

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**FACULTY OF RENEWABLE NATURAL RESOURCES**

**DEPARTMENT OF SILVICULTURE AND FOREST MANAGEMENT**

**KNUST**

**THE INFLUENCE OF LAND TENURE AND OWNERSHIP REGIMES ON  
SUSTAINABLE CONSERVATION OF MANGROVES IN THE SONGHOR  
AND KETA LAGOON COMPLEX RAMSAR SITES IN GHANA.**

**BY**

**ADDA AWOBONGBA JACOB**

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ENVIRONMENTAL GOVERNANCE.**

**MAY, 2016**



## DECLARATION

I, Adda Awobongba Jacob solemnly declare that this research is the result of my own work towards the award of the MPhil Natural Resources and Environmental Governance and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any degree of the University, except where due acknowledgement has been made in the text.

ADDA AWOBONGBA JACOB .....  
(20287046) SIGNATURE DATE  
(STUDENT)

DR. WINSTON ASANTE .....  
(SUPERVISOR) SIGNATURE DATE

DR EMMANUEL ACHEAMPONG .....  
(CO-SUPERVISOR) SIGNATURE DATE

DR. EMMANUEL ACHEAMPONG .....  
(HEAD OF DEPARTMENT) SIGNATURE DATE

## DEDICATION

This work is dedicated to the almighty God for His guidance and protection throughout my two years of study in this University. Glory is to His name through the son Jesus Christ. Also to my late mother Madam Abavereba Adda, who never lived to enjoy the fruits of her labour. May her soul rest in perfect peace.



## ABSTRACT

Mangroves play significant roles in the socio-cultural and economic life of the people within the areas where they occur. They also have intrinsic ecological function of sustaining the ecosystem which includes soil stabilization, coastal protection, fish habitats and nurseries and vital sources of protein resources for coastal communities. In spite of their economic and ecological significance, mangroves in most coastal communities in Ghana have witness unprecedented exploitation of the resources leading to degradation of the ecosystem. In spite of the enormous effort directed at mangrove vegetation conservation and restoration, communities with mangroves keep losing the gains of the effort that has been invested in these initiatives because key issues relating to access, ownership rights and land tenure are often overlooked. An understanding of the governance issues relating to access, ownership rights and land tenure in the Sanghor and Keta Lagoon Complex Ramsar Sites could therefore bring good perspectives on mechanisms and interventions to adopt to ensure sustainable management of mangroves in Ghana. The specific objectives to the study were: to assess the effectiveness of existing ownership regimes in conserving mangroves resources, to explore how mangrove ownership (tenure) influences management regime of mangroves, to identify past and existing community based mangrove management interventions (socio-cultural practices) and explore challenges in effective implementation, and to explore the potential best management regimes for sustainable conservation. The study covered a total of eleven (11) communities including five (5) communities from the Sanghor Ramsar site in Ada and six (6) communities from Keta Lagoon Complex Ramsar site in Keta which were purposively sampled. A sample of 120 respondents was selected (60 from each of the two Ramsar sites in Ada and Keta respectively) purposively and interviewed using a

household questionnaire. Participatory Rural Appraisal (PRA) tools such as Key informant interviews, FGDs and direct observation were also employed in the study.

Data collected was analyzed using SPSS version 16 and Microsoft Excel.

The study discovered that the existing mangrove resources ownership regime has a direct bearing on mangrove vegetation conservation and utilization. Most of the existing mangrove ownership regimes (Community, Clan or Family) in the area give access to the people to exploit mangrove resources indiscriminately resulting in over exploitation leading to degradation. Though faced with a lot of challenges, there were evidence of community based mangrove management interventions supported by some NGOs and WD of the Forestry Commission of Ghana in the area. Sociocultural practices (taboos) towards mangrove conservation were more pronounced in the Keta area than in Ada partly because those of Ada were perceived to have been lost in the area with the passage of time.

Co-management of mangrove vegetation involving Government/NGOs and Communities or Individual ownership and management regime was envisaged as the best for sustainable conservation and utilization of the resource.

The main policy implication drawn from the findings is that future extension of mangrove management interventions by the Government (WD)/ NGOs to the area should focus exclusively on the emerging individual mangrove resource ownership regime. The individual ownership regime was perceived as more sustainable in terms of mangrove vegetation conservation than the existing community, Clan or family ownership regimes which are characterized by the open access regime resulting in unsustainable exploitation of mangrove resources in the area.



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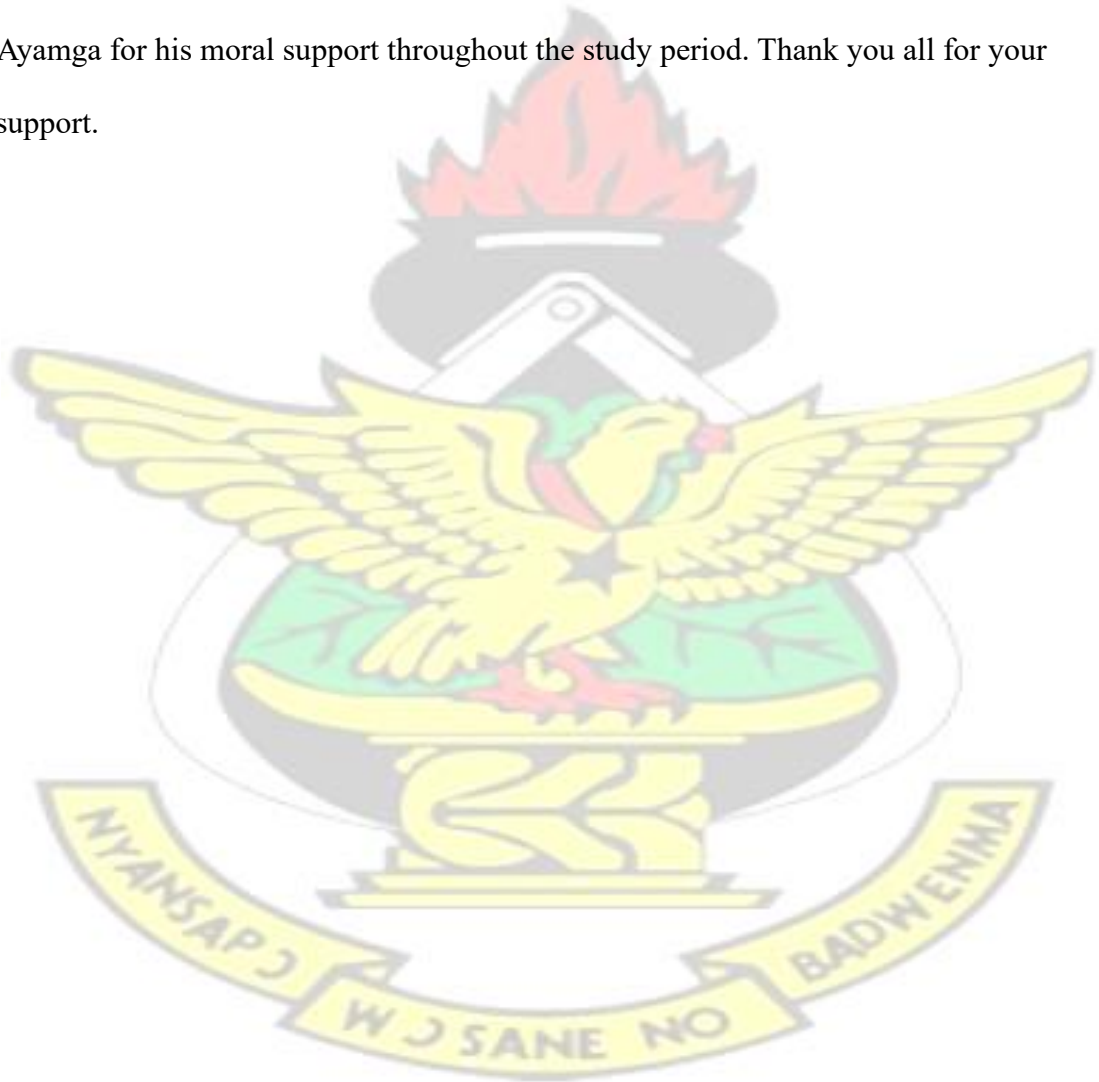
It is impossible to cite and credit individual lecturers of the Department of Silviculture and Forest Management for their contributions either directly or indirectly towards this study. My special appreciation and thanks therefore go to all the lecturers in the department for their constructive comments and suggestions that ensured a successful study.

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## TABLE OF CONTENTS

DECLARATION.....	i
DEDICATION.....	ii
ABSTRACT .....	iii
ACKNOWLEDGEMENT .....	v
TABLE OF CONTENTS.....	vii
LIST OF TABLES .....	xii
LIST OF FIGURES .....	xiv
LIST OF PLATES.....	xv
APPENDICES.....	xv
LIST OF ABBREVIATIONS.....	xvii
 <b>CHAPTER ONE: INTRODUCTION .....</b>	 1
1.1 Background to the study .....	1
1.2 Problem Statement .....	7
1.3 Justification .....	9
1.4 Aim .....	11
1.5 Research Questions .....	11
1.6 Specific Objectives .....	11
 <b>CHAPTER TWO: LITERATURE REVIEW .....</b>	 13
2.1 Mangrove Vegetation.....	13

2.2: Benefits of Mangroves .....	13
2.3 Human threats to Mangrove Conservation .....	14
2.4 Mangrove Ecosystem Services and the potential for Carbon Revenue Programmes .....	16
2.5 Land and Forest Tenure Systems affecting Mangrove Conservation and Management .....	17
2.6 Tenure Security and Mangrove Conservation .....	19
2.7 Issues of Tenure Security in Community Forestry .....	22
2.8 Tenure on the Commons and Mangrove Conservation. ....	24
2.9 Policy, Legal, Regulations and Institutional arrangements on Mangroves. ....	25
2.10 Initiatives towards Wetlands and Mangrove Management. ....	27
2.11 Community Based Mangrove Management. ....	31
<b>CHAPTER THREE: MATERIALS AND METHODS .....</b>	<b>34</b>
3.1 Study Area: .....	34
3.1.1 Physical characteristics (Ada) .....	34
3.1.2 Topography (Ada) .....	35
3.1.3 Drainage and Water Resources (Ada).....	35
3.1.4 Climate (Ada).....	36
3.1.5 Vegetation (Ada) .....	36
3.1.6 Geology (Ada) .....	37
3.1.7 Soil (Ada) .....	37
3.1.8 Population Size and Growth Rates (Ada) .....	38
3.1.9 Physical Characteristics (Keta) .....	38

3.1.10 Topography (Keta) .....	39
3.1.11 Drainage and water resources .....	40
3.1.12 Climate (Keta) .....	40
3.1.13 Vegetation (Keta) .....	41
3.1.14 Geology and Soils (Keta) .....	42
3.1.15 Population size and growth rate of Keta .....	43
3.2 Methodology .....	44
3.2.1 Research design .....	44
3.2.2 Data and Data sources .....	44
3.2.3 Data collection .....	45
<b>CHAPTER FOUR: RESULTS .....</b>	<b>50</b>
4.1 Socio-demographic characteristics of Respondents.....	50
4.1.1 Gender .....	50
4.1.2 Age .....	50
4.1.3 Migration status .....	51
4.1.5 Educational status .....	52
4.2 Existing Mangrove resources ownership regimes in the area:.....	53
4.2.1 Existing Mangrove resources user rights in the area .....	54
4.2.2 Existing Land ownership regimes in the area .....	55
4.3.1: Conditions of Mangrove vegetation under existing mangrove resources ownership regimes in the area .....	58

4.3.2: Ranking of effectiveness of existing mangrove resources ownership regimes in conserving mangroves in the area .....	62
4.5: Past and existing Community-based Mangrove management interventions ....	68
4.5.1: Socio-cultural practices towards conservation of mangroves in the area .....	68
4.5.2: Community based Mangrove management interventions in the area .....	69
4.5.3: Challenges to Community based Mangrove management interventions .....	70
4.5.4: Presence of supporting Social Institutions/NGOs in the area .....	70
4.5.5: Household involvement in activities of supporting Institutions/NGOs and sources of their (household) information on mangroves conservation. ....	71
4.6: Best sustainable management regimes in the area .....	72
5.1 Socio-demographic characteristics of Respondents.....	74
5.2 Effectiveness of existing ownership regimes (tenure) in conserving Mangrove vegetation .....	76
5.3 How mangrove resources ownership (tenure) influence mangrove vegetation management regimes .....	80
5.4 Existing community based Mangrove vegetation management interventions in the area .....	83
5.4.1 Challenges in effective implementation of Community based Mangrove vegetation management interventions .....	85
5.4.2 Socio-cultural practices (taboos) towards Mangrove vegetation conservation in the area .....	86
5.5 Best sustainable mangrove resources management regimes: Implications for conservation and utilization in the Sanghor and Keta complex RAMSAR	

sites. ....	87
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## CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS ..... 92

6.1 CONCLUSION .....	92
6.2 RECOMMENDATIONS .....	94

## REFERENCES ..... 96





## LIST OF TABLES

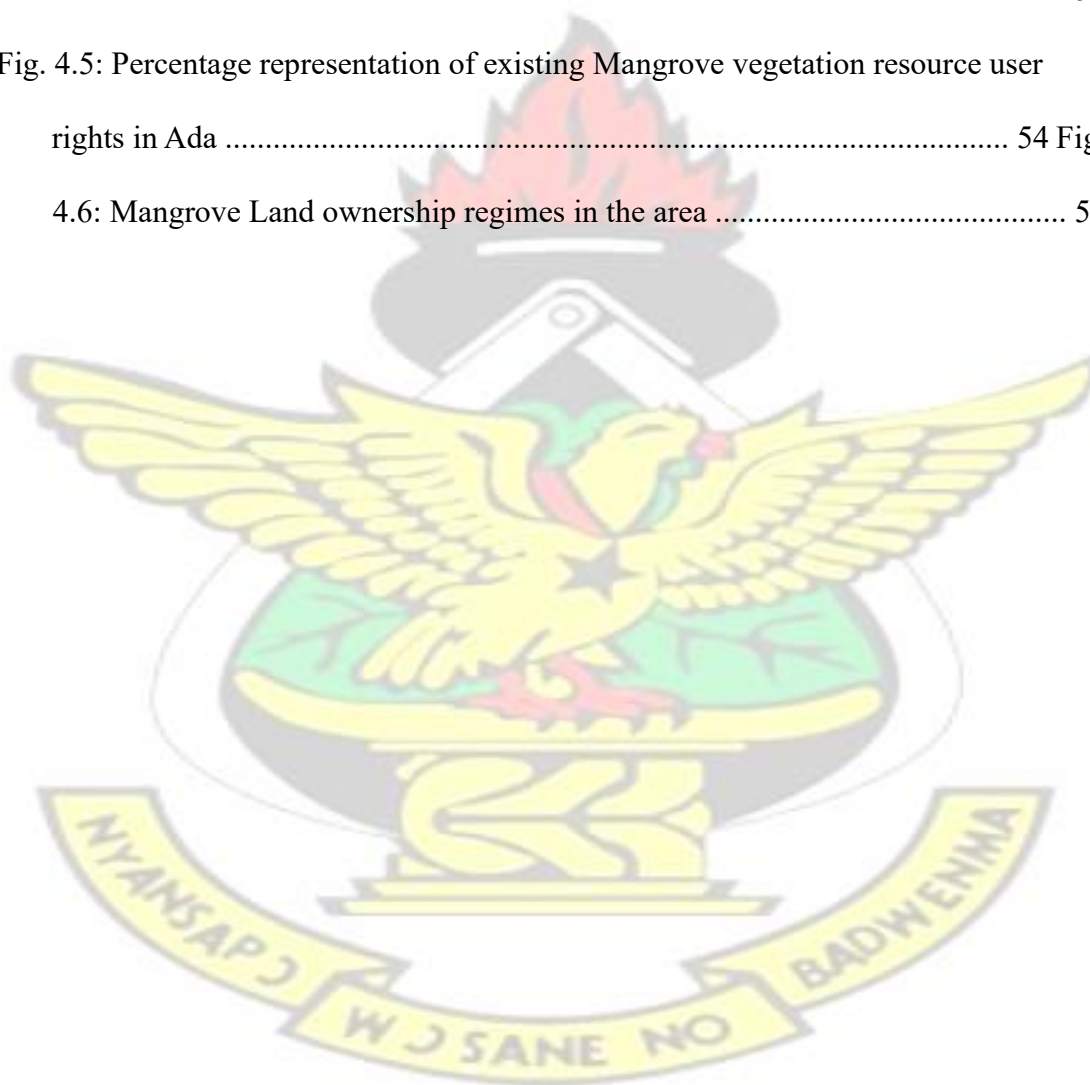
Table 3.1: Selected study communities under the Sanghor and Keta Lagoon	
Complex Ramsar Sites in Ada and Keta respectively .....	34
Table 4.1: Gender distribution of Respondents .....	50
Table 4.2: Average age of Respondents in years .....	50
Table 4.3 Migration status of Respondents.....	51
Table 4.4: Marital Status of Respondents .....	51
Table 4.5: Perceived effectiveness of the various ownership regimes in conserving mangroves .....	57
Table 4.6: Current condition of Mangrove vegetation under existing ownership regimes in two districts .....	59
Table 4.7: Condition of Mangrove vegetation under existing ownership regimes five (5) years ago in two districts .....	60
Table 4.8: Expected condition of Mangrove vegetation in five (5) years under ownership regimes in two districts .....	61
Table 4.9: Pairwise ranking of perceived effectiveness of Existing Mangrove ownership regimes in conserving Mangroves resources in Ada .....	62
Table 4.10: Pairwise ranking of perceived effectiveness of Existing Mangrove ownership regime in conserving Mangrove resources in Keta .....	63
Table 4.12: Mangrove vegetation conservation problems in the area .....	66
Table 4.13: How existing mangrove resources ownership regimes influence management of mangrove vegetation .....	67
Table 4.14: Community responses to mangrove resources access challenges under existing ownership regimes .....	68

Table 4.15: Community based Mangrove management interventions in the area .....	69
Table 4.16: Presence of supporting Social Institutions (NGOs) in the area .....	71
Table 4.17: Household respondents belonging to mangrove vegetation conservation supporting Organizations / Institutions in the area .....	72
Table 4.18: Sources of Household information on mangrove vegetation conservation in the area .....	72
Table 4.19: Proposed best sustainable management regimes by Respondents in the area .....	73



## LIST OF FIGURES

Fig 4.1: Educational Status of Respondent in the area .....	52
Fig 4.2: Occupational status of Respondents in the area .....	53
Fig 4.3: Percentage representation of existing Mangrove ownership regimes in Ada .....	53
Fig. 4.4: Percentage representation of existing Mangrove ownership regimes in Keta .....	54
Fig. 4.5: Percentage representation of existing Mangrove vegetation resource user rights in Ada .....	54 Fig.
4.6: Mangrove Land ownership regimes in the area .....	55



