

**CO-MANAGEMENT STRATEGY IN MITIGATING FISHERIES
CONFLICTS IN HOMA BAY COUNTY, KENYA**

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**A Thesis Submitted in Partial Fulfillment of the Requirements for the
Conferment of the Degree of Doctor of Philosophy in Peace and
Conflict Studies of Masinde Muliro University of
Science and Technology**

NOVEMBER, 2019

DECLARATION AND CERTIFICATION

Declaration

This Thesis is my original work prepared with no other than the indicated sources and support and has not been presented elsewhere for a degree or any other award.

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Certification

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DEDICATION

This Thesis is dedicated to my children, Trinie, Jerry, Henry and Triza for their understanding during my pre-occupation with my work. I am sure the all missed my love and paternal affection.

ACKNOWLEDGEMENTS

I would like to acknowledge the following people without whom this research could have not been successful. First and foremost I would like to thank my beloved wife, Lisa for the moral support she gave me through the course. I am proud of her.

My thanks also go to my mum, Margaret Orwa for good support she offered me. I am grateful to her.

I also pay tribute to my supervisors, Prof. John K. Byaruhanga and Prof. Crispinous Iteyo for their guidance despite their busy schedules. I am deeply indebted to them.

Lastly, I wish to express my appreciation to my colleagues David Newton Simiyu, Moses Njoroge and Netto Otila for their input. I must also acknowledge and thank staff of both the Fisheries Department and County Government of Homa Bay and all those who played different roles in helping me complete this work.

ABSTRACT

There has been conflict in the fishing industry world over. Fisheries conflicts are among the persistent problems affecting the security of food, livelihoods and fishing environments crucial to poor fishing communities in developing countries. In Kenya, the same has been a major problem and it has taken government's efforts to curb. One of the strategies introduced more so in Homa Bay County is the Co-Management Strategy in which all stakeholders are involved. Although this co-management strategy has been suggested as a solution to the problem of fisheries use, conflicts still persist. The study examined the effectiveness of co-management strategy in mitigating fisheries conflicts in Homa Bay County. It was guided by the following specific objectives: to establish the effectiveness of Co-Management Strategy in mitigating fisheries conflicts in Homa Bay County; to find out Community Perception on the Co-Management Strategy in mitigating fisheries conflicts in Homa Bay County and to establish challenges on the effectiveness of Co-Management Strategy in mitigating fisheries conflict in Homa Bay County. The common property theory which assumes that individual interest will not prevail over the best interest of the community as a whole and Marx's Conflict Theory which assumes that Conflict theory states that tensions and conflicts arise when resources, status, and power are unevenly distributed between groups in society and that these conflicts become the engine for social change were used in the study. This study was guided by a conceptual framework derived from common property theory and Marx's theory of conflict. The framework was based on the driver-problem-issue- intervention analysis that put into context the dynamics of variables that addressed the objectives of the study. The research design used was descriptive in nature. The population of the study was 18, 300 registered members of BMUs. Multi stage sampling was used to identify two beaches in each of the five divisions namely: Mfangano, Mbita, Lambwe, Central and Gwasssi. Homa Bay County was selected because it has the largest share of L. Victoria and highest number of BMUs in the country. The study established that averagely there were about 100 registered members in each BMU. 40% of BMUs from each of the five divisions were sampled, resulting to 39 BMUs. From each BMU sampled, 10 registered members were randomly sampled. The sample size was therefore, 390. The respondents were also clustered as Fishermen; Boat Owners; Fish Traders and Owners of fishing gears and government officers. Data was collected using structured questionnaires, interview schedules, observation and Focus Group Discussions (FGDs). In terms of analysis descriptive statistics was generated to build a picture of the respondents' characteristics, this was done using SPSS. Inferential Statistics used the regression models and ANOVA. The study found out that Co-Management Strategy mitigates fisheries conflict. The study also found that the community perception of co-management strategy was positive. Lastly, study also found that challenges faced by Co-Management strategy were an impediment in the mitigation of fisheries conflict. The findings of this study support and add knowledge to previous studies on fisheries conflicts. It is envisaged that the study will contribute to the field of conflict management within the broader context of co-management strategy in the fisheries sector, thus leading to harmonious coexistence at the beaches, sustainable utilization of fisheries resources and improved livelihood of the people. The study suggests more stakeholders should be involved in the policy formulation and that there should be more seminars and training of stakeholders. Studies also suggest further research targeting cultural issues and cross border fishing that is causing fisheries conflicts.

TABLE OF CONTENTS

DECLARATION AND CERTIFICATION	i
COPYRIGHT	ii
DEDICATION	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	x
LIST OF FIGURES	xii
LIST OF PLATES	xiii
OPERATIONAL DEFINITION OF CONCEPTS.....	xiv
ABBREVIATIONS AND ACRONYMS	xv
CHAPTER ONE: INTRODUCTION	1
1.1 Background to the Study.....	1
1.2 Statement of the Problem	19
1.3 Objectives of the Study	21
1.4 Research Questions	22
1.5 Justification of the Study.....	22
1.6 Scope of the Study	24
1.7 Chapter Summary.....	26
CHAPTER TWO: LITERATURE REVIEW	27
2.1 Introduction.....	27
2.2 Co-Management Strategy in Mitigating Fisheries Conflicts	27
2.2.1 State-based formal regulations.....	31
2.2.2 The Concept of Co-Management	33
2.2.3 Evolution of co-management	56
2.2.4 Rationale of Co-Management	69
2.2.5 Co-management Policies Mechanism to Fisheries Conflict	79
2.2.6 Fisheries Conflicts Addressed by Co-Management Strategy.....	90
2.2.7 Causes of Fisheries Conflict Addressed by Co-Management Strategy	96
2.3 Community Perception on Co-Management Strategy	105
2.4 Challenges facing the Co-Management Strategy.....	113
2.5 Conceptual Framework	142
2.5.1 Common Property Theory.....	142
2.5.2 Marx’s Conflict Theory.....	147

2.6	Chapter Summary.....	153
CHAPTER THREE: RESEARCH METHODOLOGY.....		154
3.1	Introduction.....	154
3.2	Research Design.....	154
3.3	Study Area.....	155
3.4	Study Population.....	157
3.5	Sampling and Sample Size.....	158
3.6	Data Collection Methods and Instruments.....	161
3.6.1	Primary Data.....	161
3.6.1.1	Interview Schedule.....	161
3.6.1.2	Questionnaires.....	162
3.6.1.3	Observation Checklist.....	163
3.6.1.4	Focus Group Discussion (FGD).....	163
3.6.2	Secondary Data Collection.....	164
3.7	Validity and Reliability of the Research Instruments.....	164
3.7.1	Validity.....	164
3.7.2	Reliability.....	165
3.8	Data Analysis and Presentation Techniques.....	166
3.9	Ethical Considerations.....	168
3.10	Limitations of the Study.....	168
3.11	Chapter Summary.....	170
CHAPTER FOUR: EFFECTIVENS OF CO-MANAGEMENT STRATEGY IN MITIATING FISHERIES CONFLICTS IN HOMA BAY COUNTY		171
4.1	Introduction.....	171
4.2	Socio-demographic Characteristics of the Respondents.....	177
4.2.1	Age of the Respondents.....	177
4.2.2	Gender of the Respondents.....	178
4.2.3	Marital status.....	179
4.2.4	Level of Education.....	180
4.2.5	Kind of activity undertaken at beach.....	181
4.2.6	Period of registration by the BMU.....	182
4.3	Co-Management Strategy Policy Mechanisms that Mitigates Fisheries Conflict in the Homa Bay County.....	184
4.3.1	Government Fisheries Policy.....	186
4.3.2	Legal support.....	187
4.3.3	Awareness of fisheries Policy.....	187
4.3.4	Involvement of fishermen in Policy Implementation.....	188
4.3.5	Involvement of the fishing community in policy formulation.....	191
4.3.6	Forms of Fisheries Conflicts addressed by Co-Management Strategy.....	195

4.3.7	Inferential Statistics on Co-management Policy Mechanisms and Fisheries Conflict.....	200
4.4	Chapter Summary.....	203
CHAPTER FIVE: COMMUNITY PERCEPTION OF THE CO-MANAGEMENT STRATEGY IN MITIGATING FISHERIES CONFLICTS IN HOMABAY COUNTY		204
5.1	Introduction.....	204
5.2	Descriptive Analysis of the Study Variable Community Perceptions	204
5.2.1	Community Perception on Effectiveness of Co-management Strategy.....	205
5.2.2	Community Perception on Transparency of Co-management Strategy.....	205
5.2.3	Community Perception on Competency of the FMIs	207
5.2.4	Community Perception on Timeliness/promptness of the FMIs	208
5.2.5	Community Perception on Networking of the FMIs	210
5.2.6	Fisheries Conflicts addressed by FMIs (Co-Management)address Fisheries Conflicts	212
5.3	Inferential Analysis of Community Perception on Co-Management and Fisheries Conflicts.....	215
5.4	Chapter Summary.....	217
CHAPTER SIX: CHALLENGES FACED BY CO-MANAGEMENT STRATEGY IN MITIGATING FISHERIES CONFLICT		219
6.1	Introduction.....	219
6.2	Challenges faced by Co-Management Strategy in Mitigating Fisheries Conflicts	219
6.2.1	Descriptive Analysis of the Study Variable Co-Management Challenges	220
6.2.1.1	Inadequate funds	221
6.2.1.2	Politics.....	222
6.2.1.3	Corruption	223
6.2.1.4	Poor Infrastructure	225
6.2.1.5	Conflict of Interest	226
6.2.1.6	Monitoring Fisheries Activities.....	228
6.2.2	Inferential Analysis of the effects of the challenges faced by Co-Management Strategy in Mitigating Fisheries Conflicts	233
6.3	Chapter Summary.....	235
CHAPTER SEVEN: SUMMARY, CONCLUSION AND RECOMMENDATIONS		236
7.1	Introduction.....	236
7.2	Summary of Findings.....	236
7.2.1	Co-Management Strategy Policy Mechanism.....	236
7.2.2	Community Perceptions on Co-management Strategy	237
7.2.3	Challenges Faced by Co-Management Strategy	237
7.3	Conclusion	238

7.4	Recommendations of the Study	240
7.5	Suggestions for Further Research	241
REFERENCES		243
APPENDICES.....		278
	Appendix I: Questionnaire	278
	Appendix II: Interview Schedule for Officials of Department of Fisheries.....	283
	Appendix III: FGDs Guide.....	284
	Appendix IV: Observation Checklist.....	285
	Appendix V: List of BMUs.....	286
	Appendix VI: MMUST Approval.....	289
	Appendix VII: Research Authorization by NACOSTI.....	290
	Appendix VIII: Research Permit.....	291
	Appendix IX: Letter from County Commissioner on Research Authorization	292
	Appendix X: Letter from County Director of Education on Research Authorization	293

LIST OF TABLES

Table 3. 1: Sample Distribution	159
Table 4. 1: <i>Study Variable Descriptives (N=389)</i>	171
Table 4. 2: <i>Tests of Normality (N=389)</i>	172
Table 4. 3: <i>Results of Multicollinearity Test^a (N=389)</i>	177
Table 4. 4: <i>Level of Education of registered members of beach management units (N=389)</i>	180
Table 4. 5: <i>Kind of activity undertaken at beaches (N=389)</i>	181
Table 4. 6: <i>Period registered by BMU (N=389)</i>	182
Table 4. 7: <i>Descriptive Statistics of Co-management Policy Mechanisms (N=389)</i>	185
Table 4. 8: <i>Respondents' Involvement in formulation of fisheries policies? (N=389)</i> ..	192
Table 4. 9: <i>Forms of conflict addressed by co-management strategy (N=389)</i>	196
Table 4. 10: <i>Model Summary of Co-management Policy Mechanisms (N=389)</i>	200
Table 4. 11: <i>ANOVA^a of Co-management Policy Mechanisms and Fisheries Conflicts (N=389)</i>	201
Table 4. 12: <i>Coefficients^a of Co-management Policy Mechanisms and Fisheries Conflicts (N=389)</i>	201
Table 5. 1: <i>Community Perception on effectiveness of Co-Management Strategy (N=389)</i>	204
Table 5. 2: <i>Conflicts addressed by Fisheries Department and BMUs (N=389)</i>	212
Table 5. 3: <i>Community Perception and Fisheries conflicts Model Summary (N=389)</i> .	215
Table 5. 4: <i>ANOVA^a Community Perception and Fisheries Conflicts (N=389)</i>	216
Table 5. 5: <i>Coefficients^a Community Perception and Fisheries Conflicts (N=389)</i>	216

Table 6. 1: <i>Co-Management Challenges Faced by FMIs in Mitigating Fisheries Conflict</i> (N=389).....	221
Table 6. 2: <i>Co-Management Challenges and Fisheries Conflicts model summary</i> (N=389).....	233
Table 6. 3: <i>ANOVA^a of Co-Management Challenges and Fisheries Conflicts</i> (N=389)	234
Table 6. 4: <i>Coefficients^a of Co-Management Challenges and Fisheries Conflicts</i> (N=389)	234

LIST OF FIGURES

Figure 2. 1: Co-management spectrum	39
Figure 2. 2: Co-management as a partnership.....	44
Figure 2. 3: Conceptual Model for Addressing the Issue of Fisheries Conflict with.....	152
Figure 3. 1: Map of Homa Bay County	157
Figure 4. 1: Q-Q Plot of Co-management Policy Mechanisms	173
Figure 4. 2: Q-Q Plot of Community Perception	174
Figure 4. 3: Q-Q Plot of Co-management Challenges	175
Figure 4. 4: Q-Q Plot of Fisheries Conflicts	176
Figure 4. 5: Age of the Respondents.....	178
Figure 4. 6: Gender of the Respondents.....	179
Figure 4. 7: Marital status	180

LIST OF PLATES

Plate 6. 1: Fish dealers drying fish (Omena) at Litare Beach	230
Plate 6. 2: Fish at Mbita Fish Banda/Stall.....	230
Plate 6. 3: Fishermen, fishing boats and nets	231
Plate 6. 4: Fishermen landing at Ukowe Beach	231
Plate 6. 5: Fishmongers buying fish from the boats at Gingo Beach.....	232

OPERATIONAL DEFINITION OF CONCEPTS

Co-management in this study is a process of management in which government shares power with resource users, with each given specific rights and responsibilities relating to information and decision-making. In this study co-management is between Fisheries Department and the fishing communities organized in as BMUs.

Beach Management Unit means an organization of fisher folk at beach (boat crew, boat owners, managers, fish processors, fish mongers, local gear makers or repairers and fishing equipment dealers) which constitutes fishing community as per the definition below.

Fishing Community refer to a community that is substantially dependent on, or substantially engaged in, the harvest or processing of fishery resources to meet social and economic needs; the fishing vessel owners, operators, crew and fish processors that are based in such a community.

Conflict management in this study means the long-term management of intractable conflicts. It is the label for the variety of ways by which people handle grievances; standing up for what they consider to be right and against what they consider to be wrong.

Management mechanism are means, measures or approaches taken by government and community institutions in the co-management arrangement to regulate access to and enhance sustainable utilization of fisheries resources.

ABBREVIATIONS AND ACRONYMS

BMU	Beach Management Unit
CBD	Convention on Biological Diversity
CECAF	Fishery Committee for the Eastern Central Atlantic
CBFM	Community Based Fisheries Management Programme
CBFMC	Community Based Fisheries Management Committee
CIDP	County Integrated Development Plan
CFDO	Community Fisheries Development Office
CMFRI	Central Marine Fisheries Research Institute (India)
DFO	District Fisheries Officer
DoF	Department of Fisheries
FAO	Food and Agriculture Organization
FCA	Fishery Cooperative Association
FGD	Focus Group Discussion
FMI	Fisheries Management Institution
FRDC	Fisheries Research Development Corporation
GoK	Government/Republic of Kenya
GPRS	General Packet Radio Service
HBCG	Homa Bay County Government
KFDA	Kenya Fisheries Development Authority
ICSF	International Collective in Support of Fish Workers
ILEG	Institute for Law and Environmental Governance
IUCN	International Union for Conservation of Nature

IRFS	Implementation of a Regional Fisheries Strategy
LVEMP	Lake Victoria Environment Management Project
LVFO	Lake Victoria Fisheries Organization
LVFRP	Lake Victoria Fisheries Research Project
MAAIF	Ministry of Agriculture Animal Industry & Fisheries
MAFF	Ministry of Agriculture, Forestry and Fisheries
MARD	Ministry of Agriculture and Rural Development, Kenya
MFA	Ministry of Fisheries and Agriculture
MNRT	Ministry of Natural Resources & Tourism, Tanzania
MOF	Ministry of Fisheries
MOL	Ministry of Lands
MPA	Marine Protected Areas
NACOSTI	National Council for Science, Technology and Innovation
NGO	Non-Governmental Organization
NTZ	No-Take-Zones
PM&E	Participatory Monitoring and Evaluation
PRSP	Poverty Reduction Strategy Paper
SPDDC	Shankar Pratap Deo Degree College
SPSS	Statistical Package for the Social Science
UNEP	United Nations Environment Programme
UNCCD	United Nations Convention to Combat Desertification
VIF	Variance Inflation Factor
WCPA	World Commission on Protected Areas
WFC	World Fish Centre

WRI

World Resource Institute

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The term 'fishing' covers an extensive variety of actions or activities including a wide range of techniques, purposes, target species and members. Numerous authors use the terms 'fishing' and 'fishing industry' to mean only one part of the full scope of activities that conceivably fall inside the ambit of these terms. For this venture, 'fishing' and 'fishing industry' have been used in a way well-defined by FRDC and the Australian recreational fishing crest body, Recfish, to cover three noteworthy fishing segments in Australia: the commercial sector, comprising enterprise and persons engaged with wild-find fishing and aquaculture, including both delivering and preparing fisheries assets or items available to be purchased (this segment is additionally alluded to as the 'fish business'); the recreational sector, involving undertakings and individuals associated with recreational, game or subsistence angling exercises that don't include offering the results of these exercises; the customary division, containing ventures and people associated with giving fisheries items to Aboriginal and Torres Strait Islander individuals as per their conventions (FRDC, 2000).

As used along these lines, fishing covers marine and freshwater exercises, and target species living in the wild or in caging. It incorporates exercises including creatures that are not angle in a zoological sense, for instance scavengers like crabs, shrimp and lobsters; shellfish like clams and mussels; and cephalopods like octopus and squid. (FRDC, 2003)

These activities provide a scope of food and non-food items available to be purchased or

subsistence. Cases of major non-food items from the business are pearls, aquarium fish, and fish-inferred manures.

The word “conflict” comes from the Latin word *conflictus*, which means collision or clash Galtung (1971). Conflict refers to some form of friction, or discord arising within a group when the beliefs or actions of one or more members of the group are either resisted by or unacceptable to one or more members of another group.

Fisheries conflicts are typically complex problems from both an environmental and political perspective. These conflicts in the fishing industry are being experienced world over, as fisheries conflicts are among the persistent problems affecting the security of food, Source of living and fishing situations vital to underprivileged or poor fishing communities in developing countries. Most intractable conflicts arise from excessive fishing efforts due to increasing population and economic motivations (Haus, 2003).

Fisheries conflicts can lead to negative conflicts in the world. In Europe for example, Glaser (2017) states that, fisheries conflict can lead to armed conflict. Think about the outrageous twentieth century cold wars amongst Iceland and the United Kingdom indicated that countries were ready to shield desired fishing ground with military power. Glaser (2017) further states that, fisheries are the major source of protein for one billion people and provide basic income to over 43.5 million, of which 95 percent live in developing countries. Based on the overhead aquatic inhabitants it can said that tussle over fish resource is one of the sources of world conflicts.

In the United States of America, there is across the board portion strife emerging from between sanctioned water crafts and recreational fishers in Puget Sound (Washington Department of Fisheries, 1990), between ethnic group in the Gulf of Mexico (Maril, 1983), amongst inshore and offshore processors in Eastern Bering Sea (Freeman, 1988), between gear groups in the (Western Pacific Fisheries Management Council, 1986) and between factory trawlers and owner-operated vessels on the West Coast (Pacific Fisheries Management Council, 1991).

In Australia and New Zealand the premise of fisheries conflict between conventional, recreational and business asset clients are moving from physical rivalry of fish to financial and legitimate contentions over social properties (Kearney, 2001), while in Europe one of the major significant conflict is that between the cormorant (*Phalacrocorax* species) and inland fisheries and aquaculture. Cowx additionally expresses that, in the previous 30 years the quantity of rearing and overwintering extraordinary cormorants has expanded drastically transverse over Europe. Cormorants are presently thought to be more successive and far reaching in Europe than whenever over the most recent 150 years. Populations have come back to a few zones after a long nonappearance and have likewise moved into previously vacant regions. This expansion depends on the land appropriation of two sub-species: the considerable cormorant (*Phalacrocorax carbo*) that lives on the Atlantic drift (the "Atlantic race"), and the subspecies *Phalacrocorax carbo sinensis* (the "mainland race"), which lives on the landmass from Western Europe over the entire of the Asian Continent to China and India. Comparable substantial increments in the quantity of cormorants have additionally been found in North America with the twofold breasted cormorant (*Phalacrocorax auritus*) (Cowx, 2013).

In south Asia where the population depends significantly on fish as an essential wellspring of dietary, protein and wage age than some other individuals on the world. This has prompted overfishing coming about to fisheries conflicts. For instance, Silvestre *et al.* (2003) express that, the consequences of overfishing in South and Southeast Asia are that coastal fishing stocks have been extremely exhausted and that the resource have been finished down to 5-30 percent of their unexploited levels. The scuffle for fish and fishing grounds are the real reasons for fisheries conflicts in these zones.

Bangladesh, for example, which is number four in inland fisheries generation on the world over, fishing, is its second major agrarian monetary program. Bangladesh as a nation vigorously relies upon fishery for a wellspring of food protein, source of living and income. For example, fisheries supply an approximated 60% of the aggregate animal protein required. Covering an approximated aggregate of 3 916 828 ha, the inland catch fishery delivered 961 458 mt fish in 2012-2013 that spoke to 28.19% of aggregate fisheries production of the nation (FRSS 2014). Inland together with seaside fisheries of recent, have encountered different issues and difficulties, for example, overfishing, serious resource debasement or degradation, jam, environmental change and variability, to say yet a couple (Islam, 2012). These elements joined with institutional clumsiness, the influx of new member fishers, control over fisheries resources and space, broad use of disallowed and ruinous fishing practices have prompted the spread of disputes among fishery associates or stakeholders in inland fisheries of Bangladesh (Jahan *et al.* 2009, 2014; Islam 2012). Species, for example, hilsa shad (*Tenulosa ilisha*) among all fisheries constitute the entire fishery of Bangladesh valuing BDT (BOBLME, 2012). About 11% of the nation's aggregate fish deliver is contributed by the hilsa fishery (DoF, 2015). It is

anticipated that the greater part a million people rely upon it for their vocations (Mohammed and Wahab, 2013). The hilsa fishery is otherwise called the biggest estuarine fishery on the planet regarding get (Blaber, 2000) and constitutes a long-standing economic activity in the Meghna River basin. Fishers typically use float gill nets (locally known as *gulti jal*, *kona jal*), monofilament gill net (current *jal*) and seine net (*ber jal*) to catch hilsa, of which later types net are unlawful.

Tsuneo Akahat (1993) states that verifiably, fishery relations among the countries bordering the Sea of Japan, the Republic of Korea (ROK, or South Korea), the Democratic People's Republic of Korea (DPRK, or North Korea), Japan and Russia, have been characterized by conflict instead of participation or cooperation.

In numerous African nations, modern fisheries have been conceded authorization to work in inadequately directed conditions. An evaluation of the condition of fisheries management in Central and West Africa in 2016 set up that not as much as a quarter of the states/countries had wide fisheries management designs or plans, the fundamental apparatus for controlling and observing fishery execution. Complete logical research is frequently missing for everything except the most high-esteem fisheries. Expansive zones of the fisheries sector, therefore, left unregulated, leaving the fishing business profoundly unprotected against unsustainable misuse.

In Ghana, conflicts arising out of fishing operations result from either all the dissimilar types of fishing crafts struggling to fish in the same fishing grounds and for the same species of fish or lack (on the part of both the industrial and artisanal operators) of respect

for the traditional and industrial fishing norms and ethics. As a result, with such an huge size of the artisanal fishing fleet (over 8,000 canoes), plus the inshore and industrial fleet – all competing for the exploitation of the same depleting resources within the same limited fishing grounds (up to 60m depth zone), the incidence of frequent fishing conflicts tends to the natural causes, and cannot be over-emphasized.

In East Africa, Lake Victoria in specific, the Uganda forces have confronted Kenyan fishermen over an island on their shared border. Glaser (2017) off the coast of Somalia, disputes between the foreigners and domestic fishing vessels have been implicated in the rise of piracy and hostage taking. Such conflicts arise because of boats and fishers being in the same fishing grounds at the same time scrambling for the scarce resource (fish).

In Kenya, the same has been a major problem and it has taken the government efforts to curb the conflict among the conflicting communities in the fishing sector. In Homa Bay County form/nature of fisheries conflict are not any different from those of the rest of the world. These include fishermen versus fishermen; conflict due to zoning; stealing of fishing gears by fishermen and the likes. Other forms of conflicts include fishermen verse boat and fishing gears owners due to stealing of fish to give women who offer them (fishermen) sex for free fish. Therefore, fisheries conflict in Homa Bay County has become a major challenge among the fisher flock, and mitigating these conflicts has remain elusive. The beach leadership in this County started as a clan or family affair at fish landing sites. Each of these sites was started as a point along the shore used by members of that family or clan for land fish, and also as a place to keep boats and gears. Initially, these sites were very peaceful because they were small and were placed under control and command of a family/clan elder (LVEMP, 2003).

According to IRFS (2011) Kenya has a relatively small coastline with a narrow continental shelf. Fisheries are however a major activity in the country, although the marine sector is overshadowed by the freshwater sector – primarily the fishery on Lake Victoria targeting Nile perch. Surprisingly, marine fisheries are insignificant relative to the freshwater fisheries – off some 145 000 t reported in 2005 (Ministry of Fisheries Development web site), only about 5%, or 6 823 t was reported as “marine”. Whereas the marine fishery is largely “artisanal”, the fresh water sector is both “industrial” and artisanal. Landings are dominated by the Lake Victoria region (133 526 t in 2005) – in recent years catch volumes from Lake Victoria have however declined underpinning the need to better manage and increase utilization of the marine sector. Fisheries are however recognized for their strategic value. In the 2008 -2012 (dated January 2011) “Fisheries Strategic Plan”, it is stated that “Fisheries are an important source of livelihood to fishing communities in the country.

They additionally add to food security and give raw materials to creation of animal feeds and in addition fish oil and bioactive molecules for the pharmaceutical industry. Fisheries bolster assistant businesses, for example, net making, boat building material, pontoon building and repair, transport, sports and recreation". The key arrangement additionally expresses that approximately 80,000 individuals are straightforwardly associated with fishing and about 800,000 indirectly included. The fisheries sub-sector contributes around 0.5% to national GDP (Economic Survey 2008). Strikingly, the technique likewise expresses that the "marine fishery potential is assessed at 150,000 t of business fish and different species against genuine arrivals of around 7,000 t yearly" and that the potential

this asset can give through Fisheries Partnership Agreements (FPA) will require remote vessels to arrive an extent of the reep in Kenya for preparing along these lines making work openings at the drift (IRFS, 2011).

Abila *et al.* (2006) affirms that Lake Victoria fishery contributes enormously to the financial advancement (socio-economic) of the riparian states. The East African Community has designated the lake basin as an 'economic growth zone', with the possibility to form into a noteworthy economic region. The fishery is imperative in making business openings, for the most part provincial based, in this way decreasing country urban relocation. Fish is likewise a rich wellspring of creature protein for human utilization and gives crude material (fishmeal) for animal protein. The fish business adds to GDP of the riparian states and has kept on being a critical wellspring of outside trade income through fish exports to the territorial and global markets. Moreover, the fish businesses add to the national and county governments' incomes through the different charges imposes and permit expenses. The sector has likewise contributed specifically and by implication to the change of physical framework and social offices, for example, streets, schools and healing centers, especially in remote fishing community.

Homa Bay County in particular, Fishing is the main economic activity, with the county controlling over 80% of the Lake Victoria Beach front in Kenya. Mbita Town is a leading fishing zone with over 80% of its inhabitants being fishermen (HBCG, 2017). Fish is an important source of human food in the country with the Dagaa and the Tilapia species constituting the bulk of fish species consumed in the domestic market. These comprise both markets within the immediate hinterland of the production areas, and the domestic

regional markets of which the main clusters include Nairobi, Kisumu, Mombasa, Nakuru and Eldoret. Abila (2002) further states that fish subsector also plays a significant forward linkage role in providing inputs to the animal feeds industry, especially the beef, dairy and poultry subsectors. Animal feed, commonly known as fish meal is derived from the processing of Nile Perch skeletons (frames) and guts, which remain after the popular fish fillet is extracted and mainly exported and the Dagaa (omena).

Gross Domestic Product and Government Revenue: The contribution of the fish subsector to GDP has increased significantly with the emergence of export markets for the Nile Perch. The value of output increased from Kshs 0.8 billion in 1991 to Kshs 2.2 billion in 2001. Despite this growth, the subsector's contribution to GDP has remained relatively small accounting for a mere 0.3% in 2000. In terms Government revenue, the subsector is also relatively small, though observers contend that this could be much higher if only the revenue correction systems were more effective and efficient (Abila 2002).

James Muriithi Njiru, Director/ CEO KMFRI explains Fisheries is an important sector in Kenya providing direct employment opportunities to over half a million people and supporting over 2m people indirectly. The future of fisheries is promising if we can fully exploit off shore areas and commercialize fish farming. Cage farming has picked up in Lake Victoria, supplementing the declining capture fisheries. The sector can therefore significantly contribute to the Blue economy.

Kenya's fisheries and aquaculture sector contributes approximately 0.54 percent to the country's GDP (2013). Fish consumption has been declining from a modest 6.0 kg/caput

in 2000 to 4.5 kg/caput in 2011. The value of fish exports was about USD 62.9 million in 2012, or about 5 times greater than the USD 12.3 million in fish imports. In 2013, around 129 300 people derived their livelihood from fishing and fish farming activities (including 48 300 in inland waters, 13 100 in coastal waters fishing and around 67 900 in fish farming).

According to FAO (2015), total fishery and aquaculture production in 2013 amounted to 186 700 tonnes, with 83 percent coming from inland capture fisheries (of which Lake Victoria contributed about 90 percent). Catches of Nile perch - the most sought and mainly exported fish species – seriously declined due to overfishing after the 2000 peak at 110 000 tonnes but since 2007 stabilized around an average of 45 000 tonnes per year. Marine capture fisheries produce less than 9 000 tonnes per year, comparatively much less than neighboring countries.

Freshwater aquaculture development in Kenya in the new millennium is remarkable, especially in 2009–2010, making Kenya one of the fast growing major producers in Sub-Saharan Africa. From the annual production of about 1 000 tonnes in 2001–2006, the harvest of farmed fish leaped to over 4 000 tonnes in 2007–2009. In a nationwide fish farming mass campaign launched by government in 2009, the total area of fish ponds was increased from 220 ha to 468 ha by building 7 760 new fish ponds. Together with the improved seed supply and supports covering other aspects, it lead to a hike in farmed fish production reaching 23 501 tonnes in 2013, more than four times of the production in 2009. The main species produced in 2013 was Nile tilapia (75 percent), followed by African catfish, common carp and rainbow trout. Mariculture is not yet practiced

commercially, despite its potential demonstrated by trials (*ibid*).

The Government is looking into ways of promoting aquaculture and using cured fish products for food relief programs in order to enhance national food security (Abila *et al.*, 2006). The main issue in the capture fisheries sector is one of overcapacity in Lake Victoria and the symptoms of overexploitation (increasing conflict, overfishing, and falling incomes) that accompany it. This issue is being addressed in cooperation with neighboring countries through the Lake Victoria Fisheries Organization (LVFO), and through the Regional Plan of Action for the Management of Fishing Capacity in Lake Victoria that was agreed in March 2007.

In concurrence with Priscoli (2002) and Warner (2000) natural resource conflict can be caused by poor correspondence, contrasts of recognition, sense of self fights or ego battles, identity contrasts, differences in views about right or wrong (conflict of values), contrasts in interests and structural factors. Conflict of fishing varies greatly between regions and between times. It is generally associated with the utilization of fish resources is considered rare. Shortage is related with generation issues, to be specific less fish can be gotten by anglers (insufficient fish). In Homa Bay County issues such as jurisdiction; fisheries management mechanism; human activities in relation nature conservation; and stealing of fishing gears by fishermen are believed to be real wellsprings of fisheries conflicts.

Fisheries conflict also occurs between fishermen due to bad methods of fishing that destroys even young and immature fish. This has been major concern for the FMIs since

maintaining and preserves the aquatic life. The department has come up with policy concerning the size or inches of the fishing gears (nets).

Additionally in concurrence with Bennet (2002), use rights are a standout amongst the most disputable issues in marine fisheries as far back as people fished in the oceans, waterways and seas, and even before public policies emerged to manage the fisheries management. In Homa Bay County, access to common resource (Lake Victoria) and its misuse is one of the significant reasons for fisheries strife or conflict. Bennet (2002) further argues that mounting pressure on a rapidly dwindling resource base from a rising population, changing consumer preference towards fish and fish products, globalization, competition from coastal zone development (for example, tourism, housing, infrastructure, aquaculture, agriculture, etc.), increasing fishing effort and number of fishers have greatly contributed to conflicts within fishing communities.

Related to the assertion above is the argument that there is overexploitation of the already degraded fish habitat. Coupled with increasing global demands from a growing population, commoditization of fish and fisheries products, an evidently inadequate fisheries management, and the whole gamut of other human interventions have led to unprecedented increase in the level and magnitude of fisheries related conflicts (Ahmed *et al.*, 2006).

All in all, the parties associated with the dispute are a groups of conservative or traditional fishermen. Numerous brands of conflict caused by assorted variety of fishermen's' recognition about the administration of fish resource. Warner (2000) recognized four

factors that can clarify the emergence of conflicts over fish resource, including the opposition of natural resources (expanded reliance on natural resources, in this way expanding rivalry).

The government and the community should take note of the fact that power in task within the dynamics of fisheries, a complex bio-economic system where assorted interaction among normal assets, people and organizations give plentiful open doors for clashes. Conflict develops when "the interests of at least two groups conflict and no less than one of the gatherings tries to declare its interests to the detriment of another gathering's advantages" (FAO, 1998). Conflicts of this type do not really need to be rough or profoundly troublesome, in any case; in actuality numerous disputes that emerge because of contrasting interests are low-level, peaceful marvels (Warner, 2000). Peaceful clashes or non-violence in fisheries, require not be disregarded as they may posture dangers to food security, job and ecological security when unabated (Salayo *et al.*, 2008).

With the advent of the central government, the work of fisheries management has been the domain of the Department of Fisheries, the challenges have been many because the number of interested parties in the exploitation and utilization of fish and fisheries products including fishing industry in general have increased geometrically while the number of fisheries personnel had been increasing arithmetically or at times decreasing (Caddy *et al.*, 1995).

To protect fisheries from fast approaching breakdown, the government chose to change the way to deal with fisheries management from centralized control and command to the integrated approach where key partners who are subject to the fisheries for their livelihood are associated with management decision making and other activities (ILEG, 2005).

Co-management has been advanced as a method for enhancing the viability and proficiency of fisheries management for the last twenty years, perceiving that the integration of resources users in management ought to advance understanding, possession and responsibility (Berkes, 2007, 2009; Pomeroy, 2007). The term co-management can be defined as the sharing of responsibility as well as authority between the government and local resource users to deal with a resource (Jentoft, 1989; Nielsen *et al.*, 2004). In the literature, co-management covers a wide range of management courses of action and the measure of responsibility as well as authority that the government and local resource users have will differ and rely on nation and site-specific conditions (Pomeroy, 1995).

Fisheries co-management is an entrenched idea and practice, with numerous cases of co-management game plans over the world, and, with more confirmation and understanding developing; the complexities of co-management have 'unfolded' (Berkes, 2007) Building on this experience, lately increasing emphasis has been given to government concerns inside fisheries, recognizing the requirement for partners to meet up to create approaches and settle on choices concerning public life (Kooiman *et al.*, 2005; 2008; Symes 2006).

Both the concepts of co-management and governance have been further built on by bringing in concerns about the ability of co-management and governance arrangements and processes to respond to, and cope with, sources of uncertainty and, procedures to react

to, and adapt to, wellsprings of vulnerability and framework complexities and decent variety (both biological and social), basic highlights of common asset frameworks. Versatile co-management and versatile management are approaches that convey to the fore worries about vulnerability, and dynamic, perplexing and various frameworks, featuring the need for institutions that are flexible and responsive (Armitage *et al.*, 2007a). Traditional and self-management of natural resources, and fisheries in particular, has been around since early times. However, co-management is an approach that has been more recently adopted globally in response to the perceived failure of centralised management of fisheries in avoiding the decline of fish stocks, and to a lack of government resources to manage fishery resources effectively. Bringing together fishers, government officials and others operating within a fisheries sector, co-management systems and processes vary in terms of the nature of power sharing, composition and functions.

Co-management imparts numerous highlights to different sorts of organizations and co-operative environmental governance game plans including various actor (Berkes, 2002; FitzGibbon, 2004). In any case, a critical characteristic for co-management is the presence of at least one strong vertical connection between the community or user and the government, including formal arrangement for sharing obligations and authority (Berkes, 2002; Borrini-Feyerabend *et al.*, 2007). Furthermore ad hoc public contribution to decision making or minor consultation is regularly not viewed as co-management.

The term Co-management is generally new, where its most punctual use has been followed to late 1970s (Pinkerton, 2003). Nonetheless, as specified beforehand, the act of intensity partaking in resource management goes back to prior times (Ostrom, 1990). Most meanings of Co-management involve some systematized course of action for participation

in management and decision-making, a dynamic organization using the parameters and premiums of local fishers and communities, supplemented by the capacity of the state to give empowering arrangements and enactment and in addition authorization and other help.

The motivation raised by adaptive co-management and adaptive government is testing or challenging. The two methodologies are nearly interlinked, with Folke *et al.* (2005) proposing that adaptive co-management is a path through which adaptive governance can be operational. Key characterizing highlights of adaptive co-management have been distinguished by Olsson *et al.* (2004), Folke *et al.* (2005), Armitage *et al.* (2007b) and others, for example, learning-by-doing, managing vulnerability and complexity, coordinated effort and power sharing, and management flexibility. Notwithstanding an expanding enthusiasm for adaptive co-management and adaptive governance, inquire about by Kooiman *et al.* (2005; 2008) accentuates the significance of connection in administration, alluding to intuitive governance as the path forward, to build the manageability of the 'framework to-be-governed'. An evaluation of manageability can be useful in distinguishing limitations on viable administration and empowering enhancements in administration to be made.

Community-based co-management is the main practical answer for most of the world's fisheries and is a successful method to manage aquatic resources and the livelihood of communities relying upon them. Under such an administration or management framework, duty regarding resources is shared between the government and users. On the

smallest scale, this may include leaders and fishers from various towns consenting to abstain from fishing in each other's waters (Kelley *et al.*, 2011).

In the Second annual Progress Report of the Ministry of State for Planning National Development and Vision 2030 of May 2011, Co-management is an ecosystem to fisheries management, which is a generally new management idea that recognizes and defines the environment to incorporate human and offers a practical choice for accomplishing maintainable fisheries use. In the new approach, partners are the stewards of the assets and are, in this way, engaged with the basic leadership, execution, and checking forms. This new approach additionally gives a system to overseeing fisheries, for instance on account of Lake Victoria.

This co-management strategy in Homa Bay County has been actualized through the formation of Beach Management Units (BMUs). These are community Co-Management Strategy, legally empowered and registered with the Department for Fisheries that bring together everyone involved in fisheries at a shoreline, pontoon/boats proprietors, vessel team , brokers, processors, watercraft manufacturers and repairers, net repairers and others to work with government and different partners in overseeing fisheries assets and enhancing the vocations of community members. The diverse associates are required to be enlisted with BMU to be permitted to work in fisheries. Every BMU along has an Assembly of all registered members and an elected Committee. The formation process and registration of a BMU is set out in the Harmonized BMU Guidelines, which are implemented at the national level (LVFO, 2005). Beach Management Unit is a group of stakeholders that constitute a fishing community whose main functions are fisheries

planning, management, conservation and development in their locality in collaboration with the local and national governments (Lwenya *et al.*, 2007). This new approach has been suggested as a solution to the problems of fisheries resource use conflicts and overexploitation.

Other benefits include stakeholder participation in decision making process motivates the fishers to adhere loyally to the regulations. It also restricts the enormous costs of managing common property resources. In co-management approach capacity building is mainly community based across gender, age and professions. (Odongkara *et al.*, 2007)

Fisheries are complex dynamic bio-socio-economic systems and the many interactions amongst natural resources, humans and institutions give ample opportunities for conflicts. Internal fishery conflicts emerge over allocation of rare fish resource, the division of fishery gains and management arrangements between fishermen and governments (WFC-Bangladesh, 2005). There have been few studies of the institutional aspects of fisheries conflicts. Given the increasing recognition of the role of institutions generally, this appears to be an important omission. For example, little attention is paid to the way communities can and do co-operate over natural resource usage which might explain why conflicts do not emerge in some situations Bennet *et al.* (2001).

There has been much study on fisheries from around the world. However, these studies have ignored the aspect of conflict and conflict management resolution mechanisms (Lwenya *et al.*, 2007). Homa Bay County is among the Counties in Kenya where a lot of fishing takes place and thus experience a lot of fishing conflicts. Homa Bay County was chosen for the study because it has the largest share of Lake Victoria in Kenya (that is

about 80% of the lake) and naturally, it is the biggest fish producer. Secondly, Homa Bay County has the highest number of registered beach management units (133 BMUs) and by extension the highest proportion of water surface accounting up to 11.3 % of the total County area. This study will therefore try to assess how conflict is mitigated within the County. Not all Conflicts are unwanted as a few question turn into an impetus for much required changes for arrangement and economic enhancements.

Nevertheless, a structure for dissecting clashes in fisheries is important to sort out mediations significant to the idea of contentions, the requirements and limits of fisheries partners in the area (FAO, 2006).

1.2 Statement of the Problem

Fisheries are dynamic socio-ecological systems that are already experiencing rapid changes in markets, exploitation and governance. The increasing exploitation and export of fish products, fast development of fishing beaches, fish markets and urbanization, human activities are threatening the aquatic environment, and lake resources. All fishing methods impacts on environment not just targeted fish stocks but also other species, sensitive habitats, and the food chain that need to be maintained in an effort of keeping aquatic environments healthy and productive. Some standard fishing gear could be used in ways which damage the resource or the environment to such an extent that they could be considered as destructive gear. This is the case with beach seining (Odada et al. 2004; Kariuki, 2012) which has come under intense criticism in recent years by resource managers, policy makers and environmentalists (EAF-Nansen Project, 2010). This criticism has largely been due to degrading effects on habitats, conflict between resource

users, and the non-selective nature of beach seining techniques, which tend to result high quantities of by-catch (EAF-Nansen Project, 2010; McClanahan, 2007; Malleret-King, *et al.*, 2003).

In Homa Bay County, fishing is one of the major incomes generating activity. Many people with poor education have migrated to Homa Bay Beaches in order to generate income from fishing. The fishing ground is Lake Victoria and the major commercial fish species in the town is the Nile Perch, Tilapia, and small fish species (Omena). The fishing industry is not well developed with fishermen using old methods of fishing which affects both the life and number of fish in the lake. The fish landing beaches are poorly developed with poorly designed fish landing sites and facilities. The commercial value of fishing has subsequently gone down because of the dwindling stocks of fish in the lake. There is also lack of efforts by the authorities to enforce sustainable exploitation of water resources in order to conserve and replenish the stocks of fish in the lake (HBCG, 2017).

