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Fisheries Management Institutions and Policy Mechanisms that Mitigate Fisheries Conflicts in Homa Bay County, Kenya

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Abstract:

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 mitigates fisheries conflicts in Homa Bay County. It was to establish if Fisheries Management Institutions (FMIs) policy mechanisms mitigate fisheries conflicts in Homa Bay County. The common property theory was used in the study. This study was guided by a conceptual framework of common property. 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 Gwassi. The study established that 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. 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. For each objective, the decision to reject or fail to reject the null hypothesis was based on the significance of coefficients ($p < 0.05$) of the related variables in the fitted regression. The study found out that FMIs policy mechanisms had a positive influence on fisheries conflict. In objective two, the study however, found that there is no relationship between community perception and performance of the FMIs as failed to reject the null hypothesis. The study also found that socio-economic challenges were an impediment in the mitigation of fisheries conflict. The findings of this study support and add knowledge to previous studies on fisheries conflicts. The study therefore, 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 research suggests further studies targeting cultural issues that may be causing fisheries conflicts and cross border fishing that is causing fisheries conflicts.

1. Background of the Study

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, livelihoods and fishing environments crucial to 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 fish conflict can lead to armed conflict. Think of the infamous 20th century cold wars between Iceland and the United Kingdom showed nations were willing to defend coveted fishing ground with military force. Glaser (2017) further state 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. Basing on the above aquatic populations I can say that struggle for fish resource is one of the sources of world conflicts.

In the United States of America, there is wide spread allocation conflict arising from between chartered boats and recreational fishermen in Puget Sound (Washington Department of Fisheries, 1990), between ethnic groups in the Gulf of Mexico (Maril, 1983), between 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 basis of fisheries conflict between traditional, recreational and commercial resource users are moving from physical competition for fish to economic and legal arguments over social properties (Kearney, 2001).

In Europe one of the more major conflicts is that between the cormorant (*Phalacrocorax* species) and inland fisheries and aquaculture. Cowx further states that, in the past 30 years the number of breeding and overwintering great cormorants has increased dramatically across Europe. Cormorants are now considered to be more frequent and widespread in Europe than at any time in the last 150 years. Populations have returned to some areas after a long absence and have also moved into previously unoccupied areas. This increase is based on the geographical distribution of two sub-species: the great cormorant (*Phalacrocorax carbo*) that lives on the Atlantic coast (the "Atlantic race"), and the subspecies *Phalacrocorax carbo sinensis* (the "continental race"), which lives on the continent from Western Europe across the whole of the Asian Continent to China and India. Similar large increases in the number of cormorants have also been seen in North America with the double-breasted cormorant (*Phalacrocorax auritus*) (Cowx, 2013).

In south Asia where it's population rely majorly on fish as a primary source of dietary protein and income generation than any other people in the world. This has led to overfishing in south Asia there by resulting to fisheries conflicts. For example, Silvestre *et al.* (2003) state that, the results of overfishing in South and Southeast Asia are that coastal fish stocks have been severely depleted and that the resources have been finished down to 5-30 percent of their unexploited levels. The struggle for fish and fishing grounds are the major causes of fisheries conflicts in these areas.

Tsunee Akahat (1993) states that historically, fishery relations among the nations 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 rather than cooperation.

In many African countries, industrial fisheries have been granted permission to operate in poorly regulated environments. An assessment of the state of fisheries management in Central and West Africa in 2016 established that less than a quarter of the countries had broad fisheries management plans—the basic tool for controlling and monitoring fishery performance. Comprehensive scientific research is often lacking for all but the most high-value fisheries. Large areas of the fisheries sector are, for that reason, left unregulated, leaving the fishing industry highly vulnerable to unsustainable exploitation.

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 a 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.

<http://www.oceandocs.org/bitstream/handle/1834/198/CONFLICTS-GHANA.pdf?sequence=1>

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 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. Other forms of conflicts include fishermen verse boat and fishing gears owners due to over 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).

In agreement with Priscoli (2002) and Warner (2000), natural resource conflicts can be caused by poor communication, differences of perception, ego battles, personality differences, differences in views about the good and the bad (conflict of values), differences 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. Scarcity is associated with production problems, namely fewer fish can be caught by fishermen (not enough 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 seen to be major sources 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).

Also in agreement with Bennet (2002), use rights is one of the most controversial issues in marine fisheries ever since mankind begun to fish in the seas, rivers and oceans, and even before public policies emerged to deal with the fisheries management. In Homa Bay County, access to common resource (Lake Victoria) and its exploitation is one of the major causes of fisheries 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).