## LIST OF PLATES

Plate 3.1: Mangrove vegetation at Kwalypoyom (MOU community ownership) in Ada .....	37
Plate 3.2: Researcher by Mangrove vegetation at Bomigo in Keta .....	42
Plate 3.3: Mangrove vegetation at Anyanui .....	42
Plate 3.4: Mangrove fuel wood market at Anyanui in Keta .....	44
Plate 3.5: Mangrove fuel wood awaiting loading to other places at Anyanui in Keta .....	44
Plate 3.6: Travelling by canoe from Tunu to Bomigo in Keta for data collection .....	46
Plate 3.7: Focus group discussion at Obane in Ada .....	47
Plate 3.8: Focus group discussion at Anyanui in Keta .....	47
Plate 3.9: Interview with Key informants at Ayigbo in Ada .....	48
Plate 3.10: Interview with key informant at Bomigo in Keta .....	48
Plate 3.11: Seedlings for supported restoration project by WD/NGOs in Ada .....	48
Plate 3.12: Seedlings for supported restoration project by WD/NGOs in Keta .....	48
Plate 3.13: Degraded mangrove vegetation at Bomigo in Keta .....	49
Plate 3.14: Degraded mangrove vegetation at Pute in Ada .....	49
Plate 4.1: Cutting of young mangroves for fuel wood at Tunu in Keta .....	65

## APPENDICES

APPENDICES .....	107
------------------	-----

### APPENDIX I: Questionnaire on the influence of Land tenure and ownership

regimes on sustainable conservation of mangroves in the

Songhor and Keta lagoon complex Ramsar sites in Ghana. ....	107
---	-----

### APPENDIX II: Interview guidelines for Government Officials and Officials of

Non –Governmental Organizations. ....	117
<b>APPENDIX III:</b> Focus Group Discussions guidelines for the Local Community. ..	119

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## LIST OF ABBREVIATIONS

ATIDEV- Tree Development Initiative at Anyanui in Keta

CBMM- Community Based Mangrove Management

CBNRM- Community Based Natural Resource Management

CIDA- Canadian International Development Agency

EAP- Environmental Action Plan

FAO- Food and Agriculture Organisation

FGD- Focus Group Discussion

FWP- Forest and Wildlife Policy

GEF- Global Environment Facility

GEO- Green Earth Organisation

GSS- Ghana Statistical Service

ICZM- Integrated Coastal Zone Management

ITTO- International Tropical Timber Organisation

IUCN- International Union for the Conservation of Nature

MES- Ministry of Environment and Science

MLF- Ministry of Lands and Forestry

MLFM- Ministry of Lands Forestry and Mines

MOU- Memorandum of Understanding

NEP- National Environment Policy

NGOs- Non-Governmental Organisations

NWCSAP- National Wetlands Conservation Strategy and Action Plan

NWP- National Wetland Policy

PES- Payment for Ecosystem Services

REDD- Reduced Emissions from Deforestation and Degradation SNV-  
Netherlands Development Organisation

SPSS-Statistical Package for Social Scientists

TDP- Tourism Development Policy

UNEP- United Nation Environment Programme

WD- Wildlife Division

WRI- World Resources Institute



## CHAPTER ONE: INTRODUCTION

### 1.1 Background to the study

Ghana is one of the Africa countries well-endowed with numerous natural resources, including mangroves. As an integral part of the natural resource endowment of the country and mostly found along the coast, tidal river estuaries and lagoons, mangroves conservation and protection is paramount in sustaining the resource to ensure its continued delivery of socio-economic and environmental services.

Mangroves are a generally classified as salt-tolerant, flowering trees mostly found in tropical and sub-tropical regions (Ellison and Stoddart, 1991). Mangrove has been defined by Duke (1992) as a “tree, shrub, palm or ground fern, generally exceeding more than half a meter in height, and which normally grows above mean sea level in the inter tidal zones of marine coastal environments, or estuarine margins”.

Mangroves play vital roles in the socio-cultural and economic life of the people within the areas where they occur. Soil stabilization, coastal protection, fish habitats and nurseries as well as sources of protein remain some of the intrinsic ecological functions of mangroves for most coastal communities. According to Macintosh and Ashton (2002), mangroves have intrinsic ecological function of sustaining the ecosystem which includes soil stabilization, coastal protection, fish habitats and nurseries and vital sources of protein resources for coastal communities. Mangroves are also said to be one of the most productive ecosystems on the world as they serve as significant natural filtration systems for most pollutants (Macintosh and Ashton, 2002).

These notwithstanding, mangrove ecosystems act as barriers between coastal communities and coastal storms by protecting people against some of these natural disasters. The disappearance of the mangroves will result in the loss of the ecosystem

services they provide and this will ultimately impact negatively on the livelihoods of the beneficiary communities.

The economic and financial benefits of mangroves cannot also be overemphasized. Wilkie and Fortuna (2003) concluded that about 14,650,000 ha of coastline globally are occupied by Mangrove forest. Mangrove resources are said to have an economic value in the order of 200,000-900,000 USD ha<sup>-1</sup> according to the UNEP-WCMC (2006) report. Alongi (2002) opined that irrespective of their monetary or economic value, mangrove ecosystems serve as vital habitats especially in most developing countries impacting positively on sustainability and livelihoods. They are utilized traditionally for food, timber, fuel, and medicine (Saenger, 2002). Mangrove forests are generally important nursery grounds and breeding sites for mammals, crustaceans, fish, shellfish as well as reptiles and a renewable source of wood while also serving as sites for accumulation of sediment, nutrients and contaminants (Twilley, 1995; Kathiresan and Bingham, 2001; Manson et al., 2005). Irrespective of their importance, mangrove forests in Ghana are in a very poor state. There is high rate of degradation in recent times as a result of several threats to different stages of their development.

As associated generally with a common property resource, the management of mangrove vegetation may be affected by the existing and prevailing tenure systems. Issues relating to access, ownership rights and tenure are likely to pose a threat to the management and sustainable utilization of mangrove resources in most coastal communities in Ghana.

Bruce (1989) explained common property resources to mean resources held in common. This concept gained popularity when Hardin (1968) propounded the concept of “tragedy of the commons” to explain how resources held in common are inevitably



overexploited and degraded. However many scholars have argued that in an open access situation, the danger of degradation is clear but in a situation where there is ownership and potential of exercising mechanisms of control, Hardin's theory could be misleading.

The two natural resource tenure systems existing and operating simultaneously in Ghana include the customary and the state. The customary tenure is based on the traditions of the local communities and the state tenure is the administrative system governed by the state rules and regulations (FAO, 1995). Bruce (1989) defined the term tenure to mean a legal concept depicting a bundle of both rights and obligations. He further explained that this includes the right to own, hold, manage, transfer or exploit resources and land with an obligation not to use these in a way harmful to others. It defines the property and what a group or individual can do with it. Moreover, tenure is also a social institution involving traditional practices, customary and formal laws. ITTO (2007) suggested that natural resource tenure in many rural communities does not only portray their relationship to the land and the natural resources on it but also includes the relationship between community members and those outside it, in terms of rights and obligations on the control and use of natural resources. Tenure determines ownership and access to natural resources, which is a prerequisite to use and benefits from such resources. It is a key means to survival in any community as it determines the access to and use of the resources (ITTO, 2007). Social identification with a community is therefore an important prerequisite for access to natural resources.

The dynamics of property rights is very complex in community forestry as observed by Luuintel and Chhetri (2008) and mangrove resources are not an exception.

Lunintel and Chhetri (2008) further posited that the diversity of community forest resources makes it complex to define tenure arrangements and property rights in society. They observed that the same mangrove vegetation may produce a variety of products



(such as fuel wood, roots, branches, timber, seeds, barks) and services (such as watershed maintenance, ground water recharge, carbon sequestration, animal habitats ecotourism etc.). Communities as well as individuals possess and enjoy the same or different legal rights on the different products and services provided by the mangrove vegetation in question (Luintel and Chhetri, 2008). Again a community or individual may exhibit rights to all kinds of uses of a particular resource, yet in other circumstances a community or individual may not exhibit this right of all kinds of uses of a particular resource; while in other cases those communities and individuals may put their claims on more than one type of use of the same resource resulting in conflict (Luintel and Chhetri, 2008). Luintel and Chhetri (2008) are of the view that use rights should include taking the responsibility to manage the resources and this according them adds an additional dimension to the complexities in defining and practicing the tenure security and property rights of community mangrove vegetation. Luintel and Chhetri (2008) also opined that, the rules and practices governing the use of mangrove resources may be dynamic and may change with the passage of time and space.

Luintel and Chhetri (2008) also concluded that most the mangrove-dependent communities are heterogeneous in nature, hence are historically embedded with unequal power relations which define property rights in unjust ways. Rechelean and Edmunds (1997) also observed that women dalits, indigenous people, ethnic and religious minority etc. have not had enough political space in shaping property right regimes in community forestry and adequate access to land and forest resources in spite of their high dependence on such resources for subsistence. Luintel (2006) is of the view that community people's usufruct rights and interest may be trampled upon by forest bureaucracies and interest of donors through their dominating roles in formulating forest policies at the national level.

Bruce (1989) contended that, the concept of rights in natural resources has to do with security of tenure and this exerts tremendous influence on how land and these resources are used. There is general agreement that tenure security is one important factor for farmers' willingness to make investment in land improvement (Birgegard, 1993). WRI (2005) pointed out that secure tenure is the certainty that a person's rights to continuous use of land and a particular resource are recognized and protected against any challenges from individuals and the state. This surety and certainty according to Bruce (1989) serve as a good incentive for people to make long-term investments in maintaining or enhancing the productivity of that property.

Insecure tenure portrays lack of assurance that one's land or resource rights will be respected over time (WRI, 2005). ITTO (2007) observed that where insecurity acts as disincentive to long-term investment, deterioration of land quality becomes the order of the day. Tenure rights over mangrove resources is also affected by insecurity since the ultimate benefits from good stewardship depend heavily on long time sustainable mangrove forest management practices. This will influence sustainable forest management practices such as tree planting if their tenure over the mangrove forests is restricted and they cannot count on reaping the benefits of such practices. The potential sources of insecurity of tenure are varied and include annual redistribution of parcels of land and where state legislation claims ownership of trees growing on holding and requires permit to gain use rights (Bruce, 1989).

Losing the mangroves will also result in the loss of all the ecosystem benefits associated with the mangroves such as improvement in fish stocks. This ultimately will have financial implication for coastal communities whose livelihoods depend in part or whole on coastal resources such as fishes.

Poverty and environmental degradation are often characterized as being part of a vicious cycle. Poverty is believed to have stimulated increased non-sustainable practices for local resources such as mangroves and wetlands (Katerere, 2007). In Ghana, the degradation of the coastal environment is linked to the persistence of poverty and the pervasiveness of income disparities in much of the coastal areas (Katerere, 2007).

This unprecedented natural resources degradation and depletion at both global and national levels has prompted Ghana to ratify many conventions. At the international level, the country ratified for example, the Ramsar Convention in 1988. The prime focus of this convention is the protection and conservation of wetlands of international importance. One major obligation under the convention is to ensure the implementation of the principle of “wise use” of these wetlands and their resources.

While the threats to mangrove degradation are observed almost everywhere globally, they are most likely triggered by issues of governance related to access, ownership rights and tenure especially in tropical Africa and Ghana is not an exception.

Within the context of coastal environment, the government and also non- governmental agencies have shown commitment towards the protection and management of the natural resources as indicated by the drafting of the coastal zone management indicative plan, integrated coastal zone plan, coastal zone profile of

Ghana and initiated projects (ITTO, 2007).

Traditional taboos/regulations and national laws appear to be working synergistically to enhance mangrove protection in some communities but majority of communities have only the traditional taboos (Nunoo and Agyekumhene, 2014).

The fragmentary nature of the existing environmental laws coupled with lack of their enforcement renders the national laws less effective in protecting mangroves. This study

therefore focused exclusively on exploring the governance issues related to access, ownership regimes and land tenure affecting sustainable conservation of mangroves in the Songhor and Keta complex Ramsar sites in Ada and Keta in the Greater Accra and Volta Regions of Ghana respectively.

## **1.2 Problem Statement**

Despite their importance, mangrove forests in Ghana are in a very poor state. There is high rate of degradation in recent times as a result of several threats to different stages of their development. Young mangroves and seedlings are grazed by goats and sheep. Threats to matured mangrove forest identified in the coastal areas of Ghana include cutting mangrove for fuel wood, conversion of mangrove areas into settlements, wildfires, pollution in the form of refuse dumping and “galamsey” (Small scale mining), and natural death from disease. The threats combined have resulted in the loss of over 47.2% of Ghana’s original mangrove cover between 2006 and 2014 (Nunoo and Agyekumhene, 2014). With the current trend of 8.1 km<sup>2</sup> per annum mangrove loss, Ghana’s mangrove cover is likely to be completely lost in the next eight to ten years if immediate measures are not put in place to halt the degradation ( Nunoo and Agyekumhene, 2014). Losing the mangroves will also result in the loss of all the ecosystem benefits associated with the mangroves such as improvement in fish stocks. This will have financial implication for coastal communities whose livelihoods depend in part or whole on coastal resources such as fishes.

Recently however, the world has begun to appreciate the importance of mangrove vegetation and the numerous benefits that can be obtained from mangrove resources hence there has been a deliberate effort towards mangrove conservation to ensure its continuous support. Several mangrove vegetation restoration and conservation initiatives have been carried out by the Wild Division of the Forestry Commission in



collaboration with some NGOs at the Sanghor and Keta Lagoon complex in Ada and Keta respectively. However, the conservation and sustainable utilization of Mangrove resources in the area remain inconsistent with these efforts and initiatives. In spite of the enormous effort directed at mangrove vegetation conservation and restoration, communities with mangroves keep losing the gains of the effort that has been invested in these initiatives because key issues relating to access, ownership rights and land tenure are overlooked. While issues relating to access, ownership rights and land tenure have been thoroughly studied in terrestrial vegetation, those of mangroves remain largely limited. For instance, the role of land tenure and ownership regimes and how it influences access and utilization of mangrove resources has not been researched in Ghana. Lack of empirical data related to issues of access, ownership rights and land tenure will therefore render any mangrove vegetation restoration or conservation initiative ineffective as these issues are very paramount in determining how community resources are managed and utilized. An understanding of the governance issues relating to access, ownership rights and land tenure in the Sanghor and Keta Lagoon Complex Ramsar Sites could therefore bring good perspectives on mechanisms and interventions to adopt to ensure sustainable management of mangroves in Ghana.

### **1.3 Justification**

In Ghana, two natural resource tenure systems operate simultaneously. These are the state and customary tenure systems. The customary tenure is based on the traditions of the local communities and the state tenure is the administrative system governed by the state rules and regulations (FAO, 1995). Bruce (1989) explained the concept tenure to mean bundle of both rights and obligations. He posited that it includes the rights to own, hold, manage, transfer or exploit the land and natural resources on it while also ensuring that these uses or actions do not harm others. It defines the property and what a group



can do with it. Moreover, tenure is also a social institution involving traditional practices, customary and formal laws. In many rural communities, natural resources tenure does not only depict a relationship between the people, the land and the natural resources but also the link between members of the community and those outside it, in terms of rights and obligations on the control and use of these natural resources. Therefore, it shapes ownership and access rights to natural resources which is a prerequisite to use and benefits from these resources.

While arrangements exist for the management of forest, wildlife other natural resources such as water, managed by the Water Resources Commission and having a national policy regulating its use, mangroves in Ghana have not benefited from such policies and rigorous attention and importance due to their perceived relatively low value, emanating partly from the extent of their coverage.

Despite increased awareness about the importance of mangroves and mangrove vegetation restoration efforts promoted by Non-Government Organizations (NGOs), the condition of the mangrove vegetation in the Ghana continue to decline considerably.

Even though the high carbon sequestration potentials of mangroves provide a good opportunity for Ghana under the REDD+ mechanism, issues of governance relating to access, ownership rights and land tenure pose greater challenges and these may derail the country's chances of taking advantage of this all important initiative.

In Ghana, one of the main reasons identified as contributing to poor mangrove management is inadequate information on issues related to access, ownership rights and land tenure. Existing information on mangrove forests in Ghana is fragmentary, incomplete, and mostly outdated (Nunoo and Agyekumhene, 2014).

In Ghana, urbanization, high population growth, and economic activities such as salt and sand mining constitute significant threats to the sustainable management of the mangrove ecosystems along its coast. Even though these remain as threats, lack of information on issues related to land tenure and ownership regimes continue to militate against efforts towards mangrove vegetation restoration and conservation. While issues relating to access, ownership rights and land tenure have been thoroughly studied in terrestrial vegetation, that of mangroves remain largely limited. Efforts at sustainable conservation and management of mangrove vegetation are hampered by scarce data inventories on issues relating to land tenure, access and ownership regimes. There is therefore the need to find tools appropriate for sustainable mangrove management in the country by first looking at governance issues relating to tenure, access and ownership rights.

This research therefore seeks to explore governance issues relating to access, ownership rights and land tenure regimes, in the Sanghor and Keta Lagoon Complex Ramsar sites in Ada and Keta respectively to provide baseline information to develop community-based mangrove management interventions and strategies to ensure sustainability of the mangrove ecosystems in Ghana.

#### **1.4 Aim**

The research is aimed at exploring issues of governance relating to access, ownership rights and land tenure regimes and how these influence the sustainable utilization of mangroves in the Songor and Keta Complex Ramsar sites in Ghana.

#### **1.5 Research Questions**

- What are the existing mangroves ownership regimes in the area?
- What are the challenges facing the existing ownership regime?

- To what extent does the existing ownership regime affect management regimes and hence mangroves conservation in the area?
- What are the management regimes (socio-cultural practices) deployed by the local people in conserving mangroves in the area?
- What are the effects of mangrove degradation in the area?
- What are the most appropriate management regimes for sustainable conservation of mangroves resources in the area?

### **1.6 Specific Objectives**

- To assess the perceived effectiveness of existing ownership regimes in conserving mangroves resources
- To explore how mangrove ownership (tenure) influences management regime of mangroves
- To identify past and existing community based mangrove management interventions (socio-cultural practices) and explore challenges in effective implementation.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Mangrove Vegetation**

Mangrove biodiversity and conservation has received significant attention in the recent past as research has increased the understanding of values, functions and attributes of mangrove ecosystems and the role they play in providing important ecological services and livelihoods for the mangrove associated communities (Attuquayefio and Fobil, 2005)

Mangroves are unique ecosystems occurring along the sheltered inter-tidal coastlines, mudflats, riverbanks in association with the brackish water margin between land and sea in tropical and subtropical areas (IUCN, 2005). They sustain diverse flora and fauna species in large proportion and provide many ecosystem services such as coastal protection from storm, reduction of shoreline and riverbank erosion, stabilizing sediments and absorption of pollutants.

### **2.2: Benefits of Mangroves**

Mangroves are very important for various reasons, including the provision of a large variety of wood and non-wood forest products; coastal protection against the effects of wind, waves and water currents; conservation of biological diversity, including a number of endangered mammals, reptiles, amphibians and birds; protection of coral reefs, sea-grass beds and shipping lanes against siltation; and provision of habitat, spawning grounds and nutrients for a variety of fish and shellfish, including many commercial species (FAO, 2006).

According to Wang et al. (2003), in Tanzania approximately 150 000 people earn their livings from mangrove vegetation. The Rufiji Delta is the largest estuarine mangroves forest in Tanzania. It contains nearly half of the mangroves in Tanzania. It is one of the



most ecologically important areas in Tanzania country. It supports a large number of other plants and animals indigenous to mangroves, thus, presenting a unique ecological unit. Literature provided by Wang et al (2003) indicates that approximately 49,799 and 48,030 hectares of mangroves existed in Rufiji district in 1990 and 2000, respectively.

