

## PROMOTING CO-EXISTENCE AMONG SHRIMP FISHERS THROUGH SOCIAL NETWORKING: A QUALITATIVE STUDY ON INFLUENCE OF BONDING ON LINKAGE IN RIVERS STATE

\*<sup>1</sup>KOMI, G.W., <sup>1</sup>ISUBIKALU, P., <sup>1</sup>TURAHABWE, N. and <sup>2</sup>O.M. ADESOPE

<sup>1</sup>Department of Extension and Innovation Studies, College of Agricultural and Environmental Sciences, Makerere University, P.O.Box 706, Kampala, Uganda. <sup>2</sup> Department of Agricultural Extension and Economics, Faculty of Agriculture, University of Port Harcourt, PMB 5323, East-West Road, Port Harcourt, Nigeria.

E-mail: [gente.komi@uniport.edu.ng](mailto:gente.komi@uniport.edu.ng)

### ABSTRACT

*Social network is an effective strategy in promoting coexistence among shrimp fishers in Rivers State Nigeria. The study assessed how network bonding is stimulating the bridging and linking among actors in eight fishing settlements of Rivers State. A mixed method was used whereby 30 in-depth interviews and four focus group discussions with shrimp fishers were conducted using an interview guide. Data was subjected to content analysis and MAXQDA 2018 software to identify themes, connections and relationships. The results show three levels of social network: bonding, bridging and linking. Network bonding, which comes in the form of planned or unplanned within-group interactions, is a significant factor for bridging with similar fisher groups. Some of the challenges in forming and maintaining interactions with other groups include bunkering activities, high transportation costs, negative externalities and encroachments into fishing grounds. linkage of a fisher's group with other actors or bodies are done through individuals/contact persons, delegates and group leadership. Linkage with other settlements was weak as each fishing settlement had specific requirements for membership and rules to abide by. However, group formation was more of fishers' initiative than imposition by external bodies' thereby promoting co-existence of fishers in coastal communities.*

**Keywords:** Interaction, Common good, Living standard

### INTRODUCTION

Social network is by far the most effective adaptation strategy for fishermen households due to strong interaction among fishers in fishing communities, and the degree to which information and behaviours spread through social networks is greatly affected by their structure (Watts, 1999; Centola 2010; Wahyuningsih, Arhim and Purwanto, 2017; Birendra *et al.*, 2018). There are three different types of social network that have been identified as important in the context of marine fisheries: bonding, bridging, and linking. Bonding social network involves strong social linkages within groups of like-minded individuals often characterized by dense, localized networks. This is exemplified in kinship network having inherent strong ties. Bonding social network can be particularly beneficial in the context of fisheries due to vulnerabilities (Grafton 2005; Wahyuningsih, Arhim and Purwanto, 2017; Birendra *et al.*, 2018).

Bridging social network characterizes weaker linkages across somewhat similar, but different groups or social networks (Grafton 2005). Though bridging social network ties tend to be weaker than those that make up bonding social network, these ties have the advantage of linking heterogeneous groups or networks of people into a larger network. Sociological and organizational studies have shown that bridging ties bring with them an inherent diversity of ideas and perspectives

that improve the capacity for the development of innovative solutions to complex problems, and can thus enhance adaptive capacity (Bodin and Crona 2009; Birendra *et al.*, 2018). For example, the existence of bridging social network ties across heterogeneous groups can allow access to external resources and diverse knowledge, which can be essential for resource governance (Hahn *et al.*, 2006, Bodin and Crona 2009). Moreover, key actors forming bridging ties among smaller groups, or subgroups, may be capable of connecting and mobilizing these subgroups toward a common goal. It has also been shown that bridging ties can foster trust amongst previously unconnected groups or heterogeneous actors, which can further facilitate collaborative processes (Woolcock 2001, Bodin and Crona 2009; Birendra *et al.*, 2018). Bridging social network is demonstrated in mixture of friendship, neighbourhood and community horizontal network. This form of network is very useful for issues of mutual benefit.