In general, the parties involved in the conflict are a group of traditional fishermen. Many types of conflict caused by diversity of fishermen's perception about the management of fish resources. Warner (2000) identified four factors that can explain the emergence of conflicts over natural resources, including the competition of natural resources (increased dependence on natural resources, thereby increasing competition).

It is also critical to note that forces in operation within the dynamics of fisheries, a complex bio-economic system where diverse interaction amongst natural resources, humans and institutions give ample opportunities for conflicts. Conflict emerges when "the interests of two or more parties clash and at least one of the parties seeks to assert its interests at the expense of another party's interests" (FAO, 1998). Conflicts of this type do not necessarily have to be violent or highly disruptive, however; in fact, many conflicts that arise as a result of differing interests are low-level, non-violent phenomena (Warner, 2000). Nonviolent conflicts in fisheries, nevertheless, need not be overlooked as they may pose threats to food, livelihood and environmental 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 safeguard fisheries from imminent collapse, the government decided to change the approach to fisheries management from centralized control and command to the integrated approach where key stakeholders who are dependent on the fisheries for their livelihoods are involved in management decision making and other activities (ILEG, 2005).

Co-management has been promoted as a way of improving the effectiveness and efficiency of fisheries management for at least the last twenty years, recognising that the inclusion of resource users in management should promote understanding, ownership and commitment (Berkes, 2007, 2009; Pomeroy, 2007). The term co-management can be defined as the sharing of responsibility and/or authority between the government and local resource users to manage a resource (Jentoft, 1989; Nielsen *et al.*, 2004). In the literature, co-management covers a broad spectrum of management arrangements and the amount of responsibility and/or authority that the government and local resource users have will differ and depend upon country- and site-specific conditions (Pomeroy, 1995).

Fisheries co-management is a well-established concept and practice, with many examples of co-management arrangements across the world, and, with more evidence and understanding emerging; the complexities of co-management have 'unfolded' (Berkes, 2007). Building on this experience, in recent years increasing emphasis has been given to governance concerns within fisheries, recognising the need for stakeholders to come together to develop policies and make decisions 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 system complexities and diversity (both ecological and social), common features of natural resource systems. Adaptive co-management and adaptive governance are approaches that bring to the fore concerns about uncertainty, and dynamic, complex and diverse systems, highlighting 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 shares many features with other kinds of partnerships and co-operative environmental governance arrangements involving multiple actors (Berkes, 2002; FitzGibbon, 2004). However, a critical characteristic of co-management is the presence of at least one strong vertical link between the community or user group and the government, including formal

arrangements for sharing responsibilities and authority (Berkes, 2002; Borrini-Feyerabend *et al.*, 2007). In addition, ad hoc public participation in management decisions or mere consultation is often not regarded as co-management.

The term co-management is relatively recent, where its earliest use has been traced to late 1970s (Pinkerton, 2003). However, as mentioned previously, the practice of power sharing in resources management goes back to earlier times (Ostrom, 1990). Most definitions of co-management entail some institutionalized arrangement for user participation in management and decision-making, a dynamic partnership using the capacities and interests of local fishers and communities, complemented by the ability of the state to provide enabling policies and legislation as well as enforcement and other assistance.

The agenda raised by adaptive co-management and adaptive governance is challenging. The two approaches are closely interlinked, with Folke *et al.* (2005) suggesting that adaptive co-management is a way through which adaptive governance can be operational. Key defining features of adaptive co-management have been identified by Olsson *et al.* (2004), Folke *et al.* (2005), Armitage *et al.* (2007b) and others, such as learning-by-doing, dealing with uncertainty and complexity, collaboration and power sharing, and management flexibility. In addition to an increasing interest in adaptive co-management and adaptive governance, research by Kooiman *et al.* (2005, 2008) emphasises the importance of interaction in governance, referring to interactive governance as the way forward, to increase the governability of the 'system-to-be-governed'. An assessment of governability can be helpful in identifying constraints on effective governance and enabling improvements in governance to be made.

