, economic, and cultural benefits.

With regard to the social benefits, the ability of the wetlands to provide access to regular supply of food and access to water headed the list with 24.4 percent. This was followed by guaranteed supply of local materials (23.1%), improved nutrition (17.8%) and access to fuel wood (10.3%) (Table 15). The results thus, show that the wetlands played an important role in the social lives of the people, and if the wetlands should disappear, the choices of the people would be restricted and their lives would become increasingly unbearable. These findings are consistent with the work of others like Coughanowr, (1998); Chinnak, (2005); Hossain, (2008); Nanyunja, (2006); and Schuyt & Brander, (2004).

With regard to the economic benefits, the results in Table 16 show that improvement in the income of the respondents was the main benefit (37.6%). This was followed by the opportunity the wetlands provided as a source of employment (37.2%), opportunity for economic activities (23.1%), and provision of fodder for ruminants to graze (2.1%). These findings were consistent with the work of Kalawole, (2000), Knudsen, (2007), and Chinnak, (2005).

With regard to the cultural benefits, the perception that the wetlands helped them uphold their traditional practices headed the list with, 27.8 percent. This was followed by the vital role the wetlands played in observing their festivals (24.9%), the ability the wetlands had to provide medicinal plants for curing diseases (24.1%), and the wetlands provided a place to perform rituals to

Table 15: Social benefits derived from wetlands by the communities

Benefits	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Access to Food	36	27.3	7	25.0	5	20.8	11	24.4	0	0	59	24.4
Regular water supply	30	22.7	6	21.4	8	33.3	12	26.7	3	23.1	59	24.4
Supply of local materials												
For housing	37	28.0	5	17.9	5	20.8	3	6.7	6	46.1	56	23.1
Source of fuel wood	9	6.8	3	10.7	2	8.4	7	15.5	4	30.8	25	10.3
Improved nutrition	20	15.2	7	25.0	4	16.7	12	26.7	0	0	43	17.8
Total	132	100.0	28	100.0	24	100.0	45	100.0	13	100.0	242*	100.0

* Less than the number of respondents because of non-response

Source Fieldwork, 2011

Table 16: Economic benefits derived from wetlands by the communities

Benefits	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Feq	%	Feq	%	Feq	%	Feq	%	Feq	%	Feq	%
Fodder for grazing	2	1.5	1	3.6	2	8.7	0	0	0	0	5	2.1
Opportunity for economic activities	22	16.5	7	25.0	4	17.4	17	37.8	6	46.2	56	23.1
Employment	51	38.4	10	35.7	11	47.8	12	26.6	6	46.2	90	37.2
Improved income	58	43.6	10	35.7	6	26.1	16	35.6	1	7.6	91	37.6
Total	133	100.0	28	100.0	23	100.0	45	100.0	13	100.0	242*	100.0

*Less than the number of respondents because of non-response

Source: Fieldwork, 2011

their gods and ancestral spirits (23.2%). The respondents indicated that during the celebration of the Fantrebo Festival at Assin Akropong, fertility rituals were performed for those who were impotent and barren so that they could reproduce. Those who had gone through such rituals had given birth within a year. The respondents of Wurakese, Bereku and Akonfudi also indicated that sacrifices were made in the wetlands. The findings in Assin North were similar to the ceremonies and rituals of the Aborigines in Australia and the initiation rites of the Indians, performed in the wetlands (Caliskan, 2008; Schuyt & Brander, 2004; Coughanowr, 1998; Schuyt & Brander, 2004).

The respondents were asked to explain why some wetlands were still intact despite the increased human activities in the wetlands. As shown in Table18, the main reasons were: the absence of pressure on land (21.4%), the wetlands were always waterlogged (20.0%), and the fear of the gods (16.2%), individuals' desire to protect the wetland (14.3%), the use of appropriate agricultural practices (10.0%), individuals not interested in developing wetlands (9.5%), and the unwillingness of people to release wetlands (8.6%). The responses show that traditional institutions have proved capable of evolving their own rules to manage the wetlands even though it had not allowed efficient utilization. Just as Chambers (1983) indicated, wetlands will continue to be degraded because traditional societie have not incorporated contemporary best practices in managing their wetlands. This also agrees with the argument by the millennium ecological assessment framework that the over-centralized planning and weak institutional framework of the state has affected wetland management.

Table 17: Cultural benefits derived from wetlands by the communities

Benefits	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Feq	%	Feq	%	Feq	%	Feq	%	Feq	%	Feq	%
Helped to perform festivals	31	23.4	9	32.1	6	31.8	14	26.1	0	0	60	24.9
Uphold traditional practices	39	29.3	6	21.4	7	25.0	11	30.4	4	30.7	67	27.8
Medicinal plants for curing diseases	29	21.8	8	4	27.2	12	17.4	5	38.6	58	58	24.1
Provide a place for performing ritual	34	25.5	5	17.9	6	16.0	7	26.1	4	30.7	56	23.2
Total	133	100.0	28	100.0	23	100.0	44	100.0	13	100.0	241*	100.0