Linking social network, also referred to as cross-scale linkages, comprise ties across incongruent groups or networks at different hierarchical levels, such as connections between resource users and resource management officials. Links to outside governing agencies in the form of linking social network can provide increased access to scientific knowledge (Grafton 2005) and information on technological innovations. Linking

social network can also help to ensure stakeholder interests are represented in the management and policy arena and can facilitate stakeholder understanding and cooperation in regard to management initiatives (Barnes-Mautheet *al.*, 2013, Jenkins, Thompson, Bourillon and Peckham, 2016). It also extends to a network of relationship between two or more communities who are engaged in similar or complementary businesses and can render services to a disadvantaged actor (Wahyuningsih, Arhim and Purwanto, 2017).

Turner *et al.* (2014) reported that different information-sharing networks existed at fishing ports with high proportion of fishers sharing information, though less than a third of reported ties were reciprocated; subgroups existed in which greater information sharing occurred; and networks displayed varying levels of cohesiveness. The level of cohesiveness is stronger in bonding and especially with central actors who have multiple

sources of information. However, reciprocal relationships are more common with fishers of similar success.

Strong ties inherent in bonding social network can be particularly beneficial in the context of fisheries due to the common-pool nature of the resource (Barnes-Mautheet *al.*, 2013). Bridging social network characterizes weaker linkages across somewhat similar, but different groups or social networks (Grafton 2005).

However, the functioning of bonding, bridging and linking social networks among shrimp fishers in Rivers State, Southern Nigeria was not documented, especially in terms of what constitute bonding, bridging and linking and how bonding is influencing bridging and linking social networks among the shrimp fishers. Therefore, this study seeks to identify the elements and activities that are indicative of bonding, bridging and linking social network among shrimp fishers in Rivers State.