Community-based co-management is the only realistic solution for the majority of the world's fisheries and is an effective way to sustain aquatic resources and the livelihoods of communities depending on them. Under such a management system, responsibility for resources is shared between the government and users. On the smallest scale, this might involve mayors and fishers from different villages agreeing to avoid 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 approach to fisheries management, which is a relatively new management concept that identifies and defines the ecosystem to include human and offers a viable option for achieving sustainable fisheries utilization. In the new approach, stakeholders are the stewards of the resources and are, therefore, involved in the decision making, implementation, and monitoring processes. This new approach also provides a framework for managing fisheries, for example in the case 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 fisheries management institutions, legally empowered and registered with the Department for Fisheries that bring together everyone involved in fisheries at a beach, boat owners, boat crew, traders, processors, boat builders and repairers, net repairers and others to work with government and other stakeholders in managing fisheries resources and improving the livelihoods of community members. The different stakeholders are required to be registered with BMU in order to be allowed 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 limits the huge 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 disputes arise over allocation of scarce fish resources, the division of fishery benefits 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 undesirable as some disputes become a catalyst for much needed reforms for policy and economic improvements.

However, a framework for analyzing conflicts in fisheries is necessary to organize interventions relevant to the nature of conflicts, the needs and capacities of fisheries stakeholders in the region (FAO, 2006).

2. Problem Statement

Fisheries are dynamic social-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.

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 (DoF-Suba, 2010).

Although this co-management strategy has been suggested as a solution to the problem of fisheries conflict and exploitation, evidence on the ground indicate that the problem of fisheries resource conflicts and over-exploitation still persist. This therefore called 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.

3. Objective of the Study

The main objective of this study was to examine co-management strategy mitigating fisheries conflicts in Homa Bay County, Kenya. Specifically, the study sought to establish that Fisheries Management Institutions policy mechanisms mitigate fisheries conflicts in Homa Bay County.

4. Descriptive Analysis of the Study Variable

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.

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).

The Fisheries (Beach Management Units) Regulations have reformed Kenyan fisheries law to facilitate co-management between government and local communities over aquatic environments and harvests. Under the Regulations, Beach Management Units have exclusive management rights over fish landing sites and consist of an assembly, an executive committee, and may also include sub-committees, Fisheries (Beach Management Units) Regulations (2007). They are required to provide data on catches and develop co-management plans to ensure sustainable fisheries in that area (Ogwang *et al.*, 2009). Such management plans must be approved by the Director of Fisheries and include measures such as closing certain areas to fishing, closing areas during breeding seasons, restricting fishing gear, and limiting the number of fishing vessels (*ibid*). Beach Management Units are required to protect the aquatic environment and cooperate with authorities to that effect. Beach Management Units must put their management plans into effect through by-laws, which are developed by each Beach Management Unit and approved by the Director of Fisheries. Such by-laws must comply with existing legislation but may go beyond legislative requirements on environmental and biodiversity protection (*ibid*).

According to the Convention on Biological Diversity opened for signature 5 June 1992 (entered into force 29 December 1993), the Fisheries (Beach Management Units) Regulations help achieve Kenya's international legal obligations, first and foremost those under the Convention on Biological Diversity. Article 8 of the Convention establishes several legal obligations which the Fisheries (Beach Management Units) Regulations aim to address. These include the obligations to: Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity; Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use; Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings; Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, inter alia, through the development and implementation of plans or other management strategies; and, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices, Kenya Fisheries (BMUs) Regulation of 2007.

Beach Management Units also possess certain law-enforcement powers on gear regulations, registration of vessels, and protection of fishing grounds. Beach Management Units self-monitor performance, along with external, authorized fisheries officers in six months intervals. To defray the costs of their operations, Beach Management Units can receive funding from the Ministry of Fisheries Development. Moreover, Beach Management Units can generate their own income through membership fees, taxing migrant fishers, or vessel registration fees, for example, Fisheries- BMU Regulations (2007). Unlike the previous top-down approach in Kenyan fisheries law, the 2007 Fisheries (Beach Management Units) Regulations create institutional linkages both horizontally and vertically. Nonetheless, the overall responsibility of monitoring and supervising Beach Management Units is still vested with the Ministry of Fisheries Development (Ogwang *et al.*, 2009).

To determine the influence of Fisheries 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 Fisheries 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 1** shows the outcomes of that probe. The extent to which Fisheries 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 Fisheries Policy mechanism dimension was applied to a great extent.

	Mean	Standard Deviation
Have you been involved in formulation of fisheries policies	0.76	.522
Does the Government have a fisheries policy	2.89	1.540
Is there legal support when conflict arises	2.84	1.342
Fishermen are aware of fishing policies	0.76	.538
Fishermen are involved in Policy implementation	0.79	.636
n=389		

*Table 1: Descriptive Statistics of Fisheries Policy Mechanisms
Source: Field 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 1** shows the mean and standard deviation for the Fisheries Policy mechanism study variable. An examination of the mean revealed that a majority had not been involved in formulation of policies as the mean was 0.76, indicating that they strongly disagreed.