The Lake Victoria fishery has come under increasing pressure in the last two decades. Fish production peaked in the early 1990s and currently catches of most species are showing downward trends. Despite this, there is greater demand for fish of Lake Victoria, chiefly Nile perch (*Lates niloticus*) and 'dagaa' (*Rastrineobola argentea*), in the export market and for fishmeal respectively, as well as for domestic consumption. The present situation is the consequence of the tremendous commercial transformation that the fishery of Lake Victoria has undergone in the last 20 years (Abila, 2002).

Fisheries resources co-management concept has gained heightened acceptance among government, development partners and community institutions as appropriate fisheries management systems. In this new approach, stakeholders become the stewards of the resources and are therefore involved in the decision making, implementation and monitoring process, Bennett *et al.*, (2001). This management approach in Homa Bay County has been actualized through the formation of one hundred and thirty three Beach Management Units (DFO-Suba, 2010).

Despite the fact that this co-management strategy has been recommended as an answer for the issue of fisheries conflicts and misuse, evidence on the ground demonstrates that the problem of fisheries resource conflicts and over-exploitation still persist. Therefore, this calls for the need to examine fisheries conflicts within these units to understand the gaps in relation to the effectiveness of the existing institutions and management mechanisms in adequately responding to these conflicts.

1.3 Objectives of the Study

The overall objective of this study was to examine co-management strategy mitigating fisheries conflicts in Homa Bay County, Kenya. Specifically the study sought to:

- i. Examine the effectiveness of co-management strategy in mitigating fisheries conflicts in Homa Bay County.
- ii. Assess Community perception of the co-management strategy in mitigating fisheries conflicts in Homa Bay County.
- iii. Establish the challenges faced by co-management strategy on mitigation of fisheries conflicts in Homa Bay County.

1.4 Research Questions

- i. How effective is co-management strategy in mitigating fisheries conflicts in Homa Bay County?
- ii. What is the Community perception of the co-management strategy in mitigating fisheries conflicts in Homa Bay County?
- iii. What are the challenges faced by Co-Management Strategy in mitigating fisheries conflicts in Homa Bay County?

1.5 Justification of the Study

Conflicts among the multiple users of fisheries resources along the shores of Lake Victoria, and more specifically in Homa Bay County have not ever been noticeable as today. Just like any other fishing community, this kind of a scenario stems largely from strong and mounting pressure on rapidly dwindling resource base arising from population increase, changing consumer preference towards fish and fish products, increasing fishing efforts and number of fishermen. Again, conflict management policies and practices have not been adequately mainstreamed within the fisheries resources co-management strategy. Studies have been carried out on constraints and challenges facing fisheries sector. Other previous studies focus management of the sector to prevent it from eminent collapse. Yet others have focused on food security and employment the fishing industry; but so far there is no study linking fisheries conflict with food security and the ecosystem in Homa Bay County. Homa Bay County which showed prevalence of conflicts among the fishing communities therefore became appropriate as a study area.

The study focused specifically on Co-Management Strategy mitigating fisheries related conflicts. Studies have been carried out on fisheries management and fisheries conflicts.

Other previous studies focus majorly on state-based fisheries management. Yet others have focused on conflict management in varied categories of institutions; but so far there is no study linking the Co-Management Approach to fisheries management in Homa Bay County which showed prevalence of fisheries related conflicts among the fishing communities amidst the advent of Co-Management Strategy/Approach became appropriate as a study area.

The findings of this research give a picture of the status of Co-Management Strategy in the fishing industry in Homa Bay County showing the contribution to management of conflicts among the fishing communities. These findings are a contribution to the body of knowledge on co-management strategy and conflict management. It is hoped that these findings will enable stakeholders to re-examine the strategies employed in training the fisher folk in addressing conflict issues in Homa Bay County.

This study is also important in developing baseline data on fisheries conflict and how existing community institutions within the context of the co-management approach or strategy respond to these conflicts. Second, the study created a typology of fisheries conflict in Homa Bay County and examine whether or not the existing fisheries resources management and policy regime has been effective in management of these conflicts.

The findings are therefore important in the development of sector specific conflict resolution training or guideline for practitioners and or stakeholders in fisheries conflict management as a way of mainstreaming this critical component within the co-management strategy.

The findings of this research give a picture of the status of fisheries conflicts in Homa County showing its contribution to management of conflicts among the fisher folk. These findings are a contribution to the body of knowledge on fisheries and conflict management. It is hoped that these findings will enable stakeholders to re-examine the strategies employed in imparting conflict management among the fishing communities. The findings will draw the attention of the officer from the Department of Fisheries, County government officials, BMU officials and the entire fishing communities to see this great value of conflict management in the fishing industry. The study will add knowledge to existing literature on life skills. The findings of this study will assist all those interested in advocating peace and conflict management in the fishing industry and strengthening food security by ensuring peace and stability within the fishing areas. The study encourages sensitization of communities on the value of co-management so as to ensure concerted efforts that will lead to breeding of youths and society who are empowered with life skills for proper living and survival.

Lastly, the information obtained from this study is important in bridging information gap about conflict in fishing communities that is prevalent in tropical Africa and especially Kenya.

1.6 Scope of the Study

The study was carried along the beaches of Homa Bay County. The study concentrated on co-management approach used as a part of the management fisheries industry as far as misuse of fish resource and moderation of fisheries conflicts in Homa Bay County in lessening melee or chaos among the fishing community. The study sample comprised five

divisions in Homa Bay County which has the highest share of Victoria and therefore, highest number of BMUs. For the purpose of this study the researcher limited his focus to 40 respondents from the selected BMUs. Staff from both department of fisheries and county government were also interviewed. These are the BMUs that are most vulnerable to conflicts because the several fisheries activities happening there including struggle for fishing grounds.

The study was drawn upon the common property theory in looking to demystify the subject of conflict and conflict management in fishing communities with reference to Homa Bay County. Common property resources are those to which no individual has exclusive property rights, for example, village pastures, bush land, uncultivable fields, community forests, wastelands, village ponds, the between tidal zones, marine waters, waterways, lakes among others. They additionally incorporate assets that are assembled from exclusive land or water with get to rights arranged as opposed to being legitimately characterized. The exploration concentrated chiefly on conflicts that emerge during the time spent abuse and use of fisheries resources.

The study also used Marx's Conflict Theory. Conflict theory originated in the work of Karl Marx, who focused on the causes and consequences of class conflict between the bourgeoisie (the owners of the means of production and the capitalists) and the proletariat (the working class and the poor). Focusing on the economic, social, and political implications of the rise of capitalism in Europe, Marx theorized that this system, premised on the existence of a powerful minority class (the bourgeoisie) and an oppressed majority

class (the proletariat), created class conflict because the interests of the two were at odds, and resources were unjustly distributed among them (Bartos *et al.*, 2002).

1.7 Chapter Summary

This chapter presents a highlight of background information on co-management strategy mitigating fisheries conflicts in Homa Bay County, statement of the problem, research objectives and questions, justification, scope of the study. As indicated fisheries conflicts are still being experienced in Homa Bay County despite the introduction of co-management which has is gaining more acceptance in the county: thus prompting the need for this study. In the next chapter a critical review of pertinent literature is done to identify prevailing gaps.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews pertinent literature in the area of fisheries conflicts. Specifically, it focuses on conflict in fishing communities, causes of fisheries conflict, Co-Management Strategy and management mechanisms, how they respond to fisheries conflicts. The chapter also focuses on community perception on Co-Management Challenges faced by the FMIs. The study is guided by two theories, that is, Theory of Common Property and Marx's Conflict Theory.

2.2 Co-Management Strategy in Mitigating Fisheries Conflicts

Institutions are an essential part of the fishing sector, and hence an integral tool in the structure and operations of the governing system. That is, the 'institutions' can be said as the rule of the game that governs a particular society since they have both direct and indirect impact on daily lives (Jentoft, 2007). Fisheries institutions are additionally viewed as frameworks of standards that direct the relations of people to each other and that characterize "what the relations of people should be (Jentoft, 2004).

The concern for overfishing and control of fishing effort is not new. Silvestre *et al.* (1987) show that the Spanish colonizer, Antonio de Morga was already concerned with over exploitation and management problems in Philippine's fisheries as early as 1597. Pearse (1980) demonstrates that trawling in France was controlled as ahead of schedule as seventeenth century and most modern fishing countries have a background marked by endeavors at exertion control. From a purely economic point of view fishery management

is a new concept. Graham (1943) was one of the first people to examine both the empirical evidence and the underlying theoretical reasons for the need to control fishing effort.

The simple development and progress of the economic thoughts is due to Gordon (1954). It was not until this work, research into fisheries management began to take interdisciplinary form. In his classic paper, Gordon used the economic theory of (static) production and generalizations about the collective behaviour of individually competing fishermen to demonstrate that overfishing is entrenched in the economic organization of fisheries. It was Gordon's goal to develop a bio-economic theory of fishery that treated fish and fishermen in an integrated fashion (Gordon, 1954).

Marine and coastal resources in various parts of the world have been managed generally by community-based-administration frameworks that include proprietorships or property rights, usually alluded to as customary marine tenure (CMT). Customary marine tenure gives a vehicle by which state organizations and customary partners (stakeholders) may work in association to share authority, and obligation regarding, resource management, in what is termed agreeable management or management (Cooke *et al.*, 2000). Customary marine tenure are the establishment of marine administration in a significant part of the Pacific and have been recorded all through the world (Cinner, 2005; Aswani *et al.*, 2013). Because of debasement of numerous inshore marine resources, CMTs and conventional community based resource administration or management have pulled in incredible consideration as financially savvy, decentralized methods for overseeing coastal fisheries (Hviding, 1998; Ruddle, 1998).

The suitability of preservation procedures based on an establishment of marine tenure, in any case, stays uncertain, as it is vague whether marine tenure frameworks can withstand the significant economic development that a significant part of the coastal states in the creating scene are confronting. A huge assortment of writing has endeavored to recognize conditions that are vital to effective working of self-management institutions for normal pool resources (Cox *et al.*, 2010; Pollnac *et al.*, 2010). Concentrates particular to CMT have recommended that social and economic variables, for example, neediness, reliance on assets, and human populace measure, influence the nature and working of marine tenure; nonetheless, particular connections between financial conditions and marine tenure are as yet not surely understood (Cinner 2005; Cinner *et al.*, 2012).

There are several studies that demonstrate how institutional mechanisms have been deployed to manage fisheries resources and attendant conflicts. Collaboration among fishers can possibly help to allay conflict. Where unified (centralized) administration or authority has not been fruitful in settling conflicts over resource use, new methodologies, similar to nearby, communitarian or co-administration arrangements, are showing prospects for conflict management. At Kayar, in Senegal, for case, a local fishing committee was formed and has managed to resolve a very long-standing dispute between local and migrant fishers (Lenslink, 2002). In Philippines' San Salvador Island in, a co-management pact was able to mitigate conflict between local fishers who uses traditional fishing gear and new migrants to the territory who were using cyanide to harvest decorative (ornamental) fish for the aquarium exchange (Berkes, 2001). All through Southeast Asia, co-management is reshaping the organizations of administration (governance) for fisheries and coastal resources. Pomeroy (2006) asserts that right now

Southeast Asia, co-management has been broadly used as an elective fisheries administration policy in various nations including Indonesia, the Philippines, Thailand, and Vietnam.

In Ghana, there are recognisable sets of institutions managing fisheries resources and responding to fisheries conflict. Bennet *et al.* (2001) observes that there is a traditional system where a Chief and a Chief Fisherman govern each fishing village and together with their representative Council of Elders they police the community and settle all conflicts and between inter-village disputes are settled through negotiation arrangements with the respective chiefs. For as far back as six years the Community Based Fisheries Management Program (CBFM) has been working in parallel with these traditional organizations (institutions) with distinct outcomes (Bennet *et al.*, 2001). Underwood (2011) argues that traditional institutions in the canoe fishery are still very influential and continue to play a significant role in everyday life for fisher folk. Underwood (2001), further notes that chief fisherman, chief fish monger and local chief are preferred in carrying out functions related to canoe fishery, rulemaking and dispute resolution.

A Community-Based Fisheries Management Committee (CBFMC) is as a local advisory group, designed in a fishing community, in view of existing traditional administration authority and local government structures, lawfully engaged by Common Law, and including all partners, to regulate the administration and improvement of the fishing business. The genesis of the CBFMCs was derived from Department of Fisheries' (DoF) interest in ensuring a more sustainable national fishery resource through co-management

(FAO, 2004). Villages in Central Region (where CBFM has been most fully implemented) reported a greater decrease in conflicts than any other region.

Through a progression of activities, the CBFM has, in addition to other things, empowered fishing communities to oversee and resolve inter-community conflicts considerably more effectively by encouraging debate determination forums at County offices (Bennet *et al.*, 2001). There are crucial laws and directions for overseeing fisheries are as of now set up in the nations where fishing is occurring. By and by, conflicts are far reaching a result of the poor usage and authorization of an expansive sum fishery laws and controls. In this manner, it is important to include all partners in the fishery and related areas and the arrangement producers and fisheries chiefs in an intensive and occasional survey of approaches and foundations (Salayo *et al.* 2006).

2.2.1 State-based formal regulations

Before the co-management approach, Fisheries management in Kenya was a preserve of government (state approach). Even before independent Kenya, the colonial government regulated fisheries activities. On Kenya's Lake Victoria fishery Formal regulations emanating from the state represent an external intervention in the exploitation of a resource, which may either be designed to encourage the exploitation of the resource base; or else, and more commonly, set out to conserve the resource so that it will remain productive indefinitely. In the latter case, such managerial intervention is designed to be coercive, using sanctions of fines and/or other punishment to force exploiters into regulatory compliance. State approach experienced a lot resistance from the fishing community.

Following the repeal of the 127mm gill-net mesh-size limitation in 1961 and the collapse of the Fishermen's Union in 1962, regulation of the lake passed to the Kenya Fisheries Department (KFD). In 1968, the Kenyan Government passed the Fish Industries Act, and the KFD was charged with implementing and enforcing this, although there is little to suggest that it did so successfully. It had been hoped that because of the large size of the introduced *Oreochromis niloticus* (Nile tilapia), fishermen would be encouraged to use larger sized gill-nets, channeling pressure away from the exhausted endemic tilapia species (Balirwa 1992). This, however, did not occur, and no further attempts to implement regulation occurred until 1989, with the introduction of the 1989 Fisheries Act (Republic of Kenya 1989, 1991), which provide the Director of Fisheries with sweeping powers to control fishing and fishing effort.

It was argued that the failure of the Lake Victoria Fisheries Service (LVFS) appears to have arisen from problems inherent to the regulations they imposed, and which arose through their incompatibility with the financial and social status aspirations of Kenya's Lake Victoria fishing communities. These were further compounded by the funding and staffing constraints faced by the LVFS (Abila *et al.*, 2006). Subsequent regulatory regimes fared little better, although for different reasons, as the fishery came to be increasingly defined by coping strategies such as sequential exploitation and migration. Despite the serious problems that have confronted the application and success of state-based formal regulations throughout the history of this fishery, Kenyan authorities have consistently tried to bring the fishery under the control and direction of the state. These efforts have been characterized by attempts at imposing contemporary forms of fisheries management, the most important of which has been efforts to gain Maximum Sustainable Yields

(MSYs) for the fishery (Unpublished Department of Fisheries Data, 1995). It upon the above management challenges that the Kenyan government started to embrace the co-management arrangement strategy in the fisheries industry.

2.2.2 The Concept of Co-Management

Co-management impacts seem to have been studied more in the recent past. Sen and Nielsen (1996) noted that in most of the co-management cases they studied, the rationale for introducing co-management was that the fishery was reaching a point of overexploitation or was already over-exploited, making it a form of crisis management.

The establishment of co-management frameworks may work as a methods for compromise between communities of local resource clients or users and the State (Pomeroy and Berkes, 1997; Singleton, 1998). The procedures of transaction, bargaining and setting up co-management agreements that arrange the rights and obligations of included parties (local groups, the State, business performing artists, and so on) lessen conflicts and may even have capacity as an all the more long-term critical thinking instrument. Effective reduction of conflicts is fundamental for long-term arrangement and for the eagerness among people to put resources into creating proper institutions (Ostrom, 1990).

Although it was mostly not possible to assess the outcomes in terms of sustainability, equity and efficiency, in most cases representation was increased and process clarity was improved. Gutiérrez *et al.* (2011) noted that the advantages of co-management include an enhanced sense of ownership which encourages responsible fishing, greater sensitivity to

local socio-economic and, environmental or limitations, enhanced management through utilization of local knowledge, aggregate ownership by users in basic decision-making, expanded consistence and compliance with directions (regulations) through peer pressure, and better monitoring, control and surveillance by fishers.

Miall *et al.* (1999) contends that many of studies on conflict management, settlement and resolution commenced with studies of the Arab-Israeli conflicts in the late 1960s and had a present day recovery in the ascent of European conflicts following the end of the Cold War. The reasoning of conflict resolution has extended into an extensive variety of different disciplines, for example, personnel management (Wallace, 1993; Chen, 1991). Galtung (1971; 1976) recognizes three key phases of conflict resolution: peace keeping (the dissociative approach) by which the two sides to the conflict pull back from the arena; peace building (the associative approach) where advantageous interaction is created and peace-making (conflict resolution).

Warner (2000) proposes a typology of natural resource conflicts that includes a large number of the exogenous and elusive impacts found in (tropical) fisheries. He recognizes an) intra miniaturized scale smaller scale conflicts (limit debate, first class catch of advantages, network contrasts), b) bury small scale smaller scale conflicts (absence of co-task between networks, conflicts over riches divergence and conflicts between long haul pioneers and fresh debuts) and c) smaller scale full scale conflicts (social question, relations between venture backers and networks, natural issues and opposing asset needs). Warner's typology extends the limits of contention to incorporate those components that are not straightforwardly identified with prompt partners in the asset, (for example,

venture funders, elites) and other more elusive issues, for example, social distinction and defilement.

Natural resources territory is probably going to be utilized by many individuals, therefore making it a Common Pool Resource region from which people utilize or extricate distinctive things with various advantages (Nathalie A. Steins and Edwards, 1999). All Common Pool Resource territory host's an assortment of resources units and it will be unseemly to believe that individuals would extricate for example fuel wood, on the off chance that they or some others can separate wild berries from a similar resources zone (Nathalie A. Steins and Edwards, 1999), giving a timberland for a case.

The earliest cases of fisheries management show that it developed as an aggregate or collective decision-making process at the community level. Allocation or access to resources had an inclination of being more coordinated at lessening conflicts than management of the resource. As social orders have changed, so have their capacities to coordinate and oversee management of resources (Richerson *et al.*, 2002). How, when and where fisheries management developed in various nations have relied upon the authentic and societal setting of every specific circumstance. In any case, the development of fishery management organizations has about dependably been as a reaction to an emergency and the acknowledgment that there was an issue with the abuse of the asset (for example, diminished stocks or requirement for income). In San Salvador Island in the Philippines, for instance, there was no history of conservative fisheries management among the underlying transients preceding 1960, and the fishery was viably an "open access" system. Increased relocation (migration) to the island combined with damaging fishing practices

prompted extreme debasement of the fishery resource that eventuated in the inception of fisheries co-management through a marine protection venture (Katon *et al.*, 1997).

The adoption of western management ideas has additionally had a noteworthy influence in changing fisheries administration hones. These were presented amid the colonialization time frame or in the consequent period of modernization/industrialization (Makino and Matsuda, 2005; MRAG, 2005). Frontier time fishery foundations were brought together to enhance tax collection or lease extraction from fisheries, yet this was regularly coupled to an accentuation on management of the asset for some time later. An imperative component of the western administration worldview was the idea of "open trust", where the legislature or State was thought to be in charge of the management of normal assets, for example, timberlands, oceans and waterways, in the interest of the proprietors of the asset - the general population. Amid the after war time frame numerous national and worldwide offices rose with the command for management of fisheries assets, in view of sectoral models got from western nations (Tietenberg, 2002).

A key aspect in this worldview was that a top-down government driven logical/economic approach gives preferred management of resources over the apparently disorganized/*ad hoc* local administration approaches. Be that as it may, this was likewise amid a period where marine resources were viewed as problematic to overexploit. The theory of open access to the resource and the deplorability of the house that anticipated that unregulated access to a typical resource would prompt its overexploitation came at a phase when fisheries had officially created to the point of unsustainability (Hardin, 1968). Indeed, even as late as the 1990s (and in a few nations even up to the present), governments and

their approaches were all the while pushing for expanded catch fishery generation and fishery advancement.

Amid this modernization period, huge scale mechanical fishing and motorization of small scale fisheries was likewise energized and extended quickly. Rivalry for resources and market driven advancement jumped out at such a degree, to the point that one of the fundamental management issues turned into the contention between high quality small scale fishers and larger scale fishers/fishing ventures. Other "non-fisheries" uses for the resource, for example, agribusiness and aquaculture, have prompted promote consumption of creation (WorldFish Center, 2003).

It is currently for the most part acknowledged that both the traditionally supervised and the best down government-managed models of fisheries management have as a rule fizzled, bringing about an overall emergency in fisheries (albeit some remarkable special cases have been archived, for, example, Cunningham and Bostock, 2005). Expanding rivalry for fisheries resources has brought about lessened yields and unsustainable fishing practices. Particularly in least developed nations, there is clear proof to demonstrate that in spite of the fact that the aggregate catch from fisheries may have expanded, the esteem and efficiency of the resource has declined. In demersal fisheries, the pattern has been to fish down the evolved way of life focusing on littler "trash fish" species for creation of creature encourages (Sugiyama *et al.*, 2005; Funge-Smith, Lindebo and Staples, in press). In pelagic fisheries, substantial fishing joined with fluctuating natural conditions have frequently prompted sensational decreases in get. In numerous fisheries, both small-scale and large-scale, a typical pattern of a decrease in catch per unit of exertion has happened.

Because of these disappointments, there has been an ongoing pattern for governments to move back to fusing networks and resource clients in the administration of fisheries - a framework currently perceived as co-management. This recognizes the two governments and partners have a part to play. Be that as it may, on account of the vast saw costs included and lacking human limit in numerous creating nations, co-management approaches have to a great extent been embraced as pilot level exercises by contributors and governments. While there have been some limited victories, there have been issues with up-scaling and very every now and again achievement has not been managed after venture reserves have been expelled. While usually important to create approaches through pilot exercises, this additionally accentuates the need to work in a reasonable situation with the resources really accessible and to maintain a strategic distance from making of fake (or "sponsored" frameworks) that can't be managed.

The introduction of decentralized strategies in numerous nations has given the chance to co-management far from nearby, pilot-scale exercises and the potential for national projects with full-scale association crosswise over expansive geographic territories (Pomeroy and Berkes, 1997; WorldFish Center, 2003).

Sen and Nielsen (1996) offer one of the very first typologies of co-management, and indeed is a defining work in the study of co-management as a distinct body of research and literature. The authors specify five distinct types of co-management arrangements (instructive, consultative, cooperative, advisory, and informative), on a spectrum from 'government management' to user group management. Co-management is the sharing of

basic leadership, decision-making and duty regarding the administration of resources between the community (local fishers) and government centralized management.

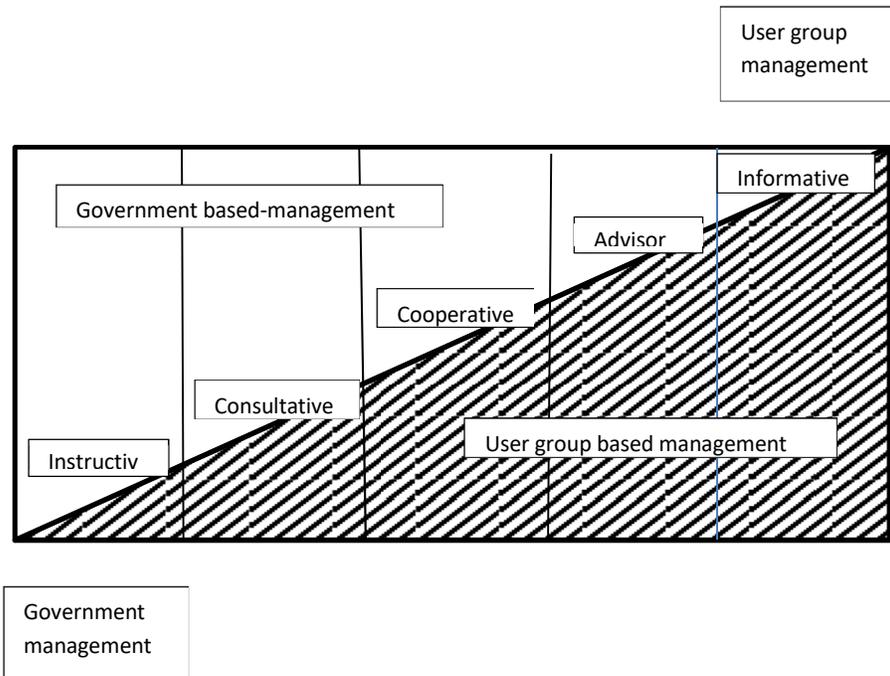


Figure 2. 1: Co-management spectrum
Source: Sen and Nielsen (1996)

Instructive management is characterized by “only minimal exchange of information between government and users,” with one-way flows of information from the government to resource users, whereas consultative management, the next step on the spectrum, allows for two-way flows of information. There is a significant step up to the third type of management: cooperative management is defined as management where “government and users cooperate together as equal partners in decision-making and the authors acknowledge that for many scholars this is the definition of co-management. The fourth and fifth types of management are role reversals from instructive and consultative: under an advisory management arrangement resource users make the decisions and government

merely ratifies or endorses the decisions, and under informative management resource users have full authority for decision-making as the government has devolved responsibility for management to the resource users.

An alternative method for understanding frameworks of co-management is to begin from the supposition that the groups are associated with a procedure of iterative critical thinking, as in versatile administration. Utilizing this concentration, the local land claims understanding, for instance, in the James Bay area can be viewed as, not a conclusion to itself, yet rather as a way to make the political space inside which networks and different gatherings can build up the learning and aptitudes to take care of their own issues. Cases followed after some time ranges of a few decades, from both Canada and Sweden; show that critical thinking focused co-administration consolidates two attributes (Olsson *et al.*, 2004). The first is the dynamic learning characteristic of adaptive administration, or learning-by-doing in an iterative way for instance (Holling, 1978), and the second is the linkage normal for helpful management (for instance, Pinkerton, 1989; Berkes, 2002). Folke *et al.* (2002) have utilized the term, versatile co-administration, to allude to this 'procedure by which institutional courses of action and environmental learning are tried and changed in a dynamic, continuous, self-sorted out procedure of experimentation'. Versatile co-management, by definition, is a comprehensive and synergistic process in which partners share administration.

Common Pool Resource users, with different benefits have different values attached to these benefits. Common Pool Resources are obviously subjected to exhaustion or reduction in quantity as humans use or extract them (OECD, 2001). In light of this, if the

extraction activities of one resource users influence the amount and nature (quality and quantity) of the other resource users, there is the probability of conflicts happening. I would want to stress here that, the sort of conflict I am alluding to is that of social conflict. Nevertheless, unmanaged and uncertain social conflicts could worsen to result violent conflict.

Usually, the community tends to focus on Common Pool Resources on land. The sea, which is mostly called the “Marine Commons”, is also a Common Pool Resource which the populace or community use to satisfy their diverse needs. A number of people obtain fish from it, others harvest salt from it, and some go to the sea to have fun or entertainment and aesthetics, and some use the sea as a medium to realize hydrocarbon exposing rocks underneath the ocean. Contingent upon values put on the different assets tapped from the Common Pool Resource and the impacts ones abuse strategies have on alternate assets, degradation, and consequently conflicts could result. Natural resource management issues in least developed countries are progressively copying western models, while the commitment of indigenous cultures and institutions are regularly ignored (Fairhead and Leach, 2004). It has turned out to be progressively evident that more practical and supportable options for Natural Resource Management (NRM) must be looked for if the extraordinary loss of natural and social assorted variety is to be controlled and recovery is permitted to happen (Pillien and Walpole, 2001; ASTREC, 1997; Marglin, 1990).

Before colonization took firm roots in Africa, the indigenous rulers possessed an extraordinary position in the management of characteristic resources. They were acknowledged by their subjects as the religious, political, and legal and the otherworldly

encapsulation of their networks and hence assumed liability in the management of network resources (Appiah-Opoku and Hyma, 1999). Fairhead and Leach, (2004) likewise contended that, colonization in Africa was a major reason in Africa's takeoff in their method of common resource management. They facilitate contended that times of colonization in Africa estranged its kin from their customary methods for overseeing and use of characteristic resources. Fundamentally, the social standards and customary frameworks that maintained Africans preceding colonization have esteemed valuable. Frontier run enabled the nearby management structures and took away the resource from the locals (Appiah-Opoku and Hyma, 1999).

FAO (2005) contends that Co-management describes the spectrum of shared management between the extremes of full community-based management (with full devolution of responsibility to communities/fishers) through to government-based management (with full responsibility controlled by government) (Figure 2.1). In this assessment, the expressions "community-based management" and "government-based management" allude to the two outrageous finishes of the range, perceiving that these extremes infrequently exist in actuality and that commonly there is some type of interceding course of action. The term co-management in this manner speaks to the differing degrees of association/cooperation of government and fishers between these two extremes.

In spite of the fact that the standards for co-management are basically the same inside large-scale industrial fisheries and in small-scale artisanal fisheries, the strategies and modalities for executing them may vary. Co-management is not only an idea that includes the rustic poor and nearby networks, however should join a wide range of angling and

effects on the resources. Having great stewardship of beach front resources by neighborhood networks that are then misused by bigger vessels from different areas is counterproductive and will definitely prompt the breakdown of the framework (*ibid*).

The major players in co-management

Governments, as significant players in co-management, must be included at all levels - national, "regional" and local. The prime government player is regularly the Ministry in charge of fisheries (frequently part of a bigger Ministry of Agriculture) with links from the Minister - Ministry - Department - District office and so on and also other significant Ministries, for example, the Environment Ministry. The other real players are, obviously, the fishery partners/stakeholders, particularly those engaged with the harvesting of the fish. Other stakeholders working with fishery partners, for example, Civil Society Organizations (for instance, NGOs, fisher's associations and alliances) likewise assume an imperative role.

Co-management may likewise include different clients of the fisheries resource or condition, (for example, the tourism/business). In numerous industrialized nations there have been endeavors to include large-scale fishers in management, through organizations speaking to their interests being engaged with exchange with governments. In nations with critical high quality or small-scale fisheries, there are a more noteworthy number of organizations which may thusly build the unpredictability of the Co-management framework. Co-management portrays the range of shared management between the extremes of full network based management (with full devolution of obligation to networks/fishers) through to government-based administration (with full duty controlled

by government) (Figure 2.1). In this audit, the expressions "community based management" and "government-based management" allude to the two outrageous ends of the spectrum, perceiving that these extremes infrequently exist in all actuality and that ordinarily there is some type of interceding course of action. The term co-management in this manner speaks to the shifting degrees of contribution/connection of government and fishers between these two extremes (FAO, 2005).

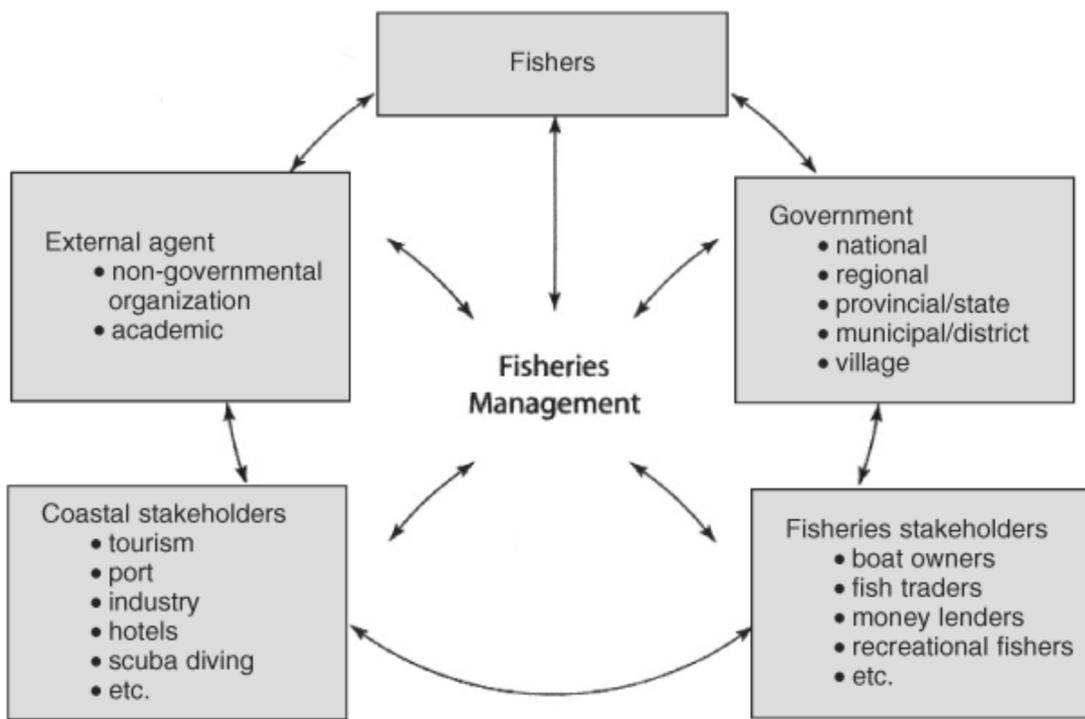


Figure 2. 2: Co-management as a partnership.
 Source: Pomeroy and Rivera-Guieb (2005)

In spite of the fact that the standards for co-management are basically the same inside substantial scale mechanical fisheries and in small-scale high quality fisheries, the strategies and modalities for executing them may contrast. Co-management isn't only an idea that includes the provincial poor and local communities, however should fuse a wide

range of angling and effects on the assets. Having great stewardship of beach front assets by neighborhood networks that are then abused by bigger vessels from different areas is counterproductive and will unavoidably prompt the breakdown of the framework (*ibid*). Governments, as significant players in co-management, must be included at all levels - national, "region" and nearby. The primary government player is regularly the Ministry in charge of fisheries (frequently part of a bigger Ministry of Agriculture) with joins from the Minister - Ministry - Department - District office and so forth and also other significant Ministries, for example, the Environment Ministry. The other significant players are, obviously, the fishery partners, particularly those engaged with the gathering of the fish. Different accomplices working with fishery partners, for example, Civil Society Organizations (for instance, NGOs, fisher's associations and leagues) likewise assume an essential part. Co-management may likewise include different clients of the fisheries asset or condition, (for example, the tourism/business). In numerous industrialized nations there have been endeavors to include huge scale fishers in administration, through associations speaking to their interests being engaged with discourse with governments. In nations with noteworthy high quality or little scale fisheries, there are a more prominent number of associations which may thus build the unpredictability of the co-management framework (*ibid*).

The normal significant players who have a stake in basic leadership on issues that identify with fisheries assets are demonstrated diagrammatically in Figure 2. This has been additionally explained amid the ongoing Asia-Pacific Fishery Commission (APFIC) workshop on "Mainstreaming fishery co-management" (FAO, 2005).

For the African, the characteristic resources were not just critical as a wellspring of food and other local items, however it was the plain premise of their religion and social convictions, in this way, certain regions, that is, forests, water focuses, mountains and so on were viewed as holy and were not to be manhandled. Abuse of the regular asset base was efficient and must be done through the motivation of soul mediums and through the direction of customary foundations for the advantages of the entire Community (Paula, 2004). The presentation of business creation frameworks by the provincial monetary and political race saw the resettlement of a few Africans from their religious and social frameworks (in the same place). This crushed indigenous learning frameworks and undermined conventional establishments.

Rockefeller Foundation (2013) contends that a wide range of types of fisheries management have advanced, contingent upon the apparent points of the management procedure. Early types of customary marine tenure concentrated on the privately controlled management of resource access and advantages. As fisheries created, yield augmentation approaches were received which, thusly, offered ascend to worries for the environment and for boosting reasonable economic returns back from fisheries management. In this way, approaches have been included that present rights – individual, community and human – on the general population in the area to accomplish both proficiency and value picks up. This acknowledgment of the more extensive ecological and economic ramifications of poor fisheries management additionally has invigorated an enthusiasm for more all-encompassing methodologies that go past fisheries and incorporate environment based methodologies and coordinated waterfront management Rockefeller Foundation (2013). Such methodologies are progressively looking carefully

again at network inclusion in fisheries management through co-management plans, under which the network and government share parts and duties.

Hviding and Baines (1994) in a case study examine the traditional fisheries related resource management in Marovo (Solomon Islands) and suggest Customary Common Property Control over the sea and its resource. Customary Marine Tenure (CMT) system that operates in Marovo offers potential for appropriate self-regulation of fishing effort and for direct local level resolutions of resource conflicts. Pomeroy and Williams (1994) argues that recent lessons point to potential benefits in some fisheries from management partnerships between the government and local fishers and communities-fisheries co-management. At the same time they caution that co-management is not a universal panacea and more experience and research are needed to learn about the conditions leading to successful fisheries co-management. Roy (1995) points out that fisheries management is not so much about managing fish, it is all about managing the way people and fishers capture fish and affect their environment. Communication and awareness building used in a participatory mode do work and could be the ingredient in fisheries management, which makes the difference between success and failure. Aziz *et al.* (1996) examine the question of sustainable fisheries and food security in the Bay of Bengal region. Management approaches that can turn public awareness into durable and sustainable mechanisms for an improved social welfare and eco-system health are examined.

Chong (1996) establishes that to work, fisheries management calls for strong public and political support and commitment. Fisheries management rules, regulations, laws and measures are fruitless unless they are respected by the fisher folks. It is therefore, crucial

to bring in and actively involve the fishermen and their communities into the management process to ensure success of fisheries management. Nickerson *et al.* (1996) reveal that those closest to the resource were the first to see the link between eco-system health, resource sustainability and their livelihood. A more equitable distribution of the costs and benefits of the environmental services from the resources are highlighted as the objective of community based management project. Nickerson (1996) points out examples of effective public stewardship from the Bay of Bengal region and asserts that to sustain stewardship the public need a mechanism for directing action to get results.

Galtung (1971) further states the containment, management or resolution of conflict is very profound to a society since conflict is a crucial element of how society functions, however, its positive role can become destructive if not properly handled. A useful indication of how far conflict has become a destructive force within society is to observe to what degree, if any, it is mitigated or managed. At the very basic level, conflicts are 'contained' where infractions are policed, laws or rules are written, despite the fact that it may not necessarily be enforced and the existence of a crisis or problem is recognized, though no way forward may be discernible. When civil and state institutions have reached a point that they are able to step in and actively deal with conflict they will at first manage it: platforms for airing grievances will be developed and will be easily accessible for all stakeholders – particularly including the most disadvantaged. Management should ensure that the positive elements of the conflict are recognized and that the situation does not decline. Resolution takes management one step further.

World over, most natural resources were previously owned locally, exploited, or they enjoyed some degree of open access regime with no clear form of ownership or management. Various practices now classed under the heading 'management' were mainly encouraged by a religion or a world view. Indeed, some 'management practices' may have not had a clear ecological purpose at all. In other words, any environmental effects may have been unplanned results of actual behaviour (Vayda, 1996). In many places wild natural resources were not merely harvested but were also increasingly domesticated and made more dynamic and productive. In the process therefore, certain wild and 'useless' resources were lost (Wiersum, 1996). Communal or fishing grounds and forest lands were managed by clearly defined communities. In addition, individuals may possess resources as private property, at times on a temporary basis.

Natural resource management issues in creating nations are progressively impersonating western models, while the commitment of indigenous societies and foundations are frequently neglected (Fairhead and Leach, 2004). It has turned out to be progressively certain that more suitable and practical options for natural resource management (NRM) must be looked for if the intense loss of organic and social decent variety is to be controlled and recovery is permitted to happen (Pillien and Walpole, 2001; Marglin, 1990).

Before colonization took firm roots in Africa, the indigenous rulers involved an exceptional position in the administration of natural resources. They were acknowledged by their subjects as the religious, political, legal and the profound encapsulation of their communities and in this way assumed liability in the management of community resources (Appiah-Opoku and Hyma, 1999). Fairhead and Leach, (2004) additionally contended

that, colonization in Africa was a major reason in Africa's takeoff in their method of common resource management. They promote contended that times of colonization in Africa alienated people from their traditional methods for management and use of common resources. Altogether, the social standards and conventional frameworks that maintained Africans preceding colonization have considered helpful. Frontier administer enabled the local administration structures and took away the asset from the locals (Appiah-Opoku and Hyma, 1999).

For the African, the natural resources were not just imperative as a wellspring of nourishment and other domestic items, however it was the very foundation of their religion and social convictions, along these lines, and certain zones for example, forests, water focuses, mountains and so forth were viewed as consecrated and were not to be mishandled. Misuse of the characteristic asset base was precise and must be done through the motivation of soul mediums and through the direction of customary foundations for the advantages of the entire Community (Paula, 2004).

The United Nations Convention to Combat Desertification (UNCCU) in Africa states that there is need for countries to strengthen where appropriate relevant existing laws or legislations and in situations where these laws are not in place then governments should enact laws concerning the same and establish long-term policies and action programmes of natural resources (UNEP, 2000). In Cameroon and Ghana for example, forest policies and management plans were formulated purposely to address the biological diversity for the reason of sustaining forestry and wildlife administration (management). Consequently, Convention on Biological Diversity (CBD) was accepted and adopted. UNEP Studies

have established that countries of Western and Central Africa have embraced legislations on CBD while North African countries have relied heavily on presidential and ministerial decrees and environmental codes (UNEP, 2000).

Co-management in this research is a procedure of administration or management in which government imparts capacity to resource users, with each given particular rights and duties relating to information and decision-making. Raakjaer *et al.* (1999) mentioned that the concept of co-management was imprecise, and this might still be the case. In particular, Plummer & FitzGibbon (2004) pointed out the difficulty of defining the concept. Berkes (2007b) presented the origin and history of the concept, whereas Armitage *et al.* (2007a) provided a variety of definitions. Two of these meanings of co-management are: "A political claim [by users or community] to share administration power and duty with the state" (McCay and Acheson 1987, in Armitage *et al.* 2007a); and "A partnership in which government agencies, local communities and resource users, NGOs and other stakeholders share ... the authority and responsibility for the administration or management of a particular region or an arrangement of resources" (IUCN 1996, in Armitage *et al.* 2007).

Co-management frameworks and systems are getting to be prevalent in numerous parts of the world and are showing extensive levels of success. The more striking association of fishers in the management choices of fisheries not just increases on traditional frameworks of resource management in numerous parts of the world, it reflects both an expanded attention to the need to enable and draw in fishers in the management procedure, and an acknowledgment that it is conceivably more affordable than endeavoring to oversee from the middle (Alpízar, 2006). Berkes (2008) examined the openings or opportunities and

teething troubles of using Indigenous and Community Conserved Areas (ICCAs) for preservation work on, taking note of that they have a part to play in guaranteeing that ordinary protection approaches turn out to be more comprehensive and pluralistic.

In its least complex shape, co-management can be portrayed as fisheries administration (management) where parts and duties are shared between the government and the users (Pomeroy, 1994; Sen and Raakjaer Nielsen, 1996). Sen and Raakjaer Nielsen (1996) differentiated this from community-based resource management (CBRM) because with co-management, government is also involved in the decision-making process concerning the management of the fishery. Abdullah *et al.* (1998) found that “co-management is a middle course between pure state property and pure communal property regimes,” while Gutiérrez *et al.* (2011) referred to co-management as community-based co-management where fishers and managers work together to improve the regulatory process.

Policy effectiveness may be improved by an elegant co-management system, with suitable incentive structures and enforcement mechanisms, since resource users can be guaranteed that they will benefit from the resource in the long-term (Johnson, 1998). Furthermore, co-management may perhaps lead to better compliance if local communities are capable to incorporate their preferences into policies (Nielsen *et al.*, 2004). An additional benefit of this local participation, also connect to policy effectiveness, is the availability of improved and more thorough information about local preferences, capacities for management, and resource conditions (Johnson, 2001). Meticulously, there is a prospect of integrating the experienced-based knowledge (EBK) of resource users into management (Nielsen *et al.*, 2004).

