



## Empirical Study of the Drivers and Strategies of Managing Fishery Conflicts in the Fadama Areas of Adamawa State

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**Abstract:** This study investigated the drivers and strategies for managing fishery conflicts in Fadama fishing communities in Adamawa state. The study employed descriptive research design and employed a purposive sampling technique to select 309 fishers from 4 fishing communities in the Fadama areas of Adamawa state which include: Bagale, Rugange, Bilanchi and Dansin Biratiye. The categories of participants selected for the study include: community leaders (37); male fishers (134); female fishers (46); fish marketers (49) and fish processors and preservers (41). Data was collected through a quantitative questionnaire and analysed through standard deviation. The study established the factors that drive fishery conflict in the fishing communities in Adamawa state to include: competition over jurisdiction between local and outside fishers; stealing of fishing gears; violation of community fishing rules and regulations; volume of water bodies due to effects of climate which heighten competition between actors in fishing communities and limited fish resources among others. In order to constructively manage fisheries resources in sustainable manner, compromise and collaboration conflict management strategies were recommended to promote a culture co-management of fisheries resources in the Fadama areas of Adamawa state and other areas where fishery conflict are endemic in Nigeria.

## INTRODUCTION

Fisheries are a vital source of food and income, supplying the main animal protein for more than 1 billion people around the world, jobs for estimated 43.5 million and with an export value of US\$86.4 billion, 50% of which comes from developing countries (FAO, 2016, Kelleher, 2008, World Bank and FAO., 2009). Similarly, a study conducted by The World Bank (2012) reveals that the bulk of fisheries employment is in the post harvest economic activities which includes fish processing and marketing and it is estimated the total employment in the whole fisheries sector in Africa is put at 25.4 million people with 7.8 million people employed in fishing and 17.6 in post-harvest. Majority of these people are small-scale, artisanal fishers eking out a living from coastal and in-shore resources. As a matter of fact,

millions of people around the world depend on fisheries both for employment and as a veritable source of protein. In Nigeria for instance, Nwafili and Tianxiang observe that out of the estimated 120 million people in Nigeria in 2000, about 1% engages in fishing and over 24 million Nigerians depend on fisheries for their livelihood yet Nigeria imports over 600,000 metric tonnes of fish annually (CBN, 2005). Nigeria's population has grown now to 198 million (United Nations, 2017) and it is expected that more Nigerians will be depending on fisheries for their livelihoods. Studies in Nigeria have indicated that fish resources provide the main source of sustenance, assets and investment capital, over 60% of the communities are engaged in fishing as their main source of livelihood (Ladu and Neiland, 1997).

In Adamawa state also, fishing provide huge employment and livelihood sustenance for many people

residing in fishing communities, especially, those along the banks of river Benue and the Fadama areas. The huge number of people engaged in fisheries in the state presupposes that the interests of these various actors would often times engender conflict which may impact negatively on the fishing activities. For instance, a study conducted by the Food and Agriculture Organisation (FAO), observe that conflicts take place in fisheries when groups or individuals seek the same resource using different methods or try to utilize the same space for their activities with either party seeking dominance (FAO., 2010). This view expressed by FAO is informed by what Desloges (1997) believe result to conflict when he noted that conflicts originate in the different perceptions of the parties involved regarding who should manage use and benefit from a resource.

Notwithstanding, however, conflict is not necessarily bad as it can be a social force or catalyst for change and development when it is constructively channeled into productive activities. A poorly managed conflict can be counter-productive to social interactions and productive activities. The massive impacts of climate change, desertification and explosion of human population have all been putting pressure on fishing communities in the Fadama areas of Adamawa state with the consequent potential for driving violent conflicts among the various fishing actors in the inland fishing communities in the Fadama areas of Adamawa state. This has often resulted in very debilitating consequences disrupting fishing activities, creating tensions, reducing revenue from fishing among others. This situation poses some very fundamental questions such as-What factors drive fishery conflicts in Fadama areas of Adamawa state? What are the implications of these conflicts on food and job security to the fisheries community in the Fadama areas of Adamawa state? What conflict management strategies are adopted by the actors to manage fishery conflict? These questions are posed against the background that research has indicated that managing conflict toward constructive action is the best approach in resolving conflict in organization (Robinson *et al.*, 1974).

This research is important because most of the fishery conflicts in the North East of Nigeria revolve around the wetland areas of the Fadamas. Fadama is a Hausa word meaning a valley-bottom, flood-plain or lowland around a river that floods or becomes wet when the river is high. Fadamas are usually flood naturally but the term is also applied to areas where people have channelled or pumped water for their farms or other purposes. Fadamas tend to be areas of reeds, teeming with fish and bird-life (Blench, 2004). A World Bank document defines Fadamas as follows:

Fadamas are defined as flood plains and low-lying areas underlined by shallow aquifers. Fadama resource users are defined as farmers, pastoralists, fisher folk/fisher

women, hunters and others who directly depend upon the natural resources of the fadamas for their livelihoods. Fadama resource users may also comprise private operators who provide complementary infrastructure and services for increasing productivity, storage, diversification and market access for Fadama resource users (2003) (World Bank, 2003).