Mangroves have tremendous social and ecological value. The annual economic value of mangroves, estimated by the cost of the products and services they provide, has been estimated to be \$200,000 - \$900,000 per hectare (Wells et al. 2006). The mangrove ecosystem provides income from the collection of the mollusks, crustaceans, and fish that live there. Mangroves are harvested for fuel wood, charcoal, timber, and wood chips.

Other mangrove services include the filtering and trapping of pollutants and the stabilization of coastal land by trapping sediment and protection against storm damage.

### **2.3 Human threats to Mangrove Conservation**

Although mangrove ecosystems have tremendous value for coastal communities and associated species, they are being destroyed at alarming rates. Over the last 50 years, about one-third of the world's mangrove forests have been lost (Alongi, 2002). Human threats to mangroves include the overexploitation of forest resources by local communities, conversion into large scale development such as agriculture, forestry, salt extraction, urban development and infrastructure, and diversion of freshwater for irrigation (UNEP 1994). The greatest human threat to mangroves is the establishment of shrimp aquaculture ponds. Because mangroves are often viewed as wastelands, many developing countries are replacing these forests with agricultural land and/or shrimp aquaculture production (Franks and Falconer 1999). Shrimp aquaculture accounts for the loss of 20 to 50 percent of mangroves worldwide (Primavera 1997). Projections



suggest that mangroves in developing countries are likely to decline another 25 percent by 2025 (Ong and Khoon 2003). In some key countries like Indonesia, which has the world's largest intact mangroves, the projected rate of loss is even higher with 90 percent loss in some provinces like Java and Sumatra (Bengen and Dutton 2003). In addition to these anthropogenic threats, mangroves are also threatened by the impact of global climate change. Global climate change and concomitant effects such as changes in temperature and CO<sub>2</sub>, altered precipitation patterns, storminess, and ecstatic sea-level rise as observed over recent decades, are due primarily to anthropogenic activities. Most of the observed warming over the last 50 years is attributed to an increase in greenhouse gas concentrations in the atmosphere (Houghton et al. 2001).

Literature indicates that even in places like Tanzania where mangroves are reserved by law, legally and declared as reserve forests (Holmes, 1995), the capacity to effectively enforce this law has remained a challenge, thus, the mangroves have not been spared.

The coastal area of Ghana makes up less than 7% of the national land area but it is currently occupied by 25% of approximately 24.6 million population of Ghana (Government of Ghana, 2010) as a result of migration from inland areas into these areas. With this high population occupying the 550 km long coastline, there is increased demand and competition on the few resources in the area resulting in overfishing, poor sanitation, wetland degradation and coastal erosion (Armah and Amlalo 1998). Most wetlands in Ghana, for instance, are degraded as a result of increased human pressures resulting in over-exploitation, drainage, conversion, pollution and other conflicting land-use practices (RAMSAR, 2001).

## **2.4 Mangrove Ecosystem Services and the potential for Carbon Revenue**

## **Programmes**

Mangrove forests are a key marine biome (Valiela et al. 2001; Bouillon et al. 2009; Spalding et al. 2010) supplying ecosystem goods and services (Daily and Matson 2008) that include water quality control, fisheries production, nursery habitats and storm protection (Ewel et al. 1998; Naylor et al. 2002; Mumby et al. 2004; Faunce and Serafy 2006; Alongi 2008; Nagelkerken et al. 2008; Walters et al. 2008). Like other forests, mangroves are efficient carbon dioxide sinks and their conservation and restoration can play a significant role in climate change mitigation strategies (Chmura et al. 2003; Koyama et al. 2008; Kristensen et al. 2008; Laffoley and Grimsditch 2009). Globally, mangrove forests are being lost at an alarming rate from pollution, land clearance, coastal development, natural disasters and climate change (FAO 2007; Spalding et al. 2010). In the Pacific, which has the world's highest mangrove biodiversity (Ellison 2009), climate change is expected to have pronounced effects upon marine ecosystems and exacerbate existing pressures (Duke et al. 2007). One possible solution to conserving mangrove forests is the use of payments for ecosystem services (PES). Wunder et al. (2008) defined PES as 'a voluntary transaction where a well-defined environmental service... is bought by a service buyer... from a service provider'. In the terrestrial sector, the ability of forests to sequester carbon has led to the quantification, purchase and trade of this ecosystem service through carbon 'credits' (Katila and Puustjarvi 2004; Pagiola and Platais 2007). Under such programmes, forest landowners are compensated for carbon sequestration by credit purchases from external buyers (to 'offset' the external buyer's emissions). In return, forest landowners protect existing forest and/or enhance CO<sub>2</sub> uptake through planting. PES programmes hold promise for combining conservation efforts with carbon sequestration goals.

PES and carbon credit systems may offer ‘convergent opportunities’ as adaptive management tools to achieve the dual goals of poverty reduction and protection of global marine carbon sinks. Management of carbon sinks can be included in developing Pacific island nations’ national greenhouse gas inventories and sequestration, thereby contributing to climate mitigation commitments (Laffoley and Grimsditch 2009). Additionally, mangrove protection via carbon credit schemes can be achieved through, or in concert with, well-established marine management approaches, such as marine protected areas and fisheries planning (Laffoley and Grimsditch 2009).

## **2.5 Land and Forest Tenure Systems affecting Mangrove Conservation and Management**

The two natural resource tenure regimes existing and operating simultaneously in Ghana are the customary and the state tenure regimes. The former regime is generally centered on the traditions of the local communities while the latter is governed by the state rules and regulations (FAO, 1995). According to Bruce (1998), tenure refers to bundle of both rights and obligations. He posited that these include the rights to own, hold, manage, transfer or exploit resources and land but also obligation not to use these in a way that harms others. In many rural communities, natural resource tenure as a social institution, defines not only their relationship to the land and natural resources but also the relationships between members of the community and those outside it, in terms of rights and obligations on the control and use of natural resources. Therefore, it governs ownership and access to natural resources which is a gateway to use and benefits from these resources.

Birgegard (1993) referred to it simply as the terms and conditions on which natural resources are held and used. Tenure defines property and what can be done with it. It

also defines who controls these assets, who benefits from them and where the power to make decisions about them is vested.

As a social institution, it defines not only relationship of a community to the land and natural resources but also the relationships between members of the community and those outside it, in terms of rights and obligations on the control and use of natural resources (Birgegard, 1993). It is a key means to survival in any community as it determines the access to and use of the resources (ITTO, 2007). Social identification with a community is therefore an important prerequisite for access to natural resources.

Natural resources cover a range of natural assets such as land, water, rivers, forest, fisheries and other natural assets. In the broad context of land tenure, rivers, forest and other natural resources on land constitute the objects of tenure. A community's rights to these natural resources define their natural resource tenure (WRI, 2005).

Based on ecological and management arrangement, there are three broad types of tenure situation or niche. These are the agricultural holding, the commons and government forest reserve (ITTO, 2007). In the agricultural holding, the key tenure issue is the extent to which the farmer has the security of tenure to invest in trees because they are slow growing and constitute long-term investment. In the commons, it is the effectiveness of community resource management and the capacity of the community to exclude outsiders from the use of the resources. The reserves are created to protect forest from non-sustainable use in free access or ill-controlled commons situation. It is only through licensing from the state or accepted custom can one have the rights to gather forest products from reserve (Bruce, 1989).



## 2.6 Tenure Security and Mangrove Conservation

The term 'tenure security' in forestry is understood differently by different groups of people. A very common definition of tenure security holds that it is equivalent to undisputed ownership of any property, i.e. defensible claim over certain resources. That is, it is as secure condition under which any property or resource is held by individuals or groups (Luintel and Chhetri, 2008). Some define it as the degree to which an individual or group feels its relationship with land or other resources that support them in jeopardy (Poffenberger 1990). Resource tenure consists of the social relations and institutions governing access to and use of land and natural resources (Maxwell and Weibe 1998). It determines who is allowed to hold or access, transfer and use any of the specified resources within a defined timeframe. The tenure is also associated with responsibilities. The tenure security generally includes certain bundles of rights that a person or community holds in the form of land, trees or other resources (Bruce 1989). The bundle of rights may be either de facto (held and promoted by communities) or de jure (held and promoted by the state) in origin. Community forestry tenure involves everyday practices of community forest user groups that legitimize and enforce claim over community forest resources (Vandergest 1997). A tenure arrangement in community forestry is generally shaped by community members' social relations, including gender, class, kin, political, economic and legal relations. It is complex, ambiguous and constantly renegotiated temporally and spatially as communities' and individuals' interests and aspirations change. It needs to be determined with the consensus of all community member and stakeholders concerned and properly communicated to all of them in a convincing way so that they accept, remember and help legitimately enforce the rights and duties.



The knowledge held and practices promoted both by communities (often known as de facto owners) and by state agencies (often known as de jure owners) in defining community forestry tenure, including property rights, may be overlapping, complementary and conflicting in nature at different level and forms. In fact, both types of ownership rights-de facto and de jure- together may assist in defining just tenure security and property rights regimes in the context of community forestry.

(Bruce, 1989)

The tenure rights in community forestry can be distinguished as operational-level rights (rights to access and withdrawal) and collective-choice level rights (rights to management, exclusion and alienation) (Schlager and Ostrum 1992, Agrawal and Ostrum 2001). Each of these rights has its own jurisdiction such as: access rights defines the physical property to enter (authorized user); withdrawal rights defines the products or resources to be obtained (authorized user); management rights defines regulating internal use pattern and transforming resources for improving them (claimant); exclusion rights defines who will have access rights and how this may be transferred (proprietor); and alienation rights defines the right to sell or lease the management and exclusion rights (owner). Looking at the community forestry practices, forest users may be authorized users, claimants and to some extent proprietors and owners. In case of forest products that are used for daily subsistence purpose such as timber, fuel wood, grass, leaf litter, medicinal plants, etc., communities hold all types of rights. However, for specific forest products such as timber from tree species like Sal (*Shorea robusta*) and Khair (*Acacia catechu*), the community forest users enjoy only claimant rights as these species are restricted for harvest for sale. Similarly, the users do not hold any rights to change the land use of the community forest. Community forest user groups are given all or some of abovementioned property rights over community forest

resources as a result of the policies and practices on decentralization in the forestry sector.

The bundle of “de jure” property rights that local people or forest users get largely depends on the interests and effective mobilization of communities and local actors to benefit from the opportunities created by the state’s forestry decentralization arrangements. In addition, de facto property right systems, which are locally suitable and financially and ecologically sustainable, also prevail among community forest users.

The question of rights in natural resources concerns security of tenure (Bruce, 1989) and security of tenure exerts tremendous influence on how land and resources are used. There is general agreement that tenure security is one important factor for farmers’ willingness to make investment in land improvement (Birgegard, 1993). Secure tenure can be defined as the certainty that a person’s rights to continuous use of land or resources will be recognized and protected against challenges from individuals and the state (WRI, 2005). This kind of certainty provides incentive to make long-term investments in maintaining or enhancing the productivity of that property (Bruce, 1989).

Insecure tenure translates to a lack of assurance that one’s land or resource rights will be respected over time (Mein-Dick et al, 2002 in WRI, 2005). When insecurity of tenure acts as a disincentive to long-term investments to land improvement, the quality of land deteriorates (ITTO, 2007). This is true as well for tenure rights over forests, mangroves, fisheries and other natural resources where the benefits of good stewardship can only be gained over time. This will affect sustainable forest management practices including tree planting if their tenure over the forests is restricted and they cannot count on reaping

the benefits of such practices. The potential sources of insecurity of tenure are varied and include annual redistribution of parcels of land and where state legislation claims ownership of trees growing on holding and requires permit to gain use rights (Bruce, 1989).

In many situations, the concepts of tree tenure and land tenure exist as separate arrangements. This is because trees are not part and parcel of land on which they grow but constitute object of tenure or property rights separable from the land on which they grow. Many tenure systems confer property rights in standing trees quite distinct from the land on which they are located. Also, a tree tenure regime may distinguish between planted and wild trees and rights to use tree products depend on the nature of use, whether it is for subsistence or commercial use (Bruce, 1989). Hence security of tenure is not concerned with only land but also object of the land and the rights in trees is also important in long-term investment in trees.

## **2.7 Issues of Tenure Security in Community Forestry**

The dynamics of property rights is very complex in community forestry. The diversity in the nature and form of community forest resources creates complexity in defining just tenurial arrangements and property rights in society (Luintel and Chhetri, 2008). For instance, the same forest may yield different products (e.g. leaf, fruits, timber, branches, seeds, roots, barks) and services (e.g. watershed maintenance, groundwater recharge, carbon sequestration, ecotourism, animal habitat, etc.). A wide range of communities and individuals use and enjoy the same or different types of usufruct rights on different products and services of the particular forest patch in question. Furthermore, in some cases, any community or individual may not use and claim the rights of all kinds of uses of a particular resource; in other cases, those communities and individuals may put their claims on more than one type of use (sometime conflicting)

of the same resource. Claiming use rights also comes with taking the responsibility to manage the resources and this adds an additional dimension to the complexities in defining and practicing the tenure security and property rights of community forestry. Also, the practices and rules related to use of resources tend to be dynamic in nature and vary over time and space.

Most of the forest-dependent communities are not only heterogeneous but may also have historically embraced unequal power relations and, therefore, may define property rights in unjust ways. For example, women, dalits, indigenous peoples, ethnic and religious minorities, etc. have had limited political space while shaping property right regimes in community forestry, negligible access to land and forest resources in spite of their high dependence on such resources for subsistence (Rochelean and Edmunds, 1997).

Furthermore, the community people's interests and usufruct rights may be encroached by forest bureaucracies' and donors' interests and their actions at national level by means of their dominating roles in shaping forest policies and property right regimes (Luintel, 2006).

Similarly, most of the de facto community rights are shaped by the traditional discriminatory, exploitative, feudal and inequitable cost and benefit sharing practices. This is particularly possible because most of the local policy processes are dominated and captured by the local elite (ibid).

## **2.8 Tenure on the Commons and Mangrove Conservation.**

Common property resources are resources held in common (Bruce, 1989). This concept became popular with the introduction of the "tragedy of the commons" propounded by Garrett Hardin in 1968 to explain that resources held in common are inevitably



overexploited and degraded. In open access situation, the danger of degradation is clear but in a situation where there is ownership and potential of exercising mechanisms of control, Hardin's theory of "tragedy of the commons" could be misleading. Community control of resources is primarily associated with geographically-bounded communities where ties of kinship buttress territorial ties. Under the commons, three elements must be clearly defined and these are the community, institutions and the mechanism of control (Bruce, 1989). The argument is that, a common is community administered and its existence ultimately depends on whether members of the community consider that its benefits outweigh its costs. Though a common property tenure arrangement provides for effective management of natural resources, enforcement of rules is difficult because members have different degrees of interest in the resources because resources are multipurpose and creates heterogeneity in the community.

The concept of the commons presumes the existence of a community, the proprietor of the commons, whose members are the persons, entitled to use of the commons and the right to exclude non-members is central to this concept. The commons provide the basis for management of use by members and the possibility of control and restrains of use in the common interest (Bruce, 1989). This is purported to limit and regulate pressure on the resources. Hence a clear identification of community which can use and control use of a resource is the essential step towards understanding commons management. However, community ownership of a resource does not guarantee effective community control because such control requires the ability to both exclude outsiders and control behaviour of members. And also the protection of trees can be a problem because in a community based on a system of reciprocal rights and obligations, this is often difficult to do and the personal or institutional capacity to enforce exclusionary rights may be very weak (Bruce, 1989).



## **2.9 Policy, Legal, Regulations and Institutional arrangements on Mangroves.**

Forest reserves and resources in the country are vested in the state in trust for the appropriate communities and ownership is reserved by the landholding communities. The Forestry Commission is the government agency responsible for the control and management forest resources and this mandate also covers timber resources in the offreserve landscape (Kotey et al., 1998). This responsibility of management is not specifically mangrove inclusive as the focus is on timber resources. The vestment of the forests in the state curtailed the access and usufruct rights of these landholding communities to the resources, with access and use rights granted through issuing of permits by Forestry Commission (FC). This is compounded by the loss of rights to the timber trees even in the off-reserve landscape and served as a disincentive to tree planting and management of the resource (Kotey et al., 1998). For instance, under the Timber Resource Management Act, 1997 (Act 547), it states that: “no person shall harvest timber from any land to which section 4 of the Act applies unless he holds timber rights in the form of a timber utilization contract entered into under this Act in respect of the area of land concerned”. It further details out the entity that qualifies to apply for the Timber Utilization Contract, the period of tenancy, the appropriate entity responsible for award of the contract, sanctions for default and other conditions under which a type of land with timber could be held and obligation such as payment of royalties, compensation and reforestation of area harvested. However, the 1994 Forest and Wildlife Policy (MLF, 1994) and other legislations recognize the rights of the communities based on the guiding principles (3.2.1) and (3.2.12) which place emphasis on the rights of people to have access to natural resources and

responsibility to ensure their suitable use as well as security of tenure as part of the incentives for achieving conservation and sustainable development of the forest resources for maintenance of environmental quality and benefits (MLF, 1994).

The most relevant legislations and legal documents however lack specificity regarding the status of mangroves with the exception of the Ghana's Wetlands Conservation Strategy which aims at ensuring sustainable wetland use within the general context of the 1999 Ghana's National Land Policy (Aryeetey, 2007) and other water related policies and enactments (ITTO, 2007). In this policy the government (specifically, Wildlife Division) is committed to the restoration, rehabilitation and protection of wetlands as indicated by the Korle Lagoon Rehabilitation Project. Also, during the implementation of the Coastal Wetlands Management Project, the Wildlife Division, in collaboration with NGOs and local communities, carried out a number of rehabilitation activities in the Ramsar Sites. A typical example is the collaboration with a local NGO (Green Earth Organization) and the local communities in the replanting of degraded mangrove areas within the Songhor Ramsar Site.

The Ghana Wetland Conservation Strategy is the only relevant legal framework, in support of mangrove conservation, though other legislations such as Water Policy and the Plantation Development Fund could be used to influence the behaviour of tenure holders towards the desired social and environmental goals. The strategy provides security of tenure and encourages investment in planting of mangroves (ITTO, 2007).

## **2.10 Initiatives towards Wetlands and Mangrove Management.**

In Ghana, the degradation of the coastal environment is linked to the persistence of poverty and the pervasiveness of income disparities in much of the coastal zone. This has stimulated increased non-sustainable practices for local resources such as mangroves and wetlands (World Bank, 1998). The cost of such coastal environmental

degradation (including all types) is estimated at US \$54 billion (Beatley et al, 2002). The degradation of the coastal environment is very pronounced and easily catches the attention of government agencies, traditional authorities and environmental NGOs consequently some modest attempts at restoration and sustainable management of this environment have been made.

The initiatives towards wetlands and mangrove management can be grouped into two broad categories namely: state-led initiatives and other restoration initiatives.

#### State-led Initiatives

Since Ghana's ratification of the Ramsar Convention in 1988, there have been some attempts to manage wetlands in general and restore mangroves in areas where they have been degraded at Ramsar sites. The Government of Ghana now recognizes the importance of mangroves, and other wetland resources as habitat for fishes and wildlife, the maintenance of the water table, mitigation of flood conditions and water purification; and the socio-economic roles they play in providing poles for construction, fuel-wood, timber for furniture and craft work (MLFM, 2007).