Co-management may be more efficient than state regulation if it utilizes comparative advantage in the allocation of tasks between government and communities (Carlsson & Berkes, 2005). Certain tasks (such as monitoring other resource users) can be done easily and cheaply at the local level while others (such as enforcement) are more efficiently done by the state. However, efficiency gains in the allocation of tasks must be weighed against the transaction costs of formulating and implementing a co-management system. Transaction costs are high when there is little community capacity to support a co-management system, due to weak community institutions, poor leadership, and/or high levels of conflict (Tokrisna *et al.*, 1999; Pomeroy & Berkes, 1997). Transaction costs are also high when it is costly or difficult to exclude outsiders from using the resource.

Ahmed *et al.* (2004) argues that fisheries are multifaceted and interdependent ecological and social systems that needs integrated management approaches. The actions of one person or group of users affect the availability of the resource for others. Managing such common good resources requires deliberate efforts by a wide range of stakeholders to organize and craft rules enabling fair and sustainable use of the resources for everyone's benefit. Communal action is often a precondition for the development of community-based institutions and the devolution of authority that is required from central to local authorities.

Universally, new trends and innovations in fisheries management have influenced the acceptance of the co-management approach since 1997; therefore the creation and function of Community-Based Fisheries Management Committees (CBFMC). Fisheries

co-management programs are plans where the duty regarding fishery resources management is shared between the government and fishing community or the fisher group (Wilson *et al.*, 2010). Fisheries co-management approaches have been practiced and succeeded in parts of Southern Africa, including Malawi, Mozambique and Zambia in the African cases as well as parts of South East Asia including Indonesia, Malaysia, Philippines and Vietnam (Wilson *et al.*, 2010).

Regardless the great variety of definitions, the literature on co-management seems to agree on its triggering factors as well as on the purposes of its implementation. First, factors that trigger co-management are related to management problems, including real or imagined resource crises (such as overexploitation), conflicts between resource users, or conflicts between resource users and management agencies (Sen & Nielsen 1996, Pomeroy & Berkes, 1997; Plummer & FitzGibbon, 2004). Second, even though it is often stated that co-management is not a panacea for solving all the problems of fisheries management (Jentoft, 1989; Raakjaer Nielsen & Vedsmand, 1999), there are several arguments for stakeholders' participation in co-management arrangements.

As per these contentions, a portion of the potential advantages of co-management incorporate more protuberant efficiency (Hanna, 1995; Singleton 2000), reasonableness (McCay and Jentoft, 1996), equity (Hanna 1995), legitimacy and compliance (Felt 1990, McCay & Jentoft 1996; Jentoft *et al.*, 1998; Singleton 2000), sustainability (Hanna, 1995), and community empowerment (Jentoft, 2005).

In this sense, more prominent productivity could be accomplished because of decreased transaction costs (that is, expenses of arrangement, usage, implementation and observing of managerial plans, Jentoft *et al.*, 1998, Carlsson and Berkes, 2005); expanded learning (McCay and Jentoft, 1996; Jentoft *et al.*, 1998); compromise systems, allotment of undertakings, trade of resources among partners and hazard sharing (Carlsson and Berkes, 2005); enhanced information gathering, observing and authorization (Pinkerton, 1989); and versatility and adaptability to manage vulnerability (McCay and Jentoft, 1996).

However, how co-management is implemented, analyzed or evaluated depends on managers' and researchers' conception of it. Sandström (2009) contended that two major approaches have emerged: one that considers co-management as a part of commons theory (Common Property or Common Pool Resource Theory), and the other that conceives co-management as a part of governance theory. She discussed the differences in their intellectual roots (rational choice institutionalism vs. sociological institutionalism) and in the way both approaches treats three core concepts: participation, power sharing, and process.

Even though Sandström (2009) pointed out that the commons approach (named CPR approach by her) is the most dominant and the governance approach the most recent, she emphasized their different origins rather than making connections between them. In the next section I focus on the evolution of the concept of co-management and argue that what actually seems to be occurring is a transition from the former approach to the latter, after a shared origin in commons theory. Subsequently, Sandström (2009) addresses the concept of governance and its evolution (including adaptive and interactive governance),

after which I look at the links between governance theories and (adaptive) co-management.

LVFO's statement of purpose explains its objective for Lake Victoria as "reestablishing and keeping up the soundness of its ecosystem, and guaranteeing economic improvement or sustainable development to the advantage of the present and who and what is to come" (LVFO, 1999). The draft Lake Victoria Fisheries Management Plan (FMP) looks to add to improvement of maintainable fisheries by building up a feasible framework for the administration of the lake fisheries (LVFRP, 2001). These objectives are re-resounded in the national advancement projects and fisheries strategies of the individual riparian states as spelt out in the Policy Mandates and Organizational Review Report for Kenya, the National Fisheries Policy for Uganda and the National Fisheries Sector Policy and Strategy Statement for Tanzania (MAAIF, 2004; MARD, 2000; MNRT, 1997).

2.2.3 Evolution of co-management

The origin of co-administration (co-management) can be traced back to commons theory (Berkes *et al.*, 2001). Despite earlier beliefs that resource users were not able to manage resources sustainably (Gordon 1954, Hardin 1968) - leading to the so-called "tragedy of the commons" (Hardin 1968), there is now substantial research supporting "sustainable" local institutions (Ostrom, 1990; Agrawal 2001; Dietz *et al.*, 2002). However, common property, private property, and state or government property, have all been associated both with success and failure, although state property is rarely related or associated with fruitful or successful management (Feeny *et al.*, 1990). In this logic, co-management must be tacit

and understood as a type of property rights regime, in between common property and state property.

Co-management starts from the assumption that participation in environmental governance is connected with a positive input on the overall performance of the governance system in terms of compliance, effectiveness, legitimacy, knowledge gathering and local adaptation. It is based on a critique of high level centralized management approaches that can be briefly summarized as (Young, 2002; Berkes, 1999; Berkes, 2002): Centralized management tends to find equal regulations for a wide area and number of ecosystems, which creates problems, if the local variation is high; Centralized management tends to ignore the local knowledge, which is used in local institutions and rely on internationally accepted (scientific) practice; Higher level institutions encourage the larger and more influential stakeholders (such as environmental NGO) as opposed to local organizations and groups that reside within the ecosystem that they exploit.

Co-management accepts that the design of some form of centralized governance mechanism can be beneficial (as opposed to for example, pure self-governance), but argues that a conscious effort has to be made to protect and include local interests and rights. Co-management therefore stresses the importance of partnerships between the different levels (Young, 2002). Co-management see the some form of power sharing between a central authority and local resource users in terms of the rights and responsibilities with respect to a specific resource, as the central component (Berkes *et al.*, 1991) However, it should not be ignored though that communities as well as the state

are usually characterized by a variety of arrangements, which can take very dissimilar types (Carlsson and Berkes, 2005). Over time, the term co-management has been used synonymously with a whole range of inclusive governance schemes including participation, partnerships and community-based management. Berkes (2009) identifies a number of different aspects for example he sees co-management as power sharing, institution building, trust and social capital, as a process, as problem solving, co-management as governance, as innovation, as conflict resolution, as knowledge building and co-management as social learning.

Over time, commons theory has progressed in numerous ways. For instance, commons research has increasingly moved to considering commons as complex systems (Berkes, 2009b), characterized by self-organization, non-linearity, uncertainty, and scale (Berkes, 2003). Likewise, there has been a difference in scale, moving from a nearby level way to deal with a multilevel one, including local, territorial (regional) and worldwide (global) levels (Ostrom *et al.*, 1999). Alongside the advancement of house hypothesis, the idea of co-management has additionally developed in the course of recent years. Co-management is more varied, more complex, and more dynamic than as described in the early literature (Berkes, 2007b).

The evolution of co-management was addressed by Berkes (2009c), who focused on a few aspects that have come to the forefront (knowledge generation, bridging organizations, social learning, and the emergence of flexible (adaptive) co-management). However, the literature on co-management seems to lack an integrated analysis of the transition that this concept has gone through over time.

According to Bennet *et al.* (2001), traditional and self-management of natural resources, and fisheries in particular, has been around since early times. However, co-management is an approach that has been more recently adopted globally in response to the perceived failure of centralized management of fisheries in avoiding the decline of fish stocks, and to a lack of government resources to manage fishery resources effectively. Bringing together fishers, government authorities and others working inside a fisheries area, co-administration frameworks and procedures differ as far as the idea of power sharing, composition and functions (Ibid, 2001).

Co-management imparts numerous highlights to different sorts of organizations and co-agent ecological administration courses of action including various performing actors (Berkes, 2002; Fitzgibbon *et al.*, 2004). Nevertheless, a basic normal for co-management is the nearness of no less than one in number vertical connection between the community or user group and the government, including formal game plans for sharing duties and authority (Berkes, 2002; Borrini-Feyerabend *et al.*, 2009). What's more, specially appointed open support in administration choices or unimportant discussion is frequently not viewed as co-management. Co-management (CM) starts from the assumption that participation in environmental governance is connected with a positive input on the overall performance of the governance system in terms of compliance, effectiveness, legitimacy, knowledge gathering and local adaptation. It is based on a critique of high level centralized management approaches that can be briefly summarized as (Young, 2002; Berkes, 1999; Berkes, 2002).

Centralized management tends to find equal regulations for a wide area and number of ecosystems, which creates problems, if the local variation is high. Centralized management tends to ignore the local knowledge, which is used in local institutions and rely on internationally accepted (scientific) practice. Higher level institutions encourage the larger and more influential stakeholders (such as environmental NGO) as opposed to local organizations and groups that reside within the ecosystem that they exploit.

Co-Management accepts that the design of some form of centralized governance mechanism can be beneficial (as opposed to e.g. pure self-governance), but argues that a conscious effort has to be made to protect and include local interests and rights. CM therefore stresses the importance of partnerships between the different levels (Young, 2002).

Co-management has been characterized as an association course of action in which government, the community of local resource users (fishers), outside operators (non-governmental organizations, scholarly and research organizations), and different fisheries and coastal resource partners (vessel proprietors, angle brokers, cash banks and tourism foundations) share the duty and specialist for basic leadership over the administration of the fishery (Pomeroy and Harkes, 2000).

It covers different organization courses of action and degrees of intensity sharing and integration of local (casual, conventional, and standard) and brought together government management systems. It seeks equity in fisheries management and strives to activate fisher's participation in the planning and implementation of fisheries management. The self-contribution of the fishing communities in the administration and management of the

resource will prompt a more grounded duty to consent to the management procedure and supportable and sustainable resource use (Pomeroy & Harkes, 2000). Co-management works on underlying basis of co-operation where the aspect of benefits is important to be clearly understood to partners involved since help to understand why people or groups of people co-operate. Co-management also works according to some explicit principles of democracy and social justice (Hersoug *et al.*, 2004), where free and autonomous legitimate community organization is vital for representing resource users and stakeholders in influencing the direction of policies and decision-making. Empowerment is a crucial thing as it is perceived as an enabling process in which individuals and communities can take responsibility and act effectively to safeguard or change their environment to solve local opportunities and problems (Jentoft, 2004).

In Asia co-management has become far more than an abstract idea. Community boundaries are being mapped (Osseweijer, Chapter 9 in this volume) and across the continent many experiments in local resource management are in progress. India has changed its forest policies in line with joint forest management and the Philippines is starting on a totally new era of resource management under the National Integrated Protected Areas System (NIPAS) law (1992) and the Indigenous Peoples' Rights Act embraced toward the end of 1997. Indonesia is also rethinking its forest policies, thus giving more scope to social forestry and recognition of local community rights. This reorientation of management styles relates to various kinds of resource, including production forests, non-timber forest products, and irrigation water and fishing grounds, as well as to the management of protected areas and surrounding buffer zones.

To set up co-management along these lines, fishermen must be will to assume on the responsibility of getting to be included. In the short-run, there would be high beginning interest in time, budgetary resources, and human resources. For some fishermen, the expenses of taking part (both time and cash) may exceed the normal advantages. There must likewise be adequate political will to help co-management. The need to build up an accord from an extensive variety of interests may stretch the basic leadership process and result in weaker, bargained measures. Co-management may not be reasonable for each fishery; for instance, it is more proper where species remain in one region for the majority of their life cycle. For co-management to be considered as an elective fisheries administration methodology would require rebuilding in the way fisheries are directly overseen. Co-management can give a chance to enhance stewardship, administration basic leadership, and correspondence amongst government and fishermen (Pomeroy *et al.*, 1994).

The term co-management is comparatively new, where its most prompt use has been followed to late 1970s (Pinkerton, 2003). Nonetheless, as said already, the act of intensity partaking in resources management returns to prior circumstances (Ostrom, 1990). Most meanings of co-management involve some organized game plan for client investment in administration and basic leadership, a dynamic association utilizing the limits and premiums of local fishers and communities, supplemented by the capacity of the state to give empowering arrangements and enactment and authorization and other help. Management of all fisheries in Cambodia is the obligation of the Ministry of Agriculture, Forestry and Fisheries (MAFF), controlled through the Department of Fisheries (DOF). Inside the DOF, the Community Fisheries Development Office (CFDO) is in charge of

encouraging the foundation of network fisheries. National fisheries arrangement centers on supporting the catch from inland fisheries, the primary concern being to oversee and monitor common sea-going resources with a specific end goal to supply adequate sustenance for all individuals (Sem, *et al.*, 2003).

Sem *et al.* (2003) notes that, despite the delay in approval of the sub-decree, numerous community fisheries have already been established as part of the fisheries reforms. Furthermore, different activities presented by NGOs before the fisheries change program became effective are currently perceived as network fisheries by the CFDO. Although community fisheries are officially recognized, they do not currently have any legal right to create new laws. Rather, rules created by the community fishery tend to mirror existing national laws (previously, poorly enforced), and are backed up by voluntary agreements between members Viner *et al.* (2006).

The fisheries of Bangladesh moved toward becoming state property under the purview of the Ministry of Land (MOL) after the abrogation of Zamindari framework through the East Bengal State Acquisition and Tenancy Act in 1950. A significant part of the inland fisheries is now divided into 13,003 bodies called Jalkars or Jalmahals. The MOL continued with the colonial policy of leasing out fishing rights in water bodies to the highest bidder (for 1-3 years) with a view to raise revenue. Most fisheries have been granted to the most noteworthy bidder ideally to cooperatives. However, in the process of competition, control became concentrated to a handful of rich/influential persons. The lease-holders usually sub-lease to as many fishers as are willing to pay user fees set to ensure a profit (Naqi, 1989; McGregor, 1995 cited in Sultana *et al.*, 2000). However, under

this leasing system the genuine fishers have not gained fishing rights due to their lack of power to enforce property rights. Fishing rights are held by influential middlemen who can prevent unauthorized fishing either by threat or social Pressure (Toufique, 1998).

In India, the community institutions, (for example, the caste (class) Panchayats, Peddalu, Padu framework or system) for the most part composed along station, family relationship or religious lines, assume a vital part in settling conflicts, other than managing and assigning resource use, guaranteeing impartial access to resources and giving some type of social protection. Most people group have developed their own particular administration or management frameworks/systems after some time to direct human association with the resource particularly when extensive number of individuals depend on a constrained resource to maintain a strategic distance from conflicts. The development of conventional management systems relied upon the resource and nature in which the resource existed and the associations between individuals to remove these resources (Kurien, 1991).

Japanese fishery administration uses fishery cooperatives, called Fishery Cooperative Associations (FCAs), which are allowed regional user rights (called normal fishing rights) built up by law for catch of fisheries inside seaside waters of its purview). FCA is an aggregate group of individual fishing units (individual, family, or little organization). Overseeing fisheries by means of FCA in this manner fundamentally includes leading aggregate activity effectively, which all around is viewed as an exceptionally troublesome errand (Uchida *et al.*, 2004). As respects, institutional reaction to fisheries clashes, Negotiation and coordination process are normal place in fisheries strife in Japan, where

intervention is frequently accomplished through a specific FCA; people group based unit (Ruddle *et al.*, 1984). In such manner, the go between exists inside the FCA (Fishery Cooperative Associations) and can assume a vital part in intervening conflict and in coordination.

When conflict extends further and involves neighbouring communities and FCAs, joint meetings are held at which officials from various FCAs work together to find mutually acceptable solutions (McGoodwin, 2001). Instruments and reform measures to resolve conflict vary across typology of conflicts and management regime. For example, conflicts arising from who controls the fishery can be resolved by traditional mediation (Bennet, 2002). Bennet (2002) further argues that regulatory enforcement of access rights is a popular instrument when fisheries are managed through central controls, although weakness in the surveillance and enforcement capacity coupled with high management costs makes this instrument ineffective in resolving conflicts.

According to Ngige and Jaeckel (2007), fisheries in Kenya had been managed locally using traditional understanding. Subsequent to independence, the Kenyan government took over fisheries management, implementing a top-down approach to run natural resources with modest participation from local stakeholders. This led to a decline in fish stocks with some local fisheries nearly collapsing. Central trouble included use of illicit and/or destructive fishing apparatus, environmental degradation/dilapidation, and cross border fishing conflicts.

Ngige and Jaeckel (2007), further notes the Fisheries Act 1989 was marked by a not having enforcement capacity as well as overlapping administrative competences between different experts and authorities for fisheries, wildlife insurance, and ranger service. Encourage pressures existed between various fisheries management levels, including the government, districts, and customary or tradition leaders. One of the underlying reasons was the perception that fisheries resources belonged to the government unavoidably leading to the disengagement of local communities. To surmount this state of affairs, Kenya undertook a shift towards co-management accompanied by a changing perception of ownership towards understanding natural resources as common property held in trust for present and who and forthcoming generations. Such consideration of the co-administration component into the arrangement of Beach Management Units (BMUs) was upheld by the Lake Victoria Fisheries Organization in the mid-1990s through its regional approach. A BMU is characterized as "an association or organization of fisher folk at the shoreline/beach (watercraft group, vessel/boat proprietors, supervisors, charterers, fish processors, fishmongers, local gear creators or repairers and fishing gear merchants) inside an fishing community" (LVFO 2007). Development tied down in Law: The Fisheries (Beach Management Unit) Regulations, 2007 under the Fisheries Act (Cap 378) – Legal Notice No. 402. Fundamental capacity of BMU is to improve the level of consistence of fisheries tenets and directions and along these lines cultivate dependable angling hones on the lake (LVFO, 2007).

In following this support of the Lake Victoria Fisheries Organization, Kenya made an arrangement of co-administration through Beach Management Units, which intend to consolidate components from all administration levels in a typical, participatory approach.

Its embodiment is to make a connection and an organization between the management level and high quality fishermen. The essential favorable position is that 'it permits the information and comprehension of all partners to be reflected in the basic leadership process and their different abilities to be outfit in execution.' Through such organized re-consideration of conventional learning in fisheries administration, Beach Management Units basically supplant the customary use of seniors at landing destinations. Such legitimate strengthening of neighborhood networks has been recommended as an answer for overexploitation and expects to speak to an environment way to deal with fisheries management (Ngige and Jaeckel, 2007).

In Kenya, Beach Management Units (BMUs) are community Co-Management Strategy, legitimately engaged and enrolled with the Department for Fisheries Resources. Fishers are required to be enlisted with BMU keeping in mind the end goal to be permitted to work in fisheries. Each BMU has an Assembly of every single enrolled part and a chose Committee. The way toward framing and enrolling a BMU is set out in the Harmonized BMU Guidelines, which are actualized at the national level (LVFO, 2005). Beach Management Unit is a gathering of partners that constitute a fishing community whose fundamental capacities are fisheries arranging and management, preservation and improvement in their territory in a joint effort with the local and national governments (FAO, 2006). There is sparse writing on how these organizations react to fisheries clashes in Kenya. This study will along these lines be critical in crossing over this data gap.

While institutions have advanced and berated aggregate activities to limit conflicts and exchange costs, their quality does not completely ensure nonappearance of contentions.

Institutional shortcomings and imperatives are unavoidable in fisheries and beach front management segment in most creating nations (Torell *et al.*, 2002). Specifically, the legitimate and institutional structures to advance and ensure get to rights for customary fishers are either powerless or not executed in the vast majority of these nations (Delgado *et al.*, 2003). Besides, the economic perspective of institutions and conflicts likewise needs to perceive the uneven conveyance of intensity in the public eye. Knight (1992) watched that establishments and guidelines develop through haggling and key clash, where the weaker challengers must choose the option to agree to the result. Therefore, existing institutions are probably not going to support or reasonably speak to the interests of poor asset clients when they vary from those of all the more ground-breaking clients.

Regardless the great variety of definitions, the literature on co-management seems to agree on its triggering factors as well as on the purposes of its implementation. First, factors that trigger co-management are related to management problems, including real or imagined resource crises (such as overexploitation), conflicts between resource users, or conflicts between resource users and management agencies (Sen & Nielsen, 1996; Plummer & FitzGibbon, 2004). Second, even though it is often stated that co-management is not a panacea for solving all the problems of fisheries management there are several arguments for stakeholders' involvement in co-management plans. As per these arguments, a portion of the potential advantages of co-management incorporate more prominent efficacy (Hanna, 1995; Singleton, 2000), reasonableness, value (Hanna, 1995), legitimacy and compliance (Singleton, 2000), sustainability (Hanna, 1995), and community empowerment (Jentoft, 2005). In this sense, greater efficiency could be achieved due to reduced transaction costs (i.e. costs of negotiation, implementation, enforcement and monitoring of regulatory schemes, increased knowledge; conflict resolution mechanisms,

allocation of tasks, exchange of resources among partners and hazard or risk sharing (Carlsson and Berkes, 2005).

2.2.4 Rationale of Co-Management

The rationale of the co-management approach in fisheries originates from the concept or idea of common property and resource management regimes theory. In 1911 the Danish economist Warming (see Andersen 1982) demonstrated that by regulating fishing effort the economic yield to be obtained from fishing can be maximized. Gordon (1954) and Hardin (1968) argued, that fishermen or resource users of a common property resource only make decisions, which in a short-term perspective will increase their profit, but they have no incentive to take a long term view in order to preserve the resources from over-exploitation. Hardin (1968) established, that: "Freedom in the commons brings destruction to all" and makes the calamity. Hardin identified two options; either privatization or government control of the commons in order to avoid the tragedy. Thus, both Gordon and Hardin assumed, that common property institutional arrangements are the same as open access. It has for a long time been a widespread perception that common property and open access are synonymous. Today this perception of common property is recognized as having no basis in reality (Hanna, 1990), but unfortunately this misconception has dominated the fisheries management debate for over 4 decades. Open access leads to tragedy and therefore some property systems need to be created in order to establish some sets of rights and rules. This paper investigates rights and rules systems for user group involvement in fisheries management.

To comprehend if co-management approaches can advance the livelihoods outcomes of a community, many studies have been conducted (Be'ne' and Neiland, 2004; Edmunds and Wollenberg, 2003; Jentoft, 2000; Jumbe and Angelsen, 2007; Sayer, 2005; Tole, 2010) on co-supervision of forests among the deprived forest-dependent communities or co-management among the fishing communities in the management of fish resource or access to the fishing industry. However, the present literature shows that many natural resource management scholars have theoretically narrowly pay attention to their research, informed either by the literature on institutional design and evaluation or by the literature on livelihood outcomes per se, without openly acknowledging and thoroughly probing likely connections between the two (Tanvir *et al.*, 2007a; Thoms, 2008). Along these lines, the fundamental hole that exists in the present writing on the appraisal of co-management institutional courses of action is the linkages between co-management and economical employments (Agrawal, 2002; Dahal and Capistrano, 2006; Dominique, 2015; Ming'ate *et al.*, 2014; Morse and McNamara, 2013; Ribot, 2004; Ribot and Larson, 2012; Ribot *et al.*, 2006; Roy, 2014; Tanvir *et al.*, 2007a, 2007b). These linkages are built up in this article by an audit of current writing on: the justification for co-management of woodlands to distinguish the current holes in co-management of common pool resources writing; common pool resources hypotheses for outlining strong foundation game plans for co-management ways to deal with recognize the requirement for these linkages in the examination of co-management approaches and their related occupation results; and a survey of writing on the economical job system to empower the improvement of a structure for assessment of timberland co-management establishments and their related job results. The article at long last builds up an evaluative system that can be utilized to

examine the linkages between co-management and their related work results in timberland subordinate communities.

Co-management advance vigorous participation of the fishing communities in planning, formulating by-laws and enforcement of fisheries regulations and this creates a high sense of rights, ownership and legitimacy and thus conformity to fisheries laws and regulations. *“Co-management promotes participation of user groups, sense of ownership, which enhances legitimacy of the regulatory regime and hence compliance with fishing regulations”*. Co-management makes the resource users have a superior understanding on the fundamental issues concerning their fishery (state of fishery, their role as stakeholders, why certain laws and regulations are imposed) and fisheries have a propensity to be better managed as the resource users and partner organizations have a better comprehension of why they are dealing with the asset and what comes about are imagined (Katon *et al.*, 1997).

Fisheries management involves balancing opposing goals with varied objectives by way of a variety of biological, economic, and social criteria (Hilborn and Walters, 1992). U.S. fishery managers are charged with achieving numerous goals and objectives, as well as maximum yield, maintaining sufficient spawning biomass to avert recruitment overfishing, reducing risk, ensuring year to year stability in the catch, and preserving jobs in the community. Since some of these objectives clash or conflict with each other and for the reason that trade-offs exist, fisheries management has often been viewed as a failure by one stakeholder group or another. An understanding is growing that conventional

approaches to fisheries management cannot entirely address the desires and concerns of small-scale fisheries with inadequate data and spatially variable demographics.

In the United States, stock-assessment models and the bureaucratic hierarchies that disseminate and put into effect fishing regulations were intended to address commercial-scale pelagic fisheries, for example, those for anchovy, cod, and hake (Wilson *et al.*, 1999), notwithstanding, ongoing prominent falls of various stocks and a rising movement toward progression of small-scale fisheries for sedentary group has supported enthusiasm for using decentralized joint management (Acheson, 2005; Chuenpagdee and Jentoft, 2007). Decentralized approaches such as cooperatives, co-management arrangements, and collaborative research permit for broader community contribution into management and regulation. These decentralized approaches can advance or improve management outcomes (ecological sustainability, social goals, and economic performance) through incorporation of local knowledge, increasing responsiveness of management measures to local conditions, and gratifying stewardship behaviour. Cooperative strategies are based on the idea that parties concerned with management—including for instance fishermen, researchers, managers, and environmental organizations—can labor jointly to realize common fishery goals via participatory processes, in contrast to other adversarial or top-down strategies. So far, nearly all examples of successful small-scale, cooperative strategies come from developing countries (Pomeroy *et al.*, 2001; Satria and Matsuda, 2004; Soreng, 2006; Sverdrup-Jensen and Nielsen, 2008). These strategies are now gaining recognition in the United States has feasible means of collecting data at smaller spatial scales and creating local incentives for stewardship in small-scale fisheries (Acheson, 2005). Cooperative research is not a precondition for co management. It is

regarded, nevertheless, as a transformational tool that provides a pathway by which fisherman can enter into the management arena.

Thoms (2008) found that community control of woodlands and forests can open up new economic of opportunities for local families. Involving communities and community institutions in forest management (a sector clearly lacking ‘good governance’) may possibly be of assistance to introduce order into the running and management of the sector and offer momentous checks and balances on otherwise not regulated public services (Brown, 1999; Schumann, 2007) owing to the involvement of resource users in administration of choices/decision and utilization of information that is practical to them (Schumann, 2007). Involvement of stakeholders in co-management is also believed to enhance their efficiency and, possibly the equity of the intertwined common-pool resource management and social frameworks (Castro and Nielsen, 2001). Co-management may probably present a path for resource users to acquire a proprietary share in the authority and decision-making powers that guarantee management (Castro and Nielsen, 2001) in addition may be created for various of reasons, including the known failure of centralized management or because of economically driven reforms and constraints (Arthur, 2005). Co-management has also been embraced due to its legitimacy reasons (Berkes, 2002). It is used to give legitimacy and acceptance of management or create fair regulations (Jentoft, 1989). Ribot and Larson (2012) have shown considerable economic and other livelihood benefits, such as improved income, better human and social capital, and natural resource conservation, reduced vulnerability, and greater equity, democratization of authority and empowerment outcomes from community forestry. They further states that

community forestry in Cameroon, Nepal and Senegal has also considerably increased income to forest villages.

Governments, donors, NGOs and theorists characteristically defend decentralization reforms on grounds of improved efficiency, equity and responsiveness of bureaucracies to citizen demands. The underlying logic is that local institutions have better knowledge of local desires when endowed with powers, are expected to respond to local aspirations. The belief in greater responsiveness is based on a statement that local establishments have better access to information about their constituents, and are more likely to be held accountable by local populations. Transfer of considerable powers and 'downward accountability' of local authorities are consequently central to this modus operandi or formula (Ribot *et al.*, 2006). Besides, they contend that supporters of decentralization likewise trust that the more prominent effectiveness and value alongside nearby individuals' 'proprietorship' of local decisions and projects will yield more effective local investments and management and ultimately in more socially and environmentally sustainable development. Rising evidence from various nations demonstrates that devolution of rights and resources results to preferred management of basic asset over concentrated or state control (Roy, 2014). Then again, the effect of participatory forests management on the human, physical and money related resources of inhabitants has been observed to be immaterial (Tanvir *et al.*, 2007b). Tanvir *et al.* (2007a) found, from their correlation of towns partaking and not taking an interest in community ranger service extends in North– West Pakistan, that there were no huge contrasts in the wellsprings of wage and job procedures of the respondents of undertaking opposite non-venture towns. Moreover, Tanvir *et al.* (2007a) similarly contends that, regardless of a considerably more

noteworthy accentuation on network based ways to deal with woodland or lake or some other water source management, there are few situations where this has really produced substantive financial advantages of an adequate quality or amount to contend on economic terms with the unsustainable utilization of forest land and resources.

The advantages of moving toward fisheries management as a base up approach versus the conventional incorporated best down framework (centralized top-down approach) could be a high level of worthiness and similarity with direction measures, inferable from the cooperation of user bunches in the basic leadership and execution process (Pomeroy and Williams 1994). Additionally, one may envision to enhanced information unwavering quality, which may result to expanded productivity, value and manageability in fisheries administration and a diminishment of organization and requirement costs. When user bunches are associated with the basic leadership and usage of fisheries administration, a range of co-management plans can be distinguished.

Co-management promotes elements of equity, fairness and democracy in sharing the resources and opportunities where decisions are mutually accepted between members and problems affecting them are jointly tackled. It enhances the information flow between resource users and central government. This is achieved through constant negotiations and interactions between all the stakeholders involved, while the state will be informed of what is taking place at local level and the fishing communities will be aware of what is taking place in the central government. This kind of information flow will help to prevent or reduce possible future conflicts between fishing communities and the state. Co-management has proved to be efficient in terms of time and monetary costs since some

activities are performed by resources users. For examples fishers will not need to spend time going far to fisheries division offices just for registering their fishing gears.

Cost required for MCS will be reduced as the community also participates in taking care of resources and through education and awareness raising the community will use the fisheries resources sustainably and the state will spend less costs in surveillance.

According to Jentoft (1989) a central argument for introducing co-management is that government bureaucracies are less flexible than fishermen's organizations in enforcing management schemes. Co- management promotes and nurtures accountability and transparency as all fisheries activities are performed in open and transparent way and these build trust between partners involved.

Co management has greater hope towards the successfully management of fishery resource since there is utilization of knowledge and skills of both resources users and other professionals compared to the more centralized approach. Apart from the above mentioned benefits of co-management, there are some drawbacks or risks of implementing this approach. The management of the fisheries resource is very sensitive and dynamic; such responsibility if completely left in the hands of resources users might leads to depletion of the resource since most of the fishing communities lack sufficient knowledge and skills on conservation and better management of the resources. This matter was also cautioned by Jentoft (2005) *"Fishing people are empowered when it becomes possible for them to sustainably manage their fishery, and capacity building is a means by which this may be accomplished."*

Limitations of Co-Management

Co-management however, has received some criticisms, for example, its rigidity, path dependency and lack of accountability. These criticisms leads to a changing view, from that co-management were seen as a management model that could be applied on specific areas to that co-management is a process with emphasis on adaptation.

Pascual-Fernández *et al.* (2005) argue that co-management arrangements have often been initiated as cooperation between the government and institutions of science. These arrangements are often based on information provided by the science institutions which set the foundation in the decision-making process. This knowledge is often created at a national level and communicated to local levels. Even though these arrangements are of local character, this proceeding leads to a reinforcement of an institutional design that is hierarchal with top-down control. Consequently, this leads to an insufficient incorporation of local knowledge (Pascual-Fernández *et al.*, 2005).

A comment on Pascual-Fernández *et al.* (2005) conclusion is that even though research is provided by institutions of science (national level); this does not automatically exclude an incorporation of local knowledge. Since one of the main features of co-management is deliberation, an incorporation of local knowledge can still be achieved. Furthermore, sometimes, especially in fisheries, there are tensions and conflicts between different local actors. If co-management arrangements would be initiated by local actors, this might, depending on who the initiator(s) is and despite a bottom-up approach, may be perceived as biased or imposed.

In order to make it possible to involve all parties with a connection to the fish resource, co-management often leads to a complex institutional design. A side effect of this is that such a complex institutional design can sometimes become too complex for being understood by resource users and thus affect the legitimacy and feasibility of the co-management arrangement (Jentoft & Mikalsen, 2004).

By aiming for a fair management system (creating legitimacy), the tendency goes towards more regulations which lead to a more complex system. In turn, this also affects the flexibility of the system and reduces the ability to adopt to change (Jentoft & Mikalsen, 2004). Jentoft and Mikalsen (2004) showed that once a strategy system has been set, for instance the quota system, it may become very difficult to change to other strategies. This is because of large investments in e.g. fishing gear and fishing vessels, and because agreements are based on the current system and the cooperation might be at risk when implementing a new strategy. Instead of leaving an insufficient strategy, more fine-tuned regulations and rules will be created and applied in order to address the limitations of the chosen strategy. Therefore, once a strategy has been applied, future challenges tend to be regulated in the same way (Jentoft & Mikalsen, 2004).

However, this tendency towards more fine-tuned regulations described by Jentoft and Mikalsen (2004) was not studied in a co-management setting. For this reason, it becomes important to point out that in a co-management arrangement, issues connected to compliance and legal framework understanding can be discussed and highlighted before rules are implemented and may counteract this tendency.

The core feature of co-management is the sharing of power and responsibility between resource users and the government. However, Jentoft and Mikalsen (2004) stress that another limitation of co-management arrangements is that fishermen do not have to take responsibility for the outcome of the fisheries management. They do have power in the decision-making process and ability to create and alter rules and regulations, but the responsibility is sometimes put on the government or governmental agencies alone.

In these cases, the involved fishermen have no incentives to take the effects of the management system as a whole into consideration (Jentoft & Mikalsen, 2004). Conferring to Jentoft and Mikalsen (2004), the separation of responsibility and power is the central limitation of co-management.

2.2.5 Co-management Policies Mechanism to Fisheries Conflict

This section explores specific management/policy mechanisms in fisheries management and how they respond to fisheries conflicts. Literature is drawn from studies mostly in Asia and Africa. In Philippines, there has been an introduction of unified, consistent, and complementary fishery ordinances within the same ecosystem, licensing and registration of fishers to regulate the number of vessels among both municipal and commercial fishers and determination of the kind of gears to be used (Ahmed *et al.*, 2006). Ahmed *et al.* (2006) further observes that in Thailand, there is strict enforcement of zoning regulations along with enforcement of closed season and protected areas. As a result of enforcement of zoning regulation, conflicts have subsided but they have not been entirely eliminated. Again, enforcement of closed season has helped in sustaining fisheries resources.

Marine fishery in Senegal is ruled by regulations and legal provisions of the marine fishery law and its implementation creed of August 1987 and specific regulations include issuance of license to all boat owners, prohibition of industrial fishers within six nautical miles from the shore and determination of the size of the fishing nets (Kebe *et al.*, 1993). Kebe *et al.* (1993) however argue that, licensed industrial boats operate regularly in prohibited fishing zones putting them at loggerheads with fisheries management authorities' artisanal fishers who are legally allowed to fish in areas and that others violate existing regulations by using too small mesh size fishing nets.

Hilborn (2007) noticed that "In nations without solid central administration structures, decentralization and locally controlled committed access has all the earmarks of being the best way to make the transition to biological and economic sustainability." In relation to community-based fisheries management (CBFM), Kuemlangan (2004) noted that above all, "the CBFM initiative or programme should be tailored in design and delivery to the individual country circumstances." Bell *et al.* (2006) determined that the success of stock enhancement of scallops in Japan could not be replicated in New Zealand, which may have been due to the existence or not of the other issues stated here.

Policy processes, legislative frameworks and governance structures often reflect situations that no longer exist. As noted by Bensted-Smith and Kirkman (2010) "Access rights, laws and institutional structures in some countries are outdated and do not reflect social and political realities, so that governance structures have inherent conflicts." The historic evolution of the fishery and the forces at play within the political economy influence the

way political decisions are made and the way fisheries managers at the national level have interpreted national policy. Much of the past emphasis of fisheries has been on productivity increases and many government departments are still staffed by people with skills that reflect this focus, in agencies structured around productivity using top-down approaches. Salas and Gaertner (2004) recognized this, noting: "... fishers develop and implement strategies and tactics in response to the constraints they encounter and their intended objectives given their particular human, social, cultural and economic contexts. Managers in contrast, have generally made simplistic assumptions about fishers' nature and attitudes when defining management policies."

In Ghana, there are distinct or separate management systems, for Marine fisheries and for Lake Volta fisheries. Together, the two management designs endeavor to react to ecological, socio-economic and institutional issues identified with the advancement of the national fishery. The principle components of the management include: restricting mechanical vessel fishing exertion (particularly trawlers and shrimpers) through a permitting administration; and endorsing the work sizes to be utilized (FAO, 2004). There are a couple of traditional management systems, which have a tendency to manage access to marine fisheries in Ghana and in this manner preserve the fish stocks. These include: Observation of non-fishing day, add up to restriction on angling exercises for different periods, boycott of a specific fishery gather for a period and prohibition on abuse of adolescent or juvenile fishes (FAO, 2004)

Mensah *et al.* (1993) argue that, the implementation of management mechanisms instituted by the government is often a source of greatest conflicts between fishers, fishing

vessel owners and government fisheries administrators in Ghana. Mensah *et al.* (1993) further observe that need for permit to import fishing vessels for example leads to conflicts between new entrants and administrators. Other management mechanisms that exacerbate conflicts include: prohibition of illegal fishing gears, limited entry to 30 meters depth, and prohibition of use of herbs and chemicals and internal and external allocation mechanisms (Bennet, 2002).

Tobey *et al.* (2009) observe that in Gambia, the government has enacted legislations regulating activities of both the artisanal and industrial fishers and delineating boundaries of operation. Tobey *et al.* (2009) further note that fisheries regulations have allocated seven nautical miles from the shore reserved exclusively to artisanal fishing operations and that, this seven nautical mile regulation does not include industrial purse seiners which are allowed to fish within the artisanal fishing zone. This is a source of conflict between the artisanal fleet and purse seiners. Also, as fishing activities intensify as a result of increases in the number of both artisanal and industrial fishing vessels, conflicts become more regular (Njie, 1993).

In Japan, multiple layers of fishery resource management procedures are employed. The Fisheries Law stipulates the basic system concerning fishery operation by providing for establishment of: national licensing system, the prefecture governor's licensing system, and right based management system. On the other hand, the Law Regarding Conservation and Management of Marine Living Resources provides provisions relating to the total allowable catch system, total allowable effort system and a basic plan for conservation

and management of marine living resources in the exclusive economic zone (Ruddle, 1987).

There are some vital fishery related acts and law in Bangladesh which include: the work measure direction is contained in Marine Fisheries Ordinance, 1983 and the Marine Fisheries rules, 1983 (Kuperan *et al.*, 1998). Kuperan *et al.* (1998) additionally watches that the purpose for the work estimate controls is to lessen the conflict between various rigging managers and furthermore bears preservation esteem since it is accepted that it will ensure the adolescents and little fishes for future development and sustenance of the stock. In India, all the seaside government states have instituted their Marine Fishing Regulation Act with ward over their regional waters. Management measures, for example, shut seasons, delimitation of angling zones for various classifications of angling make and so on are executed for guaranteeing manageability.

Catch of non-targeted species and dismissal of by catches are debilitated through mindfulness programs including partners (FAO, 2011). Different fisheries management instruments incorporate authorizing, preclusions on certain fishing gear, control on work size and outline of inshore zones where trawling isn't allowed (ICSF, 2011). Other than these, there are a few State-particular management measures, for example, angling direction measures received by Orissa to secure the turtle settling and rearing grounds, compulsory necessity to utilize turtle excluder gadgets (ICSF, 2011).

Good policies that manage and protect natural resources should be in place. For example, Ghana has come up with a policy which envisages that the country will become a middle-income country by 2020 (GPRS, 2006). Within the framework of the said policy, the

objective is to promote an efficient management and environmentally sound development of water resource in the country. For this ground, to guarantee sustainable development water resource management is considered within the perspective of two main activities: the conservation of water resources base to sustain water availability and the health of the environment; and the regulation and of demands of water use and waste disposal in order to stay within the natural capacity of the water resource base. On the bases of this the Ghana water policy is intended to provide a framework of the development of Ghana water resources (GPRS, 2006).

While in many parts of the world there is a move towards greater engagement of communities in resource management, this is not always the case. In Costa Rica, when Alpízar (2006) compared the current level of government involvement in marine protection and fisheries management with that of the community, he concluded that, at that stage of development, the greater role should remain with government. Francis and Bryceson (2001) noted weaknesses in both government and traditional institutions in coastal management in Tanzania that needed support, while Baticados *et al.* (1998) found that even within the Philippines, fisheries cooperatives on the mainland had significant differences in their capacities compared with those on the islands.

Fisheries Production in Kenya

Kenya fisheries sector is predominantly made out of freshwater (lakes, streams and dams) and marine (Indian Ocean), with aquaculture still at infancy. With fish production estimated at 150,000 metric tones (MT) annually, the sector contributes about 5% to the

country's gross domestic product (GDP), had an average producer value of Kenya shillings 8 billion in 2004 and supported the livelihood of about 500,000 people the same year. There are at least 50,000 people working in the sector directly, mainly as fishermen, traders, processors and employees. Other than being a rich wellspring of protein particularly for riparian networks, fisheries are additionally essential for the conservation of culture national legacy recreational purposes (GoK, 2005)

The freshwater fishes accounts for about 96% of Kenya's total fish production, with the principal fishery being that of Lake Victoria notwithstanding the fact that the country's share of the lake surface area is only 6% or 4,300 km². Lake Victoria production consists mainly of Nile perch, *Omena (Rastrineobola argentea)* and Tilapia. The lake accounted for 106,000 MT or 71% of the country's total annual production in 2003. Lake Turkana, Kenya's largest freshwater body (7,400 km²) produces about 4,000MT of fish annually. Other freshwater bodies of business significance incorporate lakes Naivasha, Baringo, Jipe and the Tana River dams GoK (2005).

Management

Fishery resources in Kenya are supervised or managed by the Department of Fisheries through the fisheries Act (Cap 378) and Maritime Act (Cap 250) of the Laws of Kenya he Kenya Marine fisheries Research Institute (KMFRI), built up as a state enterprise through the Science and Technology Act (Cap 250), attempts fisheries look into. These two foundations, which have regularly been in various services, are presently under the Ministry of Livestock and Fisheries Development. Because of the absence of a fisheries summit establishment at the service level, these two organizations do not have a system

for setting facilitated motivation. Other open foundations required with fishery exercises incorporate territorial improvement specialists under the Ministry of Regional Development, Ministry of Environment and Natural Resources, colleges and open research facilities (GoK, 2005).

The large-scale export-oriented private sector is organized under the Kenya Fish Processors and Exporters Association (AFIPEK), which has facilitated industry self-regulation, marketing and interfacing with the Government. The small, medium and large scale fish traders in Kenya are considering the formation of an umbrella organization. This association shall have corporate membership, comprising of associations into which these traders belong, and is aimed at influencing Government policy, providing training services and facilities to accelerate efficient and sustainable trade. A major drawback is that most of the small scale traders are not organized into strong associations. Fishermen lack strong cooperatives or associations, but there are efforts by several organizations, including the newly launched Beach Management Units (BMUs) to organize this vital group. In addition to these private sector players, there are several civil society and non-governmental organizations (NGOs) working in fisheries, especially on socio-economic and conservation issues (Gok, 2005).