In view of the foregoing arguments, this study interrogates the nature, drivers, effects and strategies of managing fishery conflicts in the Fadama fishing communities of Adamawa state.

**Purpose of the study:** The main purpose of this study is to examine the drivers and strategies for managing fishery conflict in the Fadama fishing communities of Adamawa state. The specific objectives are to:

- Understand the nature of fishery conflict in Fadama communities of Adamawa state
- Interrogate the factors that drive fishery conflict in Fadama communities
- Find out the negative impacts of fishery conflicts on the Fadama communities
- Examine the strategies employed by the fishers to manage their conflicts
- Assess the effectiveness of the conflict management strategies

**Research questions:** The study posed and answered the following research questions:

- What is the nature of fishery conflict in Fadama communities of Adamawa state?
- What are the factors that drive fishery conflict in Fadama communities?
- What are the negative impacts of conflicts on the Fadama fishing communities?
- What are the strategies employed by the actors in the fishing communities to manage their conflicts?
- How effective are the conflict management strategies?

## **Literature review**

**Theoretical insight:** The theoretical framework adopted in this study is the contingency theory of conflict management developed by Derr (1975). The theory is one of the conceptual tools useful for managing organizational conflicts. The central argument of the theory according to Derr is that there are three major conflict management approaches from which intervenor or a conflict manager or parties to conflict can draw to formulate an approach appropriate for resolving a conflict and such conflict management approaches are: collaboration, bargaining and power play. The appropriate use of these methods depends on the individual and organizational state. while

both collaboration and bargaining assist parties to discuss the issues in the conflict and finding mutually acceptable agreement to resolve the conflict, power play relies solely on the stronger party forcing the weaker party to reach concessions. Our interest here is on collaboration and bargaining, how both conflict management strategies can be used to manage fishery conflict because both strategies can be used to promote cooperative behaviours among fishers and discourage competitive behaviours that drive fishery conflicts.

### **Conceptual definitions**

**Towards a conceptual clarification of the concepts of conflict and fishery conflict:** Conflict is a social process that occurs in human interactions and it is the result of opposing forces entangled in a clash of interests that they need to resolve. 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'. Conflict is broadly defined as a situation of noncooperation between parties with contradictory objectives (FAO., 1995). Conflict is a felt struggle between two or more interdependent individuals over perceived incompatible differences in beliefs, values and goals or over differences in desires for esteem, control and connectedness. This definition emphasizes several unique aspects of conflict (Wilmot and Hocker, 2010). Conflict arises from competition for resource(s) between individuals, groups, communities, organizations and nations. In the light of the focus of this study, fishery conflict refers to a situation of competition for scarce fishery resources between or among fishers. Fishery conflict refers competitive behaviours over ownership, access to and management of fish resources. In this contest, fish resources become the main object of contention between the actors involved in the contestations.

**Typology of fishery conflict:** There are different types of conflicts that occur in fisheries. For instance, Charles (1992) categorized the wide range of fishery conflicts into four interrelated categories: fishery jurisdiction: conflicts over who owns and controls access to what, the optimal form of management and the role of government in the fishing system management mechanisms: conflicts over how policy is carried out, often short-term conflicts over harvest levels, enforcement and the consultative process internal allocation: conflicts resulting from how different fishery stakeholders interact and external allocation: conflicts resulting from how fishery groups and "outside" activities interact.

Warner (2000) proposes a typology of natural resource conflicts that encompasses many of the exogenous and intangible effects found in (tropical) fisheries. He distinguishes between intra micro-micro

conflicts (boundary disputes, elite capture of benefits, community differences), inter micro-micro conflicts (lack of co-operation between communities, conflicts over wealth disparity and conflicts between long-term settlers and new arrivals) and micro-macro conflicts (cultural disputes, relations between project sponsors and communities, environmental problems and contradictory resource needs).

Bennett *et al.* (2001) have also developed a revised typology to Charles typology of fishery conflict which they extended from four conflict categories into five categories: type 1: who controls the fishery (Access issue on who among the fishers can fish); type 2: how the fisheries is controlled (Enforcement issues on how management systems are implemented; quota allocation, fishing seasons); type 3: relations between the fishery users (User groups-related issues such as small-vs. large-scale fishers; ethnic and religious groups); type 4: relations between fishers and other resource users (Conflicts arising from multiple use of resources: farmers, tourists, conservationists, industrial developers) and type 5: relations between fishers and non-fishery issues (Conflicts external to but affecting fisheries such as corruption, politics, elite groups, environmental concerns and economic change).