**Typology of Social Network**

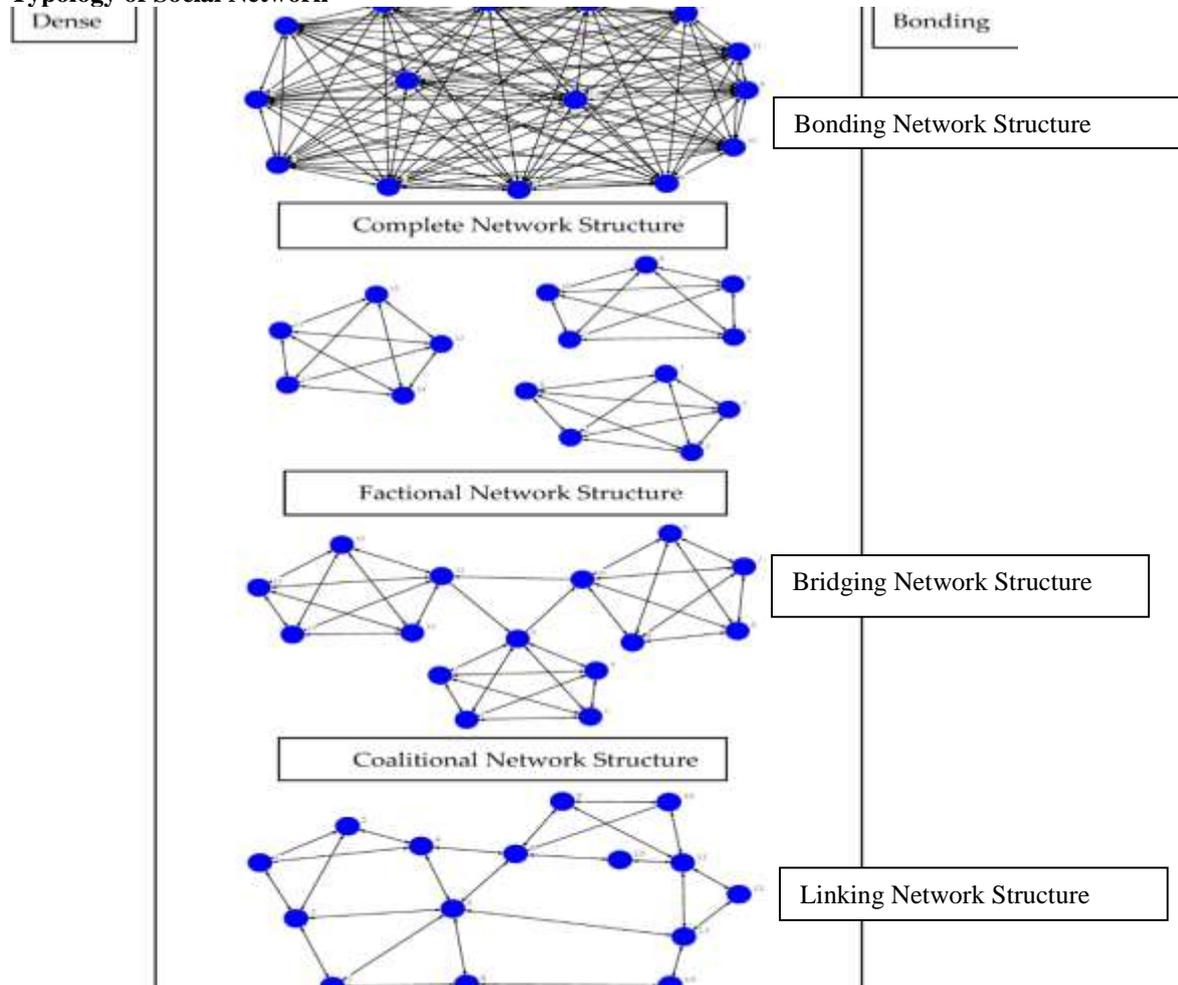


Figure 1: Network Structure Typology adapted from Birendra *et.al.* (2018)

Wahyuningsih, Arhim and Purwanto (2017) discussed typologies of social network structures in terms of socio-economic status of the fishers. Describing bonding and bridging as a horizontal chain while bridging as a vertical chain. Birendra *et.al.* (2018) however, discussed bonding, bridging and linking in terms of the density of the bonds (Fig.1).

**Theoretical framework**

Social Networks are purposively formed by individuals and groups of people who are in need of resources both tangible and intangible (Lin, 1999). These resources are exchanged through interactions in a network of social relations (Thatcher1998 in Sandström & Rova, 2010). These networks of interactions are influenced by institutional context, i.e, the framework of rules, into which they are embedded (North, 1990; Carlsson, 2000; Ostrom, 2005). Marsh and Smith (2000) reported a dialectical and ongoing relationship between network and agency, between network and context, and between network and outcome whereas the founding theoretical framework acknowledges both agency and structure. However, this study focuses on the

variables of network structure (bonding, bridging and linking) and, more importantly on network structure and outcomes in terms of benefits obtained by network members for improved living standard.

**Study Area**

The research was conducted in eight fishing communities namely; Ikpukulu (Okirika LGA), Andoni waterfront, Bundu waterside (Port Harcourt LGA), Nkpor Village, Mgbuodohia (Obio/Akpor), Okokiri, Oyorokoto and Muma (Andoni LGA) in Rivers State, Southern Nigeria. Rivers State and the eight fishing communities were purposively selected by expert knowledge and are in the Niger Delta Region which account for over 90 % of the country’s shrimp production (FAO, 2000, Nwosu, Ita & Enin, 2011). Rivers state (fig.2) has many rivers and creeks with fishing communities which are inhabited by mostly artisanal (small-scale) fishers. Rivers state is bounded on the south by the Atlantic Ocean, to the North by Imo, Abia and Anambra states to the East by Akwa-Ibom state and to the West by Bayelsa and Delta states (riversstate.gov.ng)