Rationale for a National Fisheries Policy

According to GoK (2005), the Kenya fisheries industry has operated without a comprehensive fisheries policy since independence. Fisheries production and management measures were, from time to time however, mentioned in various policy documents. Key among these include the: Various national Development Plans in which

the government emphasized fish production from natural waters; National Food Policy (1981 and 1994) in which the importance of fish as a nutritious food commodity was emphasized; District Focus for Rural Development policy (1995) that required all districts to have fisheries presence irrespective of their fisheries potential; Poverty Reduction Strategy Paper (PRSP) of 2001 that actually introduced a social responsibility and poverty reduction element into the fisheries agenda.

Policy Objectives

The overall objective of this policy is to:

“Create an enabling environment for a vibrant fishing industry based on sustainable resource exploitation providing optimal and sustainable benefits, alleviating poverty, and creating wealth, taking into consideration gender equity.”

The specific objectives of this policy are to: (i) Promote responsible and sustainable utilization of fishery resources taking into account environmental concerns; (ii) Promote development of responsible and sustainable aquaculture, recreational and ornamental fisheries; (iii) Ensure that Kenya has a fair access to, and benefit from, the country’s shared fishery resources; (iv) Promote responsible fish handling and preservation measures and technologies to minimize post-harvest losses; (v) Encourage value addition, marketing and fair trade in Kenya’s fishery products worldwide; (vi) Encourage efficient and sustainable investment in the Kenya fishery sector; (vii) Promote active involvement of fisher communities in fisheries management;(viii) Integrate gender issues in fisheries development; (ix) Promote fish consumption in the nine objectives set out in this policy document will be pursued through the implementation of the following 10 broad policies:

i) Strengthening of institutional framework and sustainable funding; ii) Sustainable utilization of fishery resources; iii) Achievement of efficient and effective fisheries management; iv) Promotion of sustainable and efficient aquaculture development; v) Promotion of sustainable and efficient recreational and ornamental fisheries; vi) Promotion of fish quality, consumption, trade and investment Improvement of infrastructure and human resource development; vii) Support and coordination of fisheries research viii) Enhancement of fisheries information and extension service; and ix) Promotion of regional and international cooperation

Economic Recovery Strategy for Wealth and Employment Creation 2003-2007 (ERS), into which the PRSP advanced, and that perceives the commitment made by fisheries to local incomes, subsistence and nutrition. To improve the sector's contribution to the overall development objectives (creation of 500,000 jobs annually, poverty reduction from 56.8% to 51.8%, increase in annual GDP growth rate from 1.1% to 7%, containment of inflation to below 5%, increase in foreign exchange reserves from \$1.1 billion to 1.7 billion, containment of balance of payments deficit to 6.2% of GDP, and increase in domestic savings), the ERS outlines the following measures for the fisheries sector: (i) development of infrastructure and improvement of standards, (ii) promotion of aquaculture, (iii) promotion of cooperation for trans-boundary resources, and (iv) encouragement of growth of micro-finance. For the anticipated contribution to be realized there is call for a development-based rather than only scientific and management focused approach, as this is essential to tap the potential existing in the marine and aquaculture sub-sectors (GoK, 2005). The Department of Fisheries shall encourage community participation in resource management to ensure that fishing activities do not have adverse

impact on the ecosystem. In addition the Department shall take measures to identify, conserve and where appropriate patent unique or rare indigenous fish species of the country (GoK, 2005).

In any case, numerous studies have established that majority of fishing communities are not associated with fisheries strategy detailing (policy formulations). For instance, Tokrisna *et al.* (1997) states that in numerous Asian nations, fishery arrangements and controls have been planned utilizing a best down approach. The government assumes the part of rule maker and is the main player in the management of marine resources. Fishers have been prohibited from taking an interest in the definition of controls. The cooperation by fishers is constrained, since fisheries resources are dealt with as regular property, they don't have a place with anybody. The fishers are unwilling to offer cooperation to the legislature for the fishery management program. They simply need to get however much as could reasonably be expected every day since they trust that in the event that they take after the fishery management program they will be failures. This influences the fishery administration to program of the legislature confronted challenges in usage.

This approach leaves fishers with no stimulus to take after the tenets or rules, as established by Abdullah and Kuperan (1997). Along these lines, Nielsen *et al.* (2004) selected the traditional mix of a best down approach with a tight spotlight on asset issues neglects to address the center worries of fishing communities. It is viewed as coldhearted to local conditions, because of absences of help from the fishing communities, and it is wasteful in accomplishing its objectives.

On a practical level, in light of the fact that specific government directions adjust to and oblige community needs less viably, the controls are not all around acknowledged and in this manner insufficient. This result could be a consequence of the management's thinking about local information irrelevant to fisheries management, since conventional learning has been viewed as crude, unsustainable and non-existent by Ruddle and Satria (2010).

As the interests and concerns of fisheries specialists in South East Asian nations perceived that fishery cannot be overseen viably without collaboration of fishers to make laws and controls works. It may be a few nations in Asia are hitherto using top-down approach, since to change the point of view in one night would not be simple, however for the most part the worry of decentralization, co-management and community based management has been expanded. The acknowledgment of the need to build support by resource users in fisheries management and more prominent limited control over-access to the resource can be seen all through the Southeast Asia districts (Pomeroy, 1995).

2.2.6 Fisheries Conflicts Addressed by Co-Management Strategy

Fishery is an unpredictable and dynamic bio-socio-economic plan (arrangement) with various interactions among the resource itself, people and management establishments such as government, where evidences of fisheries disputes are voluminous (Charles 1992; Bavinck, 2005). Fishery conflict may emerge when 'the interests of at least one party is intends to asserts it interest over the other to its disadvantage (FAO, 1998). Diverse authors outlined the real reasons for fishery conflicts, for example, rivalry over rare fish resources, statistic changes, and contradictions over the use of fishing space, fisheries industry benefits with various partners in a fish chain, unjust power relations, auxiliary

shameful acts and institutional disappointments, changing government needs and decides that administer the fishery. A few cases, outside contending users, for example, aquaculture and tourism that strive for access to aquatic space and fish habitats likewise start social pressure (Charles, 1992; Warner 2000; Bennett *et al.*, 2001). Understanding fishery skirmishes is imperative since such conflicts may result to hardships and decrease the prosperity of fishery users (Bennett *et al.*, 2001).

Lately, various surveys have distinguished a wide cluster of causes that may raise conflicts over fisheries resources in a tropical setting (Charles 1992; Warner 2000; Bennett *et al.*, 2001; Bavinck 2005; Jahan *et al.*, 2009, 2014). Charles (1992) sorted out the extensive variety of fishery conflicts into four between related classes, for example, (i) Fishery jurisdiction (identified with property rights, government part and intergovernmental conflicts), (ii) Management instruments (identified with the administration issues), (iii) Internal allocation (identified with conflicts emerging inside the particular fishery framework) and (iv) External allocation (related conflicts rising between interior fishery players and outcasts). Afterward, Warner (2000) included exogenous impacts, for example, optional partner as another class in fisheries conflict typology. Bennett *et al.* (2001) overhauled Charles (1992) and Warner (2000) conflict and presented another typology of five classifications covering conflicts amongst fishers and numerous different actors' characters outside the fishery.

Southeast Asians rely more a great deal on fish as a main source of nutritional protein and creation of income than any other people in the world (FAO, 2001). Currently, it is almost across the world accepted that the majority of the near-shore fisheries in Southeast Asia

are seriously overfished causing threat to the fishing industry (Gracia *et al.*, 2000; Burke *et al.*, 2002). It is also established that use of modern fishing gears is one of the leading causes of this overharvesting of fish. Silvestre *et al.* (1997) eludes that, “the consequences of overfishing in South and Southeast Asia are that coastal fish stocks have been harshly exhausted and that resources have been reduced to 5–30 percent of their unexploited levels.

Pomeroy *et al.* (2007) argues that wars and conflicts associated with rights over the use of land and water have been significant human issues all through recorded history. Even though majority of us are perhaps aware of wars fought for reasons such as religious freedom, political ideologies and social issues. Conflicts owing to fishing rights and resources are just as common, if less reported. Since the Exclusive Economic Zones (EEZ) were established in the 1970s, disputes have become numerous and more brutal and violent than previous years. Owing to the creation of EEZs, access to the world’s oceans has been fundamentally restructured and the access rights of foreign fishing vessels have been seriously minimized. Conflict over Fisheries have been resolved due to negotiations and international fisheries agreements (such as those between European and African countries), and remedy to global tribunal have sometimes succeeded. Usually, nonetheless, foreign boats from territorial waters and EEZs or migrant fishermen from other areas elsewhere are expelled by force. Occasionally, weapons are used and people are killed. Fights have erupted, for instance, between Philippines and China and between Vietnam and Cambodia over access to territorial waters. Numerous Indonesian fishers have been imprisoned due to illegal fishing in Australian waters.

Pomeroy *et al.* (2007) explain that despite the fact that sovereignty issues are in general the real causes of such conflicts, they are also the symptoms of rivalry concerning access to fish stocks, in coastal waters just similar to cases in the high seas. Besides, the use of flags of convenience serves to make worse the problem. Another important problem is that sometimes a country where a boat is registered does not necessarily identify its country of origin, and this ambiguity prompts fishing companies to contravene global or international fishing and labour conventions with impunity.

Salayo *et al.* (2008) asserts that Fisheries hitches and conflicts are among the stubborn problems affecting the security of food, livelihoods and fishing environments crucial to poor fishing communities in developing countries in Asia, Africa and Latin America. Most intractable conflicts arise from excessive fishing efforts due to increasing population and economic motivations several studies point to the fact that different forms of conflict do occur. In agreement with Bennett (2002) zoning one of the major causes of fisheries conflicts. In the Philippines the conflicts relate to zoning regulations allocating access for small scale and commercial fishers in the Visayan Sea, which typifies the conflict of who manages and controls the fishery (that is, access issues) (Bennett *et al.* 2001). They also include intra- fishing group conflict over perceived best fishing spots, and institutional conflicts between local sea wardens, local government officials middlemen and migrant fishers (Pomeroy *et al.*, 1994). Bennet, (2002) observes that in Thailand the main conflict is over gear use between small-scale fishers and commercial anchovy fishers in southern Thailand, and characterizes conflict on relations between fishery users (for example, linguistic, religion, ethnic, scale of fishing, etc.). Bennett, further notes that for the case of India conflicts originated from the state-government led implementation of Tamil Nadu

marine Fisheries Act (1983) that created separate zones for each of the dominant type of fishing.

Ahmed *et al.*, (2006) argues that, fisheries conflicts in Cambodia are multi-faceted ranging from: conflicts between various types of fishers, conflict between local authority officials and fishers, between fisheries officials and local influential people, conflict between committee members and community members, conflicts between local fishers and outsiders and institutional conflicts among different fisheries management bodies and ethnic conflicts.

In Bangladesh, conflicts generally exist between relatively better off fishermen and poor fishermen. The rich fishermen are attacked by the poor fishermen at night when the current is slow; condition favourable for better catch (FAO, 1994).

Conflicts over access to water bodies, Conflicts because of absence of authorization and enforcement, Conflicts amongst Hindu and Muslim fishers, Conflict identified with defilement in government over administration of fisheries resources have been accounted for (Bennett *et al.*, 2001). In Ghana, Conflicts between semi-modern or inshore vessels and high quality vessels were accounted for in numerous towns. Additionally announced are conflicts between various segments of fishing armada, conflicts between fishers pursuing a similar shore and net traps and struggle amongst fishers and ladies brokers over evaluating and disappointment by fishers to pay obligations (Bennet *et al.*, 2001). Additionally announced in Ghana are conflicts between government specialists and both

high quality and mechanical fishers (Mensah *et al.*, 1993). In Senegal, fisheries conflicts are more often than not amongst distinctive and mechanical fishers (Kebe *et al.*, 1993).

In Gambia, conflicts usually occur between artisanal and industrial fishers, between fishers and government authorities, among artisanal fishers themselves and between artisanal fishers and wood and oyster harvesters (Njie, 1993). In Japan, The reasons for these real question have been fluctuated having originated from passage rights debate, adapt clashes, illicit angling, island ownership, boundary jurisdiction and institutional reform problems (Ruddle, 1987). In Cameroon coast for example, conflicts do occur between artisanal and commercial fishers in the course of their interaction directly over fishing grounds or common resources (Djama, 1993). Conflicts between industrial fishers and artisanal fishers have also been reported in Ivory Coast (Doumbia, 1993). Leon (1993) notes that in Gabon, fisheries conflicts are mainly between industrial fishers and fishery administration, between industrial fishers and artisanal fishers and conflict among artisanal fishers themselves. The above studies indicate the main forms of conflict that occur in selected fishing communities. However, there is an acute shortage of literature on fisheries conflicts in Kenya and therefore this study would be significant in bridging this information gap.

Kenya's fisheries industry is largely composed of freshwater (lakes, rivers and dams) and marine (Indian Ocean), with aquaculture still at immaturity. With fish production estimated at 150,000 metric tones (MT) annually, the industry contributes about 5% to the country's gross domestic product (GDP), had an average producer value of Kenya shillings 8 billion in 2004 and supported the livelihood of about 500,000 people the same

year. There are at least 50,000 people working in the fishing industry directly, mainly as fishermen, traders, processors and employees. Other than being a rich wellspring of protein particularly for riparian communities, fisheries are additionally imperative for the safeguarding of culture national legacy or heritage recreational purposes (GoK, 2005).

The freshwater fish accounts for about 96% of Kenya's total fish production, with the major fishery being that of Lake Victoria despite the fact that the country's share of the lake surface area is only 6% or 4,300 km². Lake Victoria production consists mostly of Nile perch, *omena* (*Rastrineobola argentea*) and tilapia. The lake produces 106,000 MT or 71% of the country's total annual production in 2003. Lake Turkana, Kenya's main freshwater body (7,400 km²) produces about 4,000MT of fish annually. Other freshwater lakes of commercial significance include lakes Naivasha, Baringo, Jipe and the Tana River dams (GoK, 2005).

2.2.7 Causes of Fisheries Conflict Addressed by Co-Management Strategy

Ananth (2005) states that Conflicts happen when there are preclusions on juvenile fishing, catching brooders, purchasing wild brooders, and on confining automated vessels to angle in inshore waters, among different restrictions. Concerns on the fishing of small fish and declining in catches due to oil spills and discharges of effluents leads to conflicts in the fishing industry. Promoters of coastal Tourism and traditional fishers are engaged in the fishery wars and conflicts as it has been established that tourism leads to displacement of fisheries from the coastal areas.

Many discussions have been going over the techniques to be employed in reducing these fisheries conflicts. Example of such method suggested by the stakeholders is submission of written complaints to the boat operators' association on top of informing the state fisheries department. Restoration of peace through community gatherings has also been suggested as another technique of avoiding fisheries wars. Mechanized groups and Traditional fisher folks should put forth efforts together to eliminate brooder catches. The stakeholders have recommended that elimination of these conflicts ought to be through community meeting, by stopping the transport of live brooders and with the government discouraging captive brooders. The fisher folk should be self-motivated in mitigating conflicts and ensure to proper enforcement of laws (Ananth, 2005).

The allocation of resource access and use rights is a standout amongst the most disputable issues in marine fisheries as far back as humanity fish in the oceans, streams, seas, rivers and lakes, and even before public policies emerged to deal with the fisheries management (Bennet, 2002). Bennet (2002) further argues that mounting pressure on a rapidly dwindling resource base from a rising population, changing consumer preference towards fish and fish products, globalization, competition from coastal zone development (for example, tourism, housing, infrastructure, aquaculture, agriculture), increasing fishing effort and number of fishers have greatly contributed to conflicts within fishing communities.

Related to the assertion above is the argument that there is overexploitation of the already degraded fish habitat. Coupled with increasing global demands from a growing population, commoditization of fish and fisheries products, an evidently inadequate

fisheries management, and the whole gamut of other human interventions have led to unprecedented increase in the level and magnitude of fisheries related conflicts (Ahmed *et al.*, 2006).

It is equally basic to take note of that forces in activity within the dynamics of fisheries, a complex bio-economic framework where different associations and interaction among regular resources, people and institutions give adequate room for conflicts. Conflicts rises when "the interests of at least two groups conflict because one group wants to take fisheries advantages at the expense of the other" (FAO, 1998). Conflicts of this type do not really need to be fierce or profoundly problematic, in any case; in certainty numerous contentions that emerge because of contrasting interests are low-level, peaceful marvels (Warner, 2000). Peaceful conflicts in fisheries, all things considered, require not be ignored as they may posture dangers to nourishment, work and ecological security when unabated (Salayo *et al.*, 2008).

Pomeroy *et al.* (2007) states that conflicts and wars connected to the rights over the use of land and water have been significant human issues throughout recorded history. Even though many of us are perhaps more aware of wars fought over religious freedom, political ideologies and social issues, conflicts over fishing rights and resources are just as frequent, if less reported. Since the Exclusive Economic Zones (EEZ) was created in the 1970s, disputes have become more regular and more violent than ever before. Because of the formation of EEZs, access to the world's seas has been drastically rearranged and the entrance privileges of foreign fishing vessels have been shortened. Discussions, worldwide fisheries agreements, (for example, those amongst European and African

nations), and solution for international tribunal have sometimes succeeded with regards to settling conflicts. Pomeroy *et al.* (2007) further say: More often than not, nevertheless, foreign boats from territorial waters and EEZs or migrant fishermen from other locations in the country are expelled by force.

Conflicts that arise due to the use and management of natural resources are widespread (Matose, 1997) yet the creation, impact and management of such conflicts are frequently unsuccessfully understood. In the case of fisheries, even though there is to large extent there are case-study information on conflicts from all over the world, there have been few systematic investigations of conflict per se. The information deficit is chiefly acute in tropical fisheries, where, because of their important socio-economic role (for example, employment, income, food supply) conflict may generate difficulties for some of the poorest and disadvantaged members of society.

Fisheries conflicts arise from sources at the micro and macro level. Increased competition due to declining catches, market demand viz a viz the market price for catch can lead to conflict as the de jure and de facto rules that govern access and use are overlooked in the pursuit of profitable or scarce catches. Changes in macro-level conditions can also lead to conflict as policy shifts, economic conditions deteriorate or political alliances give greater power to particular stakeholders (Nickum and Easter, 1990). Matose (1997) contends that traditionally, fisheries disputes or conflicts are viewed in a perspective of sharing resource or rights to access the resource in question. This notwithstanding, these conflicts are often more multifarious and complex with a wide range of socio-economic issues like institutional and market failure contributing to the cause.

Mitigation of conflict consumes resources in terms of time and money. Countries whose economies and environments are under increased pressure, time and effort spent in managing conflicts is time and effort destructed from the major aim of poverty reduction and progress in all spheres of development. There is modest reservation that from a livelihood viewpoint, profound natural resource management that is able to manage disagreeing demands is the key to building maintainable livelihood in the long run (*ibid*).

For there to be improved management of fisheries conflicts, Herring (1991) contends that various supporting and basic procedures and steps should be set up as an essential for the management of conflict. For example, the type of disputes or conflicts in tropical fisheries should be comprehended (why and how do conflicts rise). It is additionally significant to think of methods for overseeing fisheries conflicts which are an essential for documentation and analysis. Lastly, recommendations for improved management as defined by all stakeholders need to be established. A multi-disciplinary approach to a study of conflict is most suitable to cover the complexity of issues that contribute to an effect how conflicts emerge and develop. The project thus drew on the supply and demand dynamics familiar to economics and linked this to the study of human social behaviour found in other areas of social science. The project was particularly interested in how a change in transaction costs shifted the supply and demand for institutional change and how the failure of institutions to keep up with change lead to conflict (Herring, 1991).

Vessels are boarded and crew imprisoned. Sporadically, weapons are used and people are killed. Battles and conflicts have broken out, for instance, amongst Vietnam and Cambodia and between the Philippines and China over access to regional waters. A great

many Indonesian fishers have been imprisoned because of illicit angling in Australian waters. In Cambodia, fisheries conflicts occur due to indiscriminate and unsustainable utilization of fisheries resources, competition for access to declining resources, use of illegal fishing gears and desire to protect the users of these illegal gears by local influential people and unclear delineation of responsibilities among the fisheries organization (Ahmed *et al.*, 2006).

For the case of India, the key conflicts identified in the study area were also due to competition for resources in “shared” fishing grounds; and indiscriminate fishing practices of certain groups of fishers, such as mechanized fishers, that negatively affect or marginalize the operations of the generally traditional fishers with lighter, minor and smaller boats (Ahmed *et al.*, 2006).

Another course of fisheries conflict is competition for scarce resource. For example, Pomeroy *et al.* (1994) are in agreement that competition for scarce resources. In Philippines, fisheries conflict largely occur due to competition for perceived best spots for fishing, entanglement and destruction of fishing gears belonging to local fishers by more superior and efficient gears of commercial fishers and institutional conflicts as a result of establishment of marine protected areas and lack of a unified policy and regulatory regime across the different municipalities (Pomeroy *et al.*, 1994).

In Bangladesh, Bavinck (2005) asserts that Increased fishing population is a common worry. In addition to an overarching pressure from population growth, each year, a lot of farming households become impoverished owing to river bank erosion and cyclone. A

segment of them as a result start their livelihood from scratch by entering into fishery. Since hilsa is a lucrative commercial fishery, aratdar reassures access of new fishers into the fishery which results to overcapitalization. The congested state of affairs in the fishery is explained by a 40-year-old fisher as: During my teenage years, I could hardly see any other fisher in a mile distance. Presently nets are set so close like fingers on hand (Interview directed in Puraton Hizla). Thus, there are extraordinary rivalries for fishing space which as often as possible prompt conflicts that result to loss of property or even physical harm, which frequently spillover into communities on ashore promoting the expansion social strains and tension. Most prominently, are the conflicting circumstances among fishermen using automated and non-motorized boats. Fishers of non-motorized pontoon (boats) and automated boats point the fingers at each other for unlawful fishing, however the two sorts of fishers keep fishing amid the boycott time frame. Be that as it may, because of insufficient versatility with littler boats, non-automated fishers can just collect a littler catch and frequently got in the act amid attack by law authorities (enforcers). However, motorized fishers can catch more because of more prominent portability and can split far from foes effortlessly because of higher speed of motorized boats.

Large mechanized boats are generally owned by local people with connection to power. Usually they give bribes to the police and are able to continue fishing during nights and when there are to be raids they usually get information in advance from their sources in a police station. It should however be noted that non-mechanized engage in illegal fishing out of dire need of survival but mechanized fishers do fishing out of greed (Bavinck, 2005).

Similarly, fisheries conflicts in Africa have more or less the same causes as the ones discussed above. In Cameroon for example, fisheries conflicts occur due encroachment of traditional fishing grounds of trawlers owned by commercial fishing grounds causing destruction of fishing gears owned by artisanal fishers (Djama, 1993). This is in line with Ahmed *et al.* (2006) argument, in the sense that use of illegal fishing gears destroys young fish and breeding ground. Djama (1993) further argues that the problem is compounded by limited fisheries resources lack of legislation for compensation to be given to artisanal fishers. For the case of Ivory Coast, conflicts between artisanal and industrial fishers are caused by exploitation of shared limited resources, bad fishing practices by industrial fishers coupled with lack of means for monitoring and surveillance of fishing areas (Doumbia, 1993).

Kebe *et al.*, (1993) observes that in Senegal, fisheries conflicts occur as a result of competition over the same resources, geographical space, markets and production factors, violation of existing regulations by industrial fishers such as using small size nets and encroachment on artisanal fishers' territory.

Encroachment is yet another cause of fisheries conflict. This is in agreement with both Kebe's and Njie findings. In Gambia, fisheries conflicts occur as a result of encroachment on productive artisanal grounds by industrial fishers damaging fishing gears belonging to artisanal fishers, entanglement of fishing gears belonging to different artisanal fishers, theft of fishing gears, fishing during closed season hampering conservation effort and habitat destruction (Njie,1993). Bennet (2001) argues that in Ghana, conflicts between

fishers and government are caused by fishers perception on one hand that resources are common and inexhaustible and government attempts to control access to fisheries on the other hand.

Bennet (2001) further argues that, conflicts occur as a result of stringent requirements for licensing, defaulting in submitting catch returns and refusal to weigh their catch, conflicts with forest management authorities as a result of haphazard harvesting of trees for carving traditional canoe and conflict with coastal zone management over landing sites. In Gabon, conflicts are as a result of nonpayment of fishing license, use of expired license and violence of licensing terms, destruction of artisanal fishers' gears by industrial fishers and reluctance by local artisanal fishers to accept foreign fishers (Leon, 1993).

The consequences of overfishing and multiple sources of fishing strain and stress in Southeast Asian coastal waters is the decline or collapse of vital fishery populations, resulting to protracted conflicts among various users over remaining or lingering stocks (Pauly, 1990). A multifaceted, unenthusiastic feedback cycle is created in this situation, whereby population of people living along coastal line grows fast paralleled by fewer economic opportunities and access to land increases the population of individuals living in the coastal zone depend on fishery resources and along these lines the quantity of fishers. Stretched or increased fishing burden (pressure) brings about decline in fish population and increased resource rivalry, both amongst fishers and scales of fishing task (for example, small versus commercial).

The effects are reduced income and food security, increased poverty, and overly lower standards of living and national welfare. This as a result push users towards the use of more destructive and over-efficient fishing technologies in the “rush” to catch what remains, and in so doing further depletion of fishery populations. These reasons further leads to increased user competition, and thus higher rates and probabilities of human conflict, over remaining stocks. This destructive cycle leads to a pattern of self-reinforcing “fish wars” with worsening social and environmental consequences. Decreasing fish stocks coupled with increasing conflict are pushing out some people out of the fishing industry. This results to increased unemployment in many rural areas. This increases the level of instability and fuels national levels of social unrest and political instability, thus acting as a powerful and destabilizing risk factor to regional and global security concerns (Pauly, 1990).

2.3 Community Perception on Co-Management Strategy

With rare resources accessible to fight the double issue of destitution or poverty and natural degradation, knowing when and how to support the possibilities of accomplishing "win– win" circumstances between the environment and human welfare is significant (Gjertsen, 2005). Therefore, creating viable management techniques for coral reefs has turned out to be a standout amongst the most vital difficulties challenging conservation scientists (Cinner *et al.*, 2006). These techniques are bound to minimize overexploitation and have habitually focus on opening new reef or total fisheries, shut territories, for example, Marine Protected Areas (MPAs) or expulsion of surplus or ruinous apparatus (McClanahan and Mangi, 2001). It is MPAs nonetheless, that has gotten the most

consideration and is seen similar to a basic and financially savvy approach to build stocks in various and confounded tropical fisheries (Roberts and Polunin, 1991; 1993).

Over the last two decades a number of studies have confirmed that the abundance and size of fish within MPAs have improved and increased significantly (McClanahan and Mangi 2000, Mosqueira *et al.*, 2000, Roberts *et al.*, 2001, Halpern and Warner 2002 and Denny, Willis and Babcock 2004). Other surveys furthermore have additionally archived an export of biomass outside the reserve (Russ *et al.*, 1996; McClanahan and Mangi 2000; Roberts *et al.*, 2001, Russ *et al.*, 2003; Tupper, 2007). Fishery benefits such as these have been revealed to occur within two to five years and continue to develop over time (Gell and Roberts, 2003). Evidence of the benefits of MPAs as a management strategy is continually increasing and has fueled hopes of improving dwindling fish stocks and increasing fish catches in penurious areas (Gjertsen, 2005).

The current management of Lake Victoria dates back to 1908, the year in which the Fish Protection Ordinance was enacted (Geheb, 1997). The first fish stock assessment in Lake Victoria was carried out in late 1920 by Graham, in 1929, and the second assessment in 1957 by Beverton (Kolding *et al.*, 2014). The assessments suggested at regulating the minimum limit of mesh sizes. In 1947, the Lake Victoria Fisheries Services was created to put in force fisheries laws and regulations (LVFO, 2001). This afterward followed East Africa Fresh Water Fisheries Research Organization (EAFFRO) in 1960, which was disbanded when EAC was dissolved in 1977, and later resurrected as the Lake Victoria Fisheries Organization (LVFO) in the 1994.

Perception of fishers towards BMUs performance differs from one BMU to another in conducting meetings, collecting revenues and initiating development projects and this was additionally bolstered by the discoveries from the key informants questioned or interviewed (Ogwang *et al.* (2009). They observed contrasts in performance between the two sampled BMUs meaning that there are particular zones of strengths and shortcomings, henceforth BMU particular area of improvement. In order to have a holistic understanding of the BMUs performance, Ogwang' *et al.* (2009) and Baratt *et al.* (2014) assessed their performance in all activities. The observed differences could likely be attributed to the level of commitment of the BMU administration to carry their mandate and support got from different stakeholders. This was evident from Kayenze BMU informants who uncovered to have a close working relationship with village leaders Ogwang' *et al.* (2009). This was not quite the same as Igombe BMU where this lacked, however no hostility existed between the BMU and village authority. In a similar report, it was also observed that social statuses (level of instruction gender, period in the fishery, and occupation in the fishery) impacts how a fisher perceives the BMUs. This is valuable and instrumental in understanding awareness needs of particular groups in the fishery.

In general, the study revealed inspiring attitudes towards activities coordinated at regulating fishery, however feeble perception on activities focusing on destitution or poverty mitigation. They mentioned deficient skills and ability as the reason behind slow implementation of pro-poverty measures. Notwithstanding, this should not be faulted much on the BMUs given that the country's poverty reduction procedures have accomplished negligible impact in the rural areas where fisheries is carried. In spite of,

the absence of poverty reduction strategies introduced by the BMUs, fishers have come up with of some initiative, for example, revolving funds (reserves) where fishers loan cash to each other. This is however, basic among the female than male fishers (Onyango, 2004).

Fisheries are prone to serious lapses in direction regulation, inspection and management on account of their open access nature (Botsford *et al.*, 1997; Cooke and Cowx, 2006). The absence of active monitoring likewise leads to inability to survey the genuine state of fisheries and stocks (Worm *et al.*, 2009; Branch *et al.*, 2011), least developed nations. Stock appraisal (assessment) based management in developing nations could demonstrate inconsistent (see Kasim *et al.*, 2002, and Muthiah *et al.*, 2003), for contradicting recommendations about seerfish exploitation) given the inconsistency of ecological baselines and lack of scientific knowledge about the multi-species fisheries in these countries. Management action based on single-species assessments also results in conflicts between regulating agencies and the multi-species nature of the actual fishery (Beddington *et al.*, 2007). Conflicting information (knowledge) about multi-species fisheries and fishing practices adds to fish decays and the endangered condition of numerous fisheries (Ban and Vincent, 2009).

National fisheries laws and international treaties are habitually not associated with the local realities that fishermen confront (Allison, 2001). Local involvement in fisheries management predicates comprehension (understanding) and building on the current patterns and examples of resource use (St. Martin, 2001; Chan *et al.*, 2007; Ostrom, 2007). Notwithstanding better fishery management could make and protect feasible fishing works on, guaranteeing compliance with controls requires local acknowledgment or acceptance

and participation (Bavinck and Johnson, 2008). Fishery leaders must recognize that individuals' perceptions about a fishery influence their resource extraction patterns and neighborhood fisheries management (Castillo and Saysel, 2005; Beddington *et al.*, 2007). These observations are especially essential in creating nations, for example, India, where centralized government of fisheries is inadequately enforced. Fishing behaviour, practice and the achievement of future management mediations is influenced by perceptions about the fishery (Hansen *et al.*, 2011) however, there have been few studies in India that have methodically archived these perceptions and practices.

The formal reserve funds and credit schemes worked in some landings are extension of Micro Finance Institution (MFIs) and Non-Governmental Organization (NGOs) with no BMUs activity. The members to these schemes are for the most part boat owners, chiefly ladies dealing in *dagaa* trading and processing and some dissimilar business found around the fishing communities. In view of the findings of this study, it is consequently apparent that there are a few accomplishments on-going within BMUs in performing their mandate in co-management process as required by the national rule. In any case, it ought to be noticed that co-management strategy in most small-scale fishery is as yet consultative where setting management targets is as yet the privilege of the legislature with practically zero thought for neighborhood information (Njaya, 2007). This is valid for Lake Victoria where the management still holds more powers in basic leadership and usage of fisheries management measures (Onyango and Jentoft, 2007).

Getting resource users to consent to fisheries controls is an extensive test for some marine resource management to initiate. In numerous developing nations, fisheries managers are advancing better commitment with local resource users with an end goal to create directions that better reflect neighborhood social, monetary, and social conditions (Jentoft and Kristoffersen, 1989; Pomeroy and Berkes 1997). It is normal that decides that are seen as helpful to neighborhood partners and all the more locally proper are probably going to be seen as more genuine according to resource clients and be received and consented to (Ostrom, 1990, Wade 1994). Specifically, resource clients are relied upon to agree to administration limitations that they see to be impartial, created through real procedures, and helpful to themselves (Sutinen and Kuperan, 1999).

Specifically, when national-level legitimate governance and implementation (enforcement) structures are feeble, there will be significantly more prominent dependence on the neighborhood discernments, the scope of benefits, and self-and community requirement (McClanahan *et al.*, 2008). Luomba (2015), conveyed an investigation and used a Likert scale of one to three where one represented 'not effective', two 'somehow effective' and three 'very effective', to rate fishers attitudes on performance of BMUs in undertaking various activities. From this, more than 90% of fishers showed that BMUs are extremely effective in resolving fisheries conflicts, formulating laws, and keeping inventories. This in itself is an indication that the community or the fishers have a positive attitude hence positive perception. However, it is also worth noting that the fishers ranking of BMUs performance was low in data collection, patrolling fishing grounds, initiating development projects and conducting meetings

Luomba (2015) found that there were contrasts in perception of fishers in the activities that the BMU are authorized to do. It was observed that there was factual distinction with the way fishers viewed BMUs execution in doing exercises (performance), for example, defining by laws, prosecuting wrongdoers, confiscating wrong gears, data collection, arresting offenders; tackling strife, collecting revenue and conducting meetings compared with patrolling fishing grounds. This perception suggest that the level of the execution/performance in an activity may contrast within a BMU, and this could be the motivation behind why a few studies, Hara and Nielsen (2003) contended that BMUs have not been successful in fisheries management, (Onyango and Jentoft, 2007) BMU establishments have not performed to desires and Nunan (2010) that BMUs have neglected to control movement of fishers.

Kevin Leleu *et al.* (2011) established that there was no negative perception of the impacts of No-Taking-Zones (NTZs), except for a slight impression that misfortunes (losses) surpass benefits (6% of answers). He discovered that positive feelings and opinions dominated, with lower quantities of fair-minded observations (unbiased). Out of the blue, when fishers assessed the effects of NTZs on their own undertaking, they appeared to be less persuaded (half of unbiased conclusion) than when they were asked non-individual questions, for example, the general impacts of NTZs on the fishery all in all (88% positive), the consequences for the ecosystem (69% positive) and the general impacts of NTZ creation (62% helpful or balanced). Kevin Leleu *et al.* (2011) additionally expresses that barely any fishers communicated an enthusiasm for fishing all the more every now and again close to the NTZs, notwithstanding when they viewed the NTZs as being gainful. This clearly conflicting outcome is, all things considered, reliable with the way

that NTZ vicinity is never specified (0% of reactions) when questions target the two most important factors involved in the choice of a fishing location, unlike personal experience (which is mentioned in 63% of responses), fish abundance (44%), presence of appropriate habitats (38%), harbor proximity (31%) and weather (13%). Kevin Leleu *et al.* (2011) found the positive observation a fisher may have of NTZ impacts on their own action parallels their pronounced and observed frequentation of the zone nearby the NTZs: the closer they fish to the NTZs, the more positive is their discernment. This view of NTZ impacts on their own movement is connected to their position, as opposed to their age (information not revealed). The proportion of nonpartisan to positive discernment increments plainly with the quantity of years they have spent angling in the MPA: 1:5 for a long time. This demonstrates the less rank they have, the more positive is their impression of the NTZs.

This is affirmed by the high recurrence of fishing in the zone contiguous the NTZs, which was observed for fishers with less rank. In spite of a few contrasts between proclaimed data (interviews) and observed data (monitoring of fishing trips and operations), it is important that general examples of frequentation and particularly of recognition, are predictable. How fishers see the impacts of NTZs (spillover) and how they visit the nearby zones may likewise rely upon the group of species targeted. The most usually targeted group in the zone bordering the NTZs is 'Sparids' (targeted 'consistently' in 20% of responses), with few or no fishers routinely focusing on 'Mulletts' (under 10%) and 'Rockfish' (0%) in these zones. Fishing near the NTZs seems, by all accounts, to be related with positive NTZ discernments just on account of fishers who target 'Sparids'.

According to Pramitasari *et al.* (2015) Local community members are more likely to comply with local knowledge and practices than with government regulations alone because government regulations are not always suited to the realities of the local fishery resources. Additionally, government regulations do not always reflect the views of the local community because it was not involved in formulating the regulations. Recently some countries, namely Nepal and Zimbabwe has been provided local communities with a decision making power in the protected areas, which both are quite success (Negi and Nautiya, 2009). Another example can be seen in Indonesia, as 'sasilaut' in Maluku province, is one example for pre-existing fisheries management or local knowledge, in the form of marine tenure. It was emerged in response as a failure of centralized marine resource management (Ruddle and Satria, 2010).

2.4 Challenges facing the Co-Management Strategy

The worldwide significance of Environmentally Sustainable Development (ESD) was set up with the publication of the Report of the World Commission on Environment and Development (Brundtland, 1987). It was in this specific situation, fishery management which was only worried about yields, nourishment, financial and recreational qualities related with them, till at that point, has started to see internationally as an environmental concern with regards to the human life emotionally supportive system. Many social scientists have stressed the socioeconomic aspects of sustainable development. All of them confine to the view that the socio-economic challenge of sustainability is more obdurate than the eco-efficiency challenge.

Understanding the economic matters of fishery co-management is basic to its prosperity. Management of any fishery (regardless of whether network based, co-oversaw or government-oversaw) will require contributions to terms of assets. In the focal government model of fisheries management, these assets included financing for look into, checking, consistence and reconnaissance (authorization) and looking after nearby, national and worldwide foundations (these could be network based, for example, affiliations, merchant affiliations or national, for example, fishery offices and police and incorporate human capital, or universal associations, for example, FAO and APFIC). A critical part of maintaining partner enthusiasm for being a piece of a co-management game plan is that the resource that will be co-administer is really worth managing. This implies the estimation of the resource to the partners is adequate to legitimize the speculation of time and budgetary resources that is required under a co-management system. This is a critical thought, since there might be nearby enthusiasm to deal with a fishery resource and the eagerness to contribute time and push to do as such, yet the business estimation of the fishery and the chance of cost recuperation is low to the point that the administration does not think that it's practical to help.

The best top-down management frameworks which have come into commonness since the 1950's traditionally endeavor to recoup cost through: tax assessment or collects on the deliver (either on landing or amid preparing); portions (either for access to a territory, for species, apparatus, time); or general tax assessment. Money related parts of fisheries are increasing expanding acknowledgment, and there have been late moves towards more noteworthy "market teach" in the area as a method for contributing towards a progress to mindful fisheries, as prove by late spotlight on issues, for example, withdrawal of

endowments; reinforcing of utilization rights; substitution of awards with credits; and cost-recuperation programs and more noteworthy accentuation on catch of resource rents. In this setting there has been worry that the resource lease/income recouped from co-administration plans does not take care of the administration costs. For instance, in the United Kingdom it is assessed that 20 percent of the gross estimation of the fishery is spent on checking alone. The fishing business has for this situation got unique status in light of its apparent social significance to communities.

Be that as it may, for co-management to work, the interest in time, assets and limit working to guarantee fruitful co-management cannot be disparaged. In situations where a system of boards of trustees is built up to cover both the chain of importance from national to local and the distinctive partners, costs both as far as movement, and in addition time far from the wellspring of individuals' wage and jobs, can be extremely requesting and couple of motivators for cooperation exist, particularly when the members miss out in any allocation or negotiation.

As indicated by Kuperan and Pomeroy (1998) exchange expenses can be named: (i) data (costs related with getting information of resources and associations); (ii) aggregate fisheries basic leadership (costs engaged with setting up gatherings, conceding to approaches and principles, conveying choices and organizing partners); and (iii) aggregate operational costs (consistence costs, resources support and resources circulation costs). Makino and Matsuda (2005) computed these expenses in a single locale (prefecture) in Japan. They demonstrated that the aggregate costs compared to around 27 percent of the aggregate yearly fisheries creation, 70 percent being paid by the administration and 30

percent by fishers. They called attention to that in this framework, in any case, consistence costs were low and the biggest offer of the administration's cost goes to data costs. It is intriguing to contrast this and the best down focal approach which has vast authorization spending plans and substantial research spending plans, with specialists frequently not doing work that is particularly pertinent to better administration.

Despite the fact that the expenses may seem high, these must be identified with the advantages. The advantages themselves are as far as decreased conflicts, expanded social attachment, more free communities, also the extensive monetary and social picks up that are conceivable to recover from sound fishery resources, and in addition expanded sustenance and wellbeing. The cost of not putting resources into co-management is conceivably gigantic, and with current patterns in Asian fisheries both the monetary and social effect of crumbled fisheries could cost governments commonly more than vital intercession taken at this point.

Fisheries management tries to address social, economic, environmental and political aims, but these often conflict with each other (Cochrane, 2002). Deciding how to trade-off between different aims is not an objective process but is ultimately a political one of negotiation. This section looks at these conflicting aims and discusses the importance of responding to them. Since fisheries include an inalienable interaction amongst people and the natural world, as both a monetary 'industry' and a socio-cultural establishment for individuals and communities, it is important to keep up a sound resource base crucial to fisheries as to other renewable resource frameworks throughout the centuries. Fishery is a perfect contextual analysis for those worried about issues of economic or sustainable

development for it is exactly adjust of nature which is basic to their advancement and fisheries have more than some other industry, encountered the points of confinement to productionists techniques (Ramakrishnana, 2003).

The world is currently confronting a worldwide fishing crisis of extraordinary extents (Speer, 1995). FAO reports that 70 percent of the world's financially critical marine fish stocks are completely fished, overexploited or drained. In 33% of the world's significant marine fishery regions, the catch has declined by 20 percent or more from the pinnacle years. Filled by heightening interest, quickly propelling innovation and marine government endowments, the worldwide angling armada has now come to, and in numerous regions surpassed the points of confinement of supportability imperiling a moment wellspring of nourishment for the world.

World Overfishing

Hinrichsen (1995) writes population bomb has already been destroying the world's coastlines, gives a list of scientific and policy issues that must be addressed by the scientists and policy makers when they work towards a system of governance of coastal areas. World Resources 1996-1997 reports that marine catch has changed markedly in size and composition over the past 45 years as fishing activity has increased. Though in 1993 the global fish harvest from marine and inland sources inched up to a new record high, the seeming abundance masks, and a serious decline in the productivity of many important species (World Resources, 1998). Again World Resources 1998-99 reports that world fisheries face a grim forecast. Forty five years of expanding fishing pressure have left

numerous real fish stocks exhausted or in decrease (World Resources, 1998). Bailey (1987) examines some of the social consequences of excess fishing effort, in the context of Southeast Asian fisheries, which are characterized by a dualistic structure with distinct small scale and large-scale subsectors.

The negative outcomes of excess fishing exertion incorporate dispersal of resource rent, gear conflicts prompting more extensive social clashes, expanded utilization of damaging fishing procedures, changes in the sustenance supply and conveyance channels and expanded centralization of monetary power inside the fisheries part. Pauly (1987) gives a concise audit of the demersal and pelagic fisheries of Southeast Asia and the specific highlights of Southeast Asian fisheries that make them especially helpless to overfishing. Saeger (1993) while analyzing some of the problems faced by fisheries in Maquada Bay, Samar sea area of Philippines, identifies the operation of the commercial vessels and fixed gears in the coastal waters reserved for the small scale fisheries, widespread dynamite fishing, illegal as well as government sanctioned logging, competition among fishermen and so on as the main reason for the decline in catches.