Furthermore, Mahfuzuddin *et al.* identify the following conflicts that are common among fishing communities:

- Conflicts between various types of fishers brought about by competition for access to resources
- Conflicts between fishers and local authority, arising mainly from leasing/selling of fishing grounds
- Conflicts between fishers and lot owners due to land conversion for agriculture and water extraction
- Conflicts between provincial fisheries of fishers and local influential people who allegedly try to protect illegal fishers
- Conflicts between community members and community committee members for selling the fishing grounds including deep fishing areas
- Conflicts between local fishers and outside fishers due to resources use competition and the outsiders who use illegal fishing gears
- Conflicts between local fishers and foreign fishers due to poaching and the foreign fishers using modern fishing gears
- Conflicts between fishers and seaweed culturists, because the latter restrict the former's fishing areas
- Conflicts between fishers and fish culturist
- Conflicts between farmers and lotus farmers whose activities lead to loss of fishing areas due to sedimentation
- Institutional conflicts brought about by unclear delineation of responsibilities among the fisheries management bodies

- Conflicts concerning cutting of flooded forest for different economic activities such as shrimp farming and charcoal production, leading to more losses of flooded forest
- Environmental conflicts, especially when dam building in one country poses environmental threat in another country and
- Ethnic group conflicts that are often associated with competition for fishing grounds

**Drivers of fishery conflict:** There are many factors that drive fishery conflict. Warner (2000) identifies four issues that may explain the emergence of conflict, demographic change (a sharp influx of newcomers into a community), natural resource competition (increased dependence upon the natural resources which increases competition for space and resources); developmental pressures (as government policy switches from livelihood protection to food production); and structural injustices (changes in legislation that deny or severely restrict access to a resource by dependent groups of society).

Bennett *et al.* (2001) have also identified institutional failure as a driving factor in fishery conflicts. They explained that fishery conflicts are driven by both informal institutions such as markets, communities and social capital (i.e., a set of de facto rules or norms that govern behavior and shape society) and formal institutions such as the state, the judiciary, the political system (i.e., a set of de jure rules enshrined in regulations and constitutions that govern behavior and shape society). The degree and success of conflict management is largely dictated by institutional. Other drivers of fishery conflict include factors such as impact of climate change, population explosion, scarcity or dwindling fish resources occasioned by over-fishing and lack of re-stocking of fish resources, shrinking water bodies, unregulated fishing activities, growing culture of intolerance among fishers, cultural factors among others.

**Conflict management:** The idea of conflict management emerged from the recognition that first that conflict is an inevitable and recurring phenomenon in any given society and second that not all conflicts can necessarily be resolved, hence, the need to learn conflict management techniques and reduce the odds of “non-productive escalation” (Foundation Coalition, n.d.). The term conflict management according to Akpuru-Aja refers to the use of open and clear dialogue to assist opponents or parties not only to have agreements against hostile images or actions but compliance to agreed resolutions and strategies. Otite also defines conflict management as a wider concept that involves conflict resolution and transformation when necessitated. He states further that the concept is more of a long term arrangement involving institutionalized and regulative procedures for dealing with emergent conflicts.

For Bourton, the term can also be used to connote containment of conflicts through steps introduced to promote conditions in which collaborative and value relationships control the behaviors of conflict parties. Broadly speaking, the term conflict management involves both formal and non-formal institutionalized arrangements toward preventing emergent conflict as well as resolving and mitigating the negative tendencies of conflict. Conflict management has both short and long term goals but it is primarily aimed at taken actions that seek to change the structural causes of the conflict and the behaviours of the parties towards certain direction which promotes understanding and constructive resolution of the issues in the conflict and limiting the negative impact and enhancing positive impact.

There are numerous nomenclatures of conflict management techniques which Daly and Rasmi for instance interchangeably refer to as conflict handling styles and they describe them as the different approaches used by individuals in dealing with others in potentially confrontational business or social situations. Verma also toe the same line by referring to conflict management approaches as conflict management styles. It, therefore, means that conflict management techniques could be used interchangeably as conflict management styles, strategies, approaches, techniques, etc.

There are many types of conflict management strategies ranging from those that emphasize cooperativeness and assertiveness to those that indicate low concern and high concern. Blake and Moustoun (1964) suggest the five conflict management strategies which include: withdrawal, smoothing, compromise, forcing and problem-solving. These five styles used to manage conflict are: avoiding (low assertiveness and low cooperation), accommodating (low assertiveness and high cooperation), competing (high assertiveness and low cooperation), compromising (medium assertiveness and medium cooperation) and collaborating (high assertiveness and high cooperation). The five conflict management strategies are explained:

**Avoiding:** This happens when one party or parties in a conflict pretend, ignore, evade, withdraw or delay response to a conflict. In this scenario, one or both parties are not cooperative, less assertive and have low concern for each other. Avoiding behavior in a conflict situation can be counter-productive as the parties may over react when they eventually confront the issue(s).