With respect to the respondents being indicating that the government had a fisheries policy, the mean was 2.89 showing that they were somewhat moderate.

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.

Fishermen being aware of fishing policies had a mean of 0.76, 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.

5. Policy/Regulatory Regime in Fisheries Resources Management and Conflict

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

Response	Percentage
Yes	37.8
No	62.2
n	100.0

*Table 2: Have you been involved in formulation of fisheries policies?
Source: Field Data (2016)*

From the above **table 2**, 62.2% of the respondents said that they have not been involved in the formulation of fisheries policies whereas only 37.8% of the respondents said that they have been involved. I assume that fisheries conflict exists because many fishermen and other shareholders are not involved in the formulation of the fisheries policies. This therefore calls for more involvement of all the stakeholders in the formulation of fisheries policies.

However, the few (37.8%) of the respondents who had been involved in the formulation of policies cited some of the policies they formulated. Therefore, the following were policies suggested 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.

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.

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/AIDS which is very common in the county and more so in the beaches.

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.

That 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/AIDS.

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.

That all BMUs finances must be audited and they also mentioned of regular elections of BMU officials.

That there should be good 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.

6. Inferential Statistics on Fisheries Policy Mechanisms

a) H_{01} : Fisheries policy mechanisms have no significant effect in mitigating fisheries conflicts.

A regression model to determine the relationship between Fisheries 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.

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

a. Predictors: (Constant), Fisheries Policy Mechanisms

Table 3: Model Summary of Fisheries Policy Mechanisms

Fisheries 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% ($R^2 = 0.010$) as shown in **Table 4** and **Table 5**. This shows that 1.0% of the variation in Fisheries Conflicts is accounted for by Fisheries Policy Mechanisms. The fitted regression model was Fisheries Conflicts = $0.054FPM + 2.475$ as observed in **Table 5**, which implies that one-unit increase in Fisheries Policy Mechanisms index increases Fisheries Conflicts by 0.054 units.

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), Fisheries Policy Mechanisms (FPM)

Table 4: ANOVA^a of Fisheries Policy Mechanisms and Fisheries Conflicts

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

a. Dependent Variable: Fisheries Conflicts

Table 5: Coefficients^a Fisheries Policy Mechanisms and Fisheries Conflicts

Therefore, the null hypothesis that "Fisheries policy mechanisms have no significant effect in mitigating fisheries conflicts in Homa Bay County" is **REJECTED**.

According to the findings from **Table 5**, Fisheries Policy Mechanisms had an influence on the Fisheries Conflicts in Homa Bay County, Kenya, since its relationship was observed to be statistically significant ($p=0.047$; $t= 1.991$).

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

$$Y = 2.475 + 0.054FPM$$

Where: Y is Fisheries Conflicts and FPM is the Fisheries Policy Mechanisms.

7. Discussion of Findings for Fisheries Policy Mechanisms and Fisheries Conflicts

This section discussed the research findings based on the study objective one that focused on investigating the influence of Fisheries Policy Mechanisms on the Fisheries Conflicts in Homa Bay County.

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 (Fisheries Policy Mechanisms). Thus, the study established that the relationship between Fisheries 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.

In agreement with GoK (2008) states that the policies of co-management are 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/AIDS prevention and management.

Strong fisheries policies are very good in managing fisheries sector. For example, Coffey (2000) states that: Unlike many other sectors, however, the fisheries sector also particularly dependent upon a healthy ecosystem for its own survival. The replenishment of fish stocks relies not only on the existence of healthy spawning stock, but also on clean water, adequate food supplies, and sufficient and accessible spawning or nursery areas to support reproduction and early life cycle stages. Farmed fish also depend on the availability of clean water. It is thus in the interest of both the environment and the fisheries sector to ensure that marine or freshwater ecosystem are maintained in a way that permits sustainable production. Therefore, the way in which the fisheries sector develops is determined by the European Union's Common Fisheries Policy.

Lastly, good fisheries policies reduce 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 permit, irrespective of whether such conduct is by intent or negligence. Major or repeated intentional offenses are subject to up to six years imprisonment. If a catch of a vessel exceeds the allowable catch of the said vessel of individual species, the relevant fishing company must obtain an additional catch quota for the relevant species. If this is not done within a certain timeframe, the fishing permit may be revoked as well as a charge having to be paid for the illegal catch. This policy therefore, instills discipline among the fishing communities.

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