*Less than the number of respondents because of non-response

Source: Fieldwork, 2011

Table 18: Reasons why some wetlands were still intact

Reasons	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Individuals are not interested in developing wetlands	15	13.5	1	5.2	0	0	3	6.7	1	7.7	20	9.5
The fear of the gods	21	19.9	0	0	1	4.6	5	11.1	7	53.7	34	16.2
Always water-logged	31	27.9	4	21.1	1	4.6	6	13.3	0	0	42	20.0
No pressure on land	6	5.4	7	36.8	10	45.4	18	40.0	4	30.7	45	21.4
People are not interested in releasing wetland for development	12	10.8	1	5.2	1	4.6	3	6.7	1	7.7	18	8.6
Farming is done on rotational basis	4	3.6	4	21.1	3	13.6	10	22.2	0	0	21	10.0
Willingness to protect the wetland for posterity	22	19.8	2	10.0	6	27.2	0	0	0	0	30	14.3
Total	111	100.0	19	100.0	22	100.0	45	100.0	13	100.0	210*	100.0

*Less than the number of respondents because of non-response

Source: Field work. 2011

Existing wetland management strategies in Assin North Municipality

Wetlands are very important ecological resources which must be protected to ensure that their benefits continue to accrue to the people. Table 19 shows that, although responsibility for protecting the wetlands is entrusted to the Municipal Assembly in collaboration with the Wildlife Department, to ensure sanity in the wetlands, their presence in the communities was not felt. Their absence has allowed different institutions, who were not firmly grounded in the community, to assume some form of preservation responsibility. About 35.0 percent of the respondents said they did not know any institution that was exercising control on the wetlands in their communities. However, 65 percent mentioned some institutions which were exercising some management control over the wetlands. They included: the Local Council (28.2%), the Municipal Assembly (23.9%), Ministry of Natural Resources (22.1%) Forestry Department (16.8%), and Wildlife Division (9.0%).

The Municipal Assembly, Wildlife Division and the Forestry Department were mentioned more in Fosu, while the traditional authorities and others were prominent in the four rural communities. The respondents in Fosu mentioned the Municipal Assembly because it was situated in the town and also collected levies, fees, taxes and tolls from them. The Forestry Department, on the other hand, was often seen seizing lumber from illegal chainsaw operators and patrolling the forest communities. This might explain why they were known in the community.

Table 19: The major institutions working on wetlands in the communities

Institutions	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Feq	%	Feq	%	Feq	%	Feq	%	Feq	%	Feq	%
Municipal Assembly	47	27.7	4	41.3	7	29.2	9	20.0	0	0	67	23.9
Forestry Department	46	27.1	1	3.6	0	0	0	0	0	0	47	15.8
Wild Life Division	24	14.1	0	0	0	0	1	2.2	0	0	25	9.0
Local council	21	12.3	18	64.3	10	41.6	20	44.5	10	76.9	79	28.2
Ministry of Natural Resources	32	18.8	5	17.8	7	29.2	15	33.3	3	23.1	62	22.1
Total	170	100.0	28	100.0	24	100.0	45	100.0	13	100.0	280	100.0

Source: Fieldwork, 2011

The responses given by the communities show that there were many institutions exercising some kind of managerial authority in the wetlands. The institutions were many, intricate and complex and they were working without specific clear-cut directives, roles and responsibilities. The exercise of responsibility in the wetlands in the Assin North Municipality is disorienting and the inability of the centralized institutions to recognize this challenge and address the issues has led to the destruction of the wetlands in the municipality.

In Akropong, Akonfudi, and Wurakese, where the traditional institutions were identified as responsible for enforcing environmental laws, the communities had been engulfed in chieftaincy dispute for the past 30, 32 and 29 years respectively. The conflict had led to the breakdown of law and order and everyone did whatever they wanted. Act 490, which established the EPA, empowers the MMDAs to form environmental management teams which will further collaborate with the communities to form specific sub-committees to ensure the protection of the environment. At the time of the study, the team in the Assin North Municipality had not been formed.

Respondents were asked to indicate the local institutions that had been formed to protect the wetlands. The following were some of the local institutions identified by the respondents as having been formed to protect the wetlands: Farmers Association (28.2%); the Traditional Council (26.3); heads of clans and chiefs (25.0%); and Unit Committee (20.5%).

On the issue of the strategies for wetland management in the Assin North Municipality, respondents said that there were no specific wetland management

strategies, and that wetland owners exercised their discretion as to what to do in the wetlands. The results in Table 21 show that 63.6 percent of the respondents indicated there were no strategies established for the management of wetlands, while 36.4 percent said there were management strategies to ensure the sustenance of wetlands and the benefits that accrued from them. With the exception of Akropong, where the majority (58.3%) of the respondents indicated that strategies existed for the protection of the wetlands, the majority in the rest of the communities indicated that there were no strategies. They claimed that there were no taboos and closure periods, and decisions on the wetlands were always executed without consultation with the community members. They blamed the Assembly and government for taking unilateral decisions most of the time.

Those who said that there were management strategies mentioned the various measures used in managing the wetlands. The results in Table 22 indicate those measures as: collaboration with government agencies (24.5%); collaboration with the communities (24.5%); enforcement of taboos (23.3%); enforcement of closure periods (19.6%); and consultation with chiefs and opinion leaders (7.8%). They indicated that the closure periods were supervised by the traditional authorities; Furthermore, they all suggested that the consultations were mostly for a short time, often before the inauguration of a project. They expressed worry over the short nature of the consultation and the lack of open communication with the community before, during and after the programme.