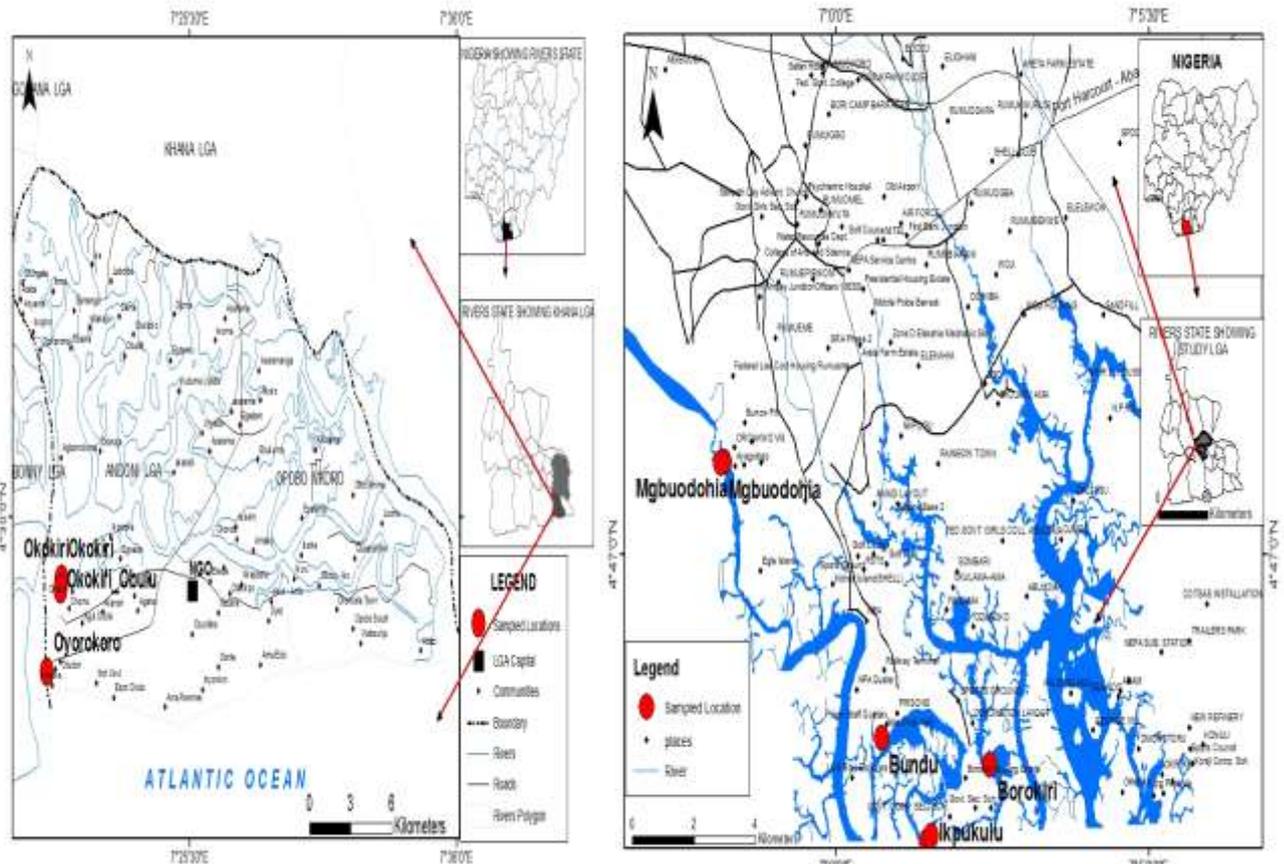


Figure 2: Map of Study Area showing the Local Government Areas sampled. Source: Komi, *et al.* (2018)

**MATERIALS AND METHODS**

**Research Design**

This study adopted qualitative approach in a cross-sectional design. The qualitative approach through an in-depth interview gave a better understanding of how fishers network. By focusing on a few cases (fishers' associations/fishing ports), the qualitative approach helped in obtaining more contextual explanation and interpretation of some of the findings obtained through quantitative approach. For the qualitative approach, the study used Focus Group Discussion (FGD) of shrimp fishers' associations and key informant interview to identify the kind of network that exist, nature, and history; who the fishers interact with and membership to networks.