**Accommodating:** This happens when surrender to the demands of the other strong party. In accommodation process, one party is cooperative but less assertive and has concern for the other party while the other person is assertive but uncooperative and has low concern for the other party that he or she considers weak.

**Compromising:** This also happen when parties in a conflict are willing to demonstrate the attitude of give and take and the willingness to make concession to each other in order to find common ground. In this situation, both parties are cooperative, assertive and have high concern for each other.

**Competing or forcing:** This is a situation when parties in a conflict tries to achieve their goals at the expense of the each other. In this situation, both parties are not cooperative but assertive and have low concern for each other.

**Collaborative or cooperating:** This happens when parties in conflict agree to come together to mutually resolve the issues in their conflict. Both parties are cooperative, assertive and have high concern for each other.

Conflict is a very sensitive phenomenon and therefore requires very creative ways to constructively manage it. This is the reason why Brodtker *et al.* argue that the approach to conflict and the conflict management style depend on the participant's emotional involvement in the conflict. He argues that conflict is formed by three major elements: attitudes: cognitive ideas and emotion, behaviour: evident behaviour and potential aggressive actions and contradiction: values and interests. Brodtker *et al.* argue further that for a conflict to take place, these three elements must be present.

By and large, fishery conflict can be managed largely through attitudes and behaviours that is favourable to compromises and collaboration and that which is also able to constructively clarify the contradictory values and interests that drive fishery conflicts. The most effective of the five conflict management strategies are collaboration and compromise. The two strategies enable the parties in conflict to mutually resolve the issues in the conflict.

## MATERIALS AND METHODS

A descriptive survey design was adopted for the study. The participants of the study consisted of 309 (three hundred and nine) fishers purposively drawn from four fishing communities in the Fadama areas of Adamawa state. The study areas are 4 fishing communities in the Fadama areas of Adamawa state. These communities are: Bagale, Rugange, Bilanchi and Dansin Biratiye. The number of participants drawn from these fishing communities are 16 from Bagale, 86 from Rugange, 32 from Bilanchi and 175 from Dansin Biratiye. The categories of participants selected for the

study include: community leaders (37); male fishers (134); female fishers (46); fish marketers (49) and fish processors and preservators (41). A structured questionnaire containing 46 items was designed and used to elicit data on "Conflict Drivers and Conflict Management Strategies of Fishers in Fadama areas of Adamawa State". The quantitative data elicited was analysed through the use of descriptive statistics such as mean and standard deviation.

## RESULTS AND DISCUSSION

The results presented are based on (309) data collected on the topic on-Managing Conflict in communities in Fadama areas of Adamawa state. Descriptive statistics were used to analyze the demographic characteristics of the respondents and all sections of the questionnaires while mean and standard deviation was used to test the research questions.

**Demographic data:** Table 1 shows that 5.2, 27.8, 10.4 and 56.6% of the respondents were from Bagale, Rugange, Bilanchi and Dasin Biratiye fadama areas respectively. Also, 252 (81.6%) of the respondents were male while 57 (18.4%) were female. Also, 123 (39.8%) of the respondents were in the age range of 18-30 years, 111 (35.9%) belong to the age range of 31-40 years, 72 (23.3%) belong to the age range of 41-50 years while 3 (1.0%) of them belong to the age range of 41 years and above. Further, 82 (26.5%) of the respondents were primary school leaving certificate holders, 119 (38.5%) of them had WASSCE/SSCE, 8 (2.6%) of them had NCE/OND Diploma, 94 (30.4%) had other degrees while 6 (1.9%) were undecided.

Moreover, 81 (26.2%) of the respondents were single, 189 (61.2%) were married, 18 (5.8%) of them were divorced, 17 (5.5%) of them were widows/widowers, while 4 (1.3%) were undecided. Additionally, 224 (72.5%) were Christians, 68 (22.0%) were Muslims, 16 (5.2%) the respondents belong to traditional religion while only 1 (0.3%) of them was undecided.

Additionally, 37 (12.0%) were fishing community leaders, 134 (43.4%) of the respondents were men fishers, 46 (14.9%) were women fishers, 49 (15.9%) were fish marketers/buyers, 41 (13.3%) were fish processing and preservation while 2 (0.6%) were undecided. Finally, 17 (5.5%) have been involved in fisheries sector between 1-5 years, 63 (20.4%) of the respondents have been involved in fisheries sector between 6-10 years, 102 (33.0%) have been involved in fisheries sector between