Table 20: Local institutions protecting wetlands in the communities

Local institutions	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Heads of clans and Chiefs	16	20.0	4	28.6	8	47.1	9	28.1	2	15.3	39	25.0
Traditional council	29	36.3	1	7.1	1	5.9	5	15.6	5	38.5	41	26.3
Unit committee	20	25.0	3	21.4	1	5.9	8	25.0	0	0	32	20.5
Farmers Association	15	18.7	6	42.1	7	41.1	10	31.3	6	46.2	44	28.2
Total	80	100.0	14	100.0	17	100.0	32	100.0	13	100.0	156*	100.0

*Less than the number of respondents because of non-response

Source Fieldwork, 2011

Table 21: Availability of strategies for wetland protection in the communities

Strategy	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Yes	64	37.6	11	39.3	14	58.3	8	17.8	5	38.5	102	36.4
No	106	62.4	17	60.7	10	41.7	37	82.2	8	61.5	178	63.6
Total	170	100.0	28	100.0	24	100.0	45	100.0	13	100.0	280	100.0

Source: Fieldwork, 2011

The majority (67.5%) of those who suggested that there were taboos, community consultation and closure periods were from the rural communities, while all those who mentioned collaboration with government agencies were from Fosu where the government agencies were located. The results also indicate that, even though there were no clear-cut roles for institutions, and circumstances around wetlands were chaotic, management strategies in the rural communities were better than those in the urban area. This corroborated Apunyo's (2007) assertion that traditional folks tend to have evolved strategies that have helped to protect the wetlands.

The kind of management strategies which had been adopted in the communities had produced both positive and negative results. These positive and negative results have been presented in Tables 23 and 24 respectively. Table 23

Table 22: Strategies for managing wetlands in the Assin North Municipality

Strategies	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Taboos	8	12.5	5	45.5	4	28.6	4	50.0	3	60.0	24	23.6
Collaboration with opinion leaders	6	9.4	0	0	0	0	2	25.2	0	0	8	7.8
Closure period	10	15.6	1	9.0	5	35.7	2	25.2	2	40.0	20	19.6
Collaboration with the community	15	23.4	5	45.5	5	35.7	0	0	0	0	25	24.5
Collaboration with government agencies	25	39.1	0	0	0	0	0	0	0	0	25	24.5
Total	64	100.0	11	100.0	14	100.0	8	100.0	5	100.0	102*	100.0

*Less than the number of respondents because of non-response

Source: Fieldwork, 2011

Table 23: The positive effects of wetland management strategies on the communities

Positive effects	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Feq	%	Feq	%	Feq	%	Feq	%	Feq	%	Feq	%
Created environmental awareness	5	6.0	2	22.2	2	16.6	3	15.8	3	100.0	15	11.9
Improved conservation	29	35.0	5	55.6	5	41.7	7	36.8	0	0	46	36.5
Helped assess the viability of projects	20	24.0	1	11.1	0	0	5	26.3	0	0	26	20.6
Helped create reserves	29	35.0	1	11.1	5	41.7	4	21.1	0	0	39	31.0
Total	83	100.0	9	100.0	12	100.0	19	100.0	3	100.0	126	100.0

*This represents the respondents who thought that the management strategies had yielded positive results

Source: Fieldwork, 2011

shows that 36.5 percent indicated that the strategies being used in the communities had helped to improve wetland conservation practices, 31.0 percent said they had helped to create wetland reserves for future use, 20.6 percent said that the existing strategies allowed the chiefs and the communities the opportunity to assess the viability of projects, and 11.9 percent indicated that the strategies had helped to enhance public environmental awareness, especially on the usefulness of wetlands.

Those who thought that the current wetland management strategies had had adverse effects on the communities mentioned a number of these effects. The results in Table 24 indicate that 42.2 percent of the respondents intimated that the nature of the management strategies did not support wetland development since there were no laws prescribing prohibition and punishment. A further 20.8 percent of the respondents indicated that the existing arrangements neglected the interests of the people in the consultation, planning and execution of projects. Again, 20.1 percent indicated that nobody enforced the by-laws. Finally, 16.9% said the existing regulations did not mandate any person to be responsible for the wetlands in the communities.

Although it was known that the Wildlife Division was responsible for the protection of the wetlands, their interest was mostly in the management of Ramsar sites. They indicated that they always only got to know of a decision when it was being implemented. The results of the study clearly show that weak and fragmented laws were being used in the Assin North Municipality to manage wetlands. This is in conformity with the assertion by Amuzu (1997); Campbell

Table 24: The negative effects of wetland management strategies on the communities

Negative effects	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Does not support wetland management and development	21	25.3	12	63.2	6	46.2	15	53.6	11	100.0	65	42.2
It neglects the peoples interest	17	20.5	0	0	4	30.7	11	39.3	0	0	32	20.8
Nobody takes care of the wetlands	23	27.7	3	15.8	0	0	0	0	0	0	26	16.9
Nobody enforces that by-laws	22	26.5	4	21.0	3	23.1	2	7.1	0	0	31	20.1
Total	83	100.0	19	100.0	13	100.0	28	100.0	11	100.0	154*	100.0

*This represents those who thought that the managing strategies had not yielded any positive results

Source: Fieldwork, 2011

(2003) and Ayibotele (1998) that there is no comprehensive wetland management policy in Ghana. This is irrespective of the fact that Ghana was signatory to the Abidjan Convention on Coastal and Marine Environments of 1994 and the Ramsar Convention of 1972.These laws have not been included in Assin North Municipal Development Plans. The scenario is also consistent with DANIDA's (2003) statement that many African countries currently do not have specific legal and policy framework regarding wetland management and protection.