There have been some strategies to ensure the judicious use of the nation's land and all its natural resources, including mangroves. In June 1999, the then Ministry of Lands and Forestry launched the National Land Policy which recognizes wetlands as environmental conservation areas and precludes the following practices:

- physical draining of wetland water;
- draining of streams and water courses feeding the wetlands;
- human settlements and their related infrastructural developments in wetlands;
- disposal of solid waste and effluents in wetlands;

- mining in wetlands

The policy also seeks to promote the use of wetlands for farming, grazing, fishing, timber production and salt-winning, provided that such uses also serve to conserve the ecosystem, biodiversity and sustainable productivity of the wetlands.

The Government of Ghana, through the implementation of the Global Environment Facility funded the Coastal Wetlands Management Project from 1993 to 1999; carried out public education and awareness-creation programmes to enlighten the general public on the values, benefits and functions of wetlands and the need for their conservation and sustainable use. To integrate wetlands issues into national land-use planning and decision-making, the then

Ministry of Lands and Forestry, in consultation with key stakeholders, prepared a document –Managing Ghana’s Wetlands: A National Wetlands Conservation Strategy in 1999 to promote participation of the local communities and other stakeholders in the sound management and sustainable utilization of Ghana’s wetlands and their resources. The strategy was developed to provide opportunity for a more detailed expression of relevant actions for effective implementation. Six years on (1999-2006), the strategy has not been revised, in the light of new and emerging challenges, new government policy directions, lessons learnt and experiences gained over the period (MLFM, 2007).

#### Other Mangrove Restoration Initiatives

1. Between 1993 and 1999, the Wildlife Division of the Forestry Commission implemented an ecological restoration programme in the Songhor or Ramsar Site. In the Songhor Ramsar site, there was a threat to mangroves emanating from the alternative uses to which mangroves were put and conversion of mangrove areas to other land uses, such as rice and sugarcane farming. The



- project sought to restore degraded mangrove areas in collaboration with landowners and the entire communities of Obane and Kwalakpoyom, all in the Dangbe-East district of Greater Accra Region. The initiative was successful and the once degraded areas were restored to a natural ecosystem, capable of supporting other life forms. Communities have left the restored mangroves intact, without unduly exploiting them. The success can be attributed to the support landowners gave in releasing land for the restoration and the collaborative roles played by the communities (Agyemang, Pers.Comm. 2007).
2. This initiative was replicated at Tekpekope community in the same area, with funding from the Canadian International Development Agency (CIDA) between 2000 and 2001 with similar success.
  3. Between 2003 and 2005, with funding from Global Environment Facility, attempts were made at restoring degraded mangroves in four (4) communities, viz; Agbevue, Mutukunya, Agbeve and Alikakekope, all in the Dangbe-East. The project acquired mangrove seeds and other materials such as Wellington boots and knives for communities to replant. The project also provided alternative livelihood schemes to farmers whose activities were massively degrading mangrove resources. These opted for other livelihood options such as basketry and bee-keeping. Another success story was developing the areas into ecotourism sites. It was observed that intact mangrove stands were habitats of some monkey species; thus, the area was protected and developed into ecotourism in collaboration with the communities.
  4. Two others were earlier initiated with support from the Ramsar Small Grants.  
  
One was a project dubbed „Rehabilitation and Community Management of



Mangroves and Coastal Wetlands in the Lower Volta Delta” implemented in 1996-1998 by Green Earth Organization (GEO) in collaboration with eight communities in the Lower Volta Delta area. The aim of the project was to support the rehabilitation and community management of mangroves and coastal wetlands in the Lower Volta Delta (Ramsar site). Degraded coastal wetlands were restored and managed by planting mangroves, fruit trees and woodlots, and the local communities were involved in the protection and wise use of these resources for the conservation of biodiversity and provision forest products.

5. Another project was dubbed “The Regeneration, Sustainable Use and Management of Mangrove in the Keta Lagoon Complex Ramsar Site” implemented in 1995. The project was also based in a Ramsar site which has become degraded due to mangrove over harvesting, with subsequent negative impacts on fishing resources and turtles’ breeding grounds”. There were two main components: awareness creation and capacity building among local communities to enable mangrove restoration and sustainable use, and creation of alternative income-generating activities. Mangrove plantations and woodlots were also established and alternative livelihoods such as the rearing of goat, crab, fish and grasscutter were introduced.

### **2.11 Community Based Mangrove Management.**

In Ghana, although many coastal wetlands are regarded as abode of gods, and therefore are well revered and protected, access to mangrove sites are not restricted because most of the coastal communities continue to depend on the mangroves for domestic fuel wood. As they have traditionally, the tribal elders still influence the allocation of mangrove resources to families in their communities (World Bank, 2003).

According to the World Bank (2003), spirit houses used to protect mangroves are a common sight in Southeast Asia, especially in Cambodia and Thailand, while temples associated with mangroves can be found in India and Myanmar. Again, everyone entering the Sundarbans in both Bangladesh and India requests the permission and protection of the local deity, Banobibi for the Muslims and Vanodevi for the Hindus, before engaging in their work, whether wax and honey collecting, fishing or gathering fuelwood. Shrines are built to the deity at the entry points into the mangrove forest.

Owing to the perilous condition of mangrove ecosystems as well as wide-scale adaptation of decentralized governance policies in many developing countries in the last fifty years, the concept of community based mangrove management (CBMM) has become imperative. CBMM is integrated to the broader concept of community based natural resource management (CBNRM), which refers to decentralization of rights, responsibilities and authority from government to local communities in managing natural resources (Alcorn et al., 2002).

Local communities traditionally managed and harvested the mangroves. However, during the colonial and post-colonial periods, these forests came under direct control of state governments, which subsequently gave impetus to commercial logging and large-scale shrimp farming (Gunawardena, 2001).

The essence of CBMM lies in the concept that “people first and sustainable mangrove forest management will follow” (Melana et al., 2000). It means community participation in management increases when ‘well-being’ of the members of community is ensured. Worldwide adaptation of CBMM approach, especially in the tropical developing countries, and its popularity among coastal communities directly stem out from this perspective of ‘well-being’. In fact, lack of income generating options incites local

communities to practice unsustainable methods of mangrove exploitation (Zorini et al., 2004).

CBMM initiatives are practiced in sectorial and sporadic manners in Kenya under direct supervision of state agencies (Kairo et al., 2008). In other countries like Tanzania, control of state and influence of international donor agencies in management activities are very prominent (Mohammed, 2004).

In Pondicherry, India, NGO led mangrove rehabilitation project engaging local villagers had found higher rate of success than that of the government departments because of choice of appropriate species and suitable planting sites based on the traditional knowledge of locals. While villagers planted *Rhizophora* species, government departments opted for *Avicennia* mainly. This distinct difference between the two initiatives was visible at the time of the Indian Ocean Tsunami (26th December, 2005) when even one-year old *Rhizophora* plantations managed by the villagers survived but most of the government plantations were destroyed (Saravanan, 2005).

As noted by many, prime aspects of institutional sustainability are sharing of property rights, means of exercising power in resource distribution and access by individuals who cumulatively form the local institutions (Brechin et al., 2002; Brown, 2003). Interests of communities in forest management emanate from the incentives members are going to accrue in this process through well-defined property rights. Property rights are subsets of institutional arrangements, which encompass several factors like tenure security, ownership types and implementation of rules, regulations and sanctions. Users without these rights can engage in ecologically undesirable activities leading to over exploitation of resources and community conflicts (Pagdee et al., 2006).

## CHAPTER THREE: MATERIALS AND METHODS

### 3.1 Study Area:

The research was conducted in the Sanghor and Keta Lagoon Complex Ramsar Sites in Ada and Keta respectively in Ghana. In all eleven (11) communities were selected for the study. Table 3.1 below gives details of the selected communities under each study area:

Table 3.1: Selected study communities under the Sanghor and Keta Lagoon Complex Ramsar Sites in Ada and Keta respectively

Ada Communities	Keta Communities
Ayigbo	Anyanui
Pute	Tunu
Futuenya	Gblipe
Kwalypoyom	Bomigo
Obane	Dzita
	Salo

Refer to appendix 117 for map of Ghana showing the two study areas circled in blue with arrows.

#### 3.1.1 Physical characteristics (Ada)

Ada is located in the Eastern part of the Greater Accra Region and it is part of the Dangme East Municipality. It lies between Latitudes 5°45 south and 6°00 north and from Longitude 0°20 west to 0°35 east ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006). Ada shares common boundaries with North Tongu District at the North, South Tongu at the East, Dangme West Districts at the West and at the South is the Gulf of Guinea, which stretches over 45 kilometers (27.9 miles) ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006).The



Municipality covers a total land area of about 909 sq. km (350 sq. miles) and it is estimated to constitute about 28% of the total area of the Greater Accra Region ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006).

Ada Foah which is the district capital of the Municipality is located at the southeastern part, about 20km off the Accra-Aflao road, along the coast and about 2km from the Volta River Estuary. Big Ada, Kasseh, Got, Anyamam, Lolonya etc. constitute some of the major settlements in the area ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006).

### **3.1.2 Topography (Ada)**

The topography of Ada is generally undulating with few prominent boulders scattered irregularly over the entire coastal area. The highest part of the boulders is about 240 meters above sea level while the rest of the area is about 60 meters above sea level ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).

### **3.1.3 Drainage and Water Resources (Ada)**

The Volta River which runs along the south-east part of the eastern boundary and enters the sea southwards is the major River in the Municipality. Other major water bodies are the Futue River, Sege River, Akplaba, Luhue, Kajah and the Songhor lagoon ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006).

The area is characterized by seasonal streams which dry up during the dry season. This has resulted in the creation of numerous dugouts and ponds of varying sizes for the purpose of irrigation, domestic use and rearing of livestock in the area. The sea feeds and drains the major lagoons during high or low tides and is located at the southern portion ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006).

Notwithstanding the economic and social benefits of the sea, it contributes significantly to water salinity in dugouts and wells which are closer to it there by rendering water

from these sources unwholesome for use domestically ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006).

#### **3.1.4 Climate (Ada)**

Ada is climatically one the hottest areas in the south-eastern coast of Ghana. This explains why temperatures are generally high throughout the year and range between 23°C-28°C with a maximum of 33°C ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006). The district records heavy rains between March and September and averages 750mm annually ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006). The area is relatively dry during the harmattan season when there is little or no rainfall. However humidity is observed to be very high, about 60% resulting from the proximity of the sea, the Volta River and other water bodies ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006).

#### **3.1.5 Vegetation (Ada)**

The vegetation of Ada is classified under the coastal savanna with short grasses interspersed with shrubs and short trees ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006). It is characterized by stretches and patches of coconut trees and grooves. Along the coast stretches of coconut trees and patches of coconut groves can be seen. Stands of mangrove trees are common around the Songhor lagoon and some tributaries of the Volta River due to waterlogged and salty soil condition (Dickson and Benneh, 1980). The mangrove trees which generally grow up to heights of 15m are densely vegetated and green in appearance throughout the year. They are cut and utilized as fuel wood and as rafters for roofing houses by people of the fringe communities ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006).



**Plate 3.1: Mangrove vegetation at Kwalypoyom (MOU community ownership) in Ada**

### **3.1.6 Geology (Ada)**

Geologically the district is under laid with recent deposits and tertiary rocks. Most parts of the northern and eastern areas of the district, especially Afiadenyigba and Sege are embedded with the Dahomeyan complex rocks of Precambrian age ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). The predominant rocks include gneisses, schists, and migmatites ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).

### **3.1.7 Soil (Ada)**

The area is characterized by soils of different types. These soils vary in characteristics, distribution as well as the agricultural activities they support. For instance the Red Earth with Reddish brown Loamy soils which are well drained and porous support the cultivation of maize, cassava, vegetables and cashew. These soils are common in Togeh, Caesarkope, and Asigbekope communities ([www.ghana districts. org](http://www.ghana districts. org), 2006). Again the Ada Association mottled which are extremely acidic and contain heavy clay found in the estuary and islands support the cultivation of sugarcane-grass, coconut and mangroves. The various soil types in the district, their characteristics, distribution and agricultural activities they support can be obtained from Government of Ghana (GoG), 2010 Medium term national development policy framework for the Ada Municipality.

### **3.1.8 Population Size and Growth Rates (Ada)**

Figures from the National Population and Housing Census put the population growth of Ada at about 2.6 to 3% per annum. Using this growth rate of about 3% for the period 2000 and beyond, the population for the district is estimated at 115,097 by the year 2010 (GSS, 2010). The high population growth rate depicts the level of pressure that the people exert on the land and other available natural resources ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).

### **3.1.9 Physical Characteristics (Keta)**

Keta which is the capital town of the Municipality is one of the 18 administrative districts of the Volta Region. Keta was carved out of the former Anlo district which comprised Akatsi and Ketu districts ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). Keta is located east of the Volta estuary and it is about 160km to the east of Accra, off the Aflao main road. The Keta Municipality shares boundaries with Akatsi district to the North, Ketu district to the East, South Tongu district to the West and the Gulf of Guinea to the South. ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006). It lies within Longitudes 0.30E and 1.05E and Latitudes 5.45 and 6.005N ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006).

362km<sup>2</sup> (about 30%) out of the total land mass of about 1086km<sup>2</sup> of the Keta Municipality is covered by water bodies ([www.ghanadistricts.com](http://www.ghanadistricts.com), 2006).. Conspicuous and largest amongst these water bodies is the Keta Lagoon which is approximately 12km in width and 32km long. The remaining land area is therefore only 724km<sup>2</sup> culminating in severe land access challenges for development in the area. Fishing and water transportation however exist as great potentials in the area ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).



### 3.1.10 Topography (Keta)

The topography of Ada is generally undulating with few prominent boulders scattered irregularly over the entire coastal area. The highest part of the boulders is about 240 meters above sea level while the rest of the area is about 60 meters above sea level.

([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).

Keta is generally a low-lying coastal plain with a highest point of only 53 metres above sea level around Abor in the North. The lowest point is approximately between 1-3.5 metres below sea level along the coast around Vodza, Kedzi and Keta township. ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). The area has three main geographical belts which include the Narrow Coastal strip, the Lagoon Basin of the middle belt and finally the Plains of the North ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).

Three main geographic belts may be identified namely the Narrow Coastal Strip, the Lagoon Basin of the middle belt and the Plains of the North. The Coastal Strip which characterized by sand bars is severely affected by sea erosion with Keta, Kedzikope, Vodza, Kedzi and Horvi being the worst hit areas. The general elevation of the lagoon basin is also below sea level and it is marshy due to the underlying sandy-clay geological material([www.ghanadistricts.org](http://www.ghanadistricts.org),2006).

The Northern plains have a relatively higher elevation of about 50m above sea level and generally have gentle undulating landscape. The low-lying nature of the plains has exposed particularly the eastern parts of the coastal strip to intense sea erosion and occasional subject the area to flooding. In spite of all these, irrigation farming is identified as a great potential in the area ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). The lagoons

\*serve as the main drainage basins in the area constituting about 362km<sup>2</sup>

([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).

### **3.1.11 Drainage and water resources**

The Keta Municipality is characterized by major lagoons including Angaw, Agbatsivi, Keta, Nuvi, etc. Linking these lagoons constitutes some streams and tributaries of the Volta River. These streams and tributaries include Angor, Avida, Tordzie, Kplikpa etc. ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). It is also observed that many of the creeks in the area consistently dwindling in size as a result of low rainfall, excessive evaporation and siltation. Consequently, the volume of water in the lagoon has declined drastically and tends to fluctuate seasonally, creating several islands in many of the lagoons in the area. Water transport which is a major potential in the area is not tapped and properly developed as the local canoe remain the only means of water transport in the area ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).

### **3.1.12 Climate (Keta)**

The Keta Municipality is one of the driest areas along the coast of Ghana with an average rainfall of less than 1000mm annually and falls within the dry Coastal Equatorial Climate ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). The amount of rainfall declines as one move from the North to the South averaging 800mm annually ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).

The Municipality experiences a bi-modal rainfall pattern with the major (peak) rainy season between March and July while the minor rain season falls between September and November ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). These seasons incidentally coincide with the major and minor cropping seasons in the area as well. The major rainy season is between March and July while the minor one begins in September and ends in November. The high average temperature of about 30° C coupled with the low humidity give rise to evapo-transpiration while the rainfall is been declining and irregular in distribution throughout the year ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). The high average

temperatures (about 30°C), couple with low relative humidity, promote high evapotranspiration. Thus, the total amount of rain is relatively low. The high evapotranspiration has rendered most of the soils deficient in water and hence posing a severe challenge to all-year cropping except in areas like Anloga which relies heavily on irrigation for dry season vegetables farming ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).

### **3.1.13 Vegetation (Keta)**

The entire Keta Municipality falls within the coastal savanna zone though five (5) vegetation zones can be identified within the area ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). The Northern part of the Municipality is characterized by tall grasses interspersed with medium sized trees while the mid- section is characterized by short grasses with short trees such as palm and baobab. The South-western part is characterized by Mangrove plants and tall grasses along the Volta estuary while the South-eastern part which stretches along the coast from Whuti contain short grasses and many neem trees ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). Coconut trees that previously grow along the coast have been destroyed by Cape St. Paul Wilt disease and this subsequently influenced the pattern and distribution of rainfall in the Municipality ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). Last but not the least vegetation zone constitutes pockets of land along the Dabala-Srogboe-Whuti highway that supports little or no vegetation ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).





**Plate 3.2: Researcher by Mangrove vegetation at Bomigo in Keta**



**Plate 3.3: Mangrove vegetation at Anyanui**

#### **3.1.14 Geology and Soils (Keta)**

Similar to the major geographical units, the municipality is characterized by different types of soils emanating from the parent material underground ([www.ghana-districts.org](http://www.ghana-districts.org), 2006). The coastal strip (Keta and Oyibi-Muni Association) is generally characterized by sandy soils which are deficient in humus and support the cultivation of coconut. They however support the cultivation of vegetables such as okro, pepper, shallot etc. when matured. Despite the fact that the strip constitutes only 11% of the Municipality's dry land, it is the leading producer of shallots in Ghana ([www.ghana-districts.org](http://www.ghana-districts.org), 2006). Soils in the lagoon basin (Ada-Oyibi Association) are very shallow with underlying clay that supports the mangrove vegetation, sugar cane and pasture grasses. The underlying clay subjects the soil to flooding and render it unsuitable for arable farming though it constitute over 75% of the dry land of the district ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). Again the soils of Northern plains around Abor (Toje-Alajo Association) which constitute about 14% of the Municipality's dry land are relatively deep and support the growth of crops such as cassava, maize and legumes



([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). Notwithstanding the numerous challenges associated with access to land, nearly 80% of the land in the area is not suitable for cultivation of most crops further aggravating economic plight of the people.

Poor conditions of the soils coupled with the adverse climatic conditions in the area is a serious limitation to the cultivation of most crop and this explains why the Municipality is being described as net importer of food stuffs ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).