Table 1: Distribution of demographic characteristics of respondents

Demographic factors	N	Percentage
<b>Fadama area</b>		
Bagale	16	5.2
Rugange	86	27.8
Bilanchi	32	10.4
Dasin Biratiye	175	56.6
<b>Gender</b>		
Male	252	81.6
Female	57	18.4
<b>Age</b>		
18-30 years	123	39.8
31-40 years	111	35.9
41 years and above	72	23.3
Undecided	3	1.0
<b>Education</b>		
Primary school leaving certificate	82	26.5
WASSCE/SSCE	119	38.5
NCE/OND diploma	8	2.6
Others	94	30.4
Undecided	6	1.9
<b>Marital status</b>		
Single	81	26.2
Married	189	61.2
Divorced	18	5.8
sahee Widow/Widower	17	5.5
Undecided	4	1.3
<b>Religion</b>		
Christianity	224	72.5
Islam	68	22.0
Traditional Religion	16	5.2
Undecided	1	0.3
<b>Respondents from fishing communities</b>		
Community leaders	37	12.0
Male fishers	134	43.4
Female fishers	46	14.9
Fish marketers/buyers	49	15.9
Fish processing and preservation	41	13.3
Undecided	2	0.6
<b>How long have you been involved in fisheries sector</b>		
1- 5 years	17	5.5
6 -10 years	63	20.4
11-15 years	102	33.0
15 years and above	125	40.5
Undecided	2	0.6
Total	309	100.0

11-15 years, 125 (40.5%) have been involved in fisheries sector between 15 years and above while 2 (0.6%) were undecided.

### Research questions

**Research question 1:** What is the nature of fishery conflictin communities in Fadama areas of Adamawa state?

Table 2 of means and standard deviations above shows that all the mean values exceeded the cut-off point of 1.5, thus, indicating that respondents strongly agreed to all the items on the nature of fishery conflictin communities in Fadama areas of Adamawa state.

**Research question 2:** What are the driversof fishery conflictin communities in the Fadama areas of Adamawa state?

Table 3 means and standard deviations above shows that all the mean values exceeded the cut-off point of 1.5, thus, indicating that respondents strongly agreed to all the items on the drivers of conflict in communities in the Fadama areas of Adamawa state.

**Research question 3:** What is the prevalence of fishery conflicts during wet and dry seasons in communities in Fadama areas of Adamawa state?

Table 4 means and standard deviations above shows that only item 2 mean value exceeded the cut-off point of 1.5, thus, indicating that only item 2 indicated the prevalence of fishery conflict during wet and dry seasons in communities in the Fadama areas of Adamawa state. However, fishery conflict is more prevalent during dry season.

**Research question 4:** What are the effects of fishery conflictin communities in the Fadama areas of Adamawa state?

Table 5 of means and standard deviations above shows that all the mean values exceeded the cut-off point of 1.5, thus, indicating that respondents strongly agreed to all the items on the effects of fishery conflictin communities in the Fadama areas of Adamawa state.

**Research question 5:** What are the conflict management strategies for resolving conflict in fishing communities in Adamawa state?

Table 5 means and standard deviations above shows that all the mean values exceeded the cut-off point of 1.5, thus, indicating that respondents strongly agreed to all the items on the conflict management strategies for resolving fishery conflict in communities in the Fadama areas of Adamawa state.

**Research question 6:** What is the effectiveness of the strategies used in managing fishery conflict in communities in the Fadama areas of Adamawa?

Table 6 and 7 means and standard deviations above shows that all the mean values exceeded the cut-off point of 2.5 except for item 1, thus, indicating that respondents strongly agreed to all the items on the effectiveness of the strategies used in managing fishery conflict in communities in the Fadama areas of Adamawa. However, both collaboration and compromise strategies are the most widely and frequently used by fisheries actors.

**Nature of fishery conflictin communities in the Fadama areas of Adamawa state:** The study found out the nature of fishery conflict in communities in Fadama areas of Adamawa state to include: conflict between local fishers competing for access to fish resources; conflict between fishers and fish traders; conflict between fishers and traditional local authority, conflict between local

Table 2: Nature of fishery conflict in communities in Fadama areas of Adamawa state

Items	Strongly agree/agree	Strongly disagree/disagree	Mean	SD
Conflict between local fishers competing for access to fish resources	267 (86.4%)	42 (13.6%)	1.86	0.34
Conflict between fishers and fish traders	223 (72.2%)	86 (27.8%)	1.72	0.45
Conflict between fishers and traditional local authority	192 (62.1%)	117 (37.9%)	1.62	0.49
Conflict between local fishers and outside fishers	243 (78.6%)	66 (21.4%)	1.79	0.41
Conflict between fishers and government authorities	239 (77.3%)	70 (22.7%)	1.77	0.42

Table 3: Drivers of fishery conflict in communities in the Fadama areas of Adamawa state