The responses from the communities also suggest that the current strategies have ignored the interests of the people. This is consistent with what Grand River Authority (2003) stated that, although indigenes naturally own the wetlands, governments sideline them from making decisions which are intended to govern the wise use of wetlands. It was worrying to realize in Assin North Municipality that, although institutional and legal system was present, it was poorly structured and implemented, poorly enforced, under–resourced and not accessible to poor communities, which suffered most from their ineffectiveness. This is also consistent with the concern expressed by Mehta and Ntsohma (2004), Philip (2006), Van Dame et al, (2006), and Muzzucato and Niemeyer (2002) on the current government arrangement for wetland management which neglects local institutions, the missing link in the people and environmental management interface. Such poorly framed arrangements must be frowned upon as a tragedy and a threat to human health and survival. This can be a good description of the conditions of institutional arrangement and management strategies currently being applied to wetlands in the Assin North Municipality.

Challenges facing the mandated institutions responsible for protecting the wetlands in Assin North Municipality

Respondents were asked to identify the challenges they thought had weakened the institutions mandated to protect the wetlands in the study area. As indicated in Table 25, the respondents mentioned the following as the challenges facing the institutions mandated to preserve the wetlands: insufficient trained staff (36.7%), unnecessary government interference (22.4%), inadequate finance (21.4%), and lack of appropriate technology (19.5%).

Respondents were then asked whether individuals had the responsibility to protect the wetlands in the communities. The majority (70.4%) of the respondents expressed the view that individuals had a responsibility to protect the wetlands for the present and the future generations. There was, however a higher sense of individual responsibility towards wetland management in the villages than in Assin Fosu. For example, the respondents at Fosu indicated that the Assembly collected fees and taxes from them and, therefore, had the responsibility towards the conservation of the environment.

The different postures adopted by the communities also accounted for the status of their wetlands. Those who said individuals had the responsibility towards wetland conservation suggested activities and actions which could be undertaken. As indicated in Table 26, 22.4 percent said activities in the wetlands should be regulated; 21.3 percent of the respondents said wetlands should be allowed to fallow; 14.7 percent said people should desist from the indiscriminate use of wetlands; 14.7 percent said customs and traditions governing wetlands must be

Table 25: Challenges facing the mandated institutions responsible for protecting the wetlands in Assin North Municipality

Challenges	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Lack of modern technology	28	22.4	3	21.4	4	26.7	6	18.8	0	0	41	19.5
Unnecessary government intervention	26	20.8	9	64.3	4	26.7	5	15.6	3	21.4	47	22.4
Insufficient trained personnel	37	29.6	2	14.3	5	33.3	17	53.1	6	42.9	77	36.7
Insufficient finance	34	27.2	0	0	2	13.3	4	12.5	5	35.7	45	21.4
Total	125	100.0	14	100.0	15	100.0	32	100.0	14	100.0	210*	100.0

*Less than the number of respondents because of non-response

Source: Fieldwork, 2011

Table 26: The types of individual responsibility towards wetland protection

Responsibility	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Allow land fallow	19	17.3	7	33.3	5	27.7	4	11.4	7	53.8	42	21.3
Not engage in activities that will destroy the wetlands	12	10.9	3	14.3	2	11.1	7	20.0	1	7.7	25	12.7
Prevent indiscriminate use of wetlands	15	13.6	3	14.3	3	16.7	7	20.0	1	7.7	29	14.7
Regulate how people work in wetlands	34	30.9	0	0	3	16.7	4	11.4	3	23.1	44	22.4
Plant trees along river bodies	15	14.6	6	28.6	3	16.7	2	5.8	1	7.7	28	14.2
Respect custom and traditions governing wetlands	14	12.7	2	9.5	2	11.1	11	31.4	0	0	29	14.7
Total	110	100.0	21	100.0	18	100.0	35	100.0	13	100.0	197*	100.0

*Less than the number of respondents because of non response

Source Fieldwork, 2011

respected; 14.2 percent suggested that trees should be planted along water bodies and 12.7 percent of the respondents said people should not engage in activities that would destroy the wetlands**.**

Suggestions to improve wetland management in Assin North Municipality

Having been able to identify the problems associated with wetland reduction and its effects on the social, economic and cultural lives of the communities, the respondents were asked to make suggestions for the improvement of the wetland management system in the study communities.

As indicated in Table 27, the respondents mentioned the following as their suggestions to improve the management of the wetlands in the study area: the enforcement of the by- laws to the letter (27.3%), providing training for the staff of all agencies responsible for the protection of wetlands (24.2%); the need to form local committees to be in charge of the wetlands (23.5%); provision of the necessary equipment to enable the trained staff to perform their duties (12.7%); and the need to involve the locals in the decisions concerning the use of the wetlands (12.3%). Act 490 empowers the formation of the Metropolitan, Municipal and District Assembly environmental committees. The committees must, therefore, be constituted to ensure that their allied specific environmental management sub-committees in the communities are formed to ensure the dissemination of information.