### **3.1.15 Population size and growth rate of Keta**

The Keta Municipality has a relatively low population growth averaging about 0.5% annually since 1970. It grew from a total population of 104,100 in 1970, to about 111,700 in 1984. The 2000 population census puts the total population at 133,661 which forms 8.2% of the Regional total population. The growth rate slightly increased to 1.3% between 1984 and 2000 and this was still relatively lower than the Regional and National growth rates which stood at 2.0% and 2.6% respectively around the same period ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006). It shows an inter-censal growth rate of 1.1 2.6 per cent respectively. This changed to 2.5% and 1.8% respectively between 1984 and 2000, which are still higher than the 1.3% recorded for Keta in 2000. The low population growth rate is generally attributed to a very high out-migration (281/1000 per year) of the district's potential labour force. The underlining factor causing this out-migration is perceived to be lack of employment opportunities. This is evidenced by the relatively high unemployment rate of about 38% as against the national figure of 28% even though other factors such as dwindling fish catch, low crop yields, low land per capita and the limited market for industrial produce and intensive sea erosion are occasionally cited ([www.ghanadistricts.org](http://www.ghanadistricts.org), 2006).



**Plate 3.4: Mangrove fuel wood market at Anyanui in Keta**



**Plate 3.5: Mangrove fuel wood awaiting loading to other places at Anyanui in Keta**

## **3.2 Methodology**

### **3.2.1 Research design**

The research design selected is survey. The type of survey used was socio-economic survey. This design is preferred because it is suitable for exploratory and descriptive research associated with the research topic.

### **3.2.2 Data and Data sources**

The research relied on data from both primary and secondary sources. Primary data were obtained from eleven (11) communities, five (5) within the Sanghor Ramsar Site in the Ada district and six (6) within the Keta Lagoon Complex in the Keta district using the purposive sampling technique based on:

- Presence of mangrove vegetation
- Ownership and stake in the management of mangroves
- Involvement in mangrove related economic and social activities.

The approaches for the collection of data were through desk study, interviews as well as field survey. For the desk study, relevant mangrove literature was gathered from the internet. In addition, the two Forest and Wildlife Policies of Ghana were reviewed for relevant data on mangrove conservation in Ghana.

Regarding interviews, local people including the fisher folk, farmers, opinion leaders and traditional authorities within the selected communities were sampled purposively and interviewed using a semi-structured questionnaire to obtain information. These people were selected because they have an in-depth knowledge on mangroves. The same questionnaire was administered to experts such government officials and officials of NGOs who are into mangrove conservation for the purpose of triangulation.

Field visits- Direct observation was employed to facilitate understanding of the situation and also to cross-check the information provided by the respondents.

### **3.2.3 Data collection**

Data collection techniques included eleven (11) Focused Group Discussions (FGDs), with groups ranging from 6-8 members; one FGD was conducted in every sampled community. Ten (10) key informant interviews were conducted. These included three (3) respondents from the Wildlife Division of the Forestry Commission of each of the two districts, and four (4) elderly people, two (2) from each district who have a historical perspective. They explained about the past and present status of mangrove vegetation real situation in their communities with respect to socio-economic activities. Discussions with various households revealed unique information on mangrove vegetation. Information on how communities accessed mangrove



vegetation in the past and present time was also gathered. In addition to the above, one hundred and twenty (120) questionnaires were administered. Twelve (12) respondents were interviewed in each of the five



**Plate 3.6: Travelling by canoe from Tunu to Bomigo in Keta for data collection**

(5) Communities in Ada totaling sixty (60) respondents. However, ten (10) respondents were selected from each of the six (6) communities in Keta constituting another sixty (60) respondents. To avoid repetition and some level of inconsistency in answers emanating from respondents of the same household, only one person per household was sampled and interviewed or involved in a FGD. The questionnaires and FGDs were administered and conducted in both districts using Gadangme and Ewe in Ada and Keta respectively (Local languages). Again to reduce the tendency of possible hostilities and to ensure good reception and a fluent conversation between respondents and the interviewer in the selected households during the data collection, community guides (community interpreters) were relied upon for support. The information gathered from



the responses was then written out in questionnaire schedules in English. FGDs helped to understand existing and past management regimes.



**Plate 3.7: Focus group discussion at Obane in Ada**



**Plate 3.8: Focus group discussion at Anyanui in Keta**

The questionnaire generally centered on questions that sought information about the socio-demographic characteristics of respondents. Again questions targeted information on mangrove vegetation ownership regimes, mangrove resource user rights, existing mangrove vegetation management regimes as well as questions aimed at bringing out respondents' opinion on issues concerning sustainable management of mangrove resources in the area. The questionnaire was semi-structured in nature and had some short multiple-choice questions as well as some open ended questions. Functionally the short multiple-choice- questions were aimed at narrowing down the answer categories to facilitate smooth data analysis.

Generally, the FGDs and interviews started with simple questions about mangrove vegetation to ensure that both interviewer and the respondent were on the same pedestal as far as the concept and subject matter were concerned.



**Plate 3.9: Interview with Key informants at Ayigbo in Ada**



**Plate 3.10: Interview with key informant at Bomigo in Keta**

### **3.2.5 Data Analysis**

The data obtained was analyzed with the aid of the Statistical Package for Social Scientists (SPSS version 16) and Microsoft Excel. The socio-demographic characteristics of respondents were summarized and presented using simple descriptive statistics such as frequencies and percentages. Cross tabulations of selected variables were produced as a precursor to observe association between various variables such as age, gender, education level, migratory status, effectiveness of existing mangrove resources ownership regimes in conserving mangrove vegetation, how ownership regimes (tenure) influence mangrove vegetation management regimes, community based management interventions and potential best management regimes for sustainability



**Plate 3.11: Seedlings for supported restoration project by WD/NGOs in Ada**



**Plate 3.12: Seedlings for supported restoration project by WD/NGOs in Keta**





**Plate 3.13: Degraded mangrove vegetation at Bomigo in Keta**



**Plate 3.14: Degraded mangrove vegetation at Pute in Ada**



## CHAPTER FOUR: RESULTS

### 4.1 Socio-demographic characteristics of Respondents

The results of the socio-demographic characteristics focused exclusively on gender, age, and marital status, level of education, migration status and occupation of the respondents.

#### 4.1.1 Gender

Total of 120 respondents were interviewed and of this an average of 55.8% represented males while 44.2% were females. Table 4.1 shows the percentage gender distribution of respondents in both Ada and Keta respectively.

Table 4.1: Gender distribution of Respondents

Gender	Percentage of Response	
	Ada	Keta
Male	53.3%	58.3%
Female	46.7%	41.7%
Total	100.0%	100.0%

#### 4.1.2 Age

Table 4.2 depicted details of the minimum, maximum and mean age bracket of respondents in the two study areas.

Table 4.2: Average age of Respondents in years

District	Minimum	Maximum	Mean
Ada	28	79	41.45
Keta	29	87	47.23



### 4.1.3 Migration status

Another important socio-demography variable was the migration status of respondents. Findings from the research portrayed 96.6% and 96.7 of respondents as natives for Ada and Keta respectively. These were people perceived to have lived there for at least two decades while 3.4% and 3.3% were migrants or people who had moved from other places to these districts. Details of the migration status of respondents in the two districts are summarized in Table 4.3:

Table 4.3 Migration status of Respondents

Status	Percentage of Responses	
	Ada	Keta
Native	96.7%	96.7%
Migrant	3.3%	3.3%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>

### 4.1.4 Marital status

Majority of respondents were married while very few respondents were single, separated, divorced or widowed. Details of the marriage status of respondents in the two study areas are represented by Table 4.4:

Table 4.4: Marital Status of Respondents

Status	Percentage of Responses	
	Ada	Keta
Single	5.0%	8.4%
Married	81.6%	80.0%
Separated	1.8%	3.3%
Divorced	6.6%	3.3%
Widowed	5.0%	5.0%

<b>Total</b>	<b>100.%</b>	<b>100.0%</b>
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#### 4.1.5 Educational status

Educational status of respondents and level of Education was also obtained. The percentages of respondents pertaining to the various levels of education in the two study areas are presented in Fig 4.1.:

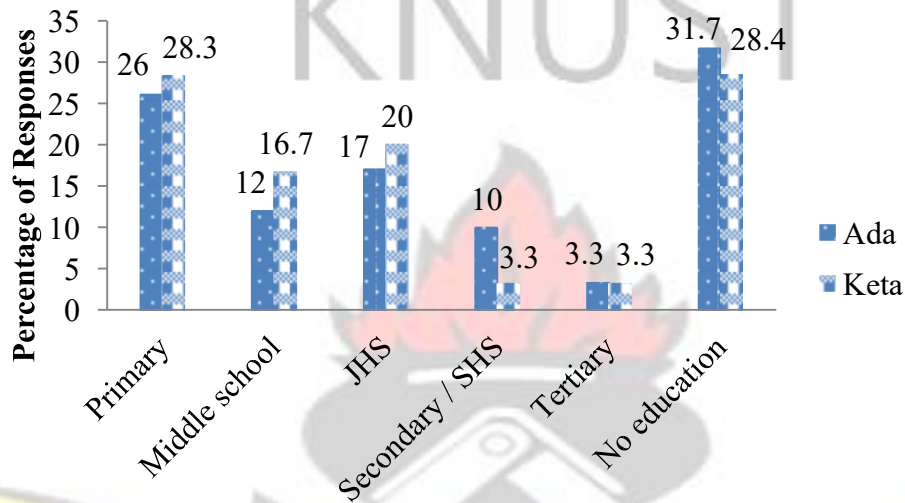


Fig 4.1: Educational Status of Respondent in the area

#### 4.1.6 Occupational status

Occupation of respondents constitutes one of the vital instruments for measuring natural resource dependency ratio in a given community, hence it was imperative to obtain information on the occupations of the respondents. Findings from the two study areas are summarized in percentages and represented by Fig. 4.2

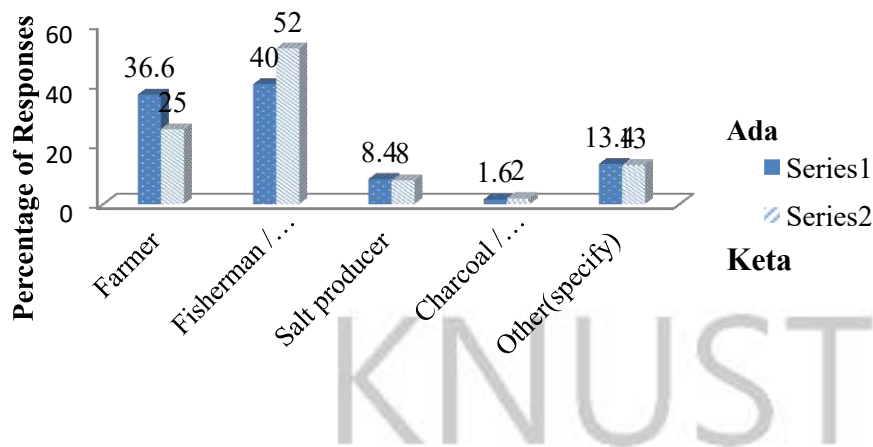


Fig 4.2: Occupational status of Respondents in the area

#### 4.2 Existing Mangrove resources ownership regimes in the area:

The study discovered the existing Mangrove resources ownership regimes in the two study area. Figures 4.3 and 4.4 represent the percentage representation of Mangrove resource ownership regimes existing in the two study areas. From the results, the most dominant ownership regime in the Ada area is the MOU Community ownership regime (58%) followed by Clan ownership regime (20%), Community ownership regime (18%) and lastly the Family ownership regime (4%). On the other hand the Family ownership regime (55%) constitute the most predominant in the Keta area followed by the Clan and Individual ownership regime (23.3%), the Clan ownership regime (16.7%) and lastly individual ownership (5.0%). The individual ownership regime is therefore peculiar only to the Keta area as depicted by Fig. 4.3 and 4.4:

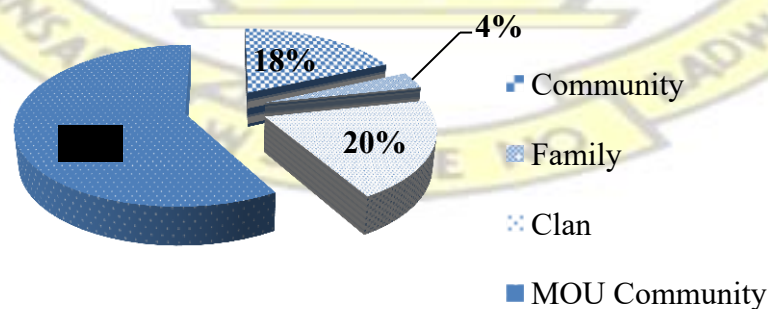


Fig 4.3: Percentage representation of existing Mangrove ownership regimes in Ada

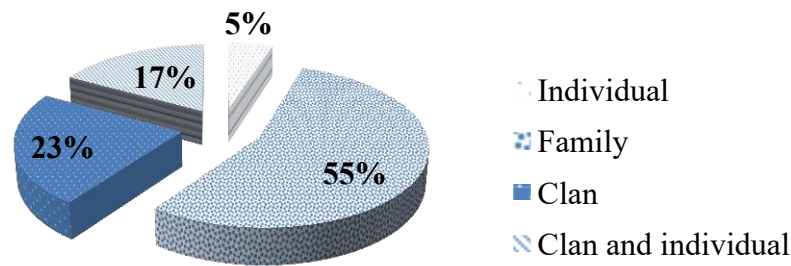


Fig. 4.4: Percentage representation of existing Mangrove ownership regimes in Keta

#### 4.2.1 Existing Mangrove resources user rights in the area

The study also discovered the right to the use of Mangrove vegetation resources in the area. The results showed that the right to the use of Mangrove vegetation resources in Ada is exclusively reserved for the people as a community (58.3%), Clan (23.7%) or Family (18%). The findings however pointed out that the right to the use of Mangrove vegetation resources in Keta is reserved for the people as Families or as Individuals. Mangrove vegetation resource user rights in Keta portrayed a 76.7% for Individuals and 23.3% for Families.

Fig 4.5 gives the detailed percentage representation of the various user rights in Ada

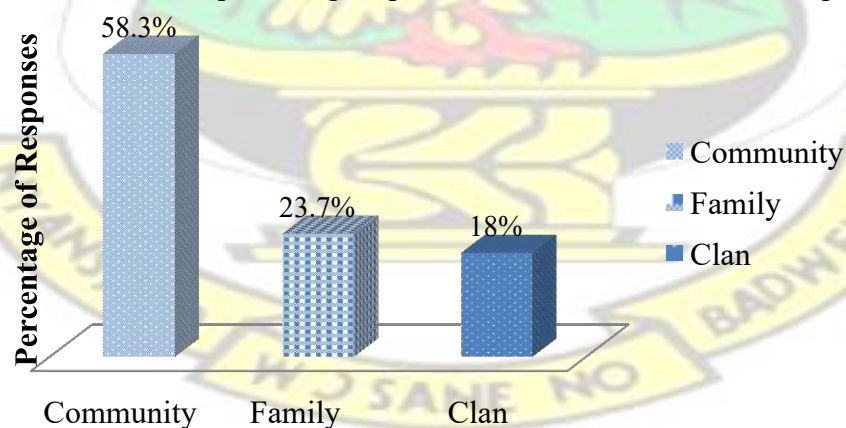


Fig. 4.5: Percentage representation of existing Mangrove vegetation resource user rights in Ada



#### 4.2.2 Existing Land ownership regimes in the area

Generally, with regards to Land ownership regimes in the two districts, the study revealed that land is generally owned and held in trust by the Chief, Family head or head of the Clan for the people. Land in the Ada area is generally owned by the Chief/Community as confirmed by 70% of responses while 45% of responses indicate land is owned by the Clan in the Keta area. Fig 4.6 gives details of the various land ownership regimes in the two study areas

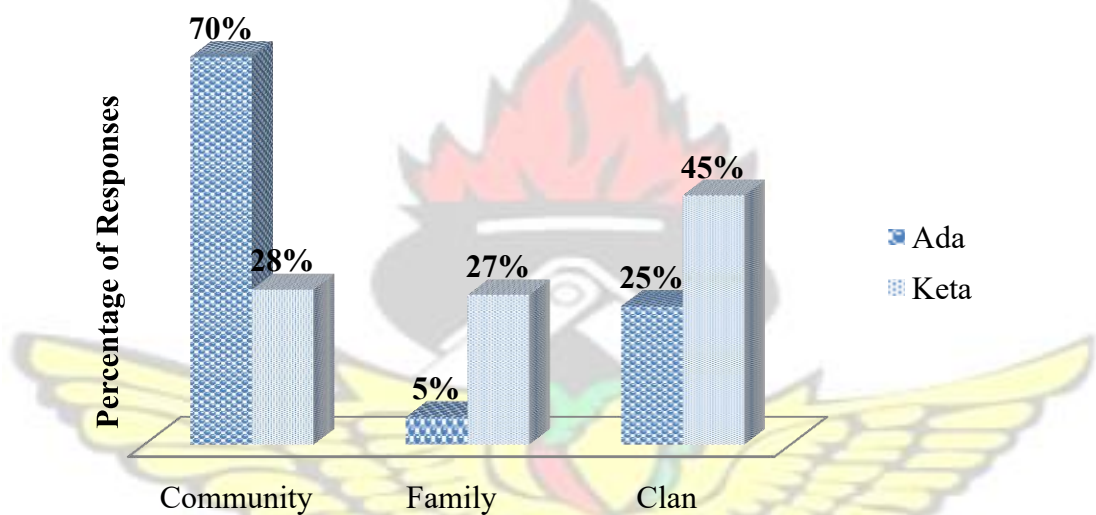
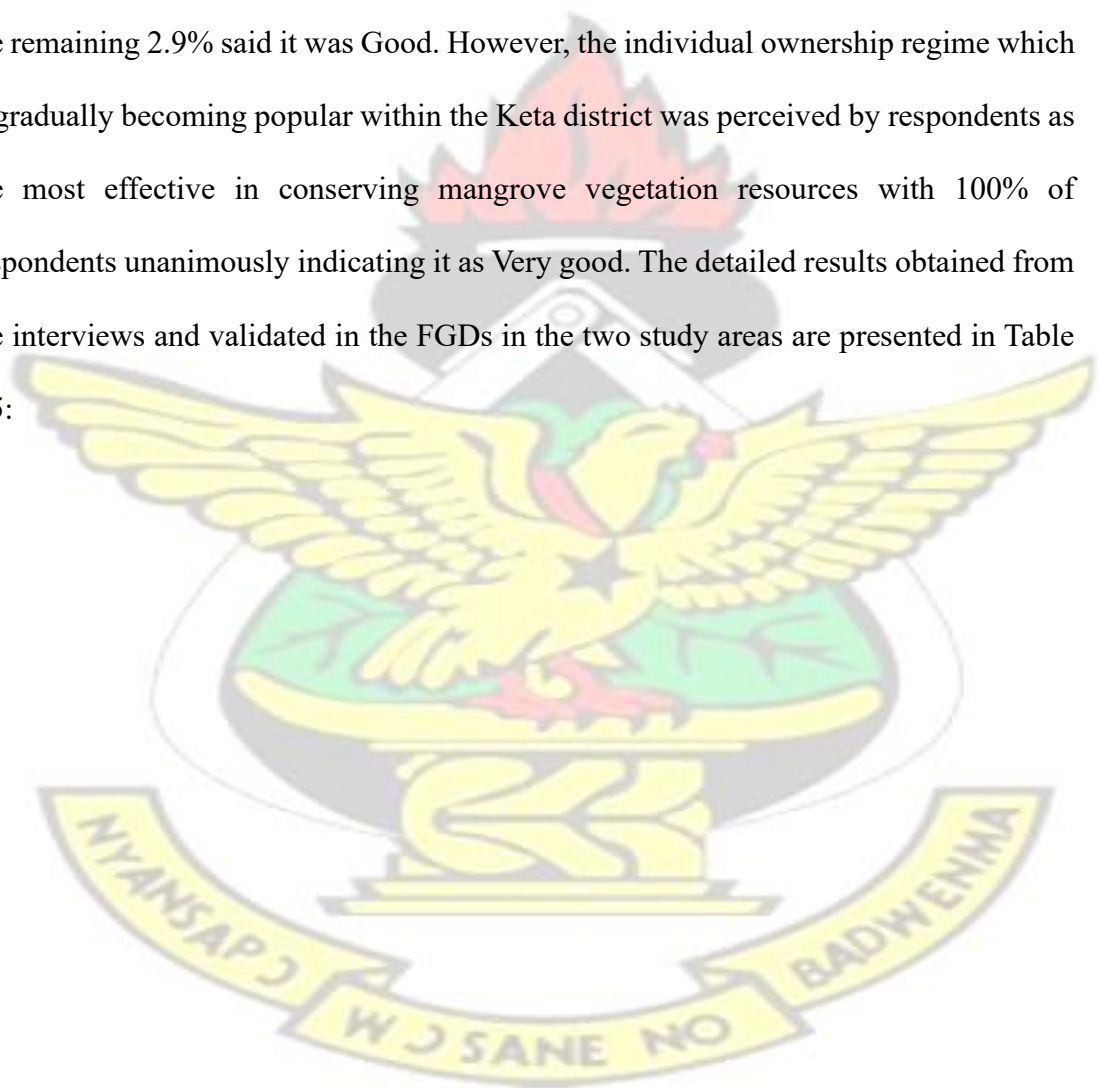