Items	Strongly agree/agree	Strongly disagree/disagree	Mean	SD
Competition between fishers over access to fish resources	255 (82.5%)	54 (17.5%)	1.83	0.38
Competition over fishing boundaries or jurisdiction between local and outside fishers	271 (87.7%)	38 (12.3%)	1.88	0.33
Stealing of fishing items (boat, net, paddle, fish etc) by fellow fishers	252 (81.6%)	57 (18.4%)	1.82	0.39
Violation of community rules and regulations on fishing by fishers	244 (79.0%)	65 (21.0%)	1.79	0.41
Mutual suspicion and hatred between fishers	278 (90.0%)	31 (10.0%)	1.90	0.30
Reduced catches of fish by fishers creates frustration desperation to catch fish	260 (84.1%)	49 (15.9%)	1.84	0.37
Misunderstanding amongst fish traders or between fish traders and fishers over the purchase or selling of fish (i.e., fish pricing)	231 (74.8%)	78 (25.2%)	1.75	0.44
Struggling for the same stock of fish	196 (63.4%)	113 (36.6%)	1.63	0.48
Increase migration of fishers who are searching for better fishing grounds	183 (59.2%)	126 (40.8%)	1.59	0.49
Running into net of other or casting of net over others	201 (65.0%)	108 (35.0%)	1.65	0.47
Reduction in the volume of water bodies due to effects of climate which heighten competition between actors in fishing communities	188 (60.8%)	121 (39.2%)	1.61	0.49
Limited fish resources in water bodies in Adamawa state	271 (87.7%)	38 (12.3%)	1.88	0.33

Table 4: Prevalence of fishery conflict during wet and dry seasons in communities in Fadama areas of Adamawa state

Items	Prevalent	Not prevalent	Mean	SD
Conflict in fishing communities are common during raining season	103 (33.3%)	206 (66.7%)	1.33	0.47
Conflict in the fishing communities are common during dry season	169 (54.7%)	140 (45.3%)	1.55	0.50
There occurrences of conflicts within fishing communities during the raining and dry seasons is not significantly different	20 (6.5%)	289 (93.5%)	1.06	0.25

Table 5: Effects of fishery conflict in communities in the Fadama areas of Adamawa state

Items	Strongly agree/agree	Strongly disagree/disagree	Mean	SD
Injury and loss of life and property	216 (69.9%)	93 (30.1%)	1.70	0.46
Destruction of fishing materials	214 (69.3%)	95 (30.7%)	1.69	0.46
Loss of revenue for fishers and other fish stakeholders	216 (69.9%)	93 (30.1%)	1.70	0.46
Destruction of aquatic life	174 (56.3%)	135 (43.7%)	1.56	0.50
Disruption of fishing activities	166 (53.7%)	143 (46.3%)	1.51	0.50
Fish traders are afraid to go and buy fish from the communities where fishers are involved in violent conflict	157 (50.8%)	152 (49.2%)	1.51	0.50
Creates tension and mutual suspicion among fish stakeholders	166 (53.7%)	143 (46.3%)	1.54	0.50
Livelihood of the people are negatively affected	191 (61.8%)	118 (38.2%)	1.62	0.49

Table 6: Conflict management strategies for resolving conflict in fishing communities in Adamawa state

Items	Strongly agree/agree	Strongly disagree/disagree	Mean	SD
I try to give in to the demands of the other party, so that, peace can reign (Accommodation)	184 (59.5%)	125 (40.5%)	1.60	0.49
I pursue my goals without cooperating with the other party to resolve the issues in the conflict (Competition/Domination)	162 (52.4%)	147 (47.6%)	1.52	0.50
I ignore and refuse to confront the conflict situation to resolve it (Avoidance/Denial)	170 (55.0%)	139 (45.0%)	1.55	0.50
We agree to confront the issues in conflict by exploring our differences and resolving them together (Collaboration)	212 (68.6%)	97 (31.4%)	1.69	0.47
I use give and take, so that, we can compromise to resolve the issues	222 (71.8%)	87 (28.2%)	1.72	0.45

fishers and outside fishers and conflict between fishers and government. These findings bordering on the nature of fishery conflicts in the Fadama areas of Adamawa state is consistent with studies such as (Bennett *et al.*, 2001; Warner, 2000; Ahmed *et al.*, 2006)

all identified and categorized the different types of fishery conflict. These categorizations are done based on the types of actors involved in the conflict and it makes it easy for identification of the parties and issues in the conflict for proper resolution.