Table 27: Suggestion to improve wetland management in Assin North Municipality

Suggestions	Fosu		Akonfudi		Akropong		Bereku		Wurakese		Total	
	Feq	%	Feq	%	Feq	%	Feq	%	Feq	%	Feq	%
Involve the locals	15	10.0	3	10.7	2	8.3	10	22.3	2	15.4	32	12.3
Enforce the by-laws	38	25.4	11	39.3	6	25.0	11	24.4	5	38.5	71	27.3
Provide trading for staff	36	24.0	7	25.0	6	25.0	11	24.4	3	23.1	63	24.2
Form local committee	35	23.3	6	21.4	10	41.7	8	17.8	2	15.4	61	23.5
Provide equipment	26	17.3	1	6.6	0	0	5	11.1	1	7.6	33	12.7
Total	150	100.0	28	100.0	24	100.0	45	100.0	13	100.0	260*	100.0

*Less than the number of respondents because of non response

Source: Fieldwork, 2011

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents the summary of the study, the conclusions and recommendations derived from the findings of the study.

Summary

The research sought to examine the effects of wetland management on the social, cultural, and economic development of the Assin North Municipality. The descriptive and evaluative research designs in a case study format were used in the research. These designs were selected to allow inquiry into the understanding and perception of events and status of wetlands in the Assin North Municipality.

The probability and non-probability sampling techniques were employed in the study. The simple random (lottery) technique was used to ensure that the population in the sampled communities was given opportunity to be selected for the interview. The non-probability sampling techniques used were the proportional and purposive sampling techniques. The proportional sampling technique was used to allocate quota of households to be interviewed in the five communities, while the purposive sampling technique was used to select five communities and the respondents from three government institutions (Forestry Department, Wild Life Division and the Assin North Municipal Assembly). This was done to make sure that the communities which were selected had different

activities and also captured views from informed persons. A sample of 283 was drawn from the population.

The questionnaire and interview schedule were the instruments used in gathering the field data. The questionnaires were administered to the three government institutions, while the interview schedule was used on the respondents from the communities.

Analysis of the results was based on the data collected from the field. The data was first cleaned and coded and then fed into the computer. The SPSS (Version 16.0) software was used to analyze the data. The results were presented in frequency tables, graphs and charts in a format which could easily be understood.

The main findings of the study were:

1 Females and males who owned land were 68.1 percent; and 58.1 percent respectively. The majority of the respondents from Wurakese (76.9%); Bereku (66.7%); Akropong (62.5%); Fosu (60.0%); and Akonfudi (53.4%) owned land.

2 The common land tenure arrangements in the communities were: those who had their own farms (22.1%); Abusa (20.3%); Abunu (19.2%); those who rented land for a short period (14.5%); leased land for a long period (14.0%); and those who didn't give out land for any purpose (9.9%).

3 The period of Land tenure varied from long lease (31.7%); two farming seasons (30.7%); farming season (22.7%); crop cycle (14.9%).

4 Farming was the main activity in the wetlands, with 37.8 percent, followed by human settlement (22.5%); sand winning (17.9%); car washing and garages (11.4%); and refuse dumping (10.4%).

5 The respondents extracted resources from the wetlands always (27.9%); bi – annually (25.6); sometimes (20.9%); seasonally (15.7%); and annually (9.9%).

6 The majority (65.0%) of the respondents were aware of the local institutions that were protecting the wetlands in the communities. The main ones mentioned were: famers association (28.2%); traditional council (26.3%); head of clans and chiefs (25.0%); and the Unit Committee (20.5%). However, the majority (74.1 %) were aware of the ineffectiveness of the said institutions. In addition, 67.6 percent were aware that there were no strategies for managing wetlands in the study area.

7 The repsondnets also were aware of the major institutions that were protecting wetlands in the communities. The ones identified were local council (28.2%); Municipal Assembly (23.9%); Ministry of natural resources (22.1%); Forestry Department (15.8%); and Wildlife Division (9.0)

8 The main challenges facing the mandated institutions responsible for protecting the wetland were: insufficient trained personnel (36.7%); unnecessary government interference (22.4%); inadequate finance (21.4%); and lack of appropriate technology (19.5%).

9 The main reasons for the increased activities in the wetlands were: inadequate land (24.9%); the ability of the wetlands to support dry season farming

(21.1%); population increase (19.7%); the desire to obtain extra income (17.4%); more opportunities for economic activity (11.3%); and the lucrative nature of sand winning (5.6%).

10 The majority (82.5%) of the respondents was aware of the important social (86.4%), economic (86.4%), and cultural (86.0%) services that wetlands provided for the communities.

11 The social benefits derived by the communities were: regular water supply (24.4%); access to food (24.4%); supply of local materials for housing (23.1%); improved nutrition (17.8%); and source of fuel wood (10.3%).

12 The economic benefits derived were: improved income (37.6%); employment (37.2%); opportunity for diverse economic activities (23.1%); and provision of fodder for grazing throughout the year (2.1%).

13 The cultural benefits derived by the communities were: upholding of traditional practices (27.8%); helping to perform festivals (24.9%); providing medicinal plants for curing diseases (24.1%); and providing a place for performing traditional rituals (23.2%).

Conclusions

These are the conclusions drawn from the findings of the study. The wetlands in the Assin North Municipality (ANM) were under serious threat. The possibility of the wetlands getting extinct was imminent, given the increase in activities in the wetlands. Many people were engaged in wetland activities with no enforcement of regulations, strong institutions, and formation of relevant local

environmental committees, as required by law. The prevailing land tenure systems and the willingness of people to release land easily compelled people to use unproductive and damaging agricultural practices on the land and, therefore, exposed it to both physical and chemical threats.