**Study Population and Sampling procedure**

The study population was the accessible shrimp fisher folks in Andoni, Borokiri waterfront and Eagle Island fishing axes of Rivers State who harvest shrimps from the wild and depend on it for

their household livelihood. An accessible population is part of the target population which the researcher can reach, and out of which the researcher can draw a sample (Oso and Onen, 2009). Accessibility to fishers in the different fishing communities is encumbered by the difficult water terrains and requires more resources including time and finance (Lawal *et al.*, 2016). Hence, the study sample was drawn from accessible population of shrimp fishers in the Andoni (10 respondents), Borokiri waterfront (10) and Eagle Island (10).

**Focus Group Discussion (FGD)**

A group comprising eight to twelve members (Ssebagala *et al.*, 2017) selected from among shrimp fishers were involved in the FGD (Table 1). The members to participate in the FGDs was purposively selected with preference being given to those; who belong to a network, who have spent at least five years in shrimp business, who have good knowledge and experience to discuss networking among shrimp fishers.

**Table 1: Composition of Focus Group Discussion**

S/N	Fishing axes	No. of Participants		Total Participants
		Male	Female	
1	Andoni	10	2	12
2	Borokiri	6	2	8
3	Eagle Island(Nkpor)	8	1	9
4	Borokiri Kozo	7	1	8

**Key informant interview**

Key informant interview was conducted with purposively selected stakeholders from research institute, government ministries and fishing community leaders.

**Data Analysis**

This objective followed an inductive data analysis described by Creswell (2007). The responses (data) obtained from participants of the focus group discussion (FGD) on bonding: for example, 'What form of interactions (planned or unplanned) do you have in your group and how do these interactions affect your group's connection with similar groups in terms of purpose and benefits' were sorted into patterns, categories and themes.

Subsequently, the participants' view on how group members are mobilized and selected was sorted in a similar manner to arrive at the most effective way of mobilizing and selecting members of a shrimp fishing group. Similarly, how

goals/objectives are set and by whom was analyzed interactively (Jansen, 2010, Creswell, 2007) among participants and the results presented in order of their priority to the shrimp fishers. How rules and regulation are developed and by whom was interpreted in relation to what shrimp fishers consider to be (a) Strong group (b) Weak group.

This was done first by listing out how rules and regulations are developed and by whom as well as listing what the shrimp fishers consider being strong or weak group. The lists were cross-tabulated (forming matrix) to pair the items and score them. Then, the items ranked in the order to which they are scored with items having the highest score top on the list. This is on the assumption that there is a relationship between the process of rule formation, who makes the rule and group strength (Agumagu & Adesope 2012). The extent of relationship was illustrated with project maps generated from MAXQDA 2018 software and in

line with Igbokwe and Enwere (2001); Isubikalu (2007) and Agumagu & Adesope (2012).

## RESULTS

### Network Bonding and Bridging

From figure 3, the responses from the key informants show that fishers' groups are bonded through interactions that are either planned or unplanned or both. For planned interaction, R3, a key informant and Vice Chairman Ikpukulu fishing settlement, said that: "There exists a planned interaction, that is, formal meeting. The frequency of this interaction is once a week". Similarly, R4, a female fisher and a key informant, said that: "Interactions between members are planned, and the frequency is once a week".

For unplanned interaction, R5, a key informant who is also the Chairman of a fishing settlement, said that: "An unplanned interaction operates here and the frequency is dependent on the need". Likewise, R6, a key informant who is also an old experienced fisherman, said that: "No planned interaction. Unplanned interactions occur at least once in a week".