Willman (1987) examines the economic factors, which have caused and are causing economic and biological overfishing in Southeast Asian countries. Veiel (1999) explains how overfishing leads to the collapse of Morocco's sardine port Safi, where 35000 inhabitants are struggling to make a living. The sardine schools in the coastal waters have become a rare occurrence that their industrial processing is no longer viable. Kurien and Achari, (1989) while examining the case of a common property resource nature-the coastal ecosystem and the fish there in highlight how a combination of economic,

technological and social factors interacting in a specific context results in overuse of the commons leading to its near ruin and point out that the ensuing economic consequences are by no means equitably distributed.

Zwieten *et al.* (2003) says co-management is an emerging trend and is usually applied in the management of common property resources, such as fisheries especially capture fisheries, floodplains and forests. Hence, there is an increasing realization among fisheries managers that fisheries management must include participatory approaches, to address the many challenges and or complex issues including many interests, interest groups, disciplines and issues.

Socio-economic limitations, for example, household family pressure, low salary (income), low levels of education, low monetary status and absence of elective business openings are the fundamental issues for marine fisheries progress. The offered credit facilities from various GOs, NGOs are deficient to address their issues. Plus, in accepting such credit facilities they have to pay high interests. These financial elements are influencing marine resources. Fishermen are additionally confronting issues of child education, nutrition, sustenance, cooking fuel, creature feed and house building materials. All fishermen specified absence of capital and the expanding fishing pressure as their primary issues. The fishermen of Bangladesh are socially burdened and ailing in satisfying their fundamental needs (DFID, 1998). As indicated by Rahman (1994), fishermen were beneath the destitution line and were attempting to make due, with wellbeing,

nourishment, sanitation, water supply, soil richness, cooking fuel, creature feed and house building materials as their everyday issues.

The fishermen's lack of control over the marketing of the fish they caught is the beginning of livelihood insecurity they face and thereby increasing their indebtedness which in turn cause labour stickiness in the sector. The fishermen's share of consumer Rupee for the different varieties of fish has been estimated by the CMFRI to range from as low as 18 percent for whitebaits in the Kozhikode region, 51 percent for Tuna in the Ernakulam region, to as high as 74 percent for Sharks in the Thiruvananthapuram regions

Low quality of Life Poverty is firmly identified with overfishing and debasement of aquatic ecosystem. Those socially and economically worse-off in the fisheries are, from one perspective, casualties of the worldwide ravaging of fisheries resources and due to this their livelihoods are under risk. Then again, they themselves have contributed, frequently driven by need, to the descending spiral of destitution (poverty) and environmental degradation, which others started (SPDDC, 1995). Sten & Nielsen (1996) established that, the fishers and their families are dependent on the fishery for their livelihood. In most cases, they have no substitute source of income or access to other sources of food production. Therefore, they require an income to buy all necessities. This clarifies why every one of the fisheries analyzed are market-focused. Only fishers in Zambia and Zimbabwe who are of the overwhelming Tonga tribe and the fishers from

Kayar in Senegal follow the tradition of merging (seasonal) fishing with the rearing of livestock and farming.

Fishermen are leading a very poor quality of life, which has implications on their ability to move out from fishing as a way of life. One of the central purposes behind the low quality of life and substandard states of natural surroundings of the marine fishing communities is the swarming and crowding of them within half a kilometer wide from the seafront (Kurien, 1995). Kerala coasts are overcrowded and over exploited. The marine fishing villages of Kerala are the most densely populated (2330 per Sq.Km.) (Kurien, 2004) not only among the maritime States of India, but even from Shanghai, one of the most densely populated (2000 per sq.km.) municipalities in China. (Hinrichsen *et al.*, 2001). The major impact of crowding is reflected in the holding pattern of homestead plots.

Over Capacity and Excess Capital

Overcapacity, its dynamics and control are the most pressing economic issues faced by the sustainable management of Kerala fishery as any fishery in the world. It has implications for all other issues of fishery management. The crux of the problem lies in public economic incentives supporting the initial take off and development stages of the fisheries development cycle tending to remain even after development has been completed facilitate over fishing. Subsidized public investment in fishing harbours and marketing infrastructures, subsidized credit and investment incentives, and trade and investment incentive policies are among the factors that lead to over fishing (Garcia *et al.*, 2012).

These factors by controlling mobility of capital are playing as incentives for over fishing in the context of Kerala fisheries as well.

In Africa, fisheries can likewise be a huge part of regional economies. For instance, inland fisheries in Malawi give around 70– 75% of the aggregate animal protein utilization of both urban and provincial or rural low-pay families (FAO, 1996, referred to in Revenga *et al.*, 2000). In Northeast Nigeria fisheries offer employment, pay/income, trading opportunities and significant protein for human use. From 42– 70% of provincial (rural) family units were found to gain some salary from fishing and all things considered it contributed 24 – 28% of their income (Neiland and Sarch, 1994). Similarly in the Brazilian Amazon, floodplain (Varzea) families acquire around 30% of their income from fishing (Almeida *et al.*, 2002).

The best advancement challenges confronting Lake Victoria and its basin are the socio-economic and ecological issues, which are predominantly associated with the inter-linkages between destitution, that is, poverty and degradation of nature. These are additionally exacerbated by the absence of capacity among the concerned institutions to deal with the resources of the Lake basin, both human and natural, in a practical way. Likewise, the judicial and institutional frameworks that govern the socio-economic activities have so far been wrongly conceived and enforced, and in an uncoordinated manner. Sustainable growth is one prerequisite for poverty alleviation in any country. Considering the fact that population growth in the Lake Victoria basin is in the region of 3% and that 50% of the population live under poverty line, a substantial growth is required

in order to alleviate poverty to any significant degree. The growth that has been seen in the region over the last few decades has mainly been based on the exploitation of natural resources. Some of it is linked to finite resources, such as mining activities (mainly diamonds and gold), other parts of it linked to agriculture and fisheries (Oyugi, 2002).

Lake Victoria has conservatively supported valuable fisheries, which are an important source of protein for the indigenous peoples. However, the fishery has exhibited substantial change over the last 80 years. Evidence of a decrease in catches started as early as the 1920s and resulted in the introduction of *Tilapia melanopleura*, *Tilapia zillii*, *Oreochromis leucostictus*, and *Oreochromis niloticus* in the 1950s (Welcomme, 1988). Overfishing was confirmed as early as 1972 (Worthington and Lowe-McConnell, 1994). Haplochromines, which contributed 80% of the demersal fish stocks (Kudhongania and Cordone, 1974) were not utilized until late 1970s when fish meal processing factories were established. The introduction of Nile perch (*Lates niloticus*, L.) in the late 1950s and early 1960s altered the fishery and, with other factors, resulted in changes in the lake's ecosystem and the food web (Ogutu-Ohwayo, 1990, 1995; also Ligotvoet and Mkumbo, 1992; Witte *et al.*, 1992). Increased pollution and clearing of the peripheral wetlands (Kaufman, 1992; Hecky, 1993; Muggide, 1993), which served as fish nursery grounds, may have seriously affected the fisheries and the lake resources in general.

The issue of overfishing in Lake Victoria was specified as early as 1920s when the main fishery review was directed by Graham in 1927-1928 (Kolding *et al.*, 2008). The

presentation of gill-nets of 5 inch mesh size was thought to have negatively affected the Tilapiine stocks in some parts of the lake (Graham, 1929). Commercial fishing on tilapia began when the railway reached Kisumu (Vershuren *et al.*, 2002) in the early twentieth century (1901). Preceding the introduction of Nile perch, Lake Victoria fishery was made out of the indigenous tilapia (*Oreochromis esculentus* and *Oreochromis variabilis*) (Ogutu-Ohwayo, 1990). There was in any case, a limited abatement in individual catch the Winam Gulf of Kenya (Graham, 1929), and may have provoked the presentation of Nile tilapia (*Oreochromis niloticus*) and other tilapiine species to support fisheries productivity (Kudhongania and Chitamwebwa, 1995). Overfishing was again specified when Ray Beverton went by the lake in 1957 (Beverton, 1959).

Studies have estimated that artisanal fisheries use one-fifth as much capital and create a hundred times more jobs per dollar invested unlike large-scale fisheries (FAO, 2000). Yet in many developing countries, small- scale fishers live close to, or below, the subsistence level or at any rate, amongst the lowest socio- economic groups with low incomes, poor living conditions and little political influence (Enger and Smith, 1983; Panayotou, 1982). The resources on which these individuals depend are still to a great extent natural fish populations. It is projected that at least 50 million individuals in least developed countries are specifically engaged with the harvesting, processing and marketing of fish and other aquatic items and overall fish production provides employment to about 150 million people as a result of participating in the fishing industry. Inland aquatic resources keep up to be experiencing tension coming about because of misfortune, loss or dilapidations of territory or over fishing. The United Nations Food and Agriculture Organization

(UNFAO) gauges that nearly 70% of fish stocks for which data are available and accessible are totally abused, to a great degree over-fished, or generally are in the pressing need of management (FAO, 2000).

Fisheries in the different water-bodies of Kenya are at different levels of exploitation. Lake Turkana stocks are considered underexploited, chiefly due to poor road infrastructure and long distances from main market centers. Some of the Indian Ocean stocks are also seen as underexploited. Fishing in Lake Victoria is seen to be at its maximum sustainable level, while such lakes like Naivasha and Jipe are viewed to be overexploited. The river line system is exploited by artisanal fishers for household or domestic consumption. Kenya's aquatic ecosystem and species are faced with both anthropogenic and natural threats such as proliferation of alien invasive species, pollution, uncontrolled water abstraction, deforestation, siltation and unregulated physical developments (GoK, 2005).

Concurring GoK (2005) Fish trade in Kenya get around for the most part artisanal fishers; intermediaries engaged with item transference to the markets, more often with some value addition, for example, drying, smoking and deep-frying and a substantial scale export-oriented processing sector right now comprising of about 18 EU-certified firms. In the local and regional markets, tilapia is the fundamental species and is more often traded fresh, with smaller quantities in dried or smoked form. Different species traded commercial quantities in the local markets advertise incorporate *omena*, Nile perch (*Mbuta/embuta*), tuna, kingfish, shrimps and lobsters. The significant export is of Nile

perch filets from Lake Victoria, representing about 90% of the nation's aggregate fish trade items. Other export items include fish, shrimps, lobsters, octopus and squids.

Trade is hampered by poor road networks to the production sites and need for cool storage facilities (ice plants). There are no sale frameworks for fish, a factor that likewise contributes to high price differentials across the areas or locations. Thus, there are huge post-harvest misfortunes such as losses, which also confine market expansion. Sanitary standards enforced by significant export destinations, and other non-tariff barriers to trade, also constrain Kenya's global trade in fish and fishery items.

Fishery capital in Kenya are managed by the Department of Fisheries through the Fisheries Act (Cap 378) and Maritime Act (Cap 250) of the Laws of Kenya the Kenya Marine Fisheries Research Institute (KMFRI), established as a state parastatal through the Science and Technology Act (Cap 250), carry out fisheries research. These two institutions, which have frequently been in different ministries, are currently under the Ministry of Livestock and Fisheries Development. Due to the lack of a fisheries apex institution at the ministry level, these two institutions lack a mechanism for setting coordinated agenda.

Other public institutions concerned with fishery activities include regional development authorities under the Ministry of Regional Development, Ministry of Environment and Natural Resources, universities and public laboratories. The large-scale export-oriented private sector is organized under the Kenya Fish Processors and Exporters Association (AFIPEK), which has promoted industry self-regulation, marketing and interfacing with the government. The small, medium and large scale fish traders in Kenya are considering

the formation of an umbrella organization. A major shortcoming is that most of the small scale traders are not organized into strong associations. Fishermen are being short of strong cooperatives or associations, although there are efforts by several organizations, including the newly launched Beach Management Units (BMUs) to organize this vital group. In addition to these private sector players, there are several civil society and non-governmental organizations (NGOs) working in fisheries, especially on socio-economic and conservation issues (GoK, 2005).

In the fisheries sector women have not been seriously empowered. Empowering women and escalating their income is the best way to address poverty within households. Men at almost all levels dominate the fisheries sector and this domination, together with the lower status of women in many cultures around the lakes, shows that women have not benefited from fisheries capital in East Africa, specifically, Uganda and worldwide as much as they could. Women are not very much occupied in fisheries and around 40% of traders and processors are women. The implementation of fisheries co-management and the establishment of Beach Management Units (BMUs) provide ideal opportunities to increase the participation of women in both fisheries administration and development. Mainstreaming of gender equity has been advocated by the Kenya Fisheries Policy Act, 2005. Under the coordination and guidance of the KFPA and gender experts, participants in the fisheries sector shall be encouraged to address issues of gender equity in their fisheries activities, and the Department of Fisheries shall be required to include gender equity in fisheries management (GoK, 2005).

Customarily, Women have been excluded from fisheries administration structures. They should be urged to get more involved, to expand their benefits got from fisheries resources. BMUs were at first formed in numerous parts of the lake in the late 1990s. Around then, BMUs were not committed to have ladies on the committees and hence just a couple of ladies were associated with running BMUs. Women feel ill-treated in aquaculture, yet to a much lesser degree, and are undeniably representatively included. There are a few of particularly women-managed aquaculture exercises. women in general do not wish to go to ocean and are not especially needed, so while guaranteeing that women can partake on the off chance if they so wish (that is, no unjustifiable obstructions) there is little point in pushing for more prominent involvement or participation. Be that as it may, for some small-scale, discrete inshore fisheries there could be degree for community-based management (CBM), an approach both conceivably useful in itself, and one offering women an all the more generally satisfactory and also a more acceptable part in the essential production segment.

On a global level, fisheries are often perceived as male-dominated, laden with culturally stereotypical images of fishermen. The term “fishing industry”, for example, conjures an image that focuses attention on harvest and men’s work more than the term “seafood industry” which is more equitable and evenhanded (Aslin *et al.*, 2000). The involvement of women is now reflected by the increasing use of gender-neutral terms such as “fisher” and “fisher folk”, and more international discussion of gender (Williams *et al.*, 2005). Yet recent global investigation has shown that if post-harvest (e.g., fish processing and trade) and ancillary activities (e.g., fishing inputs and financing) are taken into account, then the gendered image is quite different. Overall, women may be in the majority in fisheries, or

nearly so (FAO *et al.*, 2008). This does not take into account the growing number of women engaged worldwide in fisheries policy, planning, management, science, education, civil society advocacy and other activities related to fisheries that were previously more male-dominated.

The post-harvest situation is particularly inequitable. Women outnumber men in fish processing and trading across the world, but their informal sector activities are often not recorded, and they are invisible in national labour and economic statistics. Thus the socioeconomic contribution of women to fisheries is underestimated at national and global levels. Only a few countries in the developing world collect and use gender disaggregated statistical data and other information data for fisheries policy and planning (Weeratunge and Snyder, 2009). Without comparative data for women and men, it is difficult in most places to determine the disparity between female and male socioeconomic activities and well-being. This scarcity of gender-disaggregated fisheries data constrains gender-sensitive policies and mainstreaming, with little action taken to address the disadvantageous position of women (Sharma, 2003).

It is widely accepted in the developing world that women strongly influence the social, economic and cultural aspects of fishing households and the industry as a whole. There are increasing numbers of women in technical, scientific and managerial fisheries jobs around the world, but this varies markedly by region. In some societies where men engage in the most conspicuous fisheries-related socioeconomic and political activities, the women are labelled “fisher wives”, but the implied subordination is misleading (Weeratunge and Snyder, 2009). In Ghana, “fisher wives” or “fish mummies” support the

entire small-scale fishing industry as they invest in fishing boats and gear, and provide loans to husbands and other fishers while running small socioeconomic empires without formal political power (Walker, 2001). Although addressing gender-inequity is critical, interventions need to be carefully designed. 'Women in development' projects have contributed to reducing the real power that women held, for example, by introducing poorly designed credit and fish marketing schemes that exacerbate unsustainable fishing for short-term monetary gain or loan servicing.

Gender issues remains a key administration issue in both developed and developing nations. Its numerous interconnected dimensions identify with vulnerabilities, resources, openings, capacities, adapting methodologies, results, sustenance security, strengthening and that's just the beginning. With new attention to sustainable development goals based on blue and green economies, gender in fisheries should feature more prominently. State and civil society agencies realize that well-being will not be improved and poverty will not be reduced if gender is not adequately addressed. Gender mainstreaming should be an integral part of fisheries, but this is not occurring, because gender research to support fisheries policy is insufficient. As the links between gender in fisheries and poverty, climate, health and other major developmental issues become apparent (Bene and Merten, 2008; Bennett, 2005; FAO, 2006; Neis *et al.*, 2005), more attention will need to be paid to gender in fisheries in the context of the development post-2015 agenda.

BMUs are expected to have in place a mechanism that supports the sustainable utilization of the resources and poverty alleviation through improved planning and resource

management. Fishers' views were collected to understand whether these objectives have been achieved or not and 98% acknowledged their BMUs having rules/by-laws that regulate fisheries. Luomba (2013) asserts that conflict resolution and controlling illegal fishing are the major reasons why fishers think that their BMUs have formulated rules, to ensure that hygiene is maintained at landing sites; controlling illegal fishing; protection of breeding and young fish; and reduction of conflicts among fishers.

This is additionally bolstered by reactions from key informants, who demonstrated that BMUs have figured out how to have made a few accomplishments through formulation of laws, controlling illicit fishing and vagrants and furthermore have enhanced the cleanliness conditions at their landing sites. Regardless of having this set up, (Luomba, 2013) found that BMUs are inhibited by absence of working apparatuses and gear, deficient ability to uphold measures and awareness, and absence of help from other stakeholders.

On addressing the issue of poverty, (*ibid*) states that the BMUs are supposed to have a savings scheme and also self-help projects that are beneficial to all the members. However, in his study he found from his from key informants that although there exist both formal and informal savings schemes at the landing sites none are operated by the BMUs. Similarly the BMUs have not introduced income generating ventures to provide substitute source of income to fishers to address the problems of poverty. The endeavors to establish income projects have been restrained by lack of skills and expertise within BMU leadership.

Luomba (2015) in his study found that background of the fishermen influences fishers' state of mind towards execution of BMUs in a few activities. For example, those with basic or primary education are less happy with BMU performance in information (data) collection and initiation of activities or projects than those with secondary education and the individuals who never went to school. Then again, the individuals who are new in the fishery are more positive with the performance of BMUs in venture of projects than the individuals who have stayed long in fishery. BMU members are more positive towards BMU execution in collection of incomes, conducting meetings and information collection than other occupation in the fisheries.

Key source of income for dominant part of individuals at the landing sites actions taken by the BMU to manage fishery Development programs that the BMU have started to harvest income and decrease poverty among fishers achievements made by the BMU since its arrangement. (In the same place)

In his research findings, Béné (2003) characterized the defining of poverty in fisheries by associating with natural factors (fishing resource) and its associated exploitation level as an old paradigm. These have been exacerbated by Gordon's (1954) and Hardin (1968) with their perception that poverty is associated with the common property nature and open access of the fishing resource, ignoring other possible factors that can contribute to poverty in communities that their livelihoods mostly depends on the common resources. The free or open-access nature of the fisheries allows many people to enter the fishing sector which afterwards leads to the economic and perhaps biological overexploitation of the resources and rent dishonesty. According to Hardin (1968), the common property

nature of the fishing resources leads to misfortune of the commons due to the illogical exploitation of the resources. According to Hardin (ibid):

“Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all”.

The low opportunity incomes in small-scale fisheries has also been explained as the reason for poverty in fishing communities; for the reason that small-scale fisheries are usually situated in rural, remote areas with very few alternative employment opportunities. There is also the perception that the fishery is “an employer of last resort” and therefore because of its open -access nature offer a livelihood to the poorest people through fishing activities. Chirwa (1997), states that despite the decentralization of the fishery, gill nets and seines of various types are the commercial gears mostly used while hook and line and cast nets are mostly used for survival/domestic fishing.

The use of large seines with increasingly smaller mesh sizes appear to have increased in recent years, and this has contributed considerably to the depletion of stocks. Boats used in inland fisheries are un-motorized or plank boats and the economic and socio-cultural attributes are still that the fishers and their families are dependent on the fishery for their survival. Many at times, they have no substitute or alternative source of income or access to other sources of food production. Therefore they need an income to access their needs and this explains why all fisheries are market-oriented.

The ownership of means of production is either owned by the fishers themselves or by those not directly involved in fishing activities and the capitalistic system of ownership seems to have led to more advanced technologies being introduced. This has increased fishing effort and in many cases, caused the crisis in resource management. The market characteristics of fishers are that many traders are involved in the marketing of produce, and fishers are not entirely dependent on just one or a few traders. In Southern Africa, fish processing and trading is predominantly a male activity, and the traders rarely live among or within the fishing communities. In West Africa, fish processing and trading is a female occupation which is often undertaken by the fishermen's wives.

Putnam *et al.* (1993) guaranteed to see an interrelationship between organizational at the local level in the fishery and level of majority rule government in the public arena when all is said in done. Social capital is to Putnam highlights of social affiliation, for example, trust, standards and systems that can enhance effectiveness in the public eye by encouraging composed activities. Standards manage the activities of individuals so they consent to aggregate tenets and the aggregate activity that emerges from this consistence will thusly reinforce general solidarity in the public arena (Putnam *et al.*, 1993).

Social capital is a reserve or resource for the society in general, according to Putnam. While social capital originates in local level norms and trust, its effects must, according to him, be measured at the group or society level. Evans (1996) disagrees with Putnam on what is to be identified as the sources of social capital. Where Putnam sees norms and trust as prerequisites for social capital, Evans emphasizes the significance of links between state and society for the existence of social capital (Evans1996). Evans and Putnam have

differing views on the foundation of social capital, but they both tend to explain social capital as a micro level quality that is potentially beneficial to larger groups.

World Bank (2001) sees social capital as an important resource for the very poor. In its policy documents, the World Bank claims that social capital will contribute to local level trust and stability that will enhance economic transactions among the poor. It is affirmed that the being of social capital contributes to cost reduction for firms and entrepreneurs and also enables poor people to start small enterprises and increase their income. Social capital is seen as a factor with an important role to play when attempting to reduce poverty levels in developing countries (World Bank 1998). However, other views have it that; many people especially the poor, have been pushed out of this business due to a range of reasons. Fish commerce is very tricky with limited capital and therefore the weak people are driven out from the sector. Some people are weak because they cannot organize the money. This is a socio-economic challenge even to the FMIs.

Lake Victoria fisheries, the gap between the owning and labouring classes between fishers within the industry is extremely high. Most of the actual fishing is done by crew who do not own shares in boats or gears, they entered into fishery as last resort (*they are the fishermen because they are poor*). Although the crew always paid with a share of the catch, but a higher percentage of the catch goes to owners of boats and gears (Wilson et al., 1999).

Manahamis (2008) states that, it is worth known that the market institution setup and business practice within the fishery has made both boat owners and crews continue to live

in poverty situation. The marketing-cum credit relationship between fishers and the processing plants and middlemen, has made fishers weak and powerless in influencing important and key issues like setting of fish prices and better business environment. Therefore, such market institution setup can lead to the conclusion that boat owners “*are poor because they are fishermen*” which in the model not shown but just focused on the open access nature of the fisheries and ignore other factors like markets.

The neediness circumstance in Lake Victoria community is multi-dimensional that contrasts from one group to another from hardships deprivation to abilities social exclusion disparity and rights based issue (Ogwang' *et al.*, 2009; Onyango, 2009; Onyango and Jentoft, 2010). The proceeded with poverty in the fisheries sector gave the ground for the creation of co-management with the possibility that engaging local people in resource administration improves the entrance and privileges of pro-poor to natural resource administration/management and supporting their cooperation in approach and management forms which are pivotal for poverty reduction. Within the Lake Victoria formation of BMUs was a positive improvement towards achieving this (Onyango and Jentoft, 2007). A BMU mandate is to guarantee efficient, safe and effective use, management and operation of fish landing sites. Additionally to start credit and investment/saving schemes for fishers, create and actualize income generating ventures with the idea of lessening fishing pressure and effort on the lakes resources, bring issues to light of and give training to its members in fishing procedures, the promoting and handling of fish, and bolster agreeable and fishers' self-improvement gatherings among numerous others.

Kashilika (2013) found the following to be the challenges facing BMUs in combating illegal fishing: inadequate of boats for patrol (fishery patrol vessel); inadequate source of revenue; difficult in getting information about illegal fishing; BMUs leaders being involved in illegal fishing; the lives of BMUs officials being in threatened by big fishers who are involved in illegal fishing and lastly BMUs leaders are involved in a task of combating illegal fishing without payment, this situation reduces the working morale.

Similarly, Odongkara *et al.* (2007) found that problems faced by BMUs in carrying out their duties to diverse, including: inadequate co-operation between BMU committee and the assembly; inadequate equipment to carry out work like boats, engines and fuel; Conflict in roles with Marine Police and Fisheries staff; inadequate security during patrolling; lack of motivation in terms of pay for the work that they did; piracy and theft of fishing equipment, namely gear on the lake; being less empowered, BMUs are often undermined by Government authorities.

Cinner *et al.* (2009) states that Local communities have been found to fill a few holes in the managerial design outside the legitimate structure: "First offenses are frequently managed by warnings or within a community, despite the fact that there is no lawful prerequisite to do as such." Sanctions can be forced on individuals or members of Beach Management Units, for example, for resistance of fisheries directions Actual enforcement capacity lies fundamentally with the regional administration, however there are instances of individuals capturing somebody who is abusing rules.

Fatuma Musa (2012) in the coastal setting, issues exist with access to beaches through the beach buffer zone, between the high water mark and privately developed land. This zone

has regularly been "wrongfully possessed or encroached on by private investors or developers", denying public free access to the beach and Beach Management Units. As Musa *et al.* (2013) explains, "This conflict, combined with corruption has intensified the issue of resistance and deficient authorization of the laws."

Challengingly, implementation requires aptitudes (skills) and training, which can be missing at local level. For the co-management system to work effectively, capacity building is required. Oluoch *et al.* (2009) assessed eight coastal Beach Management Units and found a significant gap between expectations and actual management capacity. They concluded that most institutions had insufficient capacities, skills, and experience to effectively manage marine resources. The lack of technical capacity means that a stock assessment cannot be effectively carried out to supply information which would advise and inform regulation and enforcement. The Fisheries (Beach Management Units) Regulations, 2007 are hooked on an institutional reform to encourage successful co-management of fisheries through Beach Management Units. The huge number of Beach Management Units made demonstrates a win for this institutional overhaul. Nonetheless, as said above, the majority of these units have inadequate capacities, abilities, and experience to successfully manage marine resources. Besides, a few issues remain with the institutional restructuring of fisheries resources.

One such issue is access to Beach Management Units and fisheries resources for small, family unit, and artisanal fishers. Numerous external, small-scale fishermen, who trust that they have historical fishing rights at landing site, regardless of whether just on a

migratory premise, feel that Beach Management Units and their exclusive rights over landing sites confine fishing rights for small-scale fishers. Equally, conflicts have developed within Beach Management Units, as those small-scale and artisanal fishers who are members of a unit battle to go up against large scale administrators or operators for access to fisheries resources. These conflicts are both internal and external to the Beach Management Units and have not yet been settled by the new institutional structures (Gitonga Nancy, 2012).

Another outstanding test for Beach Management Units is accomplishing more participation and interests of women. In spite of the Fisheries (Beach Management Units) Regulations requiring that "in as far as possible" at least three members of the executive should be women, this point has not been accomplished. While correct figures for female participation are inadequate and to sometimes lacking with regards to, their roles have remained to a larger extent processing and transporting it to markets. Interestingly, management posts in charge of revenue collection and attending government workshops are fundamentally been preserves for men (*ibid*).

A further challenge is anchoring satisfactory financing for Beach Management Units. The financial sector has been ease back or slow in offering credits to fisheries work force and Beach Management Units on the grounds of uncertainty of reimbursements or repayments and in light of the fact that Beach Management Units do not have the lawful status fundamental or necessary for group loans. This prompts an absence of finances to buy fishing gear, vessels and whatnot (*ibid*).

Corruption is yet another serious socio-economic challenge facing the fisheries sector. For example, Zannetell and Knutt (2002) asserts that: Corruption and bribery also disrupt any process of development, governance and management. An illustrative case is introduced in a study of community based management in Venezuela, which can be summed up to Latin America, and incorporates the challenges in dealing with administrative or regulatory credibility because of abuse and corruption at higher levels of the establishments or institutions. The subject of legitimacy emerges: by what means would real co-management be created without legitimate organizations and processes? Pinkerton and John (2008) examine how a legitimate framework can be created, giving cases at various phases of the process and considering historical, institutional, and political features at the local level, not only the attributes of the fisheries themselves. Unfortunately, a few cases in Latin America could be considered as the outcome of legitimate processes; the main reason for that is not strictly tied to fisheries, but to the general behavior found within institutions, especially governmental institutions that still carry within past autocratic behaviours.

Finally, the accomplishment or success of Beach Management Units is hampered by social and health issues in the fisheries community. Notwithstanding a high prevalence of HIV and AIDS among the fishing community, waterborne diseases, for example, cholera and dysentery, posture issues. These are intensified by an absence of satisfactory health facilities for fisheries community (ibid). The first cases of HIV and AIDS in Africa were identified in 1982 among fishermen at the Kasensero landing site on the shores of Lake Victoria in Rakai District in Uganda (Jefferis *et al.*, 2007). It was nicknamed the “slim” disease since it was a strange disease that made people thin before dying (Jefferis *et al.*,

2007). Throughout the period of 1981-1985, Uganda was in the midst of a civil conflict, war and political chaos that caused a devastated economy and stagnation (Jefferis *et al.*, 2007). There was abuse of human rights, violence, military intimidation and refugee situation that facilitated the spread of HIV and AIDS through unprotected sexual intercourse. This period 1982-1985 was also characterized by denial about the HIV and AIDS epidemic (Jefferis *et al.*, 2007). The situation at that time provided a favourable environment for the spread of the HIV infection.

The Kenyan Fisheries Policy Act, 2005 states that Social responsibility and governance is important in the fishery sector, as in other areas of the economy. Sexual harassment of female fish traders, drug abuse and alcoholism, poor savings and investment behaviour and wide spread poverty are critical issues that need to be addressed. HIV-Aids and malaria cause high mortality of fisher folk across the country. Poor governance, low safety at sea, piracy and foreign harassment of border fishing communities, are additional social problems. Maintainable or sustainable development is difficult under such circumstances (GoK, 2005).

The first cases of HIV and AIDS in Kenya were reported in 1985 around Lake Victoria, Nyanza province among the Luo and the Basuba fishing communities (Pickering *et al.*, 1997; Barnett & Whiteside 2002). Though *chira* had been in existence among the Luo, the Luo thought that HIV and AIDS is “chira” which they believed was a curse on those who did not follow the Luo and the Basuba custom and beliefs. In addition to the civil war in Uganda, the major trans-highways shared by the three countries, and the seasonal mobility of Lake Victoria fishing communities have also acted as hubs for the spread and

increase of the disease. Kuhanen (2009), explain that the Kisumu-Uganda-Tanzania trans-highways and trading centers developed dense local and regional sexual networks which enabled HIV to spread quickly among the “risk groups” and local community of the busiest trading towns and rural arrears. Since the emergence of HIV and AIDS at the shores of Lake Victoria in 1985, the HIV and AIDS related illness and mortality remains highest among Lake Victoria artisanal fishers compared to the rest of the population (Pickering et al. 1997; Pitcher & Hart 1995; Gordon 2006). This trend underpins the global literature reporting higher HIV and AIDS rates among fishing communities (Kissling *et al.*, 2005; Gordon 2005).

2.5 Conceptual Framework

The conceptual framework in this study was based on two theories namely; common property theory and Marx’s conflict theory in seeking to understanding the question of conflict and conflict management in fishing population with reference to Homa Bay County.

2.5.1 Common Property Theory

Common property paradigm is based on the assumption that individual self-interest will not prevail over the best interest of the community as a whole, that the environment must be limited and the resource must be collectively owned and freely open to any user (FAO, 2002). With regards to fisheries, it is regularly contended that these three factors combine to guarantee that if fishing is making more than normal benefits/profits, at that point more fishermen will enter the fishery until the point that all resource rents have degenerated. Berkes (1985) contends that self-interest and over-exploitation can happen in small scale

fisheries because of weakness occasioned by various worries, for example, the loss of community's control over the resources. Different fears include: economic development and commercialization instead of subsistence fishing (Aswani, 1999; Rivers, 1999), fast population growth (exciting *et al.*, 1995) without formation of alternative work/employment (Bailey, 1984) and quick technological change (Aswani, 1999).

Common property resources are those to which no individual has exclusive property rights, for example, rural/village pastures, bush land, uncultivable fields, community forest, wastelands, village ponds, the inter-tidal zones, marine waters, rivers, lakes among others. They likewise incorporate resources that are accumulated from exclusive land or water with access to rights negotiated as opposed to being lawfully defined (Beck et al., 2001). Feeny *et al.* (1990), outlining a profound custom of property rights theory, describe four fundamental property rights regimes that might be connected to these or different kinds of resources: (I) open access (absence of clear defined property rights), (ii) collective/communal property (which is held by a group of users), (iii) private property (where rights are vested in individuals or corporations) and (iv) state or public property (where rights are vested in government). Given the propensity to mistake the resource for the property rights administration on account of regular property resources, they receive the expression "communal property" to allude to the resource and "communal property" to the administration.

A property right is an enforceable authority to embrace specific activities in a particular space (Commons, 1968). Property rights characterize moves that people can make in connection to different people with respect to some 'thing'. In the event that one individual

has a right, another person has an equivalent obligation to watch that right. Schlager and Ostrom (1992) distinguish five property rights that are most important for the utilization of basic pool assets, including access, withdrawal, administration, rejection, and estrangement. These are characterized as: Access: The privilege to enter a defined physical territory and appreciate non-subtractive advantages (for instance, hike, canoe, and sit in the sun). Withdrawal: The privilege to acquire resource units or results of a resource system (for instance, catch fish, divert water). Management: The privilege to manage internal use designs or patterns and change the resource by making enhancements. Exclusion: The privilege to figure out who will access rights and withdrawal rights, and how those rights might be exchanged. Alienation: The privilege to offer or lease management and exclusion rights (Schlager and Ostrom, 1992).

As indicated by Hardin's seminal paper *The Tragedy of the Commons* (1968), the open access and unhindered interest for a limited resource in common property resource administrations unavoidably prompts over-abuse, requiring fenced in area or privatization of the lodge. This tale remarkably affects both approach open deliberations and scholastic enquiry into common resource management. While definition and depiction of the issue of overseeing resources portrayed by non-elite property rights and strife originates before Hardin's story by numerous years, his remaining parts the focal story by which the issue has been inspected.

The assumption of the certainty of resource depletion under public or communal property managements has been broadly studied by Eleanor Ostrom and partners. The Ostrom tradition has illuminated how groups of users can make establishments or institution to

satisfy an arrangement of capacities required for overseeing assets reasonably – avoidance, portion among clients, and states of exchange – in circumstances where individuals fails to perform these functions. By studying an extensive number of case studies from traditional common property resource (CPR) management regimes over the world, they have refined an arrangement of highlights normal to foundations that have demonstrated successful in guaranteeing the sustainable management of basic property resources. These incorporate an obviously characterized community of resource users; a simply defined resource; the presence of clearly rules describing rights, duties and sanctions for non-compliance; "graduated" sanctions matched to the level of the offense; compromise components or conflict resolution mechanism; and frameworks for adaptive management (observing frameworks, capacity to adjust controls as the needs emerges) (Ostrom, 1990; Pandey and Yadama, 1990; Wittapayak and Dearden, 1999). Every one of these elements assumes an essential part in affecting levels of common trust and desires for what might be increased through participation (Blau, 1964; Burns *et al.*, 1985).

Fisheries have truly been dealt with as a typical property resource. The quantity of members is regularly restricted, yet without individually defined shares the fishery resource holds its common property nature. The risks of management fisheries as a common property resource were incorporated into the advancement of present day theory of fishery economic, first presented in 1954 by H. Scott Gordon. The theoretical framework demonstrated that the common property nature of fisheries brings about rivalry between individual operators to expand their share of the catch, which can eventually prompt unreasonable/excessive capital, for example, angling vessels and adapt, overfishing and resource wastage (Gordon, 1954). In common property fisheries,

individual operators confront a motivator to harvest however many fish as fast as could reasonably be expected with a specific end goal to pre-empt the exercises by other operators (Gordon, 1954).

Hardin (1968) recommended that the answer for self-interest and over-misuse either to regulate commons through governmental authority or to transform common into private property by means of walled in area (enclosure). In connection to control of small scale fisheries through governmental authority, centrally managed restricted entry, exorbitant as far as monitoring and enforcement subject to political obstruction or interference and absence of correspondence between resource users and managers (FAO, 1993). Co-management has been viewed as progressively essential in guaranteeing that the poor benefit from the resources.

This approach which centers on inclusion of local institutions in common property arrangements can bring about productive, impartial allocation and feasible protection or conservation (Agrawal, 2001). The structure, status and inspirations for various community management and related institutional game plans are especially imperative in choosing who benefits, however in whether they result in supportable resource use (Hartman, 1996; Dyer, 1994). Powerful *et al.* (1995) contends that as opposed to guaranteeing value and effectiveness, community managed access to game plans may fill other need, for example, support of the current social request and existing distribution of power and wealth. Different variables that remain to obstruct fruitful foundation and supportability of community based management frameworks include: the absence of ability and capacities of fishing communities as to such a part, the troubles in deciding

limits between various groups or community clients and potential clashes that outcome, the unwillingness of lawmakers to strip control, and the officially elevated amounts of capitalization of numerous fisheries (FAO, 1993)

Likewise there are high preliminary investment of time, monetary resources and human capital to set up co-management. Community awareness and sensitization, making institutional system and limit working of the fishing Communities does not happen inside a brief timeframe and these has more prominent cost of time and money related resources. As time pass a few people may lose persistence and desires henceforth less inspiration of being associated with co-management process. At long last, the co-management strategy includes different quantities of stakeholders which need to build up an agreement from an extensive variety of interests as an outcomes it diminishes the proficiency of co-management as much time required for basic leadership process and at some point result in weaker, and bargained measures.

2.5.2 Marx's Conflict Theory

Conflict theory originated in the work of Karl Marx, who focused on the causes and consequences of class conflict between the bourgeoisie (the owners of the means of production and the capitalists) and the proletariat (the working class and the poor). Focusing on the economic, social, and political implications of the rise of capitalism in Europe, Marx theorized that this system, premised on the existence of a powerful minority class (the bourgeoisie) and an oppressed majority class (the proletariat), created class conflict because the interests of the two were at odds, and resources were unjustly distributed among them (Bartos *et al.*, 2002).

Within this system an unequal social order was maintained through ideological coercion which created consensus--and acceptance of the values, expectations, and conditions as determined by the bourgeoisie. Marx theorized that the work of producing consensus was done in the "superstructure" of society, which is composed of social institutions, political structures, and culture, and what it produced consensus for was the "base," the economic relations of production (Alfazur, 1990).

Marx reasoned that as the socio-economic conditions worsened for the proletariat, they would develop a class consciousness that revealed their exploitation at the hands of the wealthy capitalist class of bourgeoisie, and then they would revolt, demanding changes to smooth the conflict. According to Marx, if the changes made to appease conflict maintained a capitalist system, then the cycle of conflict would repeat. However, if the changes made created a new system, like socialism, then peace and stability would be achieved (Galtung, 1971).

Social institutions like government, education, and religion reflect this competition in their inherent inequalities and help maintain the unequal social structure. Some individuals and organizations are able to obtain and keep more resources than others, and these "winners" use their power and influence to maintain social institutions. Several theorists suggested variations on this basic theme. Polish-Austrian sociologist Ludwig Gumplowicz (1838–1909) expanded on Marx's ideas by arguing that war and conquest are the basis of civilizations. He believed that cultural and ethnic conflicts led to states being identified and defined by a dominant group that had power over other groups (Irving 2007).

German sociologist Max Weber agreed with Marx but also believed that, in addition to economic inequalities, inequalities of political power and social structure cause conflict. Weber noted that different groups were affected differently based on education, race, and gender, and that people's reactions to inequality were moderated by class differences and rates of social mobility, as well as by perceptions about the legitimacy of those in power.

German sociologist Georg Simmel (1858–1918) believed that conflict can help integrate and stabilize a society. He said that the intensity of the conflict varies depending on the emotional involvement of the parties, the degree of solidarity within the opposing groups, and the clarity and limited nature of the goals. Simmel also showed that groups work to create internal solidarity, centralize power, and reduce dissent. Resolving conflicts can reduce tension and hostility and can pave the way for future agreements. In the 1930s and 1940s, German philosophers, known as the Frankfurt School, developed critical theory as an elaboration on Marxist principles. Critical theory is an expansion of conflict theory and is broader than just sociology, including other social sciences and philosophy. A critical theory attempts to address structural issues causing inequality; it must explain what's wrong in current social reality, identify the people who can make changes, and provide practical goals for social transformation (Horkeimer 1982). More recently, inequality based on gender or race has been explained in a similar manner and has identified institutionalized power structures that help to maintain inequality between groups. Janet Saltzman Chafetz (1941–2006) presented a model of **feminist theory** that attempts to explain the forces that maintain gender inequality as well as a theory of how such a system can be changed (Turner 2003). Similarly, **critical race theory** grew out of a critical analysis of race and racism from a legal point of view. Critical race theory looks at structural inequality based on white privilege and associated wealth, power, and prestige.

The researcher used the following conceptual model to demonstrate the relationship between the Independent Variables (Cause Variables), to determine the effect of co-management policy mechanisms, community perceptions and Challenges faced by Co-Management mitigating fisheries conflicts in Kenya.

The framework borrowing from Salayo *et al.* (2006), Charles (1992) and Bennet *et al.* (2001) depended on the driver-issue-intervention analysis that put into setting the flow of factors or variables that would address the objectives of the study. With regards to the study, the principal drivers of conflict fall into three classifications which are: policies institutions for governance and property rights, population increase and poverty and monetary or economic motivating forces/markets and new enhanced technology.

At the core of the conceptual framework is the key problem of overcapacity which is manifested in key issues of overfishing and environmental degradation. This ultimately results to fisheries conflicts the key problem of investigation in this proposed study. Fisheries conflicts were organized into five interrelated, comprehensive but not mutually exclusive categories which are: fishery jurisdiction, management mechanism, internal allocation, external allocation and conflict between fishers and those outside fishery.

Finally, the framework presents categories of management and policy interventions that would offer opportunities for addressing the issue of fisheries conflicts and excess capacity problem. This focus was intended to contribute to efforts of reducing excess fishing pressure and consequently ease conflict resolution or eliminate disputes and threats to security. This included strategies for exit from fisheries, review of policies and

institutions and information, education and communication. This framework illustrated in the Figure 2.2 below is important in addressing the three objectives of the study.