The causes of the imminent threats that constrained the effective development of the wetlands in the Assin North Municipality arose from multiple sources which could be grouped under institutional weakness, increase in human activity in the wetlands, and the regime of land tenure prevalent in the study area. Activities, such as farming, sand winning, human settlement, car washing and garages, were widespread and unstructured and had taken over the wetlands in the Municipality, whether in the urban or rural communities. This had affected the ability of the wetlands to provide the bounty of services for the community members. The persistence of looking for alternatives to meeting some social, cultural and economic needs had created a vicious cycle threatening the existence of wetlands in the communities.

There were no clear-cut wetland policies in practice in the communities. The presence of pristine wetlands in the communities was not due to any pragmatic policies and programs put in place by any of the institutions mandated to manage the wetlands in the communities. Institutions charged with the responsibility to protect the ecosystem were bedeviled with inadequate finance, inadequate staffing, lack of appropriate technology, and inadequate training facilities. As a result, the social, economic and cultural life of the people had been restructured. In view of this, individuals had taken the responsibility to protect the

wetlands. Although their efforts were not sufficient and effective, they had been able to protect pockets of the wetlands in the communities.

Wetlands in the Assin North Municipal had provided enormous social, cultural and economic opportunities for the people, and their existence was vital to their social, cultural and economic development. Therefore, the continuous degradation of the wetlands in a piece-meal fashion could make conditions of life for the people in the Assin North Municipality unbearable.

Recommendations

The following recommendations are made to ensure that wetlands in the Assin North Municipality are preserved for posterity.

1 The government of Ghana should enact laws which are specific to wetland management and conservation. These laws must empower a single institution to take control over the management and protection of wetlands. In the interim, all laws which seek to protect wetlands must be brought together under the supervision of one institution. This will help to prevent the current dissipated regulations which have been the bane of wetlands.

2 The government of Ghana should ensure that institutions charged with the responsibility of protecting the wetlands are well resourced and quipped to carry out their responsibilities.

3 The activities in the wetlands should be regulated in order to control and manage the devastating effects. The Municipal Assembly, in collaboration

with the Forestry Department and the Wildlife Division, must work together to ensure this.

4 The Wildlife Division and the Forestry Department should provide training on best wetland management practices for people who are eking out a living in the wetlands as a measure to curb the rampant destruction of the wetlands. Government must truly decentralize the Wildlife Division in all the MMDAs. At least, the Wildlife Division must be established in areas where ecological systems are threatened.

5 The Assin North Municipal Assembly should initiate small community wetland development programs to encourage the conservation of wetlands. The chiefs should assist by releasing land for infrastructural projects to avert the wanton destruction of the wetlands.

6 The communities should adopt farming practices and land management strategies which do not disturb the ability of the wetland to regenerate and also adopt self- regulating measures on how resources are extracted from the wetland

7 The Municipal Assembly should constitute the Municipal Environmental Management Committees to liaise with committees in the towns to ensure enforcement of and adherence to regulations which have been promulgated to protect the wetland.

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APPENDIX 1

INTERVIEW SCHEDULE FOR COMMUNITY MEMBERS

Residence 10Assin Fosu □. 20Assin Akonfudi□. 30Assin Bereku□

40Assin Akropong□ 5. Wurakese □

SECTION A. Demographic Characteristics of Respondents

1. Sex Male□ Female□ 2. Age.

3. Educational level. 10 Never been to school□. 20 Primary level.

30 Secondary level□. 40 Tertiary level□ 50 Other □

4. Occupation ……

SECTION B **Land Ownership and Practices in Assin North**

5. Do you own land? a) Yes b) No (go to Q8)

6. If yes do you give out land for rent? a) Yes b) No

7. If Yes to Q6, On what terms do you give out land to others ……

8. If No to Q5, How do you obtain land for farming purposes? .....

9. In the tenureship arrangement how long is one allowed to stay on the land?

(a) For a farming season. (b) Two farming seasons. (c) For a crop cycle.

(e) Permanent. (f) other

10. How often are you allowed to harvest products from the wetland reserves?

SECTION C Activities in the Wetlands

11. What will you say is the single most common human activity that goes on in the wetlands?

(a) Farming. (b) Fishing. (c) Sand winning. (d) Garages and car washing (e) Refuse disposal (f) other.

12. Do you think more people now engage in wetland activities than in the past?

(a) Yes (b) No.

13. If Yes to Q12 what do you think has contributed to more people engaging in wetland activities?

……

14. Ranking from 104, with 1 being the highest and 4 the lowest, which of the following has contributed most to the rapid reduction of wetlands in the community?

Sand winning Refuse dump Farming Settlements

SECTION D Benefits of the Wetlands to the communities

15. Do you derive any benefits from the wetlands? (a) Yes (b) No

16. Can you explain how these affect the social, economic and cultural? development of the community?

The benefits derived from the wetlands	social benefit	economic benefit	cultural benefit
Food			
Water			
Employment			
Materials			
Other			

17. Where in the community do you get resources for the following?

Activity	Source
Housing	
Food	
Craft	
Religious rituals	
Fishing	
Water	

18. Do you still have some of the wetlands intact? a) Yes. (b) No

19. If Yes, why do you think some of the wetlands are still intact?

……

20. Do you celebrate any traditional festivals in the community? (a) Yes. (b) No

21. If Yes, what is the name of the festival?

……

22. What role does the wetland play in the celebration of the festival and performance of traditional rituals? (a) Collect herbs for performing rituals. (b) Fetch water to perform rituals. (c) Make scarifies to the gods and ancestral spirits. (d) Others. Please specify

23. Do you think that the disappearance of the wetlands has affected social development? (a)Yes. (b) No (if no go to 25).