For both planned and unplanned interactions, R1, a key informant, who is also the Chairperson, Fisheries Society of Nigeria Rivers State Chapter, said that:

"They have planned interactions through regular meetings. They also have unplanned interactions which happens every day. Unplanned interaction is dominant because they live together and see themselves every day".

Equally, R2, a key informant, who is also the Assistant Director, Fisheries and Aquaculture, Nigerian Institute for Oceanography and Marine Research, said that:

"They have both planned and unplanned interactions. Unplanned interactions occur due to unforeseen events. For example, when there is boat mishap, they mobilize to rescue victims. Between planned and unplanned interactions, the unplanned interaction occurs more frequently hence, it is dominant".

From Figure 4, it is evident that the purpose of interactions between a fisher group and similar groups includes business interest, information sharing, exchange of ideas/products, protection and welfare. For example, R7, an experienced old female shrimp fisher at Bundu water side, said that: "The connection between different fisher groups is because they are in the same line of business..." Also, R1, Chairperson, Fisheries Society of Nigeria Rivers State Chapter, said that "Connections occur through information sharing, marketing information, e.g. Information on when a fishing vessel is arriving, such vessel ... Due to poor or absence of communication network, information sharing becomes a serious challenge".

Further, R5, Chairman of a fishing settlement, said that: "Fisher groups connect to have a common front against unwelcomed events that affect common interest". Equally, R9, a key informant, said that: "The purpose for which different groups connect is to share ideas and to have a common front on issues affecting the group". Finally, R12, a key informant, said that: "Purpose of connection is in the same line of occupation, and welfare purpose".

From Figure 5, the benefits of between-group interactions include security/peaceful coexistence, access information, friendship, rescue operations, privilege buying, credit purchase and enhanced performance. For example, R10, a key informant, stated that: "... benefit so far enjoyed is peaceful coexistence. You apologize when you offend the other fisher". Likewise, R9, a key informant, emphasized that:

*They have connections with other group of shrimp fishers. They can interact with fishers in Achikiri, Andrew Chuku-Ama, Owuogono and Dutch-Island. They interact for purpose of fishing and benefits so far enjoyed as a result of connecting to other groups are new friends and information.*

Also, R7, Experienced old female shrimp fisher at Bundu water side, said that: "... Benefits of this connection is security of life and fishing gear at sea". Equally, Assistant Director, Fisheries and Aquaculture, Nigerian Institute for Oceanography and Marine Research, opined that: "...Benefit of such connection is that those that the fishers had earlier connections with has the first right of purchase and can buy shrimps on credit".

Overall, the evidence in these Figures suggest that network bonding, which comes in the form of planned or unplanned within group interactions, is a significant factor for bridging with similar fisher groups.

The project map fig 3 shows the responses to the question "What form of interaction do you have in your group?"

### Network Bonding and Linkage

For the link between network bonding and linkages, the interview question was: how does your group relate with other actors or bodies? Figure 7 is a project map showing the responses to the above question. From Figure 7, we can see that the linkage of a fisher's group with other actors or bodies are done through individuals/contact persons, delegates and group leadership. Evidence: R1, who is the Chairperson, Fisheries Society of Nigeria Rivers State Chapter, stated that:

*They connect with trawler owners, input suppliers such as fishing gear, outboard engine manufacturers. They have contact persons who communicate with the anchor persons of the other actors. They have limited contacts with other actors.*

*It takes a longer time to establish a relationship with other actors....*

Similarly, R3, the Vice Chairman Ikpukulu fishing settlement, stated that:

There are other actors; boat makers, net makers, fish mongers. Connections between groups are established by targeting individuals in the group. No criterion is recognized before connection...