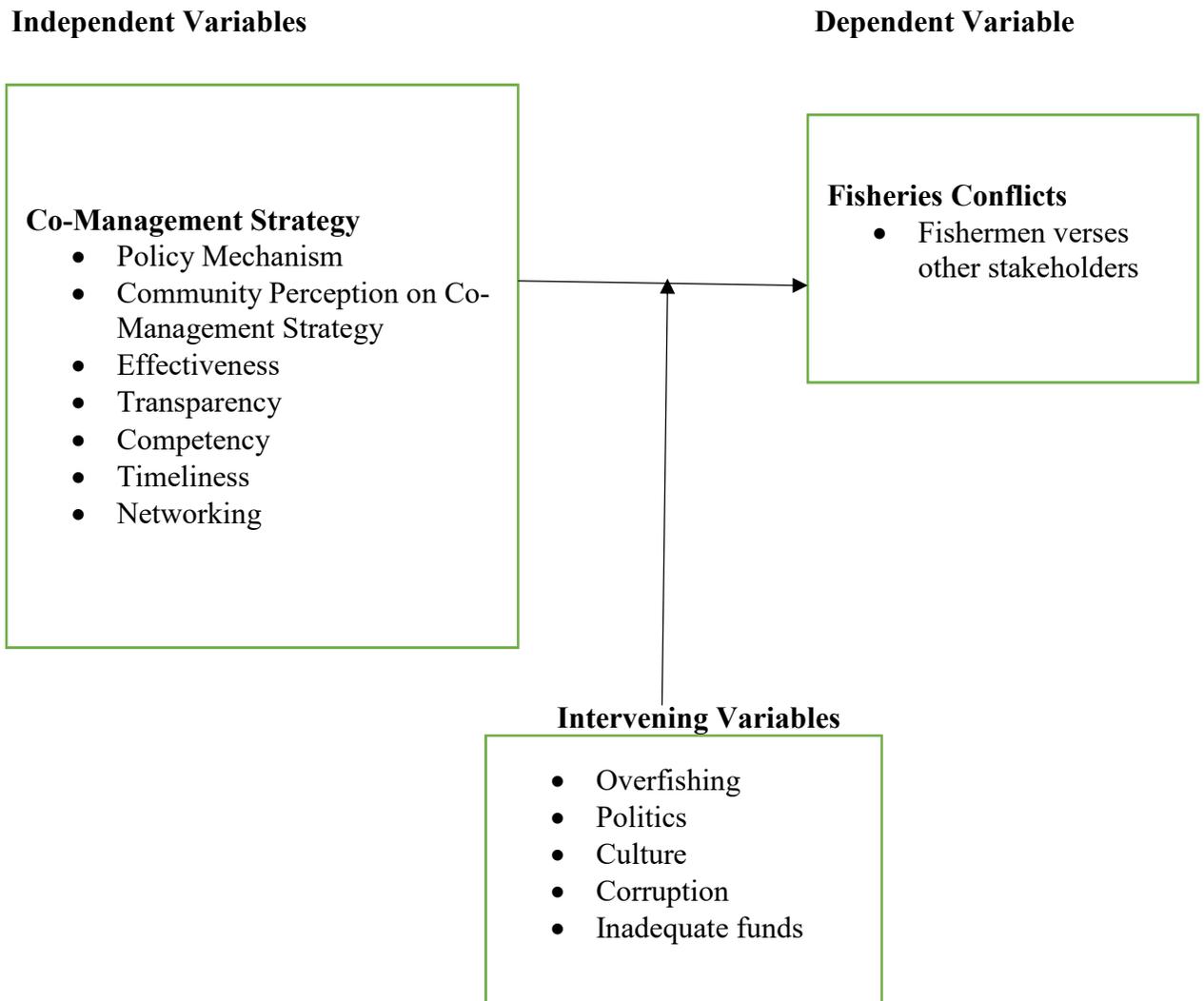


Figure 2. 3: Conceptual Model for Addressing the Issue of Fisheries Conflict with Reference to Homa Bay County
Source: (Author: 2016)

As can be seen from figure 2 above, Fisheries conflicts in Homa Bay County are being mitigated through the Co-Management strategy between the government department of fisheries and the fishing communities who have organized themselves into BMUs.

Politics, culture, corruption and inadequate funds intervenes on the effectiveness of the strategy in the mitigation of fisheries conflicts.

2.6 Chapter Summary

This chapter reviewed literature thematically basing on the three study objectives while revealing the gaps that the study aimed at addressing. It explored co-management strategy mitigating fisheries conflicts in Homa Bay County. It examined the community perceptions on co-management strategy. The challenges facing the co-management strategy in its application in mitigating fisheries conflicts in Homa Bay County are also evaluated and discussed accordingly. The study was drawn upon Common Property Theory in seeking to demystify the question of conflict and conflict management among the fishing population. Common Property Theory assumes that individual self-interest will not prevail over the best interest of community. The conceptual model drew the existent relationship between the three independent variables namely: Co-Management Strategy Policy Mechanism, Community Perception on Co-management Strategy and Challenges face by Co-Management Strategy with the dependent variable (Fisheries Conflict).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter present the methodological base for this study. Specifically, the following are addressed: the research design, study area, targeted population, sampling technique and the sample size, data collection methods, reliability and validity of the research instrument, data analysis and presentation techniques.

3.2 Research Design

This study employed descriptive research design to depict the participants in an accurate way. According to Kothari (2004) a descriptive research design is a scientific method which involves observing and describing the behaviour or subject without influencing it in any way. According to Mugenda *et al.* (2003), a descriptive research design determines and reports the way things are.

Also Creswell (2003) observed that a descriptive research design is used when information is gathered to describe people, associations, settings or phenomenon. Descriptive design was perfect in this study as the study was done within a limited geographical area and consequently it was strategically less demanding and less difficult to conduct. In concurrence with Kothari (2004), the design gave enough protection against inclination and helped to maximize quality and reliability. In agreement with Mugenda *et al.* (2003), the researcher considered cross-sectional approach; the study was undertaken within a specific point in time. As indicated by Kerlinger (1986), a research design is the

arrangement and structure of investigation so imagined as to get answers to research questions.

Orodho (2005) portrays a research design as an arrangement or the blue print of how the researcher plans to direct research. A study or research design is the arrangement of conditions for collection and examination of information or data in a way that intends to join combine relevance to the research reason with economy in method or procedure (Kothari, 2004). A research design in this way gives a sequential arrangement that indicates how the exploration or research is executed with a specific end goal to address the research questions.

The researcher found this approach appropriate because of the following reasons: First, it allowed analysis of the relations of variables under study using linear Regression. Second, there was greater flexibility in terms of money, time as well as avoiding the hardship of hunting for respondents more than once to high response rate; and a third preferred standpoint is that a lot of information was gathered without difficulty from an assortment of individuals.

3.3 Study Area

The area in which the study was conducted comprise Mbita, Mfangano, Lambwe, Central and Gwassii. The five divisions covering 1055 km² are located in Homa Bay County. The County lies between latitude 0°15' South and 0°52' South, and between longitudes 34° East and 35° East. The County comprises of sixteen islands, the biggest of which are Mfangano and Rusinga. The County's mainland and its sixteen islands cover an area of

3,154.7 km² with the water surface accounting for 11.3% of the total County area (see figure 3.1, page 148). Homa Bay County has a population of 963,794 with a population density of 371 per sq km (CIDP Homa Bay 2013 – 2017). The fishing communities in Homa Bay County comprise of a total of 3,600 households and are organized in 133 Beach Management Units (District fisheries office, 2010).

The Practical considerations that dictated the choice of study area were: Firstly, the county has the largest share of Lake Victoria in Kenya and normally, it is the greatest fish producer. Secondly, Homa Bay County has the most number of registered Beach Management Units and by extension the highest proportion of water surface accounting up to 11.3 % of the aggregate County area. Thirdly, a large portion of the fisheries related conflicts in the Kenya Lake Victoria region are enlisted or registered in Homa Bay County (Glaser *et al.*, 2013).

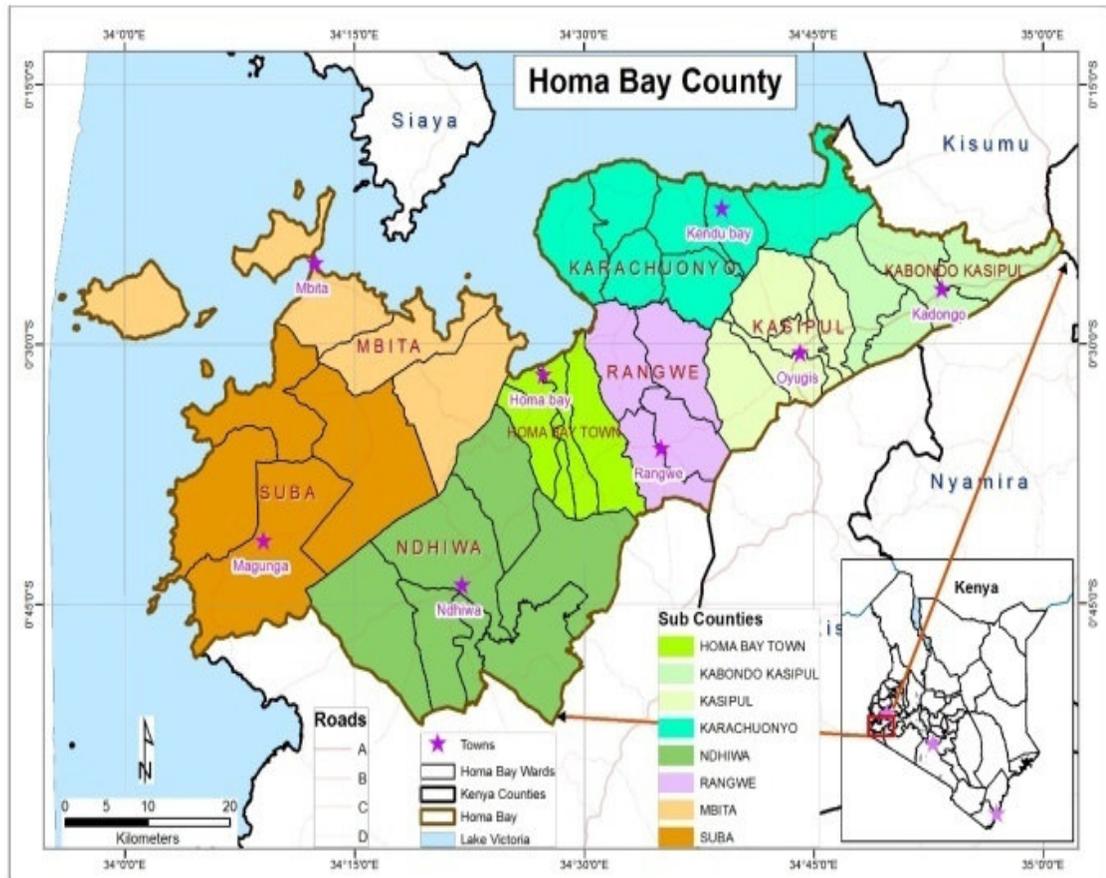


Figure 3. 1: Map of Homa Bay County
Source: (Homa Bay County Integrated Development Plan, 2013 – 2017)

3.4 Study Population

The study population of 18,300 comprised the following: fishermen; boat owners; fish traders; owners of the fishing gears; Fisheries Department staff and County Government staff. Homa Bay County has 133 Beach Management Units (DFO, 2010). These derive their livelihood directly from fisheries related activities and are registered members of these Beach Management Units (Homa Bay CIDP 2013-2017). The unit of analysis was individuals who are registered Beach Management Unit members.

3.5 Sampling and Sample Size

A sample design is a positive plan for getting a sample from a given population (Kothari, 2008). The study area was stratified into five primary sampling units namely Mbita, Mfangano, Lambwe, Central and Gwasssi. Demarcating the study area into divisions facilitated random sampling procedure that gave every unit in the population the same probability of being included in the sample so that the level of accuracy in estimating parameters is increased. Further, stratification reduced the cost of execution considerably and a probability sample was subsequently drawn within each stratum (division). Consultations were also made by relevant authorities to develop a good rapport and obtain up-to-date sample frames. The sample frame of the study include representative of individuals that drives their livelihood from the fishing industry. At least 30% of the total population is a good representative (Borg and Gall, 2003). Thus 30% of the accessible population was enough for the sample size.

Given the heterogeneity of the study population cluster sampling strategy was employed to select sample respondents. Using lists obtained from Beach Management Units (BMUs) as a sample frame, a total of 123 fishermen were randomly selected. From County Government Market Masters' Records of licensed fish traders, a total of 147 fish traders were randomly selected from the representative five divisions. Using lists of boat owners obtained from BMUs as a sample frame, a total of 67 boat owners were randomly selected. Lastly, using lists of owners of fishing gears obtained from the BMUs as a sample frame, a total of 53 fishing gears owners were selected. On the whole, a sample of 390 respondents was selected. Sample distribution is shown in Table 3.1 below.

Table 3. 1: Sample Distribution

Respondents Sample Areas (Divisions)	Fisher men	Boat Owners	Fish Traders	Owners of Fishing Gears	Fisheries Dept. Staff	County Govt. Staff	Total
Mbita	42	26	52	26	2	2	150
Mfangano	29	16	22	12	1	-	80
Lambwe	6	2	9	2	1	-	20
Central	18	6	29	5	1	1	60
Gwasssi	26	14	33	6	1	-	80
TOTAL	122	64	145	51	6	3	390

Source: (Field Data, 2016)

The members of the BMU chosen comprised community opinion leaders, leaders of CBOs and women groups from the study locations totaling up to 10. Casely *et al.* (1988), recommends 8-10 people to be used for discussion. This is a sampling method whereby the entire area is divided into systematic sub-areas in a descending order of magnitude (Mulusa, 1990). This is important in getting a representative sample from large area by accounting for variations in each level.

At phase one the researcher used purposive sampling to choose five divisions with the largest/greatest share of Lake Victoria in the county (80%), and therefore, they are the biggest fish producer. Secondly, these divisions have the highest number of registered beach management units with high fisheries related conflicts (FAO, 2011). Simple random sampling technique was used to select at least 40% of Beach Management Units from each division.

Averagely, there are about 100 registered members in each BMU DFO- Suba (2010). The population of the study was 18,300. Therefore, the sample size was of 389 registered individual members. The sample size was arrived at by the use of the Slovin's formula in Yamane (1967) which gives an improved formula to determine sample sizes. In this equation, a 95% certainty level and $p = 0.5$ are assumed.

$$n = \frac{N}{1 + N(e)^2}$$

Where: N = Population

n = Sample size

e = Level of significance $(0.05)^2$

1 = Statistical figure

Therefore,

$$n = \frac{18,300}{1 + 18,300(0.05)^2}$$

$$n = \frac{18,300}{1 + (18,300 \times 0.0025)}$$

$$n = \frac{18,300}{47}$$

$$n = \mathbf{389}$$

The sample size could have been expanded however the nature of problem is by all accounts similar for each situation. So the chosen sample size is assumed to be adequate. It is expected in this way, that the sample of 40% got was fairly representative of the beach

management unit members' perspectives on fisheries resource conflict. This is on account that this study was qualitative in nature and the sample size was smaller. Ritchie *et al.*, (2003) observes that there is a point of diminishing return to a qualitative sample, that is, as the study goes on more data does not really prompt more information. Qualitative research is additionally exceptionally labour intensive, and analyzing a huge sample can be tedious and often essentially impractical (Ritchie *et al.*, 2003).

3.6 Data Collection Methods and Instruments

Data types that were generated in this study were both categorical (nominal and ordinal) and numerical (interval and ratio). This included both primary and secondary data. Primary information or data comprised of direct depiction of any event by the researcher who carried out the research, while auxiliary or secondary data comprised of information from any publication written by an author who was not an observer or participant in the study portrayed.

3.6.1 Primary Data

This type of data was collected from original sources, that is, respondents from Homa Bay County. Several methods of data collection were used. This improved reliability and validity of the data collected (Moser *et al.*, 1971). The methods that were used are discussed below.

3.6.1.1 Interview Schedule

The study employed interview scheduled to get information from the key informants. Interview Schedule is a set of arranged or prepared questions planned to be asked exactly

as worded. Interviews schedules have a standardized design or format which means the same questions are asked to each interviewee in the same way and order. Interview schedules allows for probing, consequently taking care of the weaknesses of questionnaires. Two research assistants were recruited to interpret the interview schedules to the local community. The research assistants included both male and female so as to eliminate gender bias. The research assistants were recruited on the basis of having grown in the area and comprehend the area very well. Furthermore, they were required to have known the local language or dialect so that they could communicate well with the informants who could not comprehend Kiswahili. English was equally a necessary prerequisite since a few informants could communicate more suitably in English than the other two dialects. The preferred research assistants were undergrads.

Research assistants were given some short training, on how to conduct the interviews; this was particularly with regard to how the questions should be asked. This guaranteed some level of consistency in the type of data gathered. The instrument was checked, examined by both the supervisors and the experts and was found to be appropriate for the study.

3.6.1.2 Questionnaires

In this study questionnaires were used to get information from the respondents. Questionnaires are generally used when the respondents can be reached and are eager to cooperate. They are used to reach a large number of subjects who can read and write independently (Orodho, 2004). The questionnaires had both open ended and closed ended questions. According to Mugenda and Mugenda (1999), open ended questions enable

respondents to unreservedly give their perspectives and feelings and also recommendations. The closed ended questions enabled the respondents to give particular reactions or response required by the researcher.

Appendix I is the questionnaire for the registered members and FMIs Representatives respectively. Its Part A gathered Bio data. Part B focused on the forms of conflict and actors in conflict management whilst Part C assessed the institutions involved in the management of fisheries resources.

3.6.1.3 Observation Checklist

Observation schedules were used to evaluate exercises or actives that are really occurring in the fishing business and the fishing community at large. Appendix IV (page 279), the observation checklist was used to assess the availability of fisheries patrol boats, standard fishing gears, illegal fishing gears, FMI offices, legal framework (policies), records of fisheries cases, fishing boats, landing sites, bandas/fish stalls and middlemen trucks.

3.6.1.4 Focus Group Discussion (FGD)

A FGD is a type of a qualitative research in which a group of people are asked some information about their observation, assessments, convictions, and attitude towards a thought or point of interest. Questions are asked in an interactive group setting where participants are free to talk with other group members (Morgan, 1998). The FGD as a tool was used to collect data and information from the field. This tool was preferred in this situation since it minimized suspicion between researcher and respondents and verification of information through direct observation was enabled. Guide questions were

used by the researcher and respondents had an opportunity to present their memoranda during the discussions.

3.6.2 Secondary Data Collection

The data (for example, total population of the fishing community, Map of Homa Bay County, frequencies of fisheries clashes reported, sampling frames) were obtained from archival records. These include: research reports, County Development Plan reports, text books, business journals, web data and reports archived by different organizations engaged in the study as well as administration of fisheries resources.

3.7 Validity and Reliability of the Research Instruments

3.7.1 Validity

This is a measure of how well a test measures what it is supposed to measure (Kombo & Tromp, 2006). Nachmias and Nachmias (1996) also refer to validity as the degree to which a test or an instrument measures what it purports to measure. Construct validity was looked into by the supervisors who are knowledgeable with the theme of study. The researcher consulted with the supervisors and experts on the validity and found the research tools to be appropriate. This guaranteed the content validity in the instrument. They additionally commented on importance and any predisposition that could be on the tool to build the basis validity of the same (Kothari, 2004). In light of their response, the tool was adjusted accordingly.

3.7.2 Reliability

According to Mugenda and Mugenda (1999), reliability is the degree to which instruments give similar results for the same respondents over a common issue at different times. Reliability is concerned with consistency, dependability or stability of a test (Nachmias and Nachmias, 1996). The researcher ensured that the instruments were reliable and able to generate consistencies overtime even if used after the study period.

Reliability test was carried out using Cronbach's Coefficient Alpha using SPSS. This test validated the measuring instrument to determine its portability, structure and reliability (Kothari, 2004).

Cronbach's α is defined as

$$\alpha = \frac{N}{N - 1} \left(1 - \frac{\sum_{i=1}^N \sigma_{Y_i}^2}{\sigma_X^2} \right)$$

Where N is the number of components (items or testlets), σ_X^2 is the variance of the observed total test scores, and $\sigma_{Y_i}^2$ is the variance of component i .

Variables that did not correlate strongly (<0.7) were removed from the measuring instrument.

If the Cronbach's coefficient alpha is above 0.7, the value ordinarily required for descriptive research (Nunnally and Bernstein, 1994), it shows attractive dependability (Nunnally and Bernstein, 1994), it indicates satisfactory reliability. If not, then the researcher was to call for revision to meet this threshold level.

The study carried out the reliability testing prior to data analysis and the following findings were recorded as presented in Table 4.1. The study observed that all the variables were able to meet the minimum value of 0.7 coefficients to indicate that they were fully reliable. Co-management Policy Mechanisms (CPM) had a relatively higher reliability coefficient of 0.878 from 5 items considered while Community Perception (CP) was observed to have a slightly lower reliability coefficient of 0.875 from 6 items and Co-management Challenges had a coefficient of 0.700 with 10 items. The three factors therefore realized reliability coefficients greater than 0.700 (0.878, 0.875 and 0.700), an indication that the factors had high consistency and ability to measure the views of the respondents and could be generalized to reflect opinions of all respondents in the target population.

3.8 Data Analysis and Presentation Techniques

Baxter & Babbie (2004), explain that data analysis is essential in research since it brings logical and observational aspects together in the search for patterns in what is observed. Data collected in this study was arranged according to themes and research questions. The analysis was both qualitative and quantitative. The raw data acquired from the surveys was checked for blunders, clarity and consistency before being coded for analysis. The Statistical Package for the Social Sciences (SPSS) tool was used to code, compose and break down both quantitative and qualitative data. The primary advantage of SPSS is that it incorporates numerous approaches to control quantitative information and containing most factual measures (Neuman, 2009). Numerous descriptive and inferential statistics were used to break down or analyse the data either on individual variable or all variables together. The descriptive analysis incorporated the mean, rates (percentages) and standard deviation. The data was edited both in the field and in the office for accuracy and

completeness and then and tabulated on the basis of various objectives and variables that measure them. Descriptive statistics was generated to build a picture of the respondents' characteristics for three objectives; qualitative data was typed and analyzed by emerging or predefined themes in line with overall information needed.

The inferential statistics used incorporated the simple regression model technique. The data was presented in form of pie charts, figures and tables. Normality test was carried out on the dependent variable (Fisheries conflict) and the residuals. Multiple linear regression analysis was done on SPSS to discover the rate of progress of factors in connection to changes in each other. From the result, the model of goodness of fit (how well the model fits the data) was built up and statically coefficients.

The key statistical model that was used for this study was the simple linear regression model as illustrated below. Table 4.1 provides a further breakdown of the regression model into specific hypotheses under test.

$$Y = \beta_0 + \beta_i X_i + \varepsilon$$

Where: Y = Fisheries conflicts;

$\beta_1, \beta_2, \beta_3$ = Coefficients of independent variables X_i ;

Independent Variables:

CPM=Co-management Policy Mechanisms (X_1);

CP= Community perception (X_2);

SEC= Social economic challenges (X_3)

ε = error term which is assumed to be normal in distribution with mean zero and variance σ^2 .

The study used graphs, tables and pie charts to represent information and facts from the variables under study. These presented visual impressions of meanings and/or information that could be hidden within the data. The researcher tabulated the findings and calculated frequencies and percentages on each variable under study whilst making relevant interpretations for the qualitative data.

3.9 Ethical Considerations

Care was taken to ensure strict observance of Ethical Principles, standards and codes. For example, every participant in the study was notified of the aims, methods and benefits of the research and his/her right to refuse to participate in the research or even terminate participation at any time. No pressure or inducement of any kind was used to encourage individuals to participate in the study. Identity of participants was kept strictly confidential, and at the end of the study, any information that could reveal the identity of the participants was destroyed.

In addition, information revealing the identity of any participant was not included in the final report. Lastly, any items that were judged to be highly intrusive, offensive and immoral were avoided and, interviews and group discussions were conducted in confidence.

3.10 Limitations of the Study

During the study, various challenges were experienced. Some areas within Homa Bay County were inaccessible given the poor road networks. The existing roads linking

beaches to the main tarmac road are so badly maintained that they are impassable especially during the rainy seasons. It was noted that this could have affected the coverage and data collection. To surmount this challenge, other alternative means of transport like the motor cycles and bicycles were used.

The language barrier was another limitation. This was addressed by working closely with research assistants who effectively communicated in the local language.

Another limitation of this study was that the research findings may not be generalized across all BMUs along Lake Victoria. This problem was mitigated by trying to involve two BMU in every division.

Further, the focus of the study was registered members of BMUs and there were other lake users who were not registered members and were also the source of conflict. The use of opinion leaders helped to bridge this gap.

The weather also played a large role in determining the amount of interviews we could do in a day. On rainy days there would be no fishing and many people simply stayed at home. Whilst most people were happy to invite us for interviews it was often on the recommendation of our translator and guide. On the other hand on days that were hot and still and provided perfect diving and fishing weather, many of the divers and fishers did not want to be interviewed as they wanted to use as much of the daytime to catch as many fish as they could. This challenge was overcome by seeking appointment with them during their free time.

Quite a number of the respondents felt that the questions were a bother and sheer wastage of their time. To overcome this limitation, the main objective of the research exercise was, in all cases, explained clearly an effort to enlist the cooperation of the fishing community, opinion leaders and the BMUs officials.

3.11 Chapter Summary

This study was carried out in Homa Bay County, Kenya. The data collection was done by use of questionnaires, interviews, FGDs as well as observation checklists. The research design was a descriptive. This design enabled the researcher to describe the state of Co-Management Strategy as it is in Homa Bay County and to make interpretation of its influence on conflict management. The data collection and analysis processes were subjected to the necessary logistical and ethical considerations as prescribed by the university and the Ministry of Higher Education. The discussions of the findings of this research are presented in the subsequent chapters alongside the conclusions and recommendations.

CHAPTER FOUR

EFFECTIVENESS OF CO-MANAGEMENT STRATEGY IN MITIGATING FISHERIES CONFLICTS IN HOMA BAY COUNTY

4.1 Introduction

This chapter reports the findings related to objective one, that is, whether co-management strategy is effective in mitigating fisheries conflicts.

The items that fulfilled the threshold based on Cronbach's alpha were aggregated by taking their averages. Table 4.1 is a summary of the study variables descriptive.

Table 4. 1: Study Variable Descriptives (N=389)

Independent Variables	Cronbach's	Number of	Mean	Standard
		Items		Deviation
Co-Mgt. Policy Mechanisms (CPM)	0.878	5	3.6848	.8316
Community Perceptions (CP)	0.875	6	2.7171	.7381
Co-Mgt. Challenges (CC)	0.700	10	2.7995	.4063

Source: Survey Data, 2016

Normality Test

In this research numerous or multiple regression analysis were carried out. Regression could best be evaluated if the fundamental presumptions of different regression were achieved. To decide whether information was normally distributed, Kolmogorov-Smirnov and Shapiro-Wilk tests were carried out. The outcomes are appeared in Table 4.2.

Table 4. 2: Tests of Normality (N=389)

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Co-Mgt. Policy Mechanisms	.313	389	.000	.734	389	.000
Community Perceptions	.100	389	.000	.971	389	.000
Co-Mgt. Challenges	.141	389	.000	.906	389	.000
Conflicts	.108	389	.000	.942	389	.000

a. Lilliefors Significance Correction

Source: Survey Data, 2016

Conferring to (Bryman and Bell, 2015), if a test is non-significant ($p > 0.05$) it means that the distribution of the sample is not differently significant from any normal distribution. However, if the test is significant ($p < 0.05$) then the distribution is significantly different from the normal distribution, meaning that it is not normal. Table 4.2 shows that the results were significant even after transformation. This therefore means that the distribution was different from normal.

To validate or verify the level of departure from normality Q-Q Plots were carried out. The Quantile-Quantile (Q-Q) plot which is a graphical method of determining if two data sets come from populations with a common distribution was applied in the study. The results were shown in **Figure 4.1; 4.2; 4.3; 4.4; and 4.5** respectively.

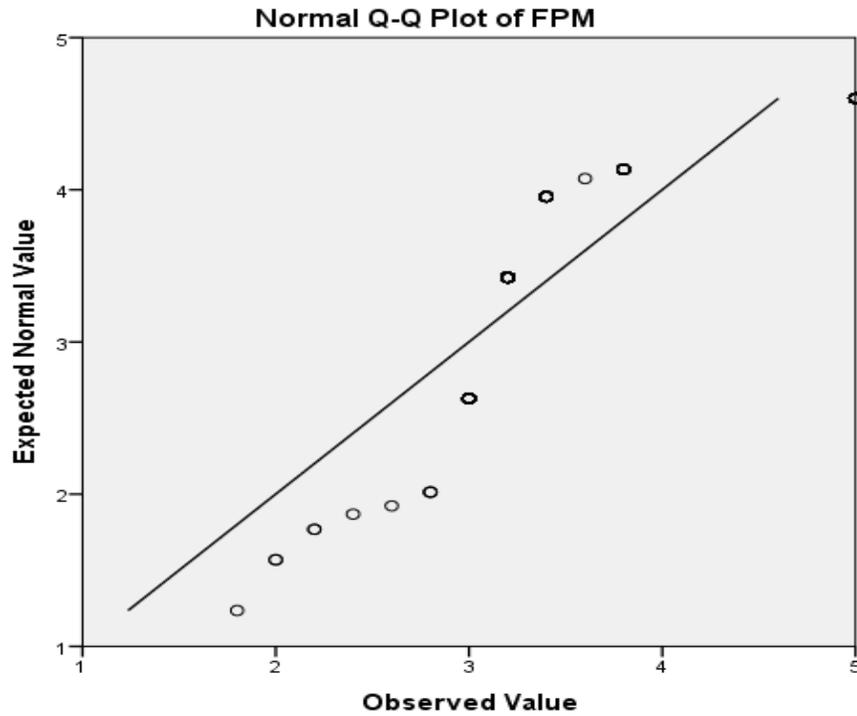


Figure 4. 1: Q-Q Plot of Co-management Policy Mechanisms

Source: Survey Data, 2016

Figure 4.1 indicated that the departure from normal for Co-management Policy Mechanisms was not much, showing that the data was almost close to normal and could therefore be employed to run the regression.

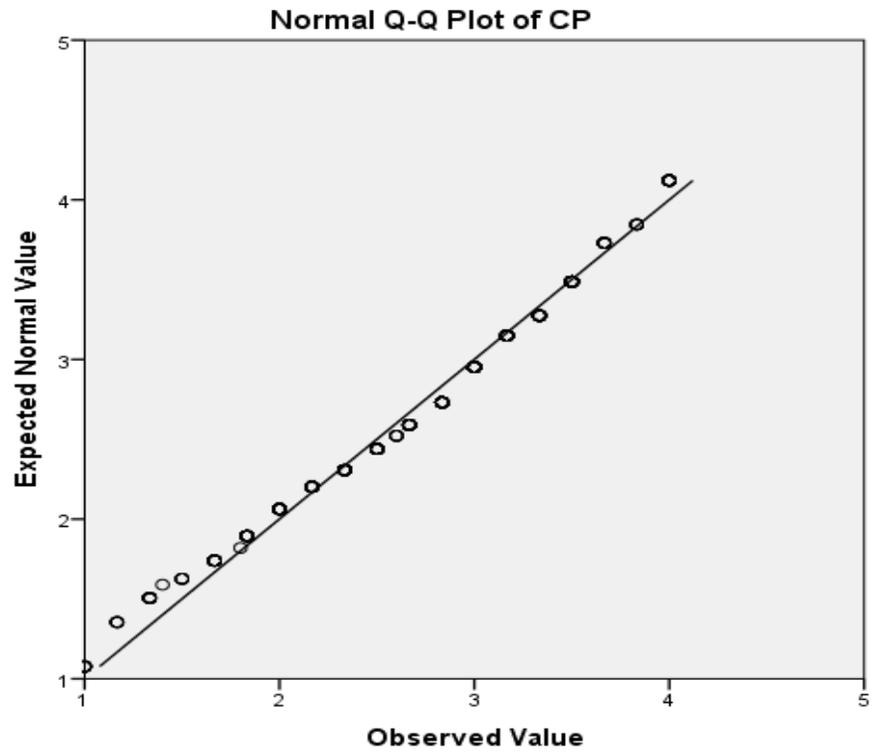


Figure 4. 2: Q-Q Plot of Community Perception

Source: Survey Data, 2016

Figure 4.2 showed that Community Perceptions was distributed along the normal line indicating that the data was suitable to run the regression.

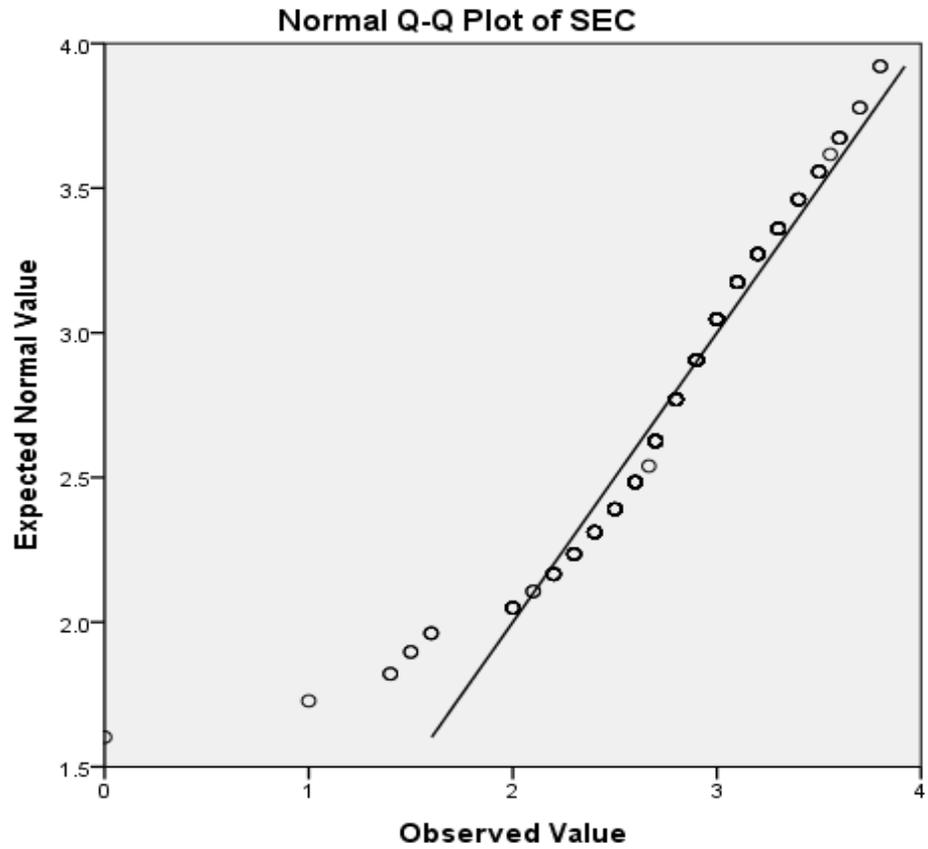


Figure 4. 3: Q-Q Plot of Co-management Challenges
Source: Survey Data, 2016

Figure 4.3 showed that Co-management challenges were distributed along the normal line indicating that the data was ideal to run the regression.

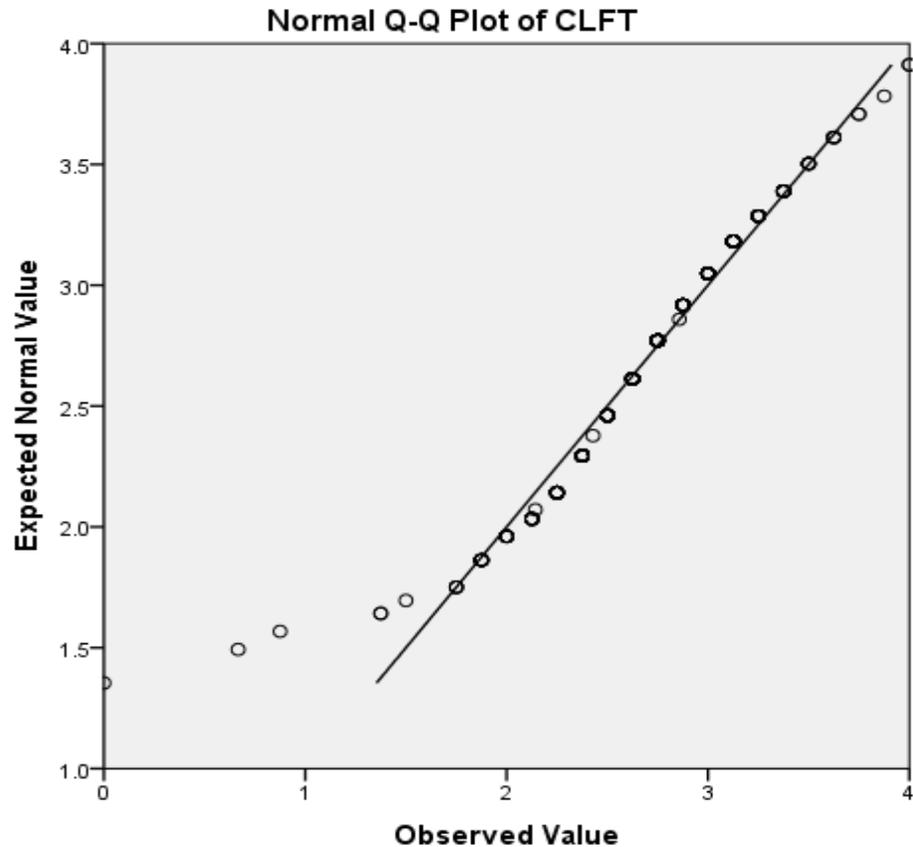


Figure 4. 4: Q-Q Plot of Fisheries Conflicts
 Source: Survey Data, 2016

Likewise, Figure 4.4 showed that the departure from normal for Fisheries Conflicts was normal and therefore could be used to run regression analysis. An observation of the visual representation of the Q- Q Plot indicated that the data was approximately normally distributed to allow for regression analysis to be carried out.

Test for Multicollinearity

A test for multicollinearity was carried out for the four variables as shown in **Table 4.3**. The Variance Inflation Factor (VIF) is the reciprocal of the Collinearity Tolerance. Multicollinearity occurs when two or more predictors in the model are correlated and

provide redundant information about the response. Tests to determine if the data met the assumption of collinearity indicated that multicollinearity was not a concern, (Co-management Policy Mechanisms, Tolerance = .980, VIF = 1.020; Community Perceptions, Tolerance = .978, VIF = 1.022; Co-Management Challenges, Tolerance = .967, VIF=1.034). The values obtained were within the recommended range of 1-3 (Bryman, 2012), thus ruling out the problem of multi-collinearity among the variables.

Table 4. 3: Results of Multicollinearity Test^a (N=389)

Variables	Collinearity Statistics	
	Tolerance	VIF
Co-Mgt Policy Mechanisms	.980	1.020
Community Perceptions	.978	1.022
Co-Management Challenges	.967	1.034

Dependent variable: Fisheries Conflicts

Source: Survey Data, 2016

4.2 Socio-demographic Characteristics of the Respondents

4.2.1 Age of the Respondents

From the Figure 4.5 below, most of the respondents were persons between ages 26 and 35 (40%); followed by persons between and 18 and 25 (27%), then persons between the ages of 36-45 years at 19% and lastly, persons of ages 46 and above only constituted 14%. This is an indication that majority of fishermen are young and energetic.

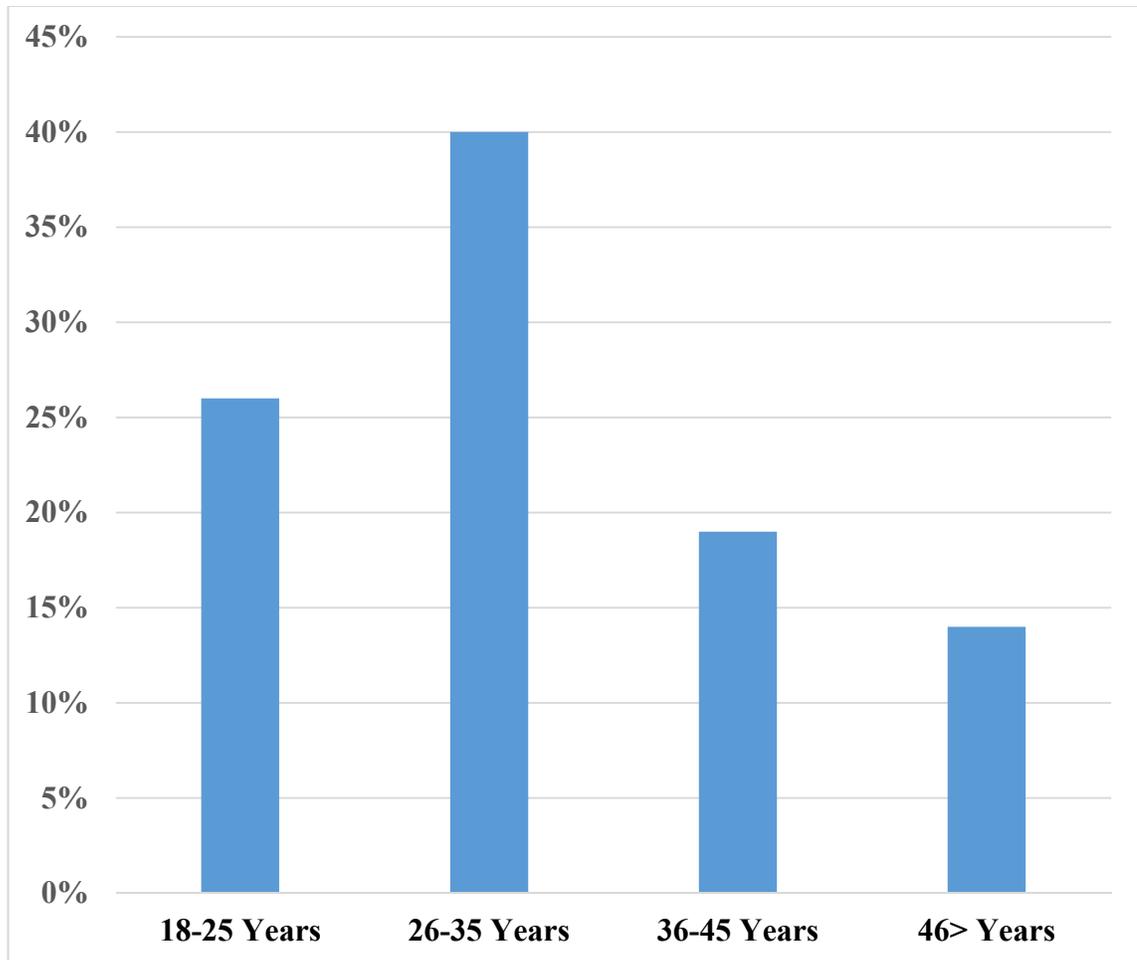


Figure 4. 5: Age of the Respondents
Source: Survey Data, 2016

4.2.2 Gender of the Respondents

As can be seen from the Figure 4.6, 84% of the respondents were male while 16% were female. This shows that the male dominates the fisheries industry. This was different from what was anticipated of gender balance. More so, the study also noted that women could not answer or provide some information since their husbands were representatives of their family and had to answer interview's questions as that was their (husbands') responsibility. In such rural areas, women tend to be still shy, inactive and hesitant.

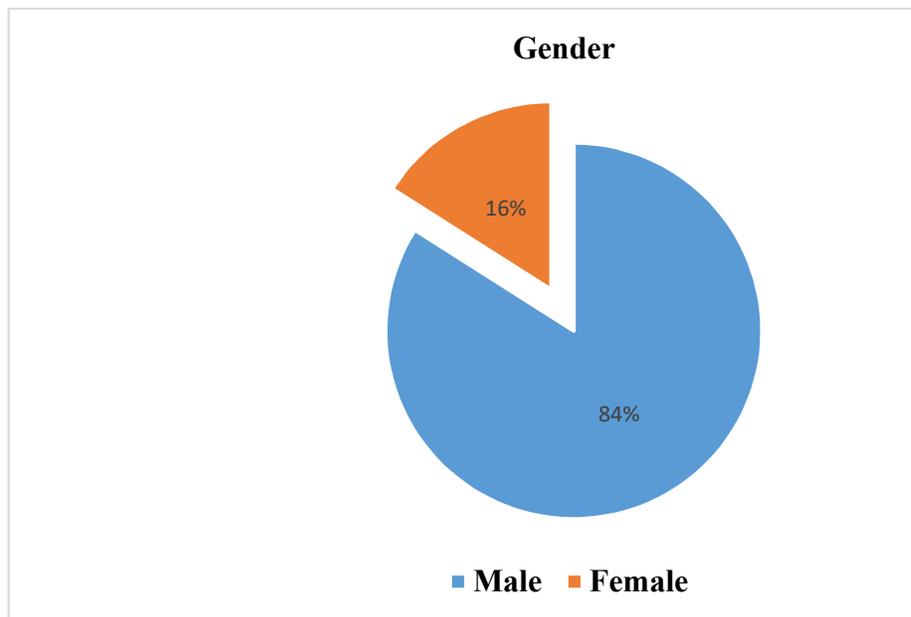


Figure 4. 6: Gender of the Respondents

Source: Survey Data, 2016

4.2.3 Marital status

Marital status of the respondents was key in this study since it informed on the basis of sex for free fish (prostitution), and status of the same was shown as in the Figure 4.7 below, a majority (71%) of respondents were married. On the other hand, 20% of the respondents were single, 6% widowed while 1% and 2% were divorced and separated respectively. These shows fishing activity is dominated by those who are married. However, during interviews and FGDs it was also mentioned that some marriages are temporary for conveniences. Some women also engage in such marriages because of free fish.