Table 7: Effectiveness of the strategies used in managing fishery conflict in communities in the Fadama areas of Adamawa

Items	Very effective	Effective	Moderately effective	Not effective	Mean	SD
Giving in to the demands of the other party to make peace reign (Accommodation)	101 (32.7%)	44 (14.2%)	39 (12.6%)	125 (40.5%)	2.39	1.31
Pursuing my goals without cooperating with the other party to resolve the issues sin the conflict (Competition/ Domination)	99 (32.0%)	63 (20.4%)	57 (18.4%)	90 (29.1%)	2.55	1.22
Ignoring and refusing to confront the conflict situation to resolve it (Avoidance/Denial)	70 (22.7%)	100 (32.4%)	69 (22.3%)	70 (22.7%)	2.55	1.08
Agreeing to confront the issues in conflict by exploring our differences and resolving them together (Collaboration)	212 (68.6%)	32 (10.4%)	27 (8.7%)	38 (12.3%)	3.35	1.07
Adopting a give and take attitude, so that, we can compromise to resolve the issues	201 (65.0%)	21 (6.8%)	50 (16.2%)	37 (12.0%)	3.25	1.11

### Drivers of fishery conflicts in fishing communities in Fadama areas of Adamawa state:

The study also discovered the various drivers of fishery conflict in communities in the Fadama areas of Adamawa state to include: competition between fishers over access to fish resources; competition over fishing boundaries or jurisdiction between local and outside fishers; stealing of fishing items (boat, net, paddle, fish, etc.) by fellow fishers; violation of community rules and regulations on fishing by fishers; mutual suspicion and hatred between fishers; reduced catches of fish by fishers creates frustration desperation to catch fish; misunderstanding amongst fish traders or between fish traders and fishers over the purchase or selling of fish (i.e., fish pricing), struggling for the same stock of fish, increase migration of fishers who are searching for better fishing grounds; running into net of other or casting of net over others; reduction in the volume of water bodies due to effects of climate which heighten competition between actors in fishing communities and limited fish resources in water bodies in Adamawa state. These conflicts are largely driving by competitive behaviours of fishers and other stakeholders in the Fadama fishing communities and the Nigerian society. The findings are consistent with studies such as Bennett *et al.* (2001) and Warner (2000) that clearly highlights the drivers of fishery conflicts. More importantly is the role that scarcity of fish resources play in driving fishery conflicts as studies such as Coser Barbier and Homer-Dixon and Homer-Dixon (1994) found out that resource scarcity is the catalyst that highlights other underlying problems in society. Therefore, the scarcity of fishery resources is a major driver of conflict between fishers in the Fadama areas of Adamawa state. scarcity of fishery resources often heighten competition among fishers and such competition may be unhealthy resulting into violent conflict.

### Prevalence of fishery conflict in the Fadama areas of Adamawa state:

It was also discovered that fishery conflicts occur during wet and dry seasons in Fadama communities of Adamawa state. However, it was discovered that fishery conflicts are more prevalent during the dry season due to the reduction in the water levels which makes catches or fishing easy. This finding

indicates the seasonal nature of fishery conflicts in the Fadama fishing communities of Adamawa state and the influence of climatic conditions as drivers of fishery conflicts in the areas of the study. This is even exacerbated by the increasing negative impacts of climate change in northern region of Nigeria which also to a large extent drive fishery conflict in the region. Nybacka (2001) also found that there was a seasonal variation in conflict between recreational fishers and the rest of the fishery (in Finland) where conflict normally occurs during the warm summer vacation months which agrees with findings from this study.

### Effects of fishery conflictin communities in the Fadama areas of Adamawa state:

The effects of fishery conflict in communities in the Fadama areas of Adamawa state include injury and loss of life and property; destruction of fishing materials; loss of revenue for fishers and other fish stakeholders; destruction of aquatic life; disruption of fishing activities; fish traders are afraid to go and buy fish from the communities where fishers are involved in violent conflict; it creates tension and mutual suspicion among fish stakeholders and livelihood of the people is negatively affected. Studies have indicated the damaging consequences that conflict could have on relationships and organizations. Parker (1974) has argued that if conflicts arise and are not managed properly, it will lead to delays of work, disinterest and lack of action and in extreme cases it might lead to complete breakdown of the group. In the same vein, fishery conflict can impact negatively on the fishery resources, relationships among fishers, food and job security, livelihoods as well as economic development.

### Strategies for managing fishery conflict in communities in the Fadama areas of Adamawa state:

The study also discovered that actors in fishery conflictin communities around the Fadama areas of Adamawa state use the five conflict management strategies in resolving their conflicts. These conflict management strategies include accommodation, competition/domination, avoidance/denial, collaboration and compromise. However, it was also discovered that both collaboration and compromise conflict management styles are the most



widely used by the actors. This is because it is a problem-solving style has the potential to assist the parties to discuss the issues in conflict in a cooperative manner and this enables them to reach mutually acceptable agreement. It allows parties in fishery conflict to attend to the issues openly, frankly and neutrally by communicating with the other party and it creates the opportunity for the parties to “see themselves as working side by side, attacking the problem, not each other” (Fisher *et al.*, 1991).