Further, R2, an Assistant Director, Fisheries and Aquaculture, Nigerian Institute for Oceanography and Marine Research, said that:

*They connect with other groups such as research institutions, Niger Delta Development Commission (NDDC), Department for International Development (DFID) UK funded Market Development in the Niger Delta (MADE), the Federal, State and Local Government, the Green River Project (GRP) support with inputs (nets, training, skills, processing equipment) ... These actors target the leaders of the group but eventually gets the whole group. If the goal of the actor is in line with their own goals and objectives then they link up. If the goal of the group matches with the goals and objectives of the actor they also link.*

Also, R12 stated that: "Other actors we are connected are Otuokoloile, Ebileoko and Ibotokpan. The purpose of this connection is information on market while the process of this connection is through delegates".

### **Requirements for group Membership**

When asked the requirements to being a member of a group, the informants indicated that individuals have to be interested in joining the groups and keeping its laws, also they have to be resident in that community (or location), should be committed to the group, attend group meetings, make contributions as and when due and pay visit to sick members.

To be members of certain groups, the respondents indicated that intending members most possess fishing paddle, boat and net. Other group joining criteria for fishers include swimming skill, ability to operate the fishing gear and being willing to be part of the group.

Membership in certain groups necessitates the payment of fishing port fees which ranges from ₦3,000 to ₦5,000; an oath of allegiance is sworn. In some other groups, intended members are required to offer drinks and a fee of ₦2,000 as pre-requisite for registration.

FGD shows that intending members pay the fishing port drink take an oath of good conduct and must also possess a boat, net, paddle and kitchen utensils. It was indicated that in some cases members are required to pay some money. However, in other events, individuals are screened by the leader after which he/she renders a crate of

mineral (soft drink) and packet of biscuits to the group.

### **Factors responsible for group strength and weakness**

Responding to this, key informants suggested that a group is weak when; they don't meet regularly, when member are not contributing their dues, when there is frequent disagreements and when members don't work together. They noted that a strong group is the opposite of a weak group. Weak groups were also seen to be groups that lack coordination, leadership, financial base and do not look forward to achieving their goals and where personal interest often clash with group goals. Strong groups were viewed to have leaders that direct the activities of the group build the financial base of the group rather than drain the group. In relation to fishing, strong groups are seen to have new (good) net, muscular power, endurance, expertise on the operation of fishing gear and members are serious minded.

Catch per unit effort and knowledge of sea and seasons among members was seen to enhance group strength. It was also indicated that market demand on the shrimp fishers, quantity of shrimps caught and the price of sale contribute to the strength or weakness of groups. The asset base and demand of groups produce makes them strong. Strong groups render assistance to members in obtaining fishing gears and crafts and are seen to consider the welfare of group members. Responding to the factors that make their group strong, members of Kozo group who participated in the FGD listed the following: regulation/laws, cooperation/love, oath taking, and dues/contributions as key determinants (Table 2). To members of this group, oath taking ranked first in determining group strength. It was however indicated that violation of group laws by acts such as fighting, littering the environment and committing adultery attracts a fine of ₦5,000 and two bottles of schnapps.

### **Classification of groups based on strength**

The respondents indicated that about 70% of the groups are strong because of their expectation for government intervention. It was reported that there are strong groups in various fishing ports (communities), Oyorokoto was seen to have a better coordinated group. Some fishing groups attributed its weakness to the illegal bunkering activities going on within their communities. However, other groups were seen to be very strong.

Another group at Ikpukulu indicated that factors that contribute to their group strength include possession of fishing gear, timeliness to fishing ground, compromise and endurance of the shrimp fisher. From the pairing and ranking exercise, Ikpukulu group (Table 3) affirmed that

fishing gear and compromise made the group strong when compared with endurance and timeliness. However, another group at Nkpor village indicated that integrity, generosity, unity, socializing, rules and regulation contributed to the strength of their group. When scored and ranked, rules and regulations were highly rated while integrity was least among the factors contributing to group strength within the area. Andoni fishers group suggested that catch per unit effort, monthly

contributions and rules are factors that determines their group strength (Table 4). Fig. 4 and 5 are in response to the question “How do these interactions affect your group’s connection with similar groups in terms of purpose and benefits?” However, Figure 6 shows, some of the challenges in forming and maintaining interactions with other groups include bunkering activities, high transportation costs, negative externality and encroachments into fishing grounds