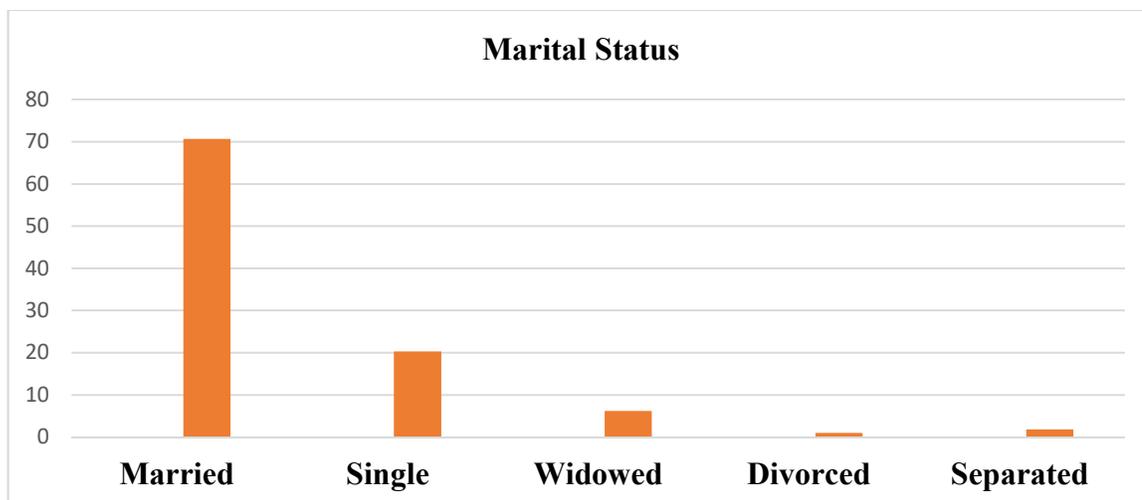


Figure 4. 7: Marital status
Source: Survey Data, 2016

4.2.4 Level of Education

Education level is a very important indicator for evaluating level of understanding/awareness of rules and regulations in the fishing industry.

The results in Table 4.4 show that a majority (63%) of the respondents were primary school leavers, 30% were secondary school leavers, 6% attained tertiary education whereas 1% had no education. The number of the fishermen declines when one climbs the educational ladder. This is the reason why majority of fishermen are primary school leavers.

Table 4. 4: Level of Education of registered members of beach management units (N=389)

Level of Education	Percentage
No Education	1
Primary	63
Secondary	30
Tertiary Level	6
N	100.0

Source: Survey Data, 2016

4.2.5 Kind of activity undertaken at beach

Table 4.5 illustrates the activities undertaken at the beaches. For example, 50% of the respondents were fishermen, followed by fish traders at 20%, fishmongers at 15% while boat owners and fishing equipment dealers at 8%, fishing equipment dealer at 3.1% and local gear maker at 3.6% respectively.

However, when the respondents were probed further, majority of them said that apart from fishing business they are also involved in other activities such as farming, trading and cattle keeping supplementing their earning from fishing activities.

Table 4. 5: Kind of activity undertaken at beaches (N=389)

Activity	Percentage
Boat Owners	8
Fishermen	50
Fish traders	20
Local gear makers	3
Fishing equipment dealers	4
Fish Mongers	15
N	100.0

Source: Survey Data, 2016

4.2.6 Period of registration by the BMU

Concerning the duration of being registered as a member of Beach Management Unit (BMU), the responses are as discussed below.

Table 4. 6: *Period registered by BMU (N=389)*

Period	Percentage
0-1 year	11
2-5 years	32
6-10 years	22
Over 10 years	35
N	100.0

Source: Survey Data, 2016

From Table 4.6 show that, 35% of the respondents said that they have been registered for more than 10 years, 32% of them have been registered 2 to 5 years, 22% have been registered been 6 to 10 years while 11% had on been registered for not more than 1 year. This shows that majority of the respondents have been registered in the BMUs for more than six years.

Even though the socio-demographic features were not directly major concern of the study, the study found it appropriate to include and briefly discuss them to bring out clearly some issues that otherwise would have not been known. There are in fact various reasons to do so. Most importantly, now and again it may be basic to know who is filling in your questionnaire. For example, if a study focuses on a population, it enables you to decide if you are really achieving your intended interest group and notwithstanding of whether one is collecting the data he/she is viably seeking. Besides, in the event that you go for a

representative sample of a populace, knowing the appropriation of the statistic qualities of your respondents will encourage you in determining how close the sample replicates the population.

Second, if sample sizes are sufficiently large, it empowers the researcher to separate between various sub-groups. This division may offer the researcher bits of knowledge that he may have missed by just taking a general data. For example, one may reason that his workers are generally happy with their career opportunities in his organization. Nevertheless, the total information may shroud the way that the workers of the IT office are not all happy with their career opportunities.

As often there are clear contrasts in assessment between respondents with an alternate educational level. Moreover, educational level – by and large solicited as 'the highest level of education' – is likewise frequently used as an intermediary for income. For case, a few respondents are not very significant on 'openly' talking about their income, regardless of whether it is an anonymous study.

In this study, the demographic characteristics examined include gender, age, education level, nationality.

Socio-demographic characteristics are important in this study since it helps in knowing the behaviour of respondents and getting information from the respondents. For example, Level of education was important since it helps in language, reasoning and objectivity. Respondents with high level of education were of more help in giving unbiased

information. Also, it is argued that the educational level provides an impression of the respondent's income, or more largely its socio-economic status (SES).

Gender also informed the study as to why majority of fishermen are male. This is a cultural issue as females are to participate majorly in selling and working on the already caught fish. More so, the study also noted that women could not answer or provide some information since their husbands were representatives of their family and had to answer interview's questions as that was their (husbands') responsibility.

Age informs the roles of participants, their likings and disliking in the fishing industry. It also informs the study the majority or minority age in the fishing industry and different roles of different ages. It was moreover established that the way unique ages see issues are very different and made the study to conceive rational judgment.

4.3 Co-Management Strategy Policy Mechanisms that Mitigates Fisheries Conflict in the Homa Bay County

This section concentrated on objective one of the study which was to examine the effectiveness of Co-management Policy Mechanisms on Fisheries Conflict mitigation in Homa Bay County.

To examine the influence of Co-management Policy Mechanisms on the Fisheries Conflict, the study considered various Fisheries Policy mechanism indicators observed among the respondents.

Respondents commented on their extent of agreement with Co-management Policy mechanism undertakings and issues presented to them on a Likert scale where: (5) presents Strongly Agree; (4) Agree; (3) Neutral; (2) Disagree; (1) Strongly disagree. Table 4.7 shows the outcomes of that probe. The extent to which Co-management Policy Mechanisms were applied was indicated by the percentages and the mean scores while the variance on Fisheries Policy mechanism characteristics was indicated by the standard deviation. A higher standard deviation was an indication of higher variation, while a standard deviation of less than one (1) indicated less variation. For the purpose of this study, a mean score of above 4.2 implied that a particular Co-management Policy mechanism dimension on fisheries was applied to a great extent.

Table 4. 7: Descriptive Statistics of Co-management Policy Mechanisms (N=389)

	Mean	Standard Deviation
Does the Government have a fisheries policy?	2.89	1.540
Is there legal support when conflict arises?	2.84	1.342
Are Fishermen are aware of fishing policies?	0.76	.538
Are Fishermen involved in Policy implementation?	0.79	.636

N=389

Source: Survey Data, 2016

A mean of between 2.60 and 3.40 was considered to be moderate while that of below 1.80 showed that a Fisheries Policy mechanism dimension had not been applied to a great extent. Table 4.7 shows the mean and standard deviation for the Fisheries Policy mechanism study variable.

4.3.1 Government Fisheries Policy

With respect to whether the government have fisheries policy, a mean of 2.89 was realized thus showing that the respondent were in agreement that the government do have fisheries policies. Indeed it is true that the government has fisheries policy. For example, GoK (2008) states that the policies of co-management is to enhance the oceans and fisheries sector's contribution to wealth creation, increased employment for youth and women, food security, and revenue generation through effective private, public and community partnerships. This policy focuses on the promotion, implementation and monitoring of sustainable management and responsible fishing practices. Similarly, it emphases on the promotion of fish consumption as a way of increasing food security, employment, income, foreign exchange earnings arising from trade and related activities. It aims at securing the rights of vulnerable and traditional fisher communities.

A Community-Based Fisheries Management Committee (CBFMC) is as a local advisory group, designed in a fishing community, in view of existing traditional administration authority and local government structures, lawfully engaged by Common Law, and including all partners, to regulate the administration and improvement of the fishing business. The genesis of the CBFMCs was derived from Department of Fisheries' (DoF) interest in ensuring a more sustainable national fishery resource through co-management

(FAO, 2004). Villages in Central Region (where CBFM has been most fully implemented) reported a greater decrease in conflicts than any other region.

4.3.2 Legal support

Likewise, for legal support when conflict arises the mean was 2.84, they were somewhat moderate indicating that legal support is not provided when conflict occurs hence not mitigating the fisheries conflict. It is true that there are legal support when conflict arises. Better fisheries as stated in the Kenya Fisheries policies reduces overfishing and conflicts within the fisheries sector. For instance, (MFA-Iceland, 2007) asserts that in Iceland, the policy state that breaches of law and regulations on fisheries management are subject to fines or revoking of the fishing license, independent of whether such conduct is by purpose or carelessness. Major or repeated deliberate offenses are liable to up to six years imprisonment. In the event that a catch of a vessel surpasses the permissible catch of the said vessel of individual species, the relevant fishing organization must get an extra catch portion for the relevant species. In the event that this is not done within a specific timeframe, the fishing license might be renounced and also a charge being paid for the illicit catch. This strategy consequently, instills discipline among the fishing communities. However, Legal framework in Homa Bay is facing some challenges. Some of the respondents said that current legal frameworks are faulty and should be improved. They suggested that they should be involved policies that inform the frameworks.

4.3.3 Awareness of fisheries Policy

Concerning whether fishermen are aware of fishing policies had a mean of 0.76, as shown in table 4.7, which is a strong indication that they were not aware of the fishing policies.

Policy implementation involvement by the fishermen had a mean of 0.79 an indication that they were not involved in the implementation of policies. At Nyagwethe, Komogo Beach in Gwasssi Division, one of the fishermen participating in a FGD said:

We hear that there are policies put in place to guide on the conduct of fishing activities in this lake (L. Victoria). However, none of us apart from the two one who carried his hand when this question was raised have been involved in the formulation of fisheries policies. So to, many *hizo ni sharia zao na sio zetu* (those are their laws and not ours).

The respondent was suggesting that most of them have not been involved in the formulation of fisheries policy. Department of fisheries should involve the fishing community through BMUs and public barazas. This will make the fisher community to own the policy decisions.

4.3.4 Involvement of fishermen in Policy Implementation

Involving the community in the implementation of the fisheries policies is very important. For example, Mensah *et al.* (1993) argue that, the implementation of management mechanisms instituted by the government is often a source of greatest conflicts between fishers, fishing vessel owners and government fisheries administrators in Ghana. Mensah *et al.* (1993) further observe that need for permit to import fishing vessels for example leads to conflicts between new entrants and administrators. Other management mechanisms that exacerbate conflicts include: prohibition of illegal fishing gears, limited entry to 30 meters depth, and prohibition of use of herbs and chemicals and internal and external allocation mechanisms (Bennet, 2002).

When the fisher folk are encouraged to manage their own affairs then the work of fisheries management becomes very easy. The concept of co-management is very appropriate due to the fact that it is cheap on the side of government and effective since the fishermen are able to resolve their problems amicably. Because of these reasons, government should encourage the fishing communities to organize themselves into BMUs. This will help the fisher folk to come up with laws that helps them to govern themselves since many of the respondents said that the government rarely involve them in during the policy formulations.

The complexity of fisheries sector is what led to the introduction of co-management in the fisheries sector. For instance, scholars such as Mason & Mitroff (1981); Wilson (2003) have argue that shifts have been made from top-down management approaches via co-management or no-management to governance approaches as fisheries crises are from time to time called complex as there is not only disagreement about solutions but also about the nature of problems. The end result of this is that traditional methods of dealing with problems (that is, where difficult issues are often considered an intellectual design question and are approached by giving research and science a central role) no longer be adequate and the fisheries sector notably is characterized by vagueness, diversity, complexity and dynamics (Kooiman & Bavinck, 2005).

GoK (2008) states that the policies of co-management is to enhance the oceans and fisheries sector's contribution to wealth creation, increased employment for youth and women, food security, and revenue generation through effective private, public and community partnerships. This policy focuses on the promotion, implementation and

monitoring of sustainable management and responsible fishing practices. Similarly, it emphasizes on the promotion of fish consumption as a way of increasing food security, employment, income, foreign exchange earnings arising from trade and related activities. It aims at securing the rights of vulnerable and traditional fisher communities. This policy further states the Government's commitment to promote gender equity, and to integrate HIV and AIDS prevention and management. Gender equity is very important as it will discourage retrogressive culture that did not allow women to go fishing or walk near fishing net as it was seen as a bad omen since they could pass or jump over fishing net during their menstrual period resulting to poor catch. This belief disadvantaged women. Good policies will also discourage the issue of *jabo* (that is, sex for free fish or prostitution) that spreads HIV and AIDS as reported during the FGDs.

Concrete fisheries policies are great in overseeing fisheries sector. For instance, Coffey (2000) states that: Unlike numerous different divisions, notwithstanding, the fisheries sector additionally especially subordinate upon a healthy ecosystem for its own actual survival. The reviving of fish stocks depends not just on the presence of sound spawning stock, yet additionally on clean water, satisfactory nourishment (food) supplies, and available generating or nursery zones to help propagation and early life cycle stages. Farmed fish additionally rely upon the accessibility of clean water.

It is along these lines in light of a legitimate concern for both the environment and the fisheries part to guarantee that marine or freshwater ecosystem are kept up in a way that grants manageable creation. In this way, the manner by which the fisheries sector develops is controlled by the European Union's Common Fisheries Policy.

Lastly, good fisheries policies reduces overfishing and conflicts within the fisheries sector. For instance, (MFA-Iceland, 2007) in Iceland, the policy state that breaches of law and regulations on fisheries management are subject to fines or revoking of the fishing license, independent of whether such conduct is by purpose or carelessness. Major or repeated deliberate offenses are liable to up to six years imprisonment. In the event that a catch of a vessel surpasses the permissible catch of the said vessel of individual species, the relevant fishing organization must get an extra catch portion for the relevant species. In the event that this is not done within a specific timeframe, the fishing license might be renounced and also a charge being paid for the illicit catch. This strategy consequently, instills discipline among the fishing communities. In Homa Bay County, FMIs has endeavored to limit the use of terrible or bad fishing gears. The fisheries department has restricted the use of some fishing gears relying upon the inches of the fishing nets. Those nets which catch even underage fish are seized, pulverized or destroyed and where arrests are made, the guilty parties are arraigned in a court of law. The latter has made the fishermen to be more cognizant with the sort of fishing gears they are using.

4.3.5 Involvement of the fishing community in policy formulation

Concerning the respondents' involvement in the formulation of fisheries policies, they (respondents) gave their responses as discussed below.

Table 4. 8: Respondents' Involvement in formulation of fisheries policies? (N=389)

Response	Percentage
Yes	38
No	62
N	100

Source: Survey Data, 2016

From Table 4.8, 62% of the respondents said that they have not been involved in the formulation of fisheries policies whereas only 38% of the respondents said that they have been involved. This is an indication that the government is doing badly in the involvement of the fisher folk in policy formulation. The research assumed that fisheries conflict exist because many fishermen and other shareholders are not involved in the formulation of the fisheries polices. This therefore calls for more involvement of all the stakeholders in the formulation of fisheries policies.

However, a few (38%) of the respondents who had been involved in the formulation of policies cited some of the policies they formulated. This is a contradiction of the assertion of previous scholars such as (Salayo *et al.*, 2006) who states that when the fishing community are involve in the fisheries policy formulation then they will have to respect these laws since they (fishermen) will have a sense of ownership. This is part of Participatory administration. Also Sen and Nielsen (1996) states that Co-management is the sharing of basic leadership, decision-making and duty regarding the administration of resources between the community (local fishers) and government centralized management. Therefore is paramount for the government to involve the community in the policy formulation. Runge (1996) and Ostrom (1992) also states that field work and theory is converging to demonstrate that where traditional institutions are given the opportunity

and the resources to build up their own particular management frameworks and residency administrations they are well ready to do as such.

It is only prudent enough to involve the community in decision on matters affecting them directly. That is the reason why Adams *et al.*, (1988) and Goodin (1996) are in common agreement that for appropriate co-management to exist, the fishing community ought to be associated with the approach detailing for that is what will make the community to consider important the procedure of co-management of fisheries division. From the time immemorial, community have attempted supervised common resources, for example, woodlands, streams and bow-holes. Adams *et al.*, (1988); Goodin (1996) also point to the way that community in the past had powerful organizations or institutions to manage resources and that these establishments are in a few place dynamic and effective today.

The 38% that have been involved in the policy formulation suggested the following to be implemented to help in curbing fisheries conflicts:

That there should be construction of more Fish Bandas/stall so that all catches must be sold at Fish Bandas/stalls, that is, direct buying from the fishermen should not be allowed. The respondents also suggested that all catches must be weighed at the Fish Bandas/stalls and must be taxed by the BMUs and it should be the responsibility of the BMUs to control fish prices.

The respondents suggested that election of BMU official should be regular, free and fair to build confidence of the fishermen and other people dealing in fishing related activities.

This will greatly mitigate fisheries conflicts in Homa Bay County as fish dealers will have faith in the leaders.

It was also said that all that all operators or fishermen must have Identity Cards (IDs); must be registered; licensed and most importantly must have welfare. All new or transferring fishermen must present their BMU transfer letter to the officials of his new BMU. The BMUs were to further ensure that all operators in the fishing industry must be regulated.

Another policy suggested by the respondents was that there should be fishing quotas for a number of specific nets and that all of those who use bad fishing gears/equipment, chemicals and those found stealing others fishing gears must be arrested and prosecuted. That there should be proper landing sites policies to curb conflict between landing site (*wath*) owners and fishermen and that all cases must be handled in the BMU office at day time including those night cases.

Finally, the respondents also suggested that sex for free fish should be control to prevent love triangle conflicts and spread of HIV and AIDS which is very common in the county and more so in the beaches. There should be good and strong marital policies in place to avoid issues of *jaboya* or sex for free fish as this will minimize love triangle conflicts and the spread of HIV and AIDS.

However, those who said that they have not been involved in the formulation of policies suggested the following changes effected in the existing Policy/management regime: That,

children should be banned from the fishing activity as that would amount to child labour, and therefore, only persons of the age 18 years and above should be registered or be allowed to participate in the commercial fishing activities.

Constant sensitization on hygiene, that is, proper handling of fish and ban on direct bathing and washing in the lake, this to take care of the aquatic lives through protection of environment. The respondents also suggested that all BMUs finances must be audited and they also mentioned of regular elections of BMU officials.

That there should be effective policies governing jurisdictions and national border issues to mitigate cross border fisheries conflicts and that fisheries department to provide patrol boats to enhance mobility of BMUs officials enforcing fisheries policies.

4.3.6 Forms of Fisheries Conflicts addressed by Co-Management Strategy

The Table 4.9 discusses forms of fisheries conflicts that co-management addresses in Homa Bay County. In this study, nature of conflicts and forms are synonymous to each other.

Table 4. 9: Forms of conflict addressed by co-management strategy (N=389)

	Don't Know	Strongly Disagree	Disagree	Agree	Strongly Agree	Percentage
	Percentage					
Fishermen-Fishermen Conflict Fisheries	4	2	5	53	36	100
Department-Fishermen Conflict Wildlife-Fishermen Conflict	3	1	43	39	14	100
Owner of fishing gears-Fishermen Conflict	4	1	16	59	20	100
Fishing ground (Wath) owners-Fishermen Conflict	4	2	65	20	9	100
NEMA-Fishermen Conflict	3	3	77	12	5	100
Fish traders-Fishermen Conflict	1	2	10	50	37	100
Immigrant fishermen-Fishermen Conflict	2	5	50	32	11	100

Source: Survey Data, 2016

From Table 4.9, 89% of the respondents agreed that one of the fisheries conflicts experienced in the fishing community and is addressed by co-management strategy is fishermen-fishermen conflict while 7% of the respondents disagreed and refute that fishermen to fishermen is addressed by the strategy.

Fisheries Department- Fishermen Conflict is yet another conflict addressed by co-management strategy as 53% of the respondents agreed that co-management strategy addresses conflict between the department of fisheries and fishermen. On the other hand, 44% of the respondents disagreed and said that the strategy is ineffective in addressing this type of conflict.

Co-management strategy was also found effective in addressing conflict between Fishermen and wildlife department was also mentioned as a type of conflict in Homa Bay County as can be seen from Table 4.9, where 54% of the respondents agreed that the strategy is mitigating conflicts between the department of wildlife and the fishermen, while 45% were of the contrary opinion.

Another form of fisheries conflict in the County that the co-management strategy addresses is Owner of fishing gears versus Fishermen Conflict. From Table 4.9, 79% of the respondents agreed with the statement that co-management strategy addresses conflicts between owners of fishing gear and the fishermen, while only 17% said that the strategy is weak and does not effectively address conflict between owners of fishing gear and the fishermen. This therefore is an indication that co-management strategy is really appreciated by majority of the fishing community and therefore should be strengthened within the County.

Conflict between fish traders and fishermen is yet another type of conflict that is addressed by co-management strategy in Homa Bay County. This is true because findings of the study

established the same as can be seen from Table 4.9, where 87% of the respondents agreed the strategy addresses conflict between fish traders and fishermen. However, 12% of the respondents were of the contrary opinion. This calls for more sensitization of both fishermen and fish traders to always seek help from the FMIs.

However, co-management strategy was said to be addressing conflicts between private landing site (*Wath*) owner verses fishermen; NEMA verses fishermen and immigrant fishermen verses local fishermen were mention but to a smaller extent.

Fisheries conflicts are many, complex, dynamic and exhibited in various forms which keep on changing from time to time. This is in agreement with scholars such as Ahmed and others, For example, Ahmed *et al.*, (2006) argues that, fisheries conflicts in Cambodia are multi-faceted ranging from: conflicts between various types of fishers, conflict between local authority officials and fishers, between fisheries officials and local influential people, conflict between committee members and community members, conflicts between local fishers and outsiders and institutional conflicts among different fisheries management bodies and ethnic conflicts. Basing on previous research on fisheries, it now clear that fisheries conflicts in Africa have more or less the same causes as the ones discussed above.

In Cameroon for example, fisheries conflicts occur due encroachment of traditional fishing grounds of trawlers owned by commercial fishing grounds causing destruction of fishing gears owned by artisanal fishers (Djama, 1993). This is in line with Ahmed *et al.*

(2006) argument, in the sense that use of illegal fishing gears destroys young fish and breeding ground.

Djama (1993) further argues that the problem is compounded by limited fisheries resources lack of legislation for compensation to be given to artisanal fishers. For the case of Ivory Coast, conflicts between artisanal and industrial fishers are caused by exploitation of shared limited resources, bad fishing practices by industrial fishers coupled with lack of means for monitoring and surveillance of fishing areas (Doumbia, 1993). Kebe *et al.* (1993) observes that in Senegal, fisheries conflicts occur as a result of competition over the same resources, geographical space, markets and production factors, violation of existing regulations by industrial fishers such as using small size nets and encroachment on artisanal fishers' territory.

In Kenya and specifically Homa Bay County form/nature fisheries conflict are not any different to those of the rest of the world. These include fishermen verses fishermen conflict due to zoning, stealing of fishing gears by fishermen and the likes; fishermen verse boat and fishing gears owners over stealing of fish to give women who offer them (fishermen) sex for free fish; wildlife department verses fishermen conflicts due to destroying other aquatic lives or fishermen being killed by aquatic animals such as crocodiles and hippos; owners of fishing gears verses fishermen and fish traders verses fishermen.

4.3.7 Inferential Statistics on Co-management Policy Mechanisms and Fisheries

Conflict

A regression model to determine the relationship between Co-management Policy Mechanisms, and Fisheries Conflict (dependent variable), was carried out in the study. This provided the output of model summary, ANOVA and regression coefficients observed.

Table 4. 10: Model Summary of Co-management Policy Mechanisms (N=389)

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.101 ^a	.010	.008	.44661

a. Predictors: (Constant), Co-management Policy Mechanisms

Source: (SPSS Output from Field Data, 2016)

Co-management Policy Mechanisms was regressed on Fisheries Conflicts and the model was found to be significant ($F(1,387) = 3.963, p = 0.047$) with a goodness of fit of 1.0% (R squared = 0.010) as shown in Table 4.10 and Table 4.11.

This shows that 1.0% of the variation in Fisheries Conflicts is accounted for by Co-management Policy Mechanisms.

The fitted regression model was Fisheries Conflicts = 0.054CPM + 2.475 as observed in Table 4.11, which implies that one unit increase in Fisheries Co-management Policy Mechanisms index increases Fisheries Conflicts by 0.054 units.

Table 4. 11: ANOVA^a of Co-management Policy Mechanisms and Fisheries Conflicts (N=389)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.790	1	.790	3.963	.047 ^b
	Residual	77.192	387	.199		
	Total	77.982	388			

a. Dependent Variable: Fisheries Conflicts

b. Predictors: (Constant), Co-management Policy Mechanisms (CPM)

Source: (SPSS Output from Field Data, 2016)

According to the findings from Table 4.12, Co-management Policy Mechanisms had an influence on the Fisheries Conflicts in Homa Bay County, Kenya, since its relationship was observed to be statistically significant (p=0.047; t= 1.991).

Table 4. 12: Coefficients^a of Co-management Policy Mechanisms and Fisheries Conflicts (N=389)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Standard Error	Beta		
1	(Constant)	2.475	.103		24.020	.000
	CPM	.054	.027	.101	1.991	.047

a. Dependent Variable: Fisheries Conflicts

Source: (SPSS Output from Field Data, 2016)

The regression model indicates that the relationship between Fisheries Conflicts and Co-management Policy Mechanisms is positive with a coefficient of 0.054 and a constant of 2.475. The regression model of this relationship is:

$$Y = 2.475 + 0.054CPM$$

Where: Y is Fisheries Conflicts and CPM is the Co-management Policy Mechanisms.

The correlation coefficient is 0.101. This indicates that the correlation among the independent and dependent variables is positive. The coefficient of determination, R^2 , is 1%. This means that close to 1% of the variation in the dependent variable (Fisheries conflicts) is explained by the independent variable (Co-management Policy Mechanisms). Thus the study established that the relationship between Co-management Policy Mechanisms and Fisheries conflict is positive. The coefficient of 0.054 indicates, on average, an additional fisheries policy mechanism increases the fisheries conflict by 0.054 unit.

The regression analysis demonstrated that fisheries policies instruments set up by the FMIs moderate fisheries conflicts in Homa Bay County since it uncovered a positive relationship. In this study, it was discovered that though a few individuals from the fishing community have been engaged in the process of policy formulation greater part of the respondents (fisher community) said that they have not been involved in the policy formulation. This is precisely with the finding of Wiber *et al.* (2003) while attempting to answer the inquiries why governments are progressively coming up with policy that

prevents individuals from the coastal fisheries. The appropriate response he thought of was that governments are not generally internally consistent with their policy direction. One burden to which governments have been responding to is the need to devolve fisheries management obligations. The study discovers this as a knee jack response to most governments including the Kenya and Homa Bay County situation.

4.4 Chapter Summary

The chapter focused on assessing the effectiveness of co-management strategy in mitigating fisheries conflicts. The results revealed that the co-management strategy is very effective in mitigating various type of fisheries conflict. Nevertheless, the study also established that a majority of the fishing community have not been involved the formulation of fisheries policies.

CHAPTER FIVE

COMMUNITY PERCEPTION OF THE CO-MANAGEMENT STRATEGY IN MITIGATING FISHERIES CONFLICTS IN HOMABAY COUNTY

5.1 Introduction

This section focused on the objective two which was to examine the community perception of the Co-Management Strategy mitigating fisheries conflicts in Homa Bay County.

5.2 Descriptive Analysis of the Study Variable Community Perceptions

When asked about their perceptions on whether the fisheries department and BMUs is effective, transparent, legitimacy, competency, networking and timeliness in relation to mitigating of fisheries conflicts, most of respondents rated the two institutions as discussed below. It was also learned that these FMIs often sensitize and train local people about the benefits of co-management as a strategy in mitigating fisheries conflicts. Moreover, there are regulations with the objective of environment protection such as ban on disposing garbage in the lake and using destructive gears (explosive, chemical, small net size, etc.).

Table 5. 1: Community Perception on effectiveness of Co-Management Strategy (N=389)

	Low	Moderate	High	Very high	Percentage
	Percentage				
Effectiveness	7	34	42	17	100
Transparency	18	33	33	16	100
Competency	10	30	42	18	100
Timeliness	15	26	35	24	100
Networking	11	16	34	39	100

Source: Survey Data, 2016

5.2.1 Community Perception on Effectiveness of Co-management Strategy

The study found out a positive perception of the fishing community on FMIs mitigating fisheries conflict. The results in Table 5.1 show that, 42% and 17% of the respondents were of the opinion that both BMUs and Fisheries department (co-management strategy) do respond effectively to fisheries conflict, whereas, 34% of the respondents were of moderate view while 7% gave the said institutions low scores. This is an indication that the FMIs are really trying to respond to the fisheries conflicts in Homa Bay County. This is a glimmer of hope to the fishing community and this findings are in agreement with the findings of Gjertsen (2005) who prior carried a similar study and established that the fishing community has seen benefits of MPAs as a management strategy is constantly increasing and has boosted hopes of improving declining fish stocks and increasing fish catches in impoverished areas. Another study by Chaigneau (2008) also confirms that co-management arrangement of fisheries is viewed positively. In his study, he found that most of the fishermen interviewed believed that MPAs were more positive towards the execution or support of these stores than the other fishermen, with 88% of answers being positive. This could be in part owed to their higher hopefulness about the future of the fish stocks and hence the sustainability of the fisheries.

5.2.2 Community Perception on Transparency of Co-management Strategy

Concerning transparency, the FMIs working in the co-management arrangement were ranked low as show Table 5.1. For instance, 18% of the respondents ranked low, 33% of the respondents ranked moderately 33% while 16% ranked highly. This calls for serious sensitization over transparency and those officials who lacks the quality of being transparent should be sacked from the positions they hold so as to enable the fishing

community to have faith in the institutions mitigates fisheries conflict. Similarly, just as the findings of Mayhew (2016), the fishing community of Homa Bay County view FMIs as institutions riddled by corruption. This was established during the Focus Group Discussions. Mayhew (2016) pointed out concerns over perceived “corruption” among officers and managers responsible for enforcing the regulations. Corruption is yet another challenge the FMIs are facing. In her study, Mayhew (2016), described corruption as the abuse of power, usually through accepting bribes or favoring certain individuals or groups of people. Similarly, as can be seen from table 6.1 under Co-Management Challenges, 83% of the respondents cited corruption as one of the major challenges. This calls for serious measure to be put in place by government to curb corruption. Corruption was also cited the study by Eggert and Lokina (2008). Incapability to enforce rules also owing to dishonesty and corruption (Eggert & Lokina, 2008; Kundu *et al.*, 2010); clanism and family relations; and BMU leaders are discouraged and unmotivated, resulting in their culpability in these activities. While Eggert and Lokina (2008) look at clannism in terms of favouritism, the study views the clannism as a negative issue which eventually leads to the problem of conflict between fishermen and the landing site (*wath*) owners.

The study also found some negative aspect of the FMIs such as corruption. Some members of the fishing community said that patrols made by the FMI aimed at controlling and managing the fisheries sector are done with an aim of getting bribes. For instance, during the FGD at Uterere beach, a member asserted that:

Some of the officers from the department of fisheries are corrupt as they are allowing some fishermen to use wrong fishing gears so long as they have they been given *kitu kidogo* (bribe).

He went further and said:

Unaweza kuona hao masifa wa serikali wakishika nyavu zile sharia hakurusu kutumiwa ziwa Victoria lakini bada ya dakika chache tu uwaona wale wavuvi na nyavu zao zilishikwa wakitega samaki na yale yale nyavu zilishikwa (You can see officers from the fisheries department arresting and confiscating wrong fishing gears) however, within a short while you will be surprised to see those fishermen arrested fishing and at the same time using the very wrong gears that were confiscated. *Hiyo ni ufisadi* (That corruption).

This is an indication that co-management strategy is faced by corruption as the respondents have cited the problem of corruption which interferes with the effectiveness of co-management.

5.2.3 Community Perception on Competency of the FMIs

The results in Table 5.1 on issue of competency, 18% of the respondents ranked very high, 42% of the respondents ranked high and therefore agreed that the FMIs in co-management arrangement are competent in resolving fisheries conflict, while 30% of the respondents were of moderate opinion concerning the same. However, 10% were of contrary opinion and as a result rank low. This is an indication that majority of the fisher folk have faith in the FMIs and their co-management arrangement. The study findings on competency is however, contradicts the findings of Djama (1992) who expresses that: The contention between the artisanal and industrial fishery has been a long standing and troublesome issue because of the absence of implementation of the fisheries control and regulations. Specifically, the identification of trawlers acting unlawfully by artisanal fishermen is not

adequate in light of the fact that the enactment perceives just reports from a sworn officer - either from the Port Authority, the Navy or from the Ministry accountable for fisheries (Djama, 1992). Further, for the reason that all the time none of these is available when the harm is done, confirm from the artisanal alone is exceptionally hard to consider. Besides, regardless of whether the report is finished by a sworn officer, and the illicit vessel is fined, there is no arrangement in the real fisheries enactment for any pay to be given to distinctive anglers rather, the fine goes to general society treasury.

5.2.4 Community Perception on Timeliness/promptness of the FMIs

Concerning timeliness, Table 5.1 show that 24% and 35% of the respondents ranked the institutions very high and high respectively, while 26.2% of the respondents raked them moderately and only 15% of the respondents rank the FMIs low. The community perception on the Co-Management Strategy is generally positive since the work done by the FMIs could be acknowledged by the FGD in Litare beach. For instance, one of the boat owners in Litare beach had to say the following concerning the FMIs:

The BMU officials are very prompt in case of emergency. The BMU though do not have enough patrolling boats, but they always community with other BMUs in case of an emergency and the people or fishermen affected may be help. *Kwa hivyo tunawapongeza* (Because of that we appreciate them).

In support of his stand concerning the BMU, a lady owning fishing gears further praised the FMIs and said:

BMUs mitigate fisheries related conflicts. This is through coming up with rules and regulations governing all the operations within a beach. The fishermen, fish traders, owners of the fishing gears, boat owners and even shop owners within the beaches have to follow these rules and

regulation, without which one can be even expelled from the beach. They (BMU officials) use these rules to resolve conflicts that may be arising from the fisheries sector.

The assertion of the respondents is indication that co-management is very fast in reaching to arrears they are need and therefore prompt in solving fisheries issues.

The above findings are in agreement with the findings of FAO (2011) that a MPA system can likewise work in a social sense by encouraging shared administration duties, normal administration strategies such as patrolling and responding to fishermen distress calls, financial efficiencies and learning openings. It can reinforce the administration of individual MPAs by giving normal guidelines and sharing of learning and experience. Then again, in the event that it is too vast and extends over an extremely wide range of authoritative layers and structures, it might wind up hard to administer.

However, FAO (2011) also established that an extra potential advantage of a system of MPAs instead of a solitary (apparently bigger) MPA, is that the system might be stronger to an extensive variety of dangers. A system can give additional strength to nearby fiascos, for example, an oil slick, or to an administration disappointment. In the event that the system spreads security over a wide land territory and along an inclination of climatic administrations, it might give more versatility to environmental change than would a convergence of MPA assurance in one or a couple of spots. MPA arranges in connection to angle (FAO, 2011)

5.2.5 Community Perception on Networking of the FMIs

Similarly on the issue of networking, 39% and 34% of the respondents ranked the institutions very high and high respectively. 16% averagely ranked them while 10% ranked them lowly. This is a positive indication that the institutions do network with other institutions and the community. The government therefore needs to reinforce this attribute so that it is maintained. This is in concurrence with Mayhew (2016) who in his study found that the fishers view FMIs in their co-management arrangement positively. For example, among his respondents (fishers) who felt the marine reserve benefited them, claimed it increased their catch owing to the “spillover effect” of the no-take zones. Some participants also mentioned that MPAs further encourage fishers to work in the tourism industry. Examples of this include one fisher who said to her that “reserves and preserves make it more beneficial to get involved in tourism – they phase out fishermen” (Dangriga fisher) and another claiming that despite the South Water Marine Reserve (SWCMR) decreasing his catch, it increased his income as a tour guide (Placencia fisher). So in this regard FMIs are really beneficial.

Similarly, IUCN-WCPA (2008) states that ecological systems are shaped when the natural connections among and within upgraded environmental capacities or functions. So as to upgrade the organization and management of natural systems, social or institutional systems are shaped through correspondence, sharing of results and coordination among establishments. The two kinds of systems ought to be viewed as, social/institutional and natural, keeping in mind the end goal to upgrade the advantages of a more comprehensive approach.

A network of smaller MPAs may have more adaptability to alleviate unfortunate social effects than a solitary extensive MPA. The defensive advantages of MPAs, and additionally the expenses brought about through access and use restrictions, are frequently more effectively disseminated among seaside networks and other client gatherings of marine environments in a MPA arrange than in a huge, single MPA. It might likewise offer chances to spread expenses and drawbacks over different networks, as opposed to amassing them in one network – as could be the situation with a solitary extensive MPA. This could be especially pertinent in tropical creating nations, where the whole waterfront zone is being abused by the networks situated along that drift (FAO, 2011).

Fishers may profit more from a system than from a solitary MPA on the off chance that it expands the quantity of grown-up angle that relocate over the limits of the secured regions (the spillover impact that makes fish accessible to fisheries). This is a consequence of the regularly more noteworthy measure of limit per unit territory secured than in a solitary MPA. It will, be that as it may, increment the powerlessness of fish assets, and the proper harmony amongst security and overflow ought to be looked for. Therefore MPA systems must be planned with the portability of the focused on angle species as a primary concern, to guarantee that a suitable level of insurance is stood to the fish moving over the MPAs in the system. In the event that a system is comprised of MPAs that are too little, they may offer almost no or no assurance for grown-ups of versatile species. Also, except if a MPA is sufficiently expansive to hold a portion of its pelagic eggs as well as hatchlings, it isn't self-managing (*ibid*).

5.2.6 Fisheries Conflicts addressed by FMIs (Co-Management)address Fisheries

Conflicts

When asked about their perceptions on whether the fisheries department and BMUs are addressing various fisheries conflicts, the respondents gave varied responses as shown in Table 5.2.

Table 5. 2: Conflicts addressed by Fisheries Department and BMUs (N=389)

	Don't Know	SD	D	A	SA	Percentage
	Percentage					
Fishermen - Fishermen conflict	3	1	11	52	33	100
Fisheries Department-Fishermen conflict	4	2	41	42	11	100
Wildlife Department-Fishermen conflict	3	3	54	32	8	100
Owner of fishing gears-Fishermen conflict	3	2	16	63	16	100
Landing site owners-Fishermen conflict	4	2	64	21	9	100
NEMA-Fishermen conflict	5	3	77	12	3	100
Fish traders-Fishermen conflict	2	2	17	41	38	100
Immigrant fishermen - Fishermen conflict	4	2	52	33	9	100

Source: Survey Data, 2016

Key: SD=Strongly Disagree; D=Disagree; A=Agree and SA=Strongly Agree.

As can be seen from Table 5.2 85% of the respondents said or were in agreement that the said above institutions do address Fishermen verses Fishermen conflicts, while only

15% of the respondents disagreed that fishermen verses fishermen conflicts are addressed by these institutions.

Concerning Fisheries Department verses Fishermen conflicts, 53% of the respondents were also in agreement that these FMIs above addresses fisheries department verses fishermen conflicts.

Similarly, 79% of the respondents said the FMIs are indeed addressing fish traders and fishermen conflict. Also, 79% of the respondents were in agreement that conflicts between owners of fishing gears and fishermen are properly addressed by the above said FMIs. This is a good indication that most common fisheries conflicts are addressed by the said FMIs, and therefore, the FMIs should be further strengthened. For example, in Remba Island, one of the fishermen said:

BMUs has been of help to many fishermen and the entire fishing community as a whole in resolving fisheries related conflicts between the local fishermen and those coming from Uganda. This has significantly reduced deaths that used to occur deep inside of the lake prior to the formation of BMUs.

However, it was realised that conflicts concerning fishermen verses NEMA, landing site owners and wildlife are poorly handled by the FMIs as can be seen from the table 5.2, 85% of the respondents said that the FMIs cannot resolve NEMA-Fishermen conflicts, whereas 70% of the respondents said that the FMIs cannot resolve Landing Site owner-fishermen conflicts. On the same breath, 60% of the respondents said the FMIs cannot

address Wildlife-Fishermen conflict. This calls for more support from the mainstream government to strengthen the FMIs.

As shown in Table 5.2, majority of the respondents are in agreement that the FMIs (co-management strategy) addresses most of the fisheries conflicts. Tables 5.1 and 5.2 are therefore an indication that the fishing communities in Homa Bay County value and appreciate the work done by the FMIs that mitigates fisheries conflicts. These findings are in agreement with the findings of Nguyen (2012) who found that the community-based-management of fisheries is viewed positively. He found that there is a positive perception of the locals fishing community towards the *Giang Xuan* Fisheries Association since the association has managed to come up with positive fishing policies which have managed to mitigate fisheries conflicts.

Further, in agreement with Wagner (2012) majority of the fisherfolk agrees that the Co-Management Strategy are very effective in mitigating fisheries conflicts. Wagner asked her respondents in villages with Marine Protected Areas (MPAs) whether they would support the increase or scale up MPAs or making the existing MPAs larger. A majority of 85% of respondents answered “yes” to creating more or larger MPAs. This was because they view these FMIs as a boost in the protection of breeding grounds and marine life, prevents illegal fishing, protects fish for the future, and improves income of the fishermen.

However, this study also found that found that FMIs to a larger extent do not solve the problem of immigrant fishermen. As shown in table 5.2 54% of the respondents disagreed with the assertion that the FMIs addresses and resolve fisheries conflict. This problem of

not being able to address and resolve the immigrant fishermen was also established by Mayhew (2016). For instance, she said that concern raised by survey respondents was the growing number of fishers in Belize waters, many of whom are non-Belizeans that have obtained a fishing license illegally and take products extracted from Belize waters back to other countries.

5.3 Inferential Analysis of Community Perception on Co-Management and Fisheries

Conflicts

A regression model to determine the relationship between Community Perceptions (independent variable) and Fisheries Conflicts (dependent variable) was carried out in the study. This provided the output of model summary, ANOVA and regression coefficients observed.

Table 5. 3: Community Perception and Fisheries conflicts Model Summary (N=389)

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.042 ^a	.002	-.001	.44849

a. Predictors: (Constant), CP

Source: (SPSS Output from Field Data, 2016)

Community Perceptions was regressed on Fisheries Conflicts and the model was found to be insignificant ($F(1,387) = 0.687, p=0.408$) with a goodness of fit of 0.2% ($R^2 = 0.002$) as shown in Table 5.4 and Table 5.3.

This shows that 0.2% of the variation in Fisheries Conflicts is accounted for by Community Perceptions.

The fitted regression model was Fisheries Conflicts = $-.026CP + 2.475$ as observed in Table 5.5, which implies that one unit increase in Community Perception index decreases Fisheries Conflicts by 0.026 units.