Fig. 4.6: Mangrove Land ownership regimes in the area

#### 4.3 Effects of existing Mangrove ownership regimes and user rights on Mangrove conservation

To assess the effectiveness of the existing ownership regimes in the conservation and sustainable management of mangrove vegetation in the two districts, various questions were put to respondents concerning existing ownership regimes and how these regimes were perceived to be contributing to the sustainable conservation or utilization of the mangrove resources in these areas. The effectiveness of these ownership regimes and user rights was measured using indicators such as Excellent, Very good, Good, Fairly

good and poor. To explain these indicators to respondents, numerical values such as 5, 4, 3, 2, and 1 were assigned to Excellent, Very good, Good, Fairly good and Poor respectively. Respondents were then asked to attach value judgment to a particular ownership regime with regards to its perceived effectiveness in conserving mangrove resources. The results pointed to the MOU Community ownership regime in the Ada area as the most effective as 34.2% of respondents who selected it indicated it was Excellent. Again 62.9% of the selected respondents perceived it to be Very good while the remaining 2.9% said it was Good. However, the individual ownership regime which is gradually becoming popular within the Keta district was perceived by respondents as the most effective in conserving mangrove vegetation resources with 100% of respondents unanimously indicating it as Very good. The detailed results obtained from the interviews and validated in the FGDs in the two study areas are presented in Table 4.5:



Table

4.5: Perceived effectiveness of the various ownership regimes in conserving mangroves

District	Ownership regime	Effectiveness indicator and Percentage (%) of Responses				
		Excellent	Very Good	Good	Fairly Good	Poor
<b>Ada</b>	Community	-	-	27.3	18.2	54.5
	Family	-	-	100.0	-	-
	Clan	-	-	-	33.3	66.7
	MOU Community	34.2	62.9	2.9	-	-
<b>Keta</b>	Family	-	6.1	42.4	27.3	24.2
	Individual	-	100.0	-	-	-
	Clan	-	-	40.0	60.0	-
	Clan/Individual	-	-	14.3	57.1	28.6

#### **4.3.1: Conditions of Mangrove vegetation under existing mangrove resources**

##### **ownership regimes in the area**

To further ascertain the effectiveness of a particular ownership regime in the conservation and sustainable utilization of Mangrove vegetation resources, the research probed into the current condition of the Mangrove vegetation, condition of the mangrove vegetation five (5) years ago and expected condition of the Mangrove vegetation in five (5) years under the various ownership regimes using the same perceived value indicators. The results portrayed by Tables 4.6, 4.7 and 4.8 put the conditions of mangrove vegetation under the MOU Community ownership regime in Ada as better than mangrove vegetation under the other ownership regimes. The community ownership regime was observed to be ineffective in mangrove conservation as condition of mangrove vegetation under it was perceived to be poor. The results from these tables however showed that the Individual ownership regime in Keta was perceived to be more effective in conserving mangrove resources. This was further buttressed by the flourishing mangrove vegetation under the individual ownership regime the area. Again the results also suggested the Clan and Individual ownership regime as the most ineffective in mangrove conservation as condition of Mangrove vegetation under it was in a deplorable state. Tables 4.6, 4.7 and 4.8 summarize the condition of mangrove vegetation under the various ownership regimes in the two study areas at the various times.



# KNUST



Table 4.6:

Current condition of Mangrove vegetation under existing ownership regimes in two districts

District	Ownership regime	Current condition of Mangrove and percentage of Responses					Total
		Excellent	Very good	Good	Fairly good	Poor	
<b>Ada</b>	Community	-	-	27.3	9.1	63.6	100.0%
	Family	-	50.0	50.0	-	-	100.0%
	Clan	-	-	-	33.3	66.7	100.0%
	MOU Community	31.4	68.6	-	-	-	100.0%
<b>Keta</b>	Family	-	9.1	54.5	21.2	15.2	100.0%
	Individual	-	100.0	-	-	-	100.0%
	Clan	-	-	80.0	20.0	-	100.0%
	Clan and Individual	-	-	21.4	57.1	21.4	100.0%

Table 4.7:

59

Condition of Mangrove vegetation under existing ownership regimes five (5) years ago in two districts

District	Ownership regime	Condition of Mangrove vegetation and percentage of Responses					Total
		Excellent	Very good	Good	Fairly good	Poor	
<b>Ada</b>	Community	-	9.1	9.1	36.4	45.5	100.0%
	Family	-	-	-	100.0	-	100.0%
	Clan	-	-	-	58.3	41.7	100.0%
	MOU Community	8.6	31.4	60.0	-	-	100.0%
<b>Keta</b>	Family	-	51.5	42.4	-	6.1	100.0%
	Individual	-	33.3	66.7	-	-	100.0%
	Clan	-	30.0	50.0	20.0	-	100.0%
	Clan and /Individual	-	-	57.1	35.7	7.1	100.0%

Table 4.8:

60

Expected condition of Mangrove vegetation in five (5) years under ownership regimes in two districts

<del>District Ownership regimes</del>		<del>Expected condition of Mangrove vegetation and percentage of Responses</del>					
		Excellent	Very good	Good	Fairly good	Poor	Total
<b>Ada</b>	Community	-	-	9.1	27.3	63.6	100.0%
	Family	-	-	-	100.0	-	100.0%
	Clan	8.3	-	25.0	8.3	58.3	100.0%
	MOU Community	48.6	45.7	-	2.9	2.9	100.0%
<b>Keta</b>	Family	-	27.3	15.2	24.2	33.3	100.0%
	Individual	-	33.3	-	33.3	33.3	100.0%
	Clan	-	20.0	10.0	30.0	40.0	100.0%
	Clan and Individual	-	-	7.1	7.1	85.7	100.0%



Table 4.9:

# KNUST



#### 4.3.2: Ranking of effectiveness of existing mangrove resources ownership regimes in conserving mangroves in the area

During the FGDs the issue of the effectiveness of the various ownership regimes was investigated and pairwise ranking was used to determine the most effective ownership regime in conserving mangrove vegetation resources in the two districts. The results from the exercise depicted the MOU Community ownership and the Individual ownership regimes as the most effective as far as mangrove vegetation conservation is concerned in Ada and Keta respectively. Details of the results can be obtained from the Tables 4.9 and 4.10 respectively

Table 4.9: Pairwise ranking of perceived effectiveness of Existing Mangrove ownership regimes in conserving Mangroves resources in Ada

REGIME	1	2	3	4	RANK
1. Community	X				rd 3
2. Family	2	X			nd 2
3. Clan	1	2	X		th 4
4. MOU Community	4	4	4	X	st 1
FREQUENCY	1	2	0	3	

Table 4.10: Pairwise ranking of perceived effectiveness of Existing Mangrove ownership regime in conserving Mangrove resources in Keta

REGIME	1	2	3	4	RANK
1. Individual	X				st 1
2. Family	1	X			nd 2

3. Clan	1	2	X		<sup>rd</sup> 3
4. Clan and Individual	1	2	3	X	<sup>th</sup> 4
<b>FREQUENCY</b>	3	2	1	0	

### Chi-Square Analysis

To confirm the statistical significance of the perceptions on the most effective mangrove ownership regime in both Ramsar Sites, the Chi-Square analyses was done at 99% confidence level and the results presented in Table 4.11, Fig 4.7 and Fig 4.8

Chi-Square: Test of Association

H<sub>0</sub>: There is no association among the categories

H<sub>A</sub>: There is association among the categories

Table 4.11: Perceived effectiveness of the various ownership regimes in conserving mangroves

Chi-Square Tests				
	District	Value	Df	Asymp. Sig. (2-sided)
Ada	Pearson Chi-Square	80.606 <sup>a</sup>	12	.000
	Likelihood Ratio	88.386	12	.000
	Linear-by-Linear Association	25.065	1	.000
	N of Valid Cases	60		
Keta	Pearson Chi-Square	44.061 <sup>b</sup>	9	.000
	Likelihood Ratio	30.025	9	.000
	Linear-by-Linear Association	2.434	1	.119
	N of Valid Cases	60		

From the above table, since the  $P(0.000) < 0.01$ , I reject the  $H_0$  that there is no significance association among the categories. This can be observed from table 4.11 where the value of the Pearson Chi-Square Analysis is 80.6 and 44.06 in Ada and Keta respectively.

#### **4.4: How mangrove ownership (tenure) influences management regimes of mangroves in the area**

To explore how the existing ownership regimes, influence the management /conservation of mangrove resources in the two areas, the research focuses exclusively on mangrove vegetation conservation problems in the districts. Coincidentally the conservation problems within the two areas are widely common. The problems however were observed with different levels of intensity. These conservation problems and the percentages of respondents who attest to them are enumerated in table 4.12



**Plate 4.1: Cutting of young mangroves for fuel wood at Tunu in Keta**



#### 4.4.1: Mangrove vegetation conservation problems in the area

To determine the extent to which the existing mangrove resources ownership regimes influence mangrove vegetation management regimes in the area, the research delved into mangrove vegetation conservation problems and the findings are represented by table 4.12

Table 4.12: Mangrove vegetation conservation problems in the area

Nature of Conservation problem	Percentage of Respondents
1. Illegal and indiscriminate cutting of mangroves	18.5%
2. High exploitation due to dwindling fish stocks and high poverty levels	7.4%
3. Low rainfall pattern coupled with blocked creeks.	8.3%
4. Open access and bad management regimes	55.8%
5. Draining of water from wetlands by salt miners to water salt ponds for mining	10%
<b>TOTAL</b>	<b>100%</b>

To ascertain how existing ownership regimes actually influence the management regimes, the investigations from the FGDs and interviews revealed suggestions to support the assertion that the ownership regimes greatly influence the management regimes. The factors cited in support of the assertion however vary from district to district with different levels of intensities. Table 4.12 presents the effects of existing ownership regimes on the management regimes in the two study areas

Table 4.13: How existing mangrove resources ownership regimes influence management of mangrove vegetation

Effects on management	Percentage of Responses		
	Ada	Keta	Total
1. Illegal and over exploitation	78.9	21.1	100.0%
	51.1	48.9	100.0%
2. Restricted and regulated access allow mangroves to flourish			
	90.0	10.0	100.0%
3. Open access resources difficult to conserve			
	56.0	44.0	100.0%
4. Discrimination in granting access permits			

As a form of triangulation on the issue of how ownership regimes influence management regimes, the research probed further into whether or not respondents have challenges accessing mangrove resources under the various ownership regimes. The results showed that in the Ada area about 81.9% of respondents did not have challenges accessing mangrove resources under the Community ownership regime while 50% and 30% of respondents equally did not have challenges under the Family and Clan ownership respectively. Respondents were however unanimous regarding access challenges under the MOU Community ownership regime in Ada as 100% respondents attested to this. In contrast to the above all respondents in Keta admitted access challenges once you did not have ownership rights. Though various reasons were advanced in support of the access challenges the most common amongst them in Ada was whether one is a member of a community, family or a clan. Details of the Mangrove resources access challenges under the existing ownership regimes is shown in table 4.14

Table 4.14: Community responses to mangrove resources access challenges under existing ownership regimes

District	Ownership regime	Percentage of Responses		
		Yes	No	Total
<b>Ada</b>	Community	18.2	81.8	100.0%
	Family	50.0	50.0	100.0%
	Clan	70.0	30.0	100.0%
	MOU Community	100.0	-	100.0%
<b>Keta</b>	Family	55.0	45.0	100.0%
	Individual	100.0	-	100.0%
	Clan	48.0	52.0	100.0%
	Clan and Individual	65.0	35.0	100.0%

#### 4.5: Past and existing Community-based Mangrove management interventions

##### 4.5.1: Socio-cultural practices towards conservation of mangroves in the area

Findings from the two districts revealed the absence of Past Socio-Cultural practices towards Mangrove vegetation conservation in both districts. The results showed that while there were existent socio-cultural practices influencing the management and conservation of mangrove vegetation in Keta, there were no known socio-cultural practices in the Ada area. For instance, in Ada, 100% of respondents were not aware of any known socio-cultural practice influencing the conservation of mangroves in the area. The situation in Keta was however different as respondents (100%) unanimously attested to the existence of socio-cultural practices and portrayed knowledge of some of them. 97% of respondents in the Keta area were generally aware that nobody is allowed to wash used cooking utensils by rivers where mangroves are growing. Again

99% of those interviewed were aware that women who are menstruating are prohibited from entering the mangrove vegetation and that people are generally prohibited from accessing mangrove resources on Fridays.

**4.5.2: Community based Mangrove management interventions in the area** The study revealed the presence of community based management interventions in the two districts. It was however evident that most of these management interventions were initiated by the Wildlife Division of the Forestry Commission in collaboration with NGOs who are into mangrove conservation. These initiatives were therefore more pronounced in the Ada area than Keta as a result of the presence of a number of NGOs in the area. This possibly explained why as much as 72.9% of respondents admitted to the absence of community based Mangrove management interventions contrary to the 27.1% in Ada. Table 4.15 gives details of the presence of Community based management interventions and the percentage responses in each case:

Table 4.15: Community based Mangrove management interventions in the area

Management Intervention/Existence	Percentage of Responses		
	Ada	Keta	Total
<b>No existent management Intervention</b>	<b>27.1</b>	<b>72.9</b>	<b>100.0%</b>
Fire management	60.0	40.0	100.0%
Access regulation	80.0	20.0	100.0%
Planting and cultural practices	-	100.0	100.0%
Mangrove vegetation restoration	100.0	-	100.0%
Community sensitization	100.0	-	100.0%
<b>Total</b>	<b>50.0</b>	<b>50.0</b>	<b>100.0%</b>



#### **4.5.3: Challenges to Community based Mangrove management interventions**

Findings from the FGDs revealed a number of challenges facing the various Community based Mangrove vegetation management interventions in the two districts. These challenges were however not distinct or peculiar to a particular district as they shared common features. Listed below is a summary of the characteristic challenges militating against the Community based Mangrove vegetation management interventions:

1. Illegal exploitation without regard for access rules and regulations
2. Blocked creeks
3. People consider process of obtaining permit as a waste of time hence prefer to cut illegally
4. Draining of water from wetlands by salt miners to water salt ponds
5. Conflicts between Chiefs and people over access permits
6. People yet to come to terms with MOU between communities and WD/NGOs
7. Restricted and regulated access results in illegal exploitation and conflicts among people
8. Conflicts over discrimination in granting access permits
9. Conflicts with cattle herdsman who deliberately burn bush, allow cattle to trample over young mangroves
10. Bush burning as a result of traps to hunt for crabs and other animals.

#### **4.5.4: Presence of supporting Social Institutions/NGOs in the area**

Respondents from some communities within the two districts acknowledged the presence of supporting Institutions/NGOs in their communities while others admitted the absence of such supporting Institutions/NGOs. For instance, 85% of respondents in

Ada acknowledged presence of these supporting institutions while 75% did same in Keta. It was however discovered that most of these supporting Institutions/NGOs in Keta are currently dormant. Table 4.16 shows the existing Supporting Institutions/ NGOs and percentage of responses in the two study areas:

Table 4.16: Presence of supporting Social Institutions (NGOs) in the area

<b>Institutions</b>	<b>Percentage of Responses</b>		<b>Total</b>
	<b>Ada</b>	<b>Keta</b>	
No existing Institutions	15.0	25.0	32.5
MOU between community and WD	20.0	-	10.0
SNV/WD	40.0	-	10.0
GEF/WD	25.0	-	10.0
ATIDEV Initiative/WD	-	51.7	25.8
AESC (Anyanui Environment and Sanitation Club)	-	23.3	11.7
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

#### **4.5.5: Household involvement in activities of supporting Institutions/NGOs and sources of their (household) information on mangroves conservation.**

To determine the level of involvement of households in the activities of the supporting institutions the study revealed the percentage of respondents belonging to such institutions and sources of their information in the two districts. The results are presented in Tables 4.17 and 4.18

Table 4.17: Household respondents belonging to mangrove vegetation conservation supporting Organizations / Institutions in the area

#### **Percentage of Responses**

<b>Belonging to Institutions</b>	<b>Ada</b>	<b>Keta</b>	<b>Total</b>
Yes	58.3	57.6	58.0
No	41.7	42.4	42.0
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Table 4.18: Sources of Household information on mangrove vegetation conservation in the area

<b>Sources of information/Existence</b>	<b>Percentage of Responses</b>		
	<b>Ada</b>	<b>Keta</b>	<b>Total</b>
<b>No source of information</b>	<b>43.3</b>	<b>40.0</b>	<b>41.7%</b>
AESC Initiative	-	15.0	7.5%
ATIDEV Initiative	-	5.0	2.5%
Radio	-	1.7	.7%
ATIDEV Initiative/WD	-	35.0	17.5%
GEF/WD	18.4	-	9.2%
SNV/WD	20.0	-	10.0%
WD	18.3	-	9.2%
WD on radio	-	3.3	1.7%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

#### 4.6: Best sustainable management regimes in the area

The best management regime for the sustainable management and utilization of Mangrove resources as revealed by the FGDs and interviews conducted depicted Government/NGOs and Community collaboration for Ada as 73.3% of respondents attested to it. The story however was different in Keta as 51.7% of respondents perceived Government and Individual collaboration as the way forward. It must however be noted that both districts admitted to the fact that Government/NGOs

intervention is paramount in crafting a sustainable management regime for mangrove resources in the country. Table 4.19 presents details of the proposed management regimes and the percentage of respondents for each in the study areas districts.