24. If Yes to 23, how has the disappearance of the wetlands affected the social life of the people in the community?

……

25. Do you think the disappearance of the wetlands has affected cultural development? (a)Yes. (b) No (if no go to 27).

26. If Yes to Q25 how has the disappearance of the wetlands affected the cultural life of the people in the community?

……

27. Do you think the disappearance of the wetlands has affected economic life?

(a)Yes. (b) No

28. How has the disappearance of wetland affected the economic life of the people in the community?

SECTION E Responsibility for the Protection of the Wetlands

29. Which institutions are responsible for wetland management in the Municipality?

Name of institution	Responsibility

30. Do you have local committees responsible for the protection of the wetlands?

(a) Yes (b) No (if no go to 31)

31. If Yes to Q 30, who are the members of these committees?

……

32. Do you think these institutions mentioned in Q 31 are useful with respect to the management of the wetlands? (a) Yes (b) No (if no go to Q 33)

33. If Yes to Q 32 Why do you think they are useful?

……

34. If No to Q 32 What do you think has prevented these institutions from performing their duties?

35. Do you think that individuals also have a responsibility towards the protection of wetlands? (a) Yes. (b) No (if no go to Q 35).

36. If Yes to Q 35 What do you think are some of these responsibilities?

……

37. If No to Q 35 why not ?

……

SECTION F Existing Wetland Management and Sustainability Strategies

38. Are there taboos and customs governing or controlling the use and extraction of wetland resources? (a) Yes (b) No

39. Can you mention some taboos and explain their importance to wetlands Management

Taboos	Importance in wetlands management

40. Do you have a closure period? (a) Yes (b) No

41. If Yes to Q 40 Who set the time and supervise the closure and opening?

(a) Landowners (b) Traditional rulers (c) The State (d) Others (specify)

42. Are the communities consulted on decisions concerning the wetlands by the government? (a) Yes (b) No (if no go to Q 44)

43. If Yes to Q 42 what is the nature of the consultation?

……

44. Do you think the existing regulations have supported the judicious use of wetland resources for social, economic and cultural development of the community? (a) Yes (b) No

45. If Yes to Q 44 how has the regulation supported judicious use?

……

46. Do you think that the continuous existence of these regulations will help to boost the economic, social and cultural development of the Municipality?

(a) Yes (b) No

If No to Q 45 why do you think the current management arrangement is not the best? ……

SECTION G Strategies to Improve or Preserve the Wetlands

47. How do you think land owners and users could be made to be responsible for the preservation of the wetlands?

……

48. How can we strengthen the existing management strategies for effective community wetland development?

APPENDIX II

QUESTIONNAIRE FOR THE COORDINATING DIRECTOR OF THE ASSIN NORTH MUNICIPAL ASSEMBLY

I am a student of the University of Cape Coast pursuing a masters' programme in development studies. These sets of questions are designed to enable me complete my study on wetland management on social, cultural and economic development in the Assin North Municipality. All the information being solicited shall only be applied to the purpose of this research. The information provided shall, therefore, not be divulged to any third party without your prior approval. Please kindly respond to the questions to your best ability to enable this research to be completed successfully. Thank you.

SECTION A land ownership and practices in Assin North Municipality

1. What is the estimated size of the wetlands in the Municipality?

……

2. Do you think that its size has reduced? (a) Yes. (b) No

3. How much is still intact today? (a) All of it. (b) About half of it (c) A quarter of the total estimates. (d) Less than a quarter of the estimated (e) Very little. (f) I don't know

4. Who owns or controls these wetlands

……

SECTION B Importance of wetlands

5. In your opinion, do you see any importance of wetlands in the social, economic and cultural development of the people in the Municipality?

a)Yes. (b) No (if no go to Q 7)

6. If Yes to Q5 what are some of the social, cultural and economic benefits of wetland to the communities

……

7. Do you think that the communities are aware of the importance of wetlands to their social, cultural and economic development? (a)Yes. (b) No (if no go to Q 9).

8. If Yes to Q 7 why do you think so?

……

9. If No to Q 7 why not?

……

10. Do you think that more people are now engaged in activities in the wetlands than in the past? a) Yes (b) No (if no go to Q 12)

11. If Yes to Q 10 what do you think has contributed to the increase in activities in the wetlands?

……

12. What are some of the activities that go on in the wetlands?

……

SECTION C Impediments to effective wetland management

13. What activities do you think have mostly contributed to the reduction of the wetlands? a)Farming. (b) Fishing. (c) Sand wining. (d) Settlements. (e) Garages and washing bay. f) refuse disposal. (g) Others

14. Do you think that these activities have affected the wetlands in the Municipality? (a)Yes. (b) No

15. If Yes, how have these activities affected the wetlands?

……

16. The disappearance of the wetlands has had serious consequences on the social, cultural and economic development of the people.

(a) Strongly agree. (b) Agree. (c) Uncertain. (d) Disagree. (e) Strongly disagree.