Table 5. 4: ANOVA^a Community Perception and Fisheries Conflicts (N=389)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.138	1	.138	.687	.408 ^b
	Residual	77.844	387	.201		
	Total	77.982	388			

a. Dependent Variable: Fisheries Conflicts

b. Predictors: (Constant), Community Perceptions

(Source: SPSS Output)

According to the findings from Table 5.5, Community perceptions had no influence on the Fisheries Conflicts in Homa Bay County, Kenya, since its relationship was observed to be statistically insignificant ($p=0.408$; $t= -.829$).

Table 5. 5: Coefficients^a Community Perception and Fisheries Conflicts (N=389)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Standard Error	Beta		
1	(Constant)	2.745	.087		31.603	.000
	Community Perceptions (CP)	-.026	.031	-.042	-.829	.408

a. Dependent Variable: Fisheries Conflicts

(Source: SPSS Output)

The regression model for this relationship is:

$$Y = 2.745 - 0.026CP$$

Despite all the above, a regression analysis found that community's perception has got no significant effect on the FMIs performance. Table 5.5 shows the correlation coefficient is 0.042. This indicates that the correlation among the independent and dependent variables is negative. The coefficient of determination, R^2 , is 0.2%. This means that close to 0.2% of the variation in the dependent variable (Fisheries conflicts) is explained by the independent variable (Community perceptions).

Thus the study established that the relationship between Community perceptions and Fisheries conflict is negative. The coefficient of -0.026 indicates, on average, an increase in community perception decreases the fisheries conflict by 0.026 units. Contrary to the above, Onyango (2015) found that, 90% of fishers perceived Beach Management Units (BMUs) on the Tanzania side of Lake Victoria to be very effective in solving fisheries conflicts, formulating laws and keeping inventories. Nevertheless, he also realized that the fishers also ranked the BMUs performance low in terms of data collection, patrolling fishing grounds and initiating development projects.

5.4 Chapter Summary

It emerged from the study that the fishing community perceive the FMIs (co-management strategy) positively. The majority of the respondent said that the com-management arrangement between the FMIs is effective, transparent, competent and timely respond or

address fisheries conflicts in Homa Bay County. The study also established that FMIs in their co-management arrangement do network even with other departments such as tourism and the likes. However, the regression analysis indicated that community perception does has no effect in the performance of FMIs in mitigating fisheries conflicts. The next chapter focused on the challenges faced by Co-management strategy.

CHAPTER SIX

CHALLENGES FACED BY CO-MANAGEMENT STRATEGY IN MITIGATING FISHERIES CONFLICT

6.1 Introduction

This section focused on the third research objective whose aim was to establish the challenges face by Co-Management strategy in mitigating fisheries conflicts. The Co-Management Challenges that have been discussed ranges from inadequate funds; poor infrastructure; monitoring fishing activities; corruption; inadequate support from the establishment or government; gender matters and conflict of interest. The respondents were exposed to questions that aimed at making (them) respondents to identify challenges confronting the co-management strategy.

6.2 Challenges faced by Co-Management Strategy in Mitigating Fisheries Conflicts

Fisheries systems are lively, complex, indeterminate and poorly understood. These components add to the challenges in fisheries management experienced by governments and stakeholders. A fishery structures encompasses not only fish and the physical environment that supports them, but also all the related social and economic structures such as: fishers, fishing organizations, processors and suppliers, policy instruments, monitoring and enforcement. On a worldwide scale fisheries are enduring gross exhaustion of fish stocks, hostile effects upon the marine environment, raising overcapacity, declining benefit of fishing fleets and social upheaval. This raises a vital question: why does fisheries management flop?

Formation of BMU structures in Kenya commenced in 2004, and by 2006, most of the BMUs had been established. Establishing the BMUs built on beach committee arrangements in existence since the early 1960s (Abila *et al.*, 2006). Even though adoption of the lake fisheries co-management program was viewed as a good option for regulating the exploitation of the fisheries, catch and effort continue to increase or expand on Lake Victoria (Kolding *et al.*, 2008), this leads to concerns about the ability of the co-management program by the FMIs to manage this valuable fisheries in a sustainable manner.

Notwithstanding the many functions of BMUs (LVFO, 2005), their main function was to enhance the level of compliance of fisheries rules and regulations, thereby fostering responsible fishing practices for the lake (LVFO, 2007). Cinner *et al.* (2009) offers a comprehensive assessment of the roles of BMUs as enshrined in the Beach Management Regulations, including boundaries/membership of BMUs, rule-making, implementation and monitoring, and stake holders' roles of nested institutions.

6.2.1 Descriptive Analysis of the Study Variable Co-Management Challenges

When the respondents were asked about the Challenges face by the Co-Management Strategy (FMIs), they responded as in the Table 6.1.

Table 6. 1: Co-Management Challenges Faced by FMIs in Mitigating Fisheries Conflict (N=389)

	Don't Know	Strongly Disagree	Disagree	Agree	Strongly Agree	Percentage
						Percentage
Inadequate funds	2	2	14	29	53	100
Politics	2	4	36	51	7	100
Vast geographical area	3	0	75	19	3	100
Corruption	4	2	11	39	44	100
Gender Issues	1	2	68	26	3	100
Poor infrastructures	0	0	4	22	74	100
Conflict of interest	1	1	13	72	13	100
Monitoring fisheries activities	3	3	40	51	3	100
Cultures	2	5	63	18	12	100

Source: Survey Data, 2016

6.2.1.1 Inadequate funds

From the statistics in Table 6.1, 82% of the respondents were in agreement with the fact that FMIs face the challenge of inadequate funds; whereas 16% of the respondents were of the contrary opinion. This is an indication that the FMIs will not effectively mitigate fisheries conflict. This therefore, calls for more allocation of resource by government to the department fisheries to enhance the department's operations. These findings are agreement with the findings of Sten & Nielsen (1996). They established that, the fishers and their families are dependent on the fishery for their livelihood. In most cases, they have no substitute source of income or access to other sources of food production. Therefore, they require an income to buy all necessities. This clarifies why every one of the fisheries analyzed are market-focused. Only fishers in Zambia and Zimbabwe who are of the overwhelming Tonga tribe and the fishers from Kayar in Senegal follow the tradition of merging (seasonal) fishing with the rearing of livestock and farming.

Similarly, SPDDC (1995) states that Low quality of Life Poverty is firmly identified with overfishing and debasement of aquatic ecosystem. Those socially and economically worse-off in the fisheries are, from one perspective, casualties of the worldwide ravaging of fisheries resources and due to this their livelihoods are under risk. Then again, they themselves have contributed, frequently driven by need, to the descending spiral of destitution (poverty) and environmental degradation, which others started (SPDDC, 1995).

6.2.1.2 Politics

Politics is yet another challenge that was cited by the respondents. As can be seen from table 6.1, 51% and 7% agree and strongly agree respectively that politics be it in the fisheries sector concerning leadership of the FMIs or national politics affects the operations of the FMIs hence rendering co-management strategy ineffective. (Abila *et al.*, 2006; Ogwang *et al.*, 2009) also established in their studies that inefficiencies have emerged, however, that negatively affect Beach Management Unit's (BMU) abilities to perform their titled roles of sustainable fisheries management. In a study conducted by Ogada (2013) established that leadership on BMU affairs were generally satisfactory. However, leadership challenges within BMUs were numerous they are constantly addressed according to the set regulations. The regulations are guided by the Fisheries Act and the Kenyan constitution which emphasizes critical leadership issues such as integrity. In Zimbabwe, Jones and Murphree (2001) found asserts that since 2000 forest fires have increased, according to both Resource Management Committee (RMC) officials and the Forestry Commission officer in Gokwe, for a number of reasons. After June 2000 there were fewer resources for firefighting and a culture of acting with impunity was quickly

developing amongst the villagers. About 180 households have invaded the reserved forest, where they use fires to open up fields for cultivation. Due to the political clout surrounding land invasions in Zimbabwe, both the Forestry Protection Unit (FPU) and the RMCs were powerless to stop them. In the neighbouring RMC in the Bomba area, people opened up fields within the forest. In the forest adjacent to Lutope FPU Camp, people went as far as to build huts within the forest. To safeguard themselves against eviction they have already formed cells and branches of the ruling party. The practice has spread to a number of villagers, who are assuming that the regulations have been relaxed and that they too can use the name of the ruling party to make them immune from prosecution. Some RMC members, in areas such as Chemusonde, have also moved into the Mafungautsi Forest. Due to the invasion of the forest reserve most of the RMCs are no longer active (Khumalo, 2003).

6.2.1.3 Corruption

Corruption is yet another challenge the FMIs are facing. As can be seen from the above table, 83% of the respondents cited corruption as one of the major challenges. This calls for serious measure to be put in place by government to curb corruption. Corruption was also cited by previous studies, for example, Eggert and Lokina (2008). This is also in agreement with the findings of Zannetell and Knutt (2002) that cite corruption and bribery as also a challenge that disrupt any process of development, governance and management. Inability to enforce rules also due to corruption (Eggert & Lokina, 2008; Kundu *et al.*, 2010); clannism and family relations; and BMU officials are disheartened and unmotivated, bringing about their culpability in these activities. While Eggert and Lokina (2008) look at clannism in terms of favouritism, the study views the clannism as a negative

issue which eventually leads to the problem of conflict between fishermen and the landing site (*wath*) owners. In a study conducted by Ogada (2013) established that leadership on BMU affairs were generally satisfactory. However, leadership challenges within BMUs were numerous they are constantly addressed according to the set regulations. The regulations are guided by the Fisheries Act and the Kenyan constitution which emphasizes critical leadership issues such as integrity. In this study, during the FGDs members (respondents) of the fishing community said that patrols made by the FMI aimed at controlling and managing the fisheries sector are done with an aim of getting bribes. For instance, during the FGD at Uterere beach, a member asserted that:

Some of the officers from the department of fisheries are corrupt as they are allowing some fishermen to use wrong fishing gears so long as they have been given *kitu kidogo* (bribe).

He went further and said:

Unaweza kuona hao masifa was serikali wakishika nyavu zile sharia hakurusu kutumiwa ziwa Victoria lakini bada ya dakika chache tu uwaona wale wavuvi na nyavu zao zilishikwa wakitega samaki nay ale yale nyavu zilishikwa (You can see officers from the fisheries department arresting and confiscating wrong fishing gears) however, within a short while you will be surprised to see those fishermen arrested fishing and at the same time using the very wrong gears that were confiscated. *Hiyo ni ufisadi* (That corruption).

In Zimbabwe, it was also established that corruption is a major challenge in the management of common resource such as forests. For example, financial management by the Resource Management Committee (RMC) level has always been contested, with the

misuse of funds occurring in some RMCs. There were even attempts to bring some of those who had misappropriated RMC funds before traditional leaders in the Batanai RMC. Despite the misappropriation there was an attempt to keep up to date financial records in the pre-2000 period. The declining national economy has brought about a gatekeeper state, with Zimbabwean politicians going about as brokers as opposed to controllers for local and (constrained/limited) foreign capital (Logan, 2005). It is simpler for dictator regime to "keep up the dedication of the core group amid economic crisis than it is democracy. With less supports, they can accomplish far more noteworthy steadfastness among the decreased number of performers that help them" (Corrales, 2004). This guard job is playing over all parts of the economy, including ranger service and natural life administration. Law requirement is specifically connected to remunerate government supporters and rebuff their rivals.

6.2.1.4 Poor Infrastructure

Another challenge of FMIs is poor infrastructure. For example, 96% of the respondents said that infrastructure is one of the major challenges, while only 4% had a contrary opinion. It was also found that there is even lack of racks for drying fish, *omena* in particular as can be seen in plate 6.1. The surrounding under which *omena* is dried is not clean and therefore does not pass the test of hygiene. Similar problem was also established in Gambia. For instance, Gillnet disposal and beach cleanliness and sanitation are important considerations. Problems with seafood safety caused a short embargo on the Gambian product due to sanitary conditions on the boat and the landing sites. Training and education, as well as access to ice, and disposal areas will improve this situation

greatly. Sanitation at the landing sites has been identified as an issue for safety and quality of seafood (DoF-Gambia, 2006).

A fisherman in the area however, cited bad/rough roads. He said:

Our main undoing is lack of tarmacked roads. Our fish do get spoilt along the way as we transport them to Mbita or Homa Bay towns. Because of this problem, middlemen who have tracks with cold boxes exploit us by paying us meagre prices for our catch.

This calls for serious improvement of infrastructure to enable the FMIs operates swiftly in mitigating fisheries conflicts. Plates 6.1 and 6.2 shows poor infrastructure for drying fish (*omena*) poor storage facility at the fish stall/banda respectively to the effect that fish is dried on the ground and there is no adequate coolant for fresh fish. Plate 6.3 is an indication that there is no proper anchoring facilities for boats and no line to hang the boats wind clothes. On the other hand the remaining plates 6.4 and 6.5 shows fishing activities along the shores or beaches of Lake Victoria in Homa Bay County.

6.2.1.5 Conflict of Interest

Conflict of interest is yet another challenge. For instance, 85.1% were in agreement that conflict of interest is another challenge to the co-management in relation to mitigation of fisheries conflict. On the other hand, only 14% dissented. The government and stakeholders therefore, must campaign against conflict of interest in the management of fisheries sector. Stakeholder conflict is another challenge in Homa Bay County. In agreement with Arlinghaus (2005) who states that fishing requires and interacts with wild living organisms. He further states that: at times, fishers and others engaged in recreation occupy the same space, generating intra-sector conflict. Be that as it may, one of the best

sources of conflict in the future is probably going to be fish welfare and the more essential and ideologically driven animal rights movement (Arlinghaus *et al.*, 2007). Another challenge according to Randomski *et al.* (2001) is controlling effort and harvest. He says: In order to address the conservation issues that have been identified in his paper, it is necessary to control or limit fish mortality.

Fisheries Department and BMUs leaders must therefore, declare their interest should there be any. For example, at Tabla beach, the group cited the issue of *Jaboya*, (sex for free) as a major socio-economic challenge. She said in her local dialect that:

Fishing and fishing business is indeed a good activity that has helped many lives. Children are going to schools because of the money their parents are earning from the fishing industry. However, one major challenge that has led to serious fisheries conflicts and shameful diseases is the issue of *jaboya* (sex for free fish). Fishermen have fought over women since some women are practicing *doho* (practising polyandry) which is even against our culture.

Her point was supported by one opinion leader who further said:

The issue of *jaboya* to a larger extent has led to the spread of *Okwimwi*, HIV and AIDS across all these beaches. *Ji mang'eny tuo* (many are seek). Though nowadays it is hard to differentiate between a healthy and a sick one because of these drugs we call *Andila* (ARVs). The issue of sickness has therefore, been a challenge and eventually when the sick die we suffer dependency problem.

Apart from the above discussed Co-Management Challenges, the following were also cited as challenges to the BMUs in the execution of their duties: Inadequate equipment like boats, engines and fuel to carry out patrol work; conflict as a result of roles ambiguity between Marine Police and Fisheries staff; Inadequate security during patrolling and BMUs being less empowered, are sometimes undermined by Government authorities. At Kisegi beach for example, one of the BMU member cited the problem of inadequate patrolling boats. He said:

One of the challenges we are facing as fishermen is the problem of lack or inadequate patrol boats. The one that we currently have here is dilapidated and can't be used because of the fear that it may capsize... *na tunaomba serekali atusaidie sisi wanyonge katika jambo hili* (and we are asking the government to help us, we the poor on this very issue).

This is a serious concern which requires Department of Fisheries to do serious work on the same. For example, Obiero *et al.* (2015) also established that illegal fishers enjoy better returns from violating regulations, this is due to low penalties, poor earning alternatives to fishing and low deterrent and detection mechanisms. This has led to serious decline of Nile perch (*Mbuta*) and increase of *dagaa/omena/mukene* (LVFO, 2009). However, culture and monitoring fisheries activities were seen as not being serious challenge to the FMIs.

6.2.1.6 Monitoring Fisheries Activities

In Table 6.1, 51% of the respondents are in agreement that monitoring fisheries activities has been a challenge to the FMI because of inadequate resources. Inadequate monitoring can lead to destruction of aquatic resources through use of illegal fishing gear. Kanyerere *et al.* (2009) also assert that destructive fishing methods as such as use of poisons and explosives as a socio-economic challenge to mitigation of fisheries conflict. These two

are prohibited in all water bodies; however, fishermen continue to illegally use the same. He further says; specific fishing gears such as *Nkacha*, an open water seine, inly allowed in Lake Malombe and not on other water bodies. Despite such mesh and gear limitations, there remains a proliferation of illegal fishing gear in the fisheries (*ibid* 2009).

All the above indicators attest the poor quality of life available to fishermen communities. The consequences of poor quality of life include heavy stress on the coastal ecosystems resulting in ecological imbalance, increased health hazards caused by water pollution and socio-political unrest. Moreover, the instruments of sustainable resource management such as control on the use of resource are more easily implemented and the goals of sustainability are more easily attained in a community where quality of life is reasonably good. For instance, in the event of such poor quality of life available to fishing communities government cannot all on a sudden implement regulatory measures like control on catch quotas, area or seasonal closures without protest from the members of the community itself Even if alternative employment opportunities are created, low educational standards, low- income levels, clustered settlement pattern isolated form the rest of the world etcetera, will put limits on their ability to move out from fishing, causing more and more labor stickiness in the sector.



Plate 6. 1: Fish dealers drying fish (Omena) at Litare Beach
Source: Survey Data, 2016



Plate 6. 2: Fish at Mbita Fish Banda/Stall
Source: Survey Data, 2016



Plate 6. 3: Fishermen, fishing boats and nets
Source: Author (2016)



Plate 6. 4: Fishermen landing at Ukowe Beach
Source: Survey Data, 2016



Plate 6. 5: Fishmongers buying fish from the boats at Gingo Beach
Source: Survey Data, 2016

6.2.2 Inferential Analysis of the effects of the challenges faced by Co-Management Strategy in Mitigating Fisheries Conflicts

A regression model to determine the relationship between Co-Management Challenges (independent variable) and Fisheries Conflicts (dependent variable) was carried out in the study. This provided the output of model summary, ANOVA and regression coefficients observed.

Table 6. 2: Co-Management Challenges and Fisheries Conflicts model summary (N=389)

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.378 ^a	.143	.140	.41566

a. Predictors: (Constant), Co-Management Challenges (SEC)

Source: (SPSS Output from Field Data, 2016)

Co-Management Challenges was regressed on Fisheries Conflicts and the model was found to be significant (F (1,387) =64.356, p<0.05) with a goodness of fit of 14.3% (R squared =0.143) as shown in Table 6.2 and Table 6.3.

This shows that 14.3% of the variation in Fisheries Conflicts is accounted for by Co-Management Challenges.

The fitted regression model was Fisheries Conflicts = 0.417SEC + 1.509 as observed in Table 6.2, which implies that one unit increase in Co-Management Challenges index increases Fisheries Conflicts by 0.417 units.

Table 6. 3: ANOVA^a of Co-Management Challenges and Fisheries Conflicts (N=389)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	11.119	1	11.119	64.356	.000 ^b
	Residual	66.863	387	.173		
	Total	77.982	388			

a. Dependent Variable: Fisheries Conflicts

b. Predictors: (Constant), Co-Management Challenges

Source: (SPSS Output from Field Data, 2016)

According to the findings from Table 6.4, Co-Management Challenges had an influence on the Fisheries Conflicts in Homa Bay County, since its relationship was observed to be statistically significant ($p < .05$; $t = 8.022$).

Table 6. 4: Coefficients^a of Co-Management Challenges and Fisheries Conflicts (N=389)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Standard Error	Beta		
1	(Constant)	1.509	.147		10.271	.000
	Co-Management Challenges (SEC)	.417	.052	.378	8.022	.000

a. Dependent Variable: Fisheries Conflicts

Source: (SPSS Output from Field Data, 2016)

The regression model for this relationship is:

$$Y = 1.509 + 0.417SEC$$

Therefore, this is an indication that there is a positive relationship between independent variable Co-Management Challenges and dependent variable Fisheries Conflicts. This

means co-management challenges affects mitigation of fisheries conflicts in Homa Bay County.

Table 6.4 shows that the correlation coefficient is 0.378. This indicates that the correlation among the independent and dependent variables is positive. The coefficient of determination, R^2 , is 14.3%. This means that close to 14.3% of the variation in the dependent variable (Fisheries conflicts) is explained by the independent variable (Co-Management Challenges). Thus the study established that the relationship between Co-Management Challenges of the FMIs and Fisheries conflict is positive. The coefficient of 0.417 indicates, on average, an increase in Co-Management Challenges increases the fisheries conflict by 0.417 units.

6.3 Chapter Summary

This chapter focused on the effects of challenges faced by co-management strategy mitigating fisheries conflicts in Homa Bay County. The study established that indeed inadequate funds, vast geographical area, corruption, gender issues, poor infrastructure, conflict of interest and culture as major challenges to co-management strategy in mitigating fisheries conflicts in Homa Bay County. On the contrary the administrators or officials of FMIs were also blamed in divulging in the fisheries politics resulting to acerbation of conflicts in the county. The inferential analysis also indicated that there is a positive relationship between the independent and dependent variables. The fishermen felt that most of the conflict arise due to the above mentioned conflicts. The next chapter presents the summary of the findings, conclusions and recommendations.

CHAPTER SEVEN

SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

This final chapter presents the summary of the findings contained in the preceding chapters. Based on the findings, conclusions are drawn and recommendations made. The areas for further research are also suggested.

7.2 Summary of Findings

The study investigated co-management strategy mitigating fisheries conflict in Homa Bay County. Descriptive research design was used. This involved observing and describing the behaviour or subject without influencing it in any way. The data needed to analyse the co-management strategy derived principally from multi-stage cluster sample of 389 respondents interviewed in the five divisions of Homa Bay County. However, secondary data were obtained from available official government records, both published and unpublished sources.

7.2.1 Co-Management Strategy Policy Mechanism

Various findings emerged from the first study objective that assessed the co-management policy mechanism mitigating fisheries conflicts in Homa Bay County. Co-management in this study referred to the collaboration between the government (Fisheries Department and the Community) in handling and mitigating fisheries conflicts. The study established that co-management is very effective and has the ability to resolved fisheries internal problems and conflicts. This is true because majority of the respondent said that there are legal

support put in place by the FMIs in the co-management arrangement that helps in resolving fisheries conflicts. However, it was also established that majority of 62% of the respondents have not been involved in the policy formulation.

7.2.2 Community Perceptions on Co-management Strategy

The second objective explained the community perceptions on co-management strategy. The descriptive analysis on community perception on co-management strategy established that co-management strategy on fisheries conflict management is very effective. An average of 60% of the respondents were in agreement that the FMIs (co-management) are effective in mitigating fisheries conflicts; transparent in their activities; competent; punctual in time of crisis or need and have got good networking which enables them to carry out their duties effectively. In this regard, community perception on co-management is very positive because of even being prompt in times of need by the fishermen. It was established however, through a regression analysis which was conducted to establish whether the community perception on co-management has any effect on the effectiveness of co-management in mitigating fisheries conflicts and it was established that community perception on the Co-management has no significant effect in mitigating fisheries conflict in Homa Bay County.

7.2.3 Challenges Faced by Co-Management Strategy

The findings of the third objective sought to evaluate the effects of challenges faced by co-management strategy in mitigating fisheries conflicts in Homa Bay County. The roles co-management is to mitigate fisheries conflicts. The BMUs which is part of the co-management strategy was created to perform the following: working on

boundaries/membership of BMUs, rule-making, implementation and monitoring, and stake holders' roles of nested institutions as enshrined in the Beach Management Regulations. The study established that FMI's Challenges have negative effects on the effectiveness of the co-management strategy. Issues to do with poor infrastructure; inadequate funds; corruption; inadequate support from government; conflict of interest and poor monitoring and even fisheries politics fisheries activities were found to be the major Co-Management Challenges faced by the FMIs. Notwithstanding the many functions of BMUs, their main function was to enhance the level of compliance of fisheries rules and regulations, thereby fostering responsible fishing practices for the lake. Inefficiencies have emerged, however, that negatively affect Beach Management Unit's (BMU) abilities to perform their titled roles of sustainable fisheries. In a study this study it was established that leadership on BMU affairs were generally satisfactory. However, leadership challenges within BMUs were numerous they are constantly addressed according to the set regulations. The regulations are guided by the Fisheries Act and the Kenyan constitution which emphasizes critical leadership issues such as integrity.

7.3 Conclusion

The first objective was to examine the effectiveness of Co-management strategy in mitigates fisheries conflicts in Homa Bay County. Study findings agreed with proponents of co-management strategy in mitigating conflicts related to common property use. The study concludes that for effective and peaceful fisheries management to exist, co-management strategy is to be embraced.

The second objective focused on the community perception on the effectiveness of co-management strategy in mitigating fisheries conflicts in Homa Bay County. It was established that the community in Homa Bay County have positive perception on the co-management strategy. The respondents said that the co-management strategy is effective, transparent, competent and timelines in managing fisheries conflicts and other fisheries related problems. The study concludes that the positive perception of the fishing community on co-management strategy improves fisheries management hence reduces fisheries related conflicts in Homa Bay County.

Finally, the third objective examine the effects of challenges faced by the co-management strategy in mitigating fisheries conflicts. The study established that the Co-management strategy faces a number of Challenges such as poor infrastructure and inadequate funds among others to enable them run their operations effectively. The study concludes that the above challenges should be addressed to enable co-management to be perfectly effective.

Generally, the study concludes that co-management strategy is effective since it is positively perceived by the fishing community and other stakeholders. However, there are some fisheries challenges like inadequate funds, corruption and poor infrastructure among others which needs to be addressed in order for the co-management strategy mitigating fisheries related conflicts to be perfectly effective.

7.4 Recommendations of the Study

Based on research findings, the following recommendations are suggested for implementation of co-management in the county:

Basing on the first objective which was to examine the effectiveness of the co-management strategy in mitigating fisheries related conflicts in Homa Bay County, the researcher recommends that: the Ministry of Fisheries and the BMUs should sensitize the fishing community on the benefits of co-management strategy. There is need to have strong policies governing jurisdictions and national border issues to mitigate cross border fisheries conflicts. The study also recommends that there should be more involvement of stakeholder in the policy formulation.

In line with the second objective which was to assessed the community perception on the effectiveness of co-management strategy in mitigating fisheries related conflicts in Homa Bay County the study recommends that the perception that that co-management is a challenge to government authorities (or State-based management) should be overcome. Experience to date, however, has shown that when government devolve authority they benefit by achieving better results in terms of ecological, social, and economic outcomes. Co-management allows fisher communities to get the benefits of participating in management and decisions making that affect their welfare. Similarly, both national and county governments will benefit by being more effective and efficient, and potentially reduce fisheries related conflicts; poverty and aquatic resource degradation.

Regarding the third objective which examined the effects of challenges faced by Co-Management, the study recommend that government should adequately finance fisheries department while members of the fishing communities should finance their BMUs. Monitoring of fishing activities should be increased through provision of patrol boats. The BMUs officials, officers from the department of fisheries and opinion leaders should be able educate the fishers and the fishmongers on the need to peaceful coexistence within the community and seriously minimize retrogressive politics in the fisheries sector. This will help to reduce the conflicts especially the verbal insults and quarrel among them. That all BMUs finances must be audited to enhance accountability while minimizing corruption.

7.5 Suggestions for Further Research

This study provides useful insights about how stakeholder groups perceive interactions between different activities in Lake Victoria. Stakeholder interviews highlighted many important issues including the regional differences that exist in Lake Victoria both in Kenya, Uganda and Tanzania. However, there remain several topics for future research on these topics and additional questions to explore. Future research goals include:

Informal arrangements that exist in some area around Lake Victoria fisheries should be examined further. Because these informal arrangements may have implications for fisheries and coastal management, it would be valuable to understand where they exist and how they develop. If managers are aware of these arrangements, they can focus their efforts on other issues that may be more pertinent to fishermen and the marine ecosystem.

The study did not examine cultural issues that might causes fisheries conflicts. Therefore, research on Conflicts in Gender Role as a Result to Commercialization of Fisheries Industry should be carried to see how new arrangement causes fisheries conflict and to come up with possible solutions.

Because of foreign immigrants in the fishing industry, research on Cross-Border Conflicts in Lake Victoria should also be carried and also to suggest possible ways of overcoming such conflicts.

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APPENDICES

Appendix I: Questionnaire

I am a graduate student at Masinde Muliro University of Science and Technology (MMUST) pursuing PhD Peace and Conflict Studies. This research thesis is about Co-Management Strategy Mitigating Fisheries Conflicts in Homa Bay County, Kenya. I am kindly requesting you to provide information as honestly as possible. I would also like to assure you that this research is purely for academic purpose and the information you give will be treated with utmost confidentiality.

Yours faithfully,

Orwa Narman T. Odhiambo

CANDIDATE

PART A: PERSONAL DETAILS

AGE (in years): below 18 18-25 26-35 36-45 46+

Gender: Male Female

Marital status (tick where applicable) Married Single Widowed
Divorced Separated

Level of education (select the highest level of education attained)

No education Primary Secondary Tertiary level

NATIONALITY: Kenyan Ugandan Tanzanian

Other.....

Division ----- location ----- beach-----

Kind of activity do you undertake at the beach. (Tick appropriately)

Boat owner fisherman fish trader local gear maker/repairer
 Fishing equipment dealer Fish monger

Apart from fisheries related activities, what other livelihood activities are you involved in at the beach. (Tick appropriately)

	Activities	Tick
a.	Farming (Crop growing)	
b.	Trading	
c.	Cattle/Sheep/Goat keeping	

3. For how long have you been registered with the beach management unit?

0-1year 2-5years 6-10 years over 10 years

Part B: Forms of Fisheries Conflict Addressed by FMIs (Co-Management Strategy)

Please indicate the extent to which you agree with the following statements in reference to Fishing Conflict by ticking (✓) in the appropriate space. (*SD-Strongly Disagree; D-Disagree; A-Agree; SA-Strongly Agree or DnK -Do Not Know*)

4. Forms/Types of fisheries related conflicts addressed by Co-management Strategy

No	Forms of Conflict	SA	A	D	SD	DnK
a.	Fishermen – Fishermen Conflict					
b.	Fisheries Department - Fishermen Conflict					
c.	Wildlife - Fishermen Conflict					
d.	Owners of fishing gears - Fishermen Conflict					
e.	Fishing ground (<i>Wath</i>) owners - Fishermen Conflict					
f.	NEMA – Fishermen Conflict					
g.	Fish traders - Fishermen Conflict					
h.	Immigrant fishermen – Local Community					

5. In your opinion, are these the **main causes** of the conflicts highlighted above?

No	Sources/causes of Conflict	SA	A	D	SD	DnK
a.	Jurisdiction: i.e. conflict over who owns and control access					
b.	Management Mechanism: i.e. conflict over how policies are implemented					
c.	Internal Interaction: i.e. conflict resulting from how different fishery stakeholders interact					
d.	External Interaction: i.e. conflict resulting from how fishery groups and 'outside' activities interact.					
e.	Fishing Technology (Destructive fishing)					
f.	Human activities and nature conservation conflict					
g.	Stealing of fishing gears					

Part C: Co-Management Policy/regulatory regime in fisheries resources and conflict management

6. a) Are you aware of any fisheries Policy regulations?

Yes

No

6. b). Have you been involved in the formulation of some of fisheries policies?

Yes

No

If yes identify any **TWO** of the policies that you were involved in their formulation

c). If no, state **TWO** changes that you would see effected in the existing Policy/management regime

d) Are there types of policies that lessen conflicts?

Yes

No

e) Are there some types of policies that are enhancing conflicts

Yes No

f) Are there policy/regulation changes which are more responsive to fisheries conflicts

Yes No

g) In general, the FMIs (Co-management Strategy) policy mechanisms mitigate fisheries Conflicts?

Yes No

Part D: Community Perceptions on the Co-Management Strategy in Addressing Fisheries Conflicts

Please indicate the extent to which you agree with the following statements in reference to Fishing Conflict by ticking (✓) in the appropriate space. (***SD**-Strongly Disagree; **D**-Disagree; **A**-Agree; **SA**-Strongly Agree or **DnK** -Do Not Know*)

7. Fisheries Department and BMUs addresses the below fishing conflicts.

No	Forms/types of Conflict	SA	A	D	SD	DnK
a.	Fishermen – Fishermen Conflict					
b.	Fisheries Department - Fishermen Conflict					
c.	Wildlife - Fishermen Conflict					
d.	Owners of fishing gears - Fishermen Conflict					
e.	Landing site owners - Fishermen Conflict					
f.	NEMA – Fishermen Conflict					
g.	Fish traders - Fishermen Conflict					
h.	Immigrant fishermen – Local Community					

8. Community perception of Fisheries Department and BMUs (Co-Management) on how they respond to fisheries conflicts. Rank them on parameters indicated below on scale of 1-4 (1-low 2 moderate 3 high 4 very high)

Fisheries Department and Beach Management Units (BMUs)

parameter	Score			
	1	2	3	4
Effectiveness				
Transparency				
Legitimacy				
Competency				
Timeliness				
Networking				

Part E: Co-Management Challenges face by FMIs in mitigating fisheries conflicts.

Please indicate the extent to which you agree with the following statements in reference to Fishing Conflict by ticking (✓) in the appropriate space. (***SD**-Strongly Disagree; **D**-Disagree; **A**-Agree; **SA**-Strongly Agree or **DnK** -Do Not Know*)

No.	Co-Management Challenges faced by FMIs in mitigating fisheries conflicts	SA	A	D	SD	DnK
	Inadequate funds					
	Politics					
	Vast geographical area/region					
	Corruption					
	Inadequate support from government					
	Gender issues					
	Poor infrastructures					
	Conflict of interest					
	Monitoring fisheries activities					
	Cultures					

Appendix II: Interview Schedule for Officials of Department of Fisheries

1. In your opinion, what are the types of fisheries related conflicts you experience in your area of operation?
2. What are the causes of fisheries related conflicts?
3. Is fisheries department and BMUs effectively addressing fishing related conflict in your area?
4. Apart from BMUs and Fisheries department, are there other institutions that participate in the co-management of fisheries resources?
5. What is the community perception of fisheries department and BMUs on how they represent on fisheries policies?
6. How frequent do local people visit you to help them solve fisheries related conflict?
7. Have you ever attended any training on conflict management?

Appendix III: FGDs Guide

1. What are the causes of fisheries related conflicts?
2. Are the FMIs effectively addressing fishing related conflict in your area?
3. Have you ever participated in the fisheries policy formulation?
4. Apart from BMUs and Department of Fisheries, are there other institutions that participate in the co-management of fisheries resources?
5. What is the community perception of fisheries department and BMUs on how they deal with matters fisheries policies?
6. What are the Co-Management Challenges faced by FMIs?

Appendix IV: Observation Checklist

The researcher checked for availability of the following items

S/No.	Item	Comment
1	Fisheries Patrol boats	
2	Standard fishing gears	
3	Illegal fishing gears	
4	FMI offices	
5	Legal framework (Policies)	
6	Records of fisheries cases	
7	Fishing boats	
8	Landing sites	
9	Banda/fish stalls	
10	Middlemen trucks	

Appendix V: List of BMUs

Sub County	Division	BMU	Landing Site
Mbita	Mbita	Gode Ariyo	Gode ariyo
		Ulugi	Ulugi
		Chiro	Chiro
		Nyagina	Nyagina, Makende, Causeway
		NgodheIsland	Ngodhe
		Litare	Litare
		Kaswanga	Kaswanga
		Gumba	Gumba, Likowe
		Utajo	Utajo
		Luanda Nyamasare	Luanda Nyamasare
		Luanda Rombo	Luanda rombo
		Kiumba	Kiumba, Misenye
		Wayando	Wayando
		Kogalo	Kogalo
		Alero	Alero
		Kaugege	Kaugege
		Sienga	Sienga
		Uta	Uta
		Kolunga	Kolunga
		Alara	Alara
		Mirunda	Mirunda
		Nyaroya	Nyaroya
		Kisui	Kisui
		Olambwe	Olambwe
		Sukru	Sukru Island
		Misori Kobar	Misori kobar
		Ng'ou	Ng'ou, Dhogunda
		Uwi	Uwi
		Sota/Akuot	Sota, Akuot
		Ondago	Ondago
		Koguna	Koguna
		Tabla	Tabla
	Nyachebe	Nyachebe	
	MbitaTown	Mbita gembe	
Kigoda	Kigoda		
Kakrigu	Kakrigu		
Wakondo	Wakondo		
Uyoga/Kombe	Uyoga, Kombe		
Lambwe	Alii	Alii	
	Ndhuru	Ndhuru	

		Kisaka	Kisaka
Sub County	Division	BMU	Landing Site
Mbita cont...	Mfangano	Makira	Makira
		Nyakweri	Nyakweri
		Kitenyi	Kitenyi
		Kiwari	Kiwari
		Mauta	Mauta
		Mrongo	Mrongo
		Kitawi	Kitawi
		Yokia	Yokia
		Mulundu	Mulundu
		Wakula	Wakula
		Tiko	Tiko
		Nyawalongo	Nyawalongo
		Ringiti Island	Ringiti
		Takawiri Island	Takawiri, Kongata
		Remba Island	Remba
		Ugina	Ugina
Kasarani	Kasarani		
Masisi	Masisi		
Sena	Sena		
Likungu	Likungu		

Sub County	Division	BMU	Landing Site
Suba	Central	Gingo	Gingo
		Kabwao	Kabwao
		Kakione	Kakione
		Sindo Gateway	Sindo gateway
		Roo	Roo
		Sindo Main	Sindo Main
		Ukula	Ukula 'A' & 'B'
		Kibuogi Island	Kibuogi 'A' & 'B'
		Nyakwara	Nyakwara
		Kosodo	Kosodo
		Jiw Dendi	Jiw dendi
		Ngeri	Ngeri
		Ragwe/Konyango	Ragwe, Konyango
		Litare	Litare
	Gwassi	Nyagwethe	Nyagwethe, Komogo
		Uterere	Uterere, Kadori
		Kiriwo	Kiriwo, Ruancha
		Osiri	Osiri

Sub County	Division	BMU	Landing Site
		Luanda Mukuribo	Luanda Mukuribo
		Kitawa	Kitawa
		Sibora	Sibora
		Kisegi	Kisegi
		Osoi	Osoi
		Nyandiwa	Nyandiwa
		Lugwagwani	Lugwagwani
		Kinda	Kinda
		Sare	Sare
		Rasira	Rasira, Nyatambe
		Kiwa 'A'	Kiwa 'A'
		Kiwa 'B'	Kiwa 'B'
		Mukuyu	Mukuyu
		Orore	Orore
		Kagoro	Kagoro

Source: DFO Suba (2016)

Appendix VI: MMUST Approval



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

Tel: 056-30870
Fax: 056-30153
E-mail: sgs@mmust.ac.ke
Website: www.mmust.ac.ke

P.O Box 190
Kakamega – 50100
Kenya

Office of the Dean (School of Graduate Studies)

Ref: MMU/COR: 509079

Date: 4th November 2015

Narman T. Odhiambo Orwa
CPC/H/07/11
P.O. Box 190-50100
KAKAMEGA

Dear Mr. Orwa,

RE: APPROVAL OF PROPOSAL

I am pleased to inform you that the Senate of Masinde Muliro University of Science and Technology acting on the advice of the Board of the School of Graduate Studies approved your proposal entitled: *'Co-Management Strategy Mitigating Fisheries Conflicts in Homa Bay County, Kenya'* and appointed the following as supervisors:

1. Prof. John K. Byaruhanga
2. Prof. Crispinous Itoyo

You will be required to submit through your supervisor(s) progress reports every three months to the Dean SGS. Such reports should be copied to the following: Chairman, Centre for Disaster Management and Humanitarian Assistance Committee and Chairman, Peace and Conflict Studies.

It is the policy and regulations of the University that you observe a deadline of three years from the date of registration to complete your PhD thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.

I once more congratulate you for the approval of your proposal and wish you a successful research.

Yours Sincerely,

P. Odera
DEAN
SCHOOL OF GRADUATE STUDIES
MASINDE MULIRO UNIVERSITY
OF SCIENCE AND TECHNOLOGY
AG. DEAN, SCHOOL OF GRADUATE STUDIES

Appendix VII: Research Authorization by NACOSTI



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, United House
Uasin Highway
P.O. Box 20023-Nairobi
NAIROBI-KENYA

Ref: No. NACOSTI/P/15/50761/8836

Date:
10th December, 2015

Narman Odhiambo Orwa
Masinde Muliro University of Science
and Technology
P.O. Box 190 - 50100
KAKAMEGA.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Ca-management strategy mitigating fisheries conflicts in Homa Bay County, Kenya.*" I am pleased to inform you that you have been authorized to undertake research in **Homa Bay County** for a period ending **10th December, 2016.**

You are advised to report to **the County Commissioner and the County Director of Education, Homa Bay County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.


BR. S. K. LANGAT, OGW
FOR: DIRECTOR GENERAL/CEO

Copy to:

The County Commissioner
Homa Bay County.

The County Director of Education
Homa Bay County.

Appendix VIII: Research Permit

THIS IS TO CERTIFY THAT:
MR. NARMAN ODHIANBO ORWA
of MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY, 402-60100
Embu, has been permitted to conduct
research in Homabay County

on the topic: **CO-MANAGEMENT
STRATEGY MITIGATING FISHERIES
CONFLICTS IN HOMA BAY COUNTY,
KENYA**

for the period ending:
10th December, 2016

Permit No : NACOSTI/P/15/50761/8836
Date Of Issue : 10th December, 2015
Fee Received : Ksh 2,000

.....
Applicant's
Signature

.....
for Director General
National Commission for Science
Technology & Innovation



Appendix IX: Letter from County Commissioner on Research Authorization



THE PRESIDENCY

MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Telephone: Homa Bay 22104 or 22105/Fax:22491
E-mail: cc_homabay@yahoo.com
When replying please quote

COUNTY COMMISSIONER
HOMA BAY COUNTY
P. O. BOX 1 – 40300
HOMA BAY

REF: ED.12/I/VOL.II/ 22

18th December, 2015

The Deputy County Commissioners:-

-HOMA BAY SUB-COUNTY

-MBITA SUB-COUNTY

✓-SUBA SUB-COUNTY

RE: RESEARCH AUTHORIZATION - NARMAN ODHIAMBO ORWA

This is to confirm that the above named has been authorized to carry out research on "*Co-management strategy mitigating fisheries conflicts in Homa Bay County*", for a period ending 10th December, 2016, 2016

This is as per their letter under Ref: NACOSTI/P/15/50761/8836 dated 10th December, 2016.

DAVID LUSAVA
For: COUNTY COMMISSIONER
HOMA BAY COUNTY

C.C.

The County Director of Education
HOMA BAY

Appendix X: Letter from County Director of Education on Research Authorization

**MINISTRY OF EDUCATION SCIENCE & TECHNOLOGY
STATE DEPARTMENT OF EDUCATION**



Telegrams: "SCHOOLING", Homa Bay
Telephone: +254726961531
When replying please quote

**COUNTY DIRECTOR OF EDUCATION OFFICE
HOMA BAY COUNTY
P.O. BOX 710
HOMA BAY.**

E-mail: cdehomabay@gmail.com
DATE: 18TH NOVEMBER, 2015

REF: MOEST/CDE/HB/ADM/11/VOL.1/69

**NARMAN ODHIAMBO ORWA
MASINDE MULIRO UNIVERSITY OF SCIENCE
P.O BOX 190-50100
KAKAMEGA**

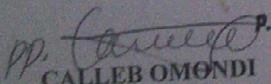
RE: RESEARCH AUTHORIZATION

In response to the letter from the National Commission for Science dated 10th December, 2015 giving you authority to carry out the research on *co-management strategy mitigating fisheries conflicts in Homa Bay County, Kenya*.

I hereby give you permission to carry out the research in Homa Bay County.

Please submit a copy of your findings both in soft and hard copy form to us.

**For COUNTY DIRECTOR OF EDUCATION
HOMA BAY COUNTY
P.O. BOX 710 - HOMA BAY.**


**CALLEB OMONDI
FOR: COUNTY DIRECTOR OF EDUCATION
HOMA BAY COUNTY**