Table 4.19: Proposed best sustainable management regimes by Respondents in the area

<b>Sustainable management regimes</b>	<b>Percentage of Responses</b>		
	<b>Ada</b>	<b>Keta</b>	<b>Total</b>
Government	1.7	5.0	3.3%
Community	5.0	3.3	4.2%
Family	1.7	5.0	3.3%
Individual	18.3	15	16.7.0%
Government/NGOs and community	73.3	20.0	46.7%
Government/NGOs and Individuals	-	51.7	25.8%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

## CHAPTER FIVE: DISCUSSION

### 5.1 Socio-demographic characteristics of Respondents

The significance of the socio-demographic variables of respondents in this research cannot be over-emphasized as they contribute to appreciating the status of mangrove vegetation and issues affecting conservation. Some of the socio-demographic characteristics of respondents looked at during the research include; age, gender, marital status, migration status, level of education, and occupation.

Gender is a vital component of any socio-economic studies or phenomenon. This variable was considered for this study, and the respondents included both male and female. Results from the analyzed data point to 53.7% male and 46.3% females for Ada



while Keta had 53.4% male and 46.6% female. It must however be noted that frantic effort was made through the purposive sampling technique to obtain a fair balance of respondents with regards to gender as there is no evidence to prove that males were involved more on mangrove issues than men.

Age of the respondents was considered an important characteristic in understanding their observations and opinions on current and past conditions and issues surrounding mangrove conservation. Conscious effort was therefore dedicated in selecting respondents pertaining to a particular age bracket as there were many retrospective questions. Higher age often depicts level of maturity of individuals and to some extent could influence respondents' analysis and responses. This accounted for the minimum 28 and 29 and maximum age of 79 and 87 years for Ada and Keta respectively.

Another important socio-demography variable of interest was the ethnicity/origin of respondents. A person place of birth is likely to influence his or her perceptions towards a particular issue. Natives are therefore more likely to give an in-depth background/history of the issue than migrants. Findings from the research portrayed 96.6% and 96.7 of respondents as natives for Ada and Keta respectively. These were people perceived to have lived there for at least two decades while 3.4% and 3.3% were migrants or people who had moved from other places to these study areas.

This notwithstanding, it is often said that marriage and family life can have a direct bearing on how an individual opine to certain critical socio-economic issues in society. Marriage as an institution could instill discipline in a person make him/her a little more responsible and matured in delivering opinion on issues. The majority of the household respondents (81.6% and 80.0%) in both study areas were therefore married in Ada and Keta respectively as depicted by Table 4.4.

Education is one of the strong foundations on which many livelihood strategies are built in society today. It affects a person's attitude and influences his or her perception about issues of socio-economic importance. A person's educational status can exert great influence on how he/she perceives issues and the sought of responses he/she will offer when probed about them. It therefore it became imperative to know the educational background of the respondents, hence the variable "highest level of education" was investigated and the data pertaining to respondents' educational status presented. The results in Fig 4.1 show that majority of the respondents in the two study areas ended their education at primary level or had no education at all. This could partly contribute to the high dependence on the natural resources and subsistence farming as sources of livelihood in the areas.

Occupations of respondents constitute one of the vital instruments for measuring natural resource dependency ratio in a given community, hence it was imperative to determine the occupations of the respondents. Findings from Fig 4.2 suggest that majority of household respondents in the two districts were engaged in fishing and farming as the main occupation. Mangrove farming was however becoming popular among the people especially at Keta where the people have taken it as an alternative source of livelihood.

## **5.2 Effectiveness of existing ownership regimes (tenure) in conserving Mangrove vegetation**

Generally, two natural resource tenure systems operate simultaneously in Ghana according existing literature. These are the state and customary tenure systems. The customary tenure is based on the traditions of the local communities and the state tenure is the administrative system governed by the state rules and regulations (FAO, 1995). As posited by Bruce (1998) tenure is a bundle of both rights and obligations. This he explained to mean the right to own, hold, manage, transfer or exploit natural resources and land but also the obligation not to use these in a way that harms others. Tenure

generally defines the property and what an individual or a group can do with it. In other circles, the concept of tenure is described as a social institution characterized by traditional practices, customary and formal laws. WRI (2005) suggested that in many rural communities, natural resource tenure as a social institution, defines not only their relationship to the land and natural resources but also the relationships between members of the community and those outside it, in terms of rights and obligations on the control and use of natural resources. Tenure therefore governs ownership and access to natural resources such as mangroves is a prerequisite for use and benefits from these resources.

The tenure system existing in Ada and Keta generally is the customary tenure system which is based on the traditions of the local people as observed by FAO (1995). The lands as well as the mangrove resources are generally owned by the local natives and these are held in trust for the people by the Chief, Head of the clan or the Family head. Contextually the term land tenure includes rivers, forest and other natural resources found on the land that constitute the objects of tenure. Government therefore does not own the land or the mangrove vegetation on it in the area. WRI (2005) opined that a community's rights to these natural resources define their natural resource tenure. Every member of the community, clan or family is therefore entitled to the land and any other natural resources found on it. Government's only user rights could be traced to the protection of the RAMSAR sites. However, the ownership regimes that exist for these resources especially mangroves uniquely vary from community to community as depicted by Fig 4.3 and 4.4. These ownership regimes have varied levels of effects on mangrove vegetation conservation and the sustainable utilization of the resource in the area. Very conspicuous among these effects is the one emanating from the Clan ownership regime existing in Ada. This system poses a lot of challenges to conservation

measures and is a threat to sustainable utilization of mangrove resources in Ada. In the cause of the study, it was discovered in one of the communities in Ada (Ayigbo) that the existing mangrove vegetation was not actually for the 'Ayigbo' people but the 'Sappor' clan in Ada Foah. This was found to create a serious conflict between the two communities over access rights. While the Sappor clan in Ada Foah are claiming ownership of the land as well as all natural resources on it, the Ayigbo people who are mainly migrant settlers feel cheated to be living with a resource without user rights. This very often resulted in illegal and indiscriminate exploitation of the mangrove resources by the people as concluded by Padee et al. (2006) when they suggested that users of community forest resources without rights will often engage in ecologically undesirable activities leading to over exploitation of the resources and community conflicts. The indiscriminate exploitation often results partly because the Ayigbo people offer little protection to the mangroves because they hold no stake when it comes to utilization of the resource. The story with the Community and Family ownership is not completely different as mangrove resources are seen as common property resources resulting in "tragedy of the commons" propounded by Hardin (1968) when he concluded that resources held in common are inevitably overexploited and degraded. However, in an open access situation, the danger of degradation is clear but in a situation where there is ownership and potential of exercising mechanisms of control, Hardin's (1968) theory could be misleading. The MOU Community ownership regime which is an initiative instituted by the Wildlife Division (WD) of the Forestry Commission/NGOs in collaboration with the various communities is to ensure mechanism of control to address the issue of over exploitation and to ensure sustainable utilization of mangrove resources in the area. The MOU Community ownership regime has promulgated local rules and regulations for the conservation of mangrove



vegetation in these communities to ensure sustainable utilization of the resource. For instance, access rights to the mangrove resources under the ownership regime are only granted through a permit from the committee set up by the MOU. Though the system also faces some challenges associated with granting of permits to the community people that sometimes creates conflict situation, it is by far the most effective ownership regime in the conservation and sustainable utilization of mangrove resources in Ada. The results from the interviews and FGDs have vividly substantiated this. The effects of the ownership regimes on mangrove conservation and sustainable utilization in Keta are not significantly different from those of Ada, though some key outstanding issues have to be pointed out for the records. The emerging individual ownership regime which is peculiar to the Keta area is fast gaining popularity and is observed by many as the best alternative to the traditional systems such as Family or Clan ownership. Several arguments have been advanced in favour of the individual ownership regime. Bruce (1998) argued that, a common resource is community administered and its existence ultimately depends on whether members of the community consider that its benefits outweigh its costs. Holmes (1995) however concluded that though tenure arrangements provide for effective management of common property resources, enforcement of these rules and regulations is difficult. Bruce (1989) however strengthened the argument made by Holmes (1995) when he suggested that, the difficulty in the enforcement of these rules and regulations stems from the fact that members have different degrees of interest in the resources because resources are multipurpose and creates heterogeneity in the community.

It was observed during the FGDs that the individual ownership regime will help to eliminate the problems of open access resources and illegal exploitation associated with family or clan ownership since individual owners will ensure total protection for their

resources. Premature exploitation which was associated with the individual ownership regime could be dealt with through community sensitization according to the people. These arguments are further strengthened by Tables 4.9 and 4.10 which portray the pairwise ranking of the most effective ownership regime in conserving mangrove resources in both Ada and Keta during the FGDs. To further confirm the effectiveness of the existing ownership regimes in mangrove resource conservation, the Chi-Square test of Association was computed. The results indicated that there is significant association between the indicators and the ownership regimes at 99% confidence interval (Table 4.11). Again in Keta, the Clan and Individual ownership regime was also observed to pose several conservation problems. This system allowed heads of clans to vest the management of mangrove resources in the hands of private individuals and the proceeds from such mangrove vegetation is then shared between that individual and the head of the clan. Conflict then arises when one party is in need before the agreed maturity period. This often has created bad blood between individual investors and clan heads and at times results in premature exploitation of mangroves.

The absence of vibrant NGOs who are into mangrove conservation in the Keta area to help manage the resources explained why there is no MOU Community ownership regime in that area. Individual ownership was therefore considered by the people as the most effective ownership regime in mangrove resource conservation and sustainable utilization.

### **5.3 How mangrove resources ownership (tenure) influence mangrove vegetation management regimes**

The general consensus on the need to conserve mangrove resources in both Ada and Keta was unilateral by the respondents. However, respondents also unanimously agreed that the existing mangrove resource ownership regimes (tenure) have tremendous

influence on the management of mangrove resources in the area. These perceptions were largely attributed to the numerous mangrove resources conservation problems emanating from the existing ownership regimes in the area as depicted by Table 4.12. Respondents arguably cited illegal and indiscriminate exploitation, restricted and regulated access, open access resources and discrimination in the granting of access permits as some of the factors associated with the existing ownership regimes which influence the management of mangrove resources in these areas. The Community, Clan and Family ownership regimes in Ada and the Clan and Family ownership in Keta give access to all people within the community, clan or family to mangrove resources in the area. Though people are required to obtain permits from the heads of these institutions before accessing mangrove resources, the open access situation often triggered over exploitation without regulation as shown in Table 4.13. This further buttressed the assertions by Holmes (1995) and supported by Bruce (1989) that enforcement of access rules and regulation in a common property resource like mangrove is difficult though tenure arrangements may prescribe guidelines for effective management of the resource in the community. This according to them is due to different degrees of interest of community members in the resource. Similar arguments can be advanced against the Clan and the Clan and Individual ownerships in the area which often results in premature or indiscriminate exploitation of mangrove resources. For instance, the tenure system existing between the people of Ayigbo (community people) and the Sappor clan (owners of the mangrove resources) in Ada confirmed to the illegal and indiscriminate exploitation of mangrove resources in the community as depicted by Table 4.13. Under the existing situation any person from the Ayigbo community needs a permit from the head of the Sappor clan before he or she can access mangrove resources in the community and might even be required to

pay for it. Contrary to this rule, the Sappor people can access the mangrove resources without a permit. Some people think the procedure for obtaining a permit is so cumbersome and do not even understand why they are sometime required to pay for it. Others also cited discrimination in the granting of access permits by clan and community heads as a serious challenge to the management of the resource. This explains why as many as 78% and 56% of respondents cited indiscriminate exploitation and discrimination in granting access as a challenge to management in Ada (Table 4.13). This ownership regime has often led to a situation where people exploit the resource illegally and indiscriminately without control since the Sappor clan is far from the resource and the people of Ayigbo are indifferent to the situation because the resource is not for them. The clan mangrove resource ownership regime in Ada does not encourage effective community control of the resources since such measures involve excluding outsiders and effectively controlling the behaviour and attitudes of members of the community. Community control is particularly difficult in this case since the mangrove resource user rights are reserved for people outside the community. Again, in Keta, the clan and individual ownership regime was observed to pose a serious challenge to the management of mangrove resources in the area. During the FGD it was revealed that conflict situation often results between Heads of Clans and individuals who have been given land to cultivate mangroves. These individuals are expected to share the proceeds of the mangrove resources with the Heads of the clans upon harvesting. The real challenge arises when the two parties disagree over maturity periods and harvesting time resulting in agitations and consequent illegal exploitation by the individuals or Heads of such clans.

The mangrove resource ownership regimes in the Keta area in terms of dominance include the Family, Clan and Individual, Clan and lastly the Individual (Fig. 4.4).



Findings from the research has shown that the dominant ownership regimes such as the Family, Clan and Individual as well as the Clan have not been successful in completely dealing with the problems of open access associated with the resource. These traditional ownership regimes are therefore gradually being replaced by the emerging Individual ownership regime which was perceived as the best and most sustainable ownership regime in the area. The emerging Individual mangrove resource ownership regime was observed by many as a panacea to the web of problems associated with a common community resource as mangroves. As observed in Table 4.13, open access is not a serious challenge to the management of mangrove resources in the Keta area. The evidence showed that as low as 10% of respondents cited open access as a challenge while 48.9% of the respondents attributed the flourishing of the mangrove vegetation in the area to the emerging individual ownership which ensured regulated and restricted access to mangrove resources. The individual ownership regime was therefore perceived to be the most appropriate ownership regime with regards to the management and sustainable utilization of mangrove resources in the Keta area.

The MOU Community ownership regime in Ada was generally observed by the majority of respondents, and also emerged as the best ownership regime during the FGDs that can support the people to manage mangrove resources sustainably in the area. This is substantiated by Table 4.13 where 51.1% of respondents think that the rules and regulations including restricted and regulated access by the MOU allow the mangroves apple time to flourish to maturity.

These assertions are further buttressed by table 4.14 which highlights the mangrove resources access challenges encountered by the people under the existing ownership regimes. It is evidently clear the Individual and the MOU community ownership

regimes in Keta and Ada respectively pose access rules and regulations and this ultimately help to manage the mangrove resources sustainably.

#### **5.4 Existing community based Mangrove vegetation management interventions in the area**

According to the World Bank (1998) report, the degradation of the coastal environment in Ghana is linked to the persistence of poverty and the pervasiveness of income disparities in much of the coastal zone. This has stimulated increased nonsustainable practices for local resources such as mangroves and wetlands (World Bank, 1998). The situation in South East Ghana is not totally different from this assertion as findings from the research attribute the over dependence on mangrove resources to the current depletion in fish population stocks and lack of alternative source of livelihood in the area.

The degradation of the mangrove resources in Songhor Ramsar site in Ada and that of the Keta lagoon complex Ramsar site in Keta is overwhelming. The local people asserted that, the situation has prompted the attention of government agencies, traditional authorities and environmental NGOs and consequently some modest attempts at restoration and sustainable management of this environment have been made (MLFM, 2007).

Findings from the research pointed to two main initiatives towards mangrove vegetation management in the area. These can be grouped into two broad categories namely: state-led initiatives and other restoration initiatives.

State-led initiatives:

Literature from the FGDs revealed that government through the Wild Division (WD) of the Forestry Commission of late has taken keen interest in the management of wetlands and mangrove resources in the area. Though support from central government towards

mangrove conservation is limited, the WD has initiated comanagement of mangrove resources through an MOU with various communities to help protect the RAMSAR sites. These initiatives according to the WD will in the long run provide technical and other resource support to these communities to manage the mangrove resources sustainably and to carry out restoration projects in most of the degraded lands. This explains the rationale behind the MOU between WD and

Communities in both Ada and Keta to mention but a few as highlighted by table 4.15.

Other initiatives:

It was also revealed that some of the initiatives towards ensuring the judicious use of the mangrove resources in these areas have been supported by NGOs and other organizations in collaboration with the WD. SNV (Netherlands Development Organization) and the GEF (Global Environment Facility) have been cited as two prominent institutions that have collaborated with some communities through the WD to impact greatly in the fight against the destruction of mangrove resources in Ada. Again the Anyanui Environment and Sanitation Club and the ATIDEV Initiatives were also projected as initiatives of NGOs doing marvelously well in ensuring conservation and sustainable utilization of the mangrove resources in Keta. Tables 4.16 and 4.17 clearly substantiate this by portraying the percentage of household respondents belonging to this supporting institutions and gaining knowledge and support from them in Ada and Keta respectively.

Some of the management interventions initiated by WD and these NGOs include Fire management, Access regulation, Improve planting and cultural practices, Mangrove restoration projects and Community sensitization on mangrove conservation and sustainable utilization.

#### **5.4.1 Challenges in effective implementation of Community based Mangrove vegetation management interventions**

Though the existing community based mangrove vegetation management interventions are impacting greatly in conserving mangroves in the area these initiatives are facing a lot of challenges in the quest to achieve the ultimate goal. Notable amongst these challenges is the reluctance of the people to come to terms with the rules and conditions guiding the introduction of some of the initiatives. Implementation and enforcement of the guiding principles of some of these initiatives has therefore many a time been met with counter activities such as illegal exploitation by the people. For instance, during FGDs in Ada, it emerged that obtaining of access permits from committee members (rule put in place by the MOU to help regulate rate of exploitation) is viewed by some people as hectic and time wasting, hence such people prefer the open access system.

#### **5.4.2 Socio-cultural practices (taboos) towards Mangrove vegetation conservation in the area**

Contrary to expectations supported by Ormsby and Mannle (2006) and ITTO (2007) project report, findings from the study suggest that there is no known past or existing socio-cultural practices (taboos) that help to restrict and regulate peoples access and use of mangrove resources in Ada. According to the people, their forefathers settled in Ada because of fishing and had little to do with mangroves. Mangrove resources were of less significance but have recently gained prominence due to the dwindled fish stocks, lack of alternative sources of livelihood and the high unemployment rate in the area. However, observations from the FGDs suggested that there were certainly some socio-cultural practices in the past that helped to conserve mangrove resources but these might have been lost with the passage of time. Lack of socio-cultural practices restricting and regulating access in Ada is at complete variance with World Bank (2003) when it



concluded that, spirit houses used to protect mangroves are a common sight in Southeast Asia, especially in Cambodia and Thailand, while temples associated with mangroves can be found in India and Myanmar. This consequently pointed to the reason why over exploitation of mangrove resources are commonly associated with the community, clan and family ownership regimes in Ada. The situation in Keta however was different as there were existing socio-cultural practices that restricted and regulated people in terms of access and use through strict observation of taboos. For instance, there are days (Fridays) that entry into the rivers/lagoons and mangrove forest is prohibited and flouting this restriction attracts sanctions/punishment. Again according to the people no one is allowed to wash cooking utensils in rivers where mangroves are found and women who are menstruating are equally prohibited from accessing mangrove resources. These are all geared towards creating the impression that mangrove vegetation is not a refuge dumping ground. Blocked creeks as a result of waste disposal into rivers and lagoons have been identified as one of the most serious challenge confronting the conservation of mangroves in both Ada and Keta.