17. What measures have been put in place to reduce the effect of these activities in the wetlands on the social, cultural and economic development of the municipality? ……

SECTION D Existing wetland management and sustainability strategies

18. Are there any laws protecting the wetlands for sustainable use? (a)Yes. (b) No (if no go to Q 20)

19. If yes to Q 18 what are some of these laws? ……..

20. Has the Municipal Assembly got any environmental expectation for farmers, fishermen and all those who participate in activities in the wetlands?

(a) Yes (b) No

21. If Yes to Q 20 what are some of these expectations?

……

22. Do you have community outreach programmes? (a)Yes. (b) No

23. I Yes to Q22 what are they?.....

24. If Yes to Q 22 why do you have these outreach programmes?

……

25. Do you have any collaboration with the community in wetlands management? (a) Yes. (b) No

26. How do you collaborate? ……

27. Which groups, organizations or institutions do you work within the community on wetlands management?

……

28. Is there any collaboration among the Environmental Protection Agency (EPA) the Municipal Assembly (MA) and the Community Environmental Management Team on monitoring the activities of wetland users?

(a) Yes. (b) No

29. If Yes to Q 28 how do they collaborate?

……

30. What do you suggest must be done to strengthen the monitoring process?

APPENDIX III

QUESTIONNAIRE FOR THE DIRECTOR OF FORESTRY DEPARTMENT IN THE ASSIN NORTH MUNICIPALITY

I am a student of the University of Cape Coast pursuing a masters' programme in development studies. These sets of questions are designed to enable me complete my study on wetland management on social, cultural and economic development in the Assin North Municipality. All the information being solicited shall only be applied to the purpose of this research. The information provided shall, therefore, not be divulged to any third party without your prior approval. Please kindly respond to the questions to your best ability to enable this research to be completed successfully. Thank you.

SECTION A. Land Ownership and Practices in the Assin North Municipality

1. What is the estimated size of the wetlands in the Municipality?

……

2. Do you think that its size has reduced? (a) Yes. (b) No

3. How much is still intact today? a) All of it. (b) About half of it (c) a quarter of the total estimates. (d) Less than a quarter of the estimated (e) very little.

(f) I don't know

4. Who owns or controls these wetlands? (a) Government. (b) Individuals. (c) Tribes. (d) Chiefs. (e) Other (please specify).

SECTION B Importance of wetlands

5. Do you always inform the community about the importance of wetlands in their social, cultural and economic development? (a) Yes. (b) No (if no go to Q 7)

6. If Yes, to Q 5 how do you get them informed? ……

7. Do you think that the communities are aware of the importance of wetlands to their social, cultural and economic development?

(a)Yes. (b) No (if no go to Q 9).

8. If yes to Q 7 why do you think they know?

……

9. Wetlands are often considered amongst majority of the population as wastelands only fit to be reclaimed to support other economic activities.

(a) Strongly agree. (b) Agree. (c) Uncertain (d) Disagree. (e) Strongly disagree

10. In your opinion, do you see any importance of wetlands in the social, economic and cultural development of the people in the Municipality?

(a) Yes. (b) No

11. If Yes to Q 10 how do wetlands contribute to the social, economic and cultural development of the municipality

……

12. Do you think that more people are now engaged in activities in the wetland than in the past (a)Yes (b) No

SETION C Impediments to effective wetland management

13. What are some of the activities that go on in the wetlands?

……

14. What do you think has contributed to an increase in wetland activities in?

……

15. What activities do you think have mostly contributed to the reduction of the wetland? a)Farming. (b) Fishing. (c) Sand wining. (d) Settlements. (e) Garages and washing bay. (f) Refuse disposal (g) Others

16. Do you think that these activities have affected the wetlands in the Municipality? (a)Yes. (b) No

17. If Yes to Q 16 how have these activities affected the wetlands?

……

18. The disappearance of the wetlands has had serious consequences on the social, cultural and economic development of the people.

(a) Strongly agree. (b) Agree. (c) Uncertain. (d) Disagree (e)Strongly disagree.

19. Can you explain the ways through which the social, cultural and economic development of the people has been affected?

……

SECTION D Existing wetland management and sustainability strategies

20. Are there laws governing the protection of wetlands in the municipality? (a)Yes. (b) No

21. What are some of these laws?

……

22. Is the public aware of these laws? (a) Yes. (b) No

23. Do you have community outreach programmes? (a)Yes. (b)No (if no go to Q 25)

24.If Yes to Q23 what are they?

……

25. If Yes to Q 23 why do you have these outreach programmes?

……

26. Do you have any collaboration with the community on the protection of wetlands? (a) Yes. (b)No

27. How do you collaborate?.....

28. Which groups, organizations or institutions do you work within the community on the protection of wetlands?

……

APPENDIX IV

OBSERVATION SHEET FOR THE INTERVIEWER

Location of the wetland ……..

1. Are there economic activities seen around the wetlands? (a) Yes (b) No

2. What are the types of economic activities seen in and around the wetlands?

(a) Farming (b) Fishing (c)2 Irrigation (d) Charcoal (e) Refuse disposal. (f) other

4. Are there any signs for wetland degradation? (a) Yes. (b) No

5. If yes to Q 5 explain the type of degradation.

……

6. Could you say the wetland is sustainably utilized? (a) Yes. (b) No.

If Yes to Q 7 Why do you say so?

……

7. If No to Q 7 Why do you say so?

……

8. Currently are there any observed sustainable management interventions in the wetlands? (a) Yes (b) No

9.If yes to Q8 what are they? s

10. What do you suggest to ensure sustainable wetland management?