Collaboration strategy also enables parties in conflict to work together and build consensus on the issues in the conflict as Charles (1992) observe that fisheries that are ‘relatively conflict free’ are those where a high degree of consensus has been reached between all stakeholders and there is little argument over the objective of the fishery (to provide food to provide for future generations or to operate efficiently for example). The platform that is mostly used for facilitating collaboration and compromise in the fishery communities studied is the community leadership structure which relies on their customs and tradition for resolving fishery conflict between and among actors. Broadly speaking in the extreme east of Nigeria, in Taraba and Borno states, the authority of traditional rulers is still respected and they are able to enforce resource-sharing agreements as well as those relating to CPRs such as restraints on fisheries (Blench, 2004).

The involvement of the traditional structures in the management of fishery conflict is based upon the FAO code of conduct for responsible fisheries that advocates the inclusion of local communities in management of their fisheries resources. Amason suggested some remedies towards alleviating fishery conflicts which the traditional platforms could leverage on in facilitating resolutions of fishery conflicts. These remedies include) fishing licenses, sole ownership) territorial use rights in fisheries (TURFS), individual catch quotas and) community fishing rights. As a matter of fact, Jul-Larsen and Zwieten (2002) has argued that co-management is one of the best tools for conflict resolution in African freshwater fisheries. Collaboration and compromise conflict management strategies can also be used to encourage co-management of fisheries resources between or among fishers for the sake of ensuring the sustainability of fish resources and the sector as a whole. Co-management is able to redistribute power and responsibility in the fishery, potential conflicts related to power relations and allocation of resources might be mitigated. Co-management is also used extensively to achieve a more holistic approach to fisheries issues (Jul-Larsen and Zwieten, 2002).

#### **Effectiveness of the conflict management strategies used in fishery conflict in communities in the Fadama**

**areas of Adamawa state:** The study found out that avoidance/denial, competition, collaboration and compromise conflict management strategies are effective in resolving fishery conflicts in the areas of the study. But the study also discovered that compromise and collaboration are the most effective of all the strategies. They are effective because they provide the parties in fishery conflicts the opportunity to discuss and separate the issues in the conflict from their personalities as Fisher *et al.* (1991) rightly observe that conflict comprise a problem factor and a people factor. To be effective in dealing with conflicts, both of these factors need to be addressed. In particular, Fisher and Ury argue that the people factor needs to be separated out from the problem factor. Both collaboration and compromise are most suitable to achieve this goal thereby leading to a win-win outcome that will be satisfactory to the parties. In resolving fishery conflict, we can borrow from Nash’s argument which stated that the solution to conflict must be the maximum product of utilities (i.e., that the solution must be on the line) and the agreement between parties must lie on the solution line and give equal division of payoffs to both sides in order that the agreement work.

Both compromise and collaboration strategies can be used in building constructive partnerships and cooperation between fishers in the Fadama fishing communities of Adamawa state as Vipinkumar found out that partnership and co-operations through fisheries co-operatives and self help groups mobilized in marine fisheries sector do play a vital role in sustainable fisheries management. In the same vein, co-management strategy of fishery resource between government and fishers or between fishers is a collaborative and compromise strategy have been acknowledged to be a very effective (Degen *et al.* 2000; Mosepele, 2000). Fisheries co-management is as an arrangement where responsibility for resource management is shared between the government and user groups. This provides cooperative behaviours and some sense of ownership among fishers to the fish resources.

Finally, a more sustainable and constructive management of fishery conflict is to scientifically and systematically conduct a robust conflict analysis into understanding the conflict and identifying the actors, issues, dynamics of the conflict and the appropriate conflict management strategies that are capable of deconstructing the competitive behaviours that drive fishery conflicts and promoting cooperative behaviours that will encourage cooperative management of fisheries resources as Bennett *et al.* (2001) argue in their study have argued that:

Conflict is not a linear, step-wise process but often a circular one: management issues can lead to conflicts and conflict in turn can create management issues. It is the circularity of the dilemma that often complicates attempts

to identify the source of conflict. Whether it is possible to manage or resolve conflicts in tropical fisheries will depend upon managers being able to distinguish between positive or negative conflict determine the root cause of the conflict and tackle that issue first and strengthen the capacity of local institutions to manage conflict, preferably in cooperation with government (2001).

## CONCLUSION

This study examined the factors that drive fishery conflict and the strategies employed to manage fishery conflict in communities around the Fadama areas of Adamawa state. The study brought to the fore the fact that fishery conflict are largely driven by competitive behaviours fishers. The consequences of fishery conflicts can be far-reaching as they can threaten food and job security as well as economic development of countries that rely on the sector if they are not timely and effectively managed. The study, therefore, argues that fishery conflict can better be managed in a sustainable manner if the actors embrace cooperative behaviours that will result in mutually beneficial manner rather than the competitive behaviours that usually drive fishery conflict. A veritable platform that can be used to facilitate and encourage cooperative behaviours is the traditional institutional structures present in fishing communities. The traditional structures are best suited to promote the culture co-management of fisheries resources because they are the custodian of the in land water bodies in Fadama areas of Adamawa state.

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