#### **5.5 Best sustainable mangrove resources management regimes: Implications for conservation and utilization in the Sanghor and Keta complex RAMSAR sites.**

Investigations from the study revealed respondents' general acceptance to the assertion that mangrove resources in the area have degraded over the years and the situation is likely to escalate if drastic measures are not put in place to arrest the trend. The findings suggest that the existing mangrove resource ownership regimes in most communities in Ada and Keta in Ghana do not allow for the institutionalization of effective and efficient mangrove resource management regimes in the area. Findings from the interviews and FGDs revealed that rules and regulations put in place by the Chiefs, Heads of Clans or

Families to regulate access to ensure sustainable utilization of mangrove resources are being flawed with impunity by some of the people. Community leaders lack the needed power resources and logics to enforce these rules and regulations under the existing ownership regimes. People feel reluctant and indifferent to management regimes such as bush fire control, replanting of degraded areas and to protect the mangrove vegetation against illegal and over exploitation because of the open access regime in most of the communities. The situation is further being aggravated by the over dependence on mangrove resources linked to the

perception of lack of alternative sources of livelihood in the area which is in line with Zorini et al (2004) when they observed that, lack of income generating options incites local communities to practice unsustainable methods of mangrove exploitation. It was also evident that the communities do not attach much value to the ecological importance of the mangrove as defensive barriers, though local knowledge indicated its importance for fish, other wildlife and medicinal uses. It is therefore common to see people converting wetlands previously supporting mangrove vegetation to other uses such as rice farming and salt mining as discovered by ITTO, (2007). During FGDs it was revealed how people deliberately drain water from the wetlands to water salt ponds which results in death of mangroves. In the presence of all these conservation problems some sustainable mangrove management regimes perceived as the best were proposed by the people to help regulate the rate of exploitation to ensure sustainable utilization of mangrove resources in both Ada and Keta.

It was however evidently clear that the best sustainable management regimes proposed by the people (table 4.19) were directly linked to the existing mangrove ownership regimes in the area. The best sustainable management regime proposed by the people of Ada was the co-management regime involving the Community and

Government/NGOs. The people of the Keta area on the other hand settled on comanagement involving Individual owners and Government. The scenario involved in these proposed management regimes can be attributed to what the people perceived as the most effective ownership regimes in conserving the mangrove vegetation. MOU community ownership regime in Ada is overwhelmingly observed as very effective in regulating access and ensuring sustainable utilization of the resource which explained why the people opted for a management regime involving Government/NGOs and the community. The emerging Individual ownership regime in the Keta area was also perceived by the people as the most effective ownership regime as it helped to eliminate the open access ownership regime which impacted negatively on mangrove vegetation conservation. This ultimately influenced their choice of a management regime involving Government/NGOs and individuals in the Keta area. The general argument is that both the MOU community and the Individual ownership regimes in Ada and Keta respectively have rules and regulations governing access and sustainable use of mangrove resources but enforcement of these rules is a challenge that needs to be addressed. Pagdee et al (2006) were therefore right when they opined that users of community forest resources without rights will ultimately engage in ecologically undesirable activities leading to over exploitation of resources and community conflicts. Government/NGOs are therefore considered as institutions with the requisite power resources that can help the people enforce these rules and regulations to the later as posited by Mohammed (2004), when he concluded that in countries like Tanzania, control of State and influence of International donor agencies in management activities are very prominent.

It was generally observed that the MOU Community ownership regime was the best and more sustainable in the Ada area because the WD was able to solicit support from

the statutory legal framework to back the MOU to succeed. However, the emerging Individual ownership regime in Keta was observed as the best in terms of its sustainability and conservation of mangrove resources. According to majority of the people interviewed, the general perception was that people tend to manage and utilize resources well when ownership rights are vested in individuals rather than in the family, clan or community. Individuals will strive hard to protect and derive continuous benefits from the mangrove vegetation if ownership rights are vested in the people as individuals while government/NGOs offer support.

Again Government/NGOs can provide the needed financial muscle to help in the restoration of vast degraded mangrove vegetation lands and to carry out community sensitization workshops for the people.

The role of NGOs towards mangrove conservation and sustainable utilization in the area cannot be overemphasized as their activities are impacting greatly in helping the people to manage mangrove resources sustainably. Communities such as Kwalypoyom and Obane in Ada and Anyanui in Keta to mention but a few have benefited tremendously from the activities of NGOs through various restoration projects and community sensitization. The conclusions drawn from the findings in this study however posed some pertinent questions as posed by Walter (2003), whether the state could still be entrusted with the responsibility of managing and conserving the country's mangrove forest aside the peripheral role of simply facilitating local management considering its past failures in similar endeavours. This role might impact positively especially in cases and areas where rare species, wildlife or marine habitats are significant attributes of a particular mangrove.



The implications of the above for the management of mangrove forest to ensure sustainable utilization of mangrove resources in both the Sanghor and Keta complex RAMSAR sites are enormous. There is evidence to support that modest attempts have been carried out by government (WD) and many other NGOs towards restoration of degraded mangrove vegetation to ensure the conservation and of mangrove resources in the Sanghor and Keta complex RAMSAR in Ada and Keta respectively. These efforts however have not created the much desired impact in management and sustainable utilization of mangrove resources in the area. The failure of these initiatives can be attributed to the fact that governance issues in relation to access, ownership rights and land tenure system has been overlooked. Findings from this research therefore portrayed that future efforts geared towards the management and sustainable utilization of mangrove resources in the area should encourage the MOU Community ownership regime in Ada or the emerging Individual ownership regime in Keta to ensure successful implementation of these initiatives.



## **CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS**

### **6.1 CONCLUSION**

The imperative evidence gathered from the study thoroughly exposes how governance issues in relation to access, ownership rights and land tenure are seriously affecting the management and sustainable utilization of the mangrove resources in the Sanghor and Keta complex RAMSAR sites in Ada and Keta respectively in Ghana. Very conspicuous amongst these effects is the open access regime which is strongly linked to most of the existing mangrove resources ownership regimes in the area. The Community, Clan or Family mangrove resources ownership regimes which are predominant in the area operate under the open access guidelines, thus allow people within the community, Clan or Family open access to mangrove resources in the area leading to indiscriminate and over exploitation of these resources. Though findings point to various rules and regulations guiding access, these are normally broken with impunity while chiefs and other community leaders lack the requisite power resources to enforce them.

Furthermore, it was also discovered that the existing mangrove resources ownership regimes in the area have great influence on mangrove resources management regimes instituted by a number of NGOs in collaboration with the WD of the Forestry Commission of Ghana. For instance, in communities where MOU has been established with NGOs/WD to ensure sustainable utilization of mangrove resources, access rules and regulations have been put in place and this allow the mangrove vegetation to flourish. However, these assisted communities occasionally face the problem of illegal exploitation by people who are reluctant to come to terms with the MOU and regard obtaining access permits from committees (put in place) as a waste of time. Existing ownership regimes such as the Community, Clan or Family expose mangrove resources

to open access leading to over exploitation stemming from a lack of management regimes regulating access.

This notwithstanding, several attempts have been made by a number of NGOs in collaboration with WD to institute various community based mangrove management interventions in the area. Several mangrove restoration projects and community sensitization programmes have been supported by these NGOs. Again the existence of socio-cultural practices (taboos) in Keta has impacted greatly in conserving mangroves. The absence of socio-cultural practices in Ada was contrary to expectation but these (socio-cultural) practices might have been lost in the area with the passage of time as there were no traces of evidence supporting their existence in the past.

In the mix of all these mangrove conservation problems the best proposed management regime for the management and sustainable utilization of the mangrove resources in the area will be one that involves the Government/NGOs as suggested by the people. Co-management of the mangrove resources will ensure Government/NGOs provide the needed financial and power resources to restore degraded areas and to help enforce access rules and regulations. Alternatively, the emerging individual ownership regime in Keta was found to be by far better than the community, clan or family ownership regimes in conserving mangroves hence the calls for Government/NGOs to collaborate with individual owners instead of the entire community, clan or family ownership regimes. However, the MOU community ownership regime in Ada which is equally yielding positive results should be encouraged and inculcated into future conservation efforts and initiatives.

In conclusion, revelations from this research have therefore ignited calls on government to get involved in the management of the country's mangrove resources in spite of its short falls in the forest sector to save a deteriorating situation.

## 6.2 RECOMMENDATIONS

The study has identified several serious governance issues in relation to access, ownership rights and land tenure militating against mangrove vegetation conservation and sustainable utilization in the Sanghor and Keta complex RAMSAR sites in Ada and Keta in Ghana. The following recommendations have therefore been outlined to salvage the rather precarious situation in the area:

NGOs in collaboration with the WD should be supported to extend their mangrove vegetation conservation initiatives to many other communities in the area to ensure conservation and sustainable utilization of the mangrove resources.

Again the emerging Individual mangrove resource ownership regime which is observed as a viable alternative to the Community, Clan or Family ownership regimes with regards to mangrove vegetation conservation should be encouraged and supported by Government/NGOs. Individuals should therefore be encouraged to take mangrove farming as an alternative source of livelihood since this may reduce the pressure on the natural vegetation. Such people also stand to benefit from the high carbon sequestration potentials of mangroves which provide a good opportunity for Ghana under the REDD+ mechanism.

In tandem with national regulations, the local people in South East Ghana should be encouraged to undertake alternative economic activities to reduce their exploitative pressures on the mangrove vegetation. Such activities may be beekeeping, aquaculture, poultry, carpentry, masonry, and other vocational skills. The communities, and especially the youth, should be empowered to pursue these alternative economic activities by providing technical assistance and vocational training, compensation for starting new activities and provision of funds to purchase equipment, feed and seed.



The Fisheries and Forestry Commissions, Ministry of Local Government through the District Assemblies, the private sector and commercial banks should liaise with local communities to make these alternative livelihoods strategies viable.

Last but not least, an important cause of the gradual depletion of the mangrove resources in the study area is the inadequate understanding of the importance of mangroves. There is therefore the need for sensitization and education programmes that will create public awareness about mangroves, their extrinsic and intrinsic values as well as Government plans in relation to management of these resources.

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## APPENDICES

### **APPENDIX I: Questionnaire on the influence of Land tenure and ownership regimes on sustainable conservation of mangroves in the Songhor and Keta lagoon complex Ramsar sites in Ghana.**

Name of Interviewer..... Date.....

Questionnaire Code..... Household Code.....

Village Name.....

This questionnaire is part of a research which will be conducted at the Kwame Nkrumah University of Science and Technology Kumasi, Ghana; Department of Forest and Silviculture in fulfillment of the award of Master of Philosophy Degree in Natural Resource and Environmental Governance. The research is solely for academic purpose. For ethical and confidential reasons, I will not write your name on this questionnaire form and besides, your anonymity is guaranteed.

Please tick and / or write responses where necessary.

#### SECTION A (Socio-Demographic Background of Respondents)

1. How old are you?.....
2. What is your sex?
  - a. Male
  - b. Female
3. What is your marital status?
  - a. Single
  - b. Married
  - c. Separated
  - d. Divorced
  - e. Widowed
4. Where were you born?
  - a. Native
  - b. Migrant
5. What is your highest level of high education?
  - a. Primary education
  - b. Middle School education
  - c. J H S education
  - d. Secondary/S H S education
  - e. Tertiary education
  - f. No education
6. What is your main occupation?
  - a. Farmer
  - b. Fisherman/fisherwoman



- c. Mangrove poles dealer
- d. Mangrove timber dealer
- e. Salt producer
- f. Charcoal/Firewood producer
- g. Others (specify).....

## SECTION B (Tenure and mangrove ownership regimes)

7. What forms of mangroves ownership exists in this locality?
  - a. Government
  - b. Chiefs
  - c. Private
  - d. Family Heads
  - e. Others (specify).....
8. Who owns the mangroves vegetation in this locality?
  - a. Government
  - b. Community
  - c. Families
  - d. Private
  - e. Others (specify).....
9. Who owns the land on which the mangrove vegetation is growing?
  - a. Government
  - b. Community
  - c. Family
  - d. Private
  - e. Others (specify).....
10. How will you describe the effectiveness of the ownership regime(s) listed above in Q7?
  - a. Excellent
  - b. Very good
  - c. Good
  - d. Fairly good
  - e. Poor

<b>Ownership Regime</b>	<b>Condition of Mangroves (use indicators above)</b>	<b>Reasons</b>
Government		
Chiefs		
Private		
Family heads		

11. (a) Do you have any problems accessing mangroves resources under the ownership regime(s)? i. Yes ii. No

(b) If yes, what are these problems?

<b>Ownership Regime</b>	<b>Nature of Problems/Challenges of access</b>
Government	
Chiefs	
Family heads	
Private	

How does one get access to the mangrove resources under the ownership regime(s)

<b>Ownership Regime</b>	<b>Nature of access</b>
Government	
Chiefs	
Family heads	
Private	

12. (a) Are you prohibited from using the mangrove resources in the locality under the ownership regime(s)?

i. Yes ii. No

(b) If yes what is the nature of the prohibition?

<b>Ownership Regime</b>	<b>Nature of prohibition</b>
Government	
Chiefs	
Family heads	
Private	

13. How will you describe the condition of the mangrove vegetation now under the ownership regime(s)?

- a. Excellent
- b. Very good
- c. Good
- d. Fairly good
- e. Poor

Ownership regime	Condition now (use indicators above)	Reasons for condition
Government		
Chiefs		
Family heads		
Private		

14. How was the condition of the mangrove vegetation 5 years ago under the ownership regime(s)?

- a. Excellent
- b. Very good
- c. Good
- d. Fairly good
- e. Poor

Ownership regime	Condition 5yrs ago (use indicators above)	Reasons for condition
Government		
Chiefs		
Family heads		
Private		

15.

16. How do you think the condition of the mangrove vegetation will be in 5 years under the ownership regime(s)?

- a. Excellent
- b. Very good
- c. Good
- d. Fairly good
- e. Poor

Ownership regime	Condition in 5yrs (use indicators above)	Reasons for condition
Government		
Chiefs		
Family heads		
Private		

### SECTION C (Ownership and Management regimes)

17. (a) Are there any rules, regulations or mechanisms (management regimes) put in place to manage mangrove vegetation in the locality?
- i. Yes ii. No
- b. If yes mentioned some of these rules, regulation or mechanisms (management regime(s) and the challenges the face

Management regime(s)	Challenges (1for Yes, 2 for No)	Description of nature of challenge if 1

18.

19. Who instituted these management regimes?

Management regime(s)	Source of power/authority
	Government
	Chief
	Community consensus
	Family head
	Private/Individuals

20. (a) Do you think that the existing mangroves ownership regime (s) affect the management regimes?



i. Yes ii.

No (b) If yes,

how?

.....  
.....

21. In your own opinion, what are the main problems of mangrove conservation in the area?

.....  
.....

22. What things would you like to change or improve?

.....

23. How have you been coping with the mangroves conservation problems in the locality?

.....  
.....

24. (a) Are there local associations, committees, NGOs, or any social group that is into mangrove conservation in the community?

i. Yes ii.

No

(b) If yes mention them

.....  
.....

25. (a) Do household members belong to a local association, committee, NGO, or any social group?

i. Yes ii.

No

(b) Why?

.....

26. (a) Do you have access to new information/knowledge on mangrove vegetation management?

i. Yes ii. No iii. (b)

If Yes, by who?

.....

(c) If no, why?

.....

.....

#### **SECTION D (Socio-cultural practices influencing mangroves management)**

27. (a) Do you know of any past socio-cultural practice(s) that influenced mangrove conservation?

i. Yes ii.

No

(b) If yes, mention them

.....

28. (a) In your opinion were these socio-cultural practices effective towards mangrove conservation

i. Yes ii.

No

(b) Why?.....

.....

.....

29. Which of these socio-cultural practice(s) is/are still observed or not observed in the locality and why?

<b>Socio-cultural practice(s)</b>	<b>Reasons for being observed or not being observed</b>

--	--

30. (a) Do you know of any current socio-cultural practice towards mangrove conservation?

i. Yes ii.

No

(b) If yes, mention them

.....

.....

31. (a) In your opinion are these socio-cultural practices effective towards mangrove conservation

i. Yes ii.

No

(b)Why.....

.....

.....

.

32. (a) Comparing the past and the current socio-cultural practices, in your opinion which of these are more effective? (skip if nonexistent)

i. Past

socio-cultural

practices ii.

Existing

socio-cultural

practices iii. I

don't know

(b)Why.....

.....

.....

.....

• • • • •

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.....

**SECTION E (Sustainable management regimes)**

.....

1. (a) Are there any measures (management regimes) that influence how the household manages mangrove vegetation in the area?

i. Yes ii. No

.....

(b) If yes mention some of these measures (management regimes)

.....

2. Who instituted these management regimes?

a. Government

b. Community

c. Family

d. Private/Individuals

e. Others (specify) .....

3. (a) Are these management regimes enforced?

i. Yes ii. No

.....

- i. Yes ii. No

- .....

- Government
- Community
- Family
- Private/Individuals
- Others (specify) .....

- i. Yes    ii.

No

- .....
- .....

- a. Government



- b. Community
- c. Family
- d. Private
- e. Others  
(specify).....

.....

f. Give reasons to support your answer  
.....  
.....

37. (a) In your opinion, is there any way mangroves can be managed sustainably?

i. Yes ii.

No

(b) If yes, how?



## **APPENDIX II: Interview guidelines for Government Officials and Officials of Non –Governmental Organizations.**

The following instrument seeks the views of Government officials and officials of NGOs on mangrove resources management.

1. Briefly explain, the historical background of mangroves management
2. How long has your organization been working in managing mangrove vegetation at the locality ii) What was the situation of mangrove vegetation before your outfit/ NGO started?  
iii) What is the future prospect of mangrove vegetation?
3. i) How effective is the existing ownership regime in conserving mangroves resources?  
ii) In your opinion do you think there can be a more effective ownership regime than the existing one?
4. To what extent does the existing ownership regime affect the conservation of mangroves resources?
5. Are there any mangroves management regimes in the area?  
i) If yes  
How effective are these management regimes?  
ii) If no  
What are some of the management regimes you would recommend?
6. Does the existing ownership regime affect mangroves management regimes in the area?
7. Do you think the existing ownership regime is secured?
8. Are you aware of any traditional management regimes, systems and practices put in place by the local people towards mangrove conservation?
9. Were there any existing community based mangrove management regimes?
10. Are you aware of any socio-cultural practice(s) observed by the people that influence mangrove conservation?
11. How can you rate the community's willingness to manage mangrove vegetation?
12. What are the main challenges of local participation and sustainability in community mangrove vegetation management?

- i) Challenges for local participation ii) Challenges for sustainable mangrove vegetation
13. What are specific roles of your organization in managing mangroves?
  14. What management regimes have you instituted towards effective mangrove vegetation management at Ada?
  15. How is your organization support to the community through participatory approach?
  16. What roles do the government through its sector Ministries and other agencies play in the management of mangrove resources?



### **APPENDIX III: Focus Group Discussions guidelines for the Local Community.**

1. Discuss on the historical background of mangroves vegetation in Ada
2. How will you describe the state of the mangrove vegetation now? Has it degraded or flourish over the years? Why?
3. Who owns the mangrove vegetation?
4. (a) Do you have any challenges/problems accessing mangrove resources in the locality?  
(b) If yes mention some of these challenges/problems
5. (a) Are you prohibited from using the mangrove resources?  
(b) If yes by who and how?
6. (a) Do you think the existing ownership regime affects the conservation of mangroves in the area?  
(b) If yes how does it affect the conservation of mangroves?
7. (a) Are there any mangroves management regimes in the area?  
(b) If yes, how effective are these management regimes?  
(c) If no, what are some of the management regimes you would recommend?
8. Do you think the existing ownership regime is secured?
9. Does the community have any traditional systems and practices put in place by the local people towards mangrove conservation?
10. How effective are these traditional systems and practices in terms of motivation and sanctions?
11. How are you involved in managing mangrove vegetation?
12. What will constitute a potential best ownership regime for sustainable management of mangroves resources in the community?





Map of Ghana showing two study areas circled in blue with arrows.

Source: <http://www.googlemaps.com>