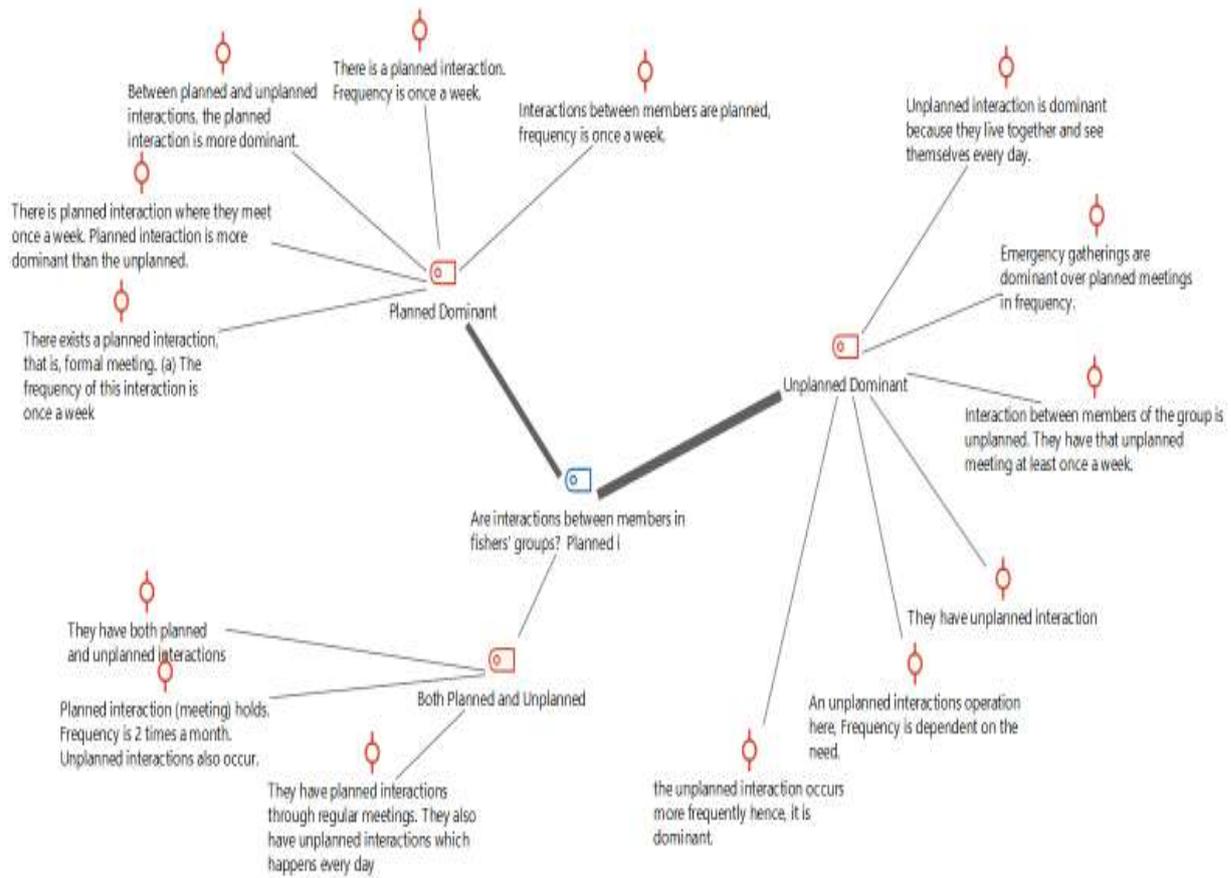


Fig. 3: Project Map for Forms of Group Interaction , Source: MAXQDA 2018 output based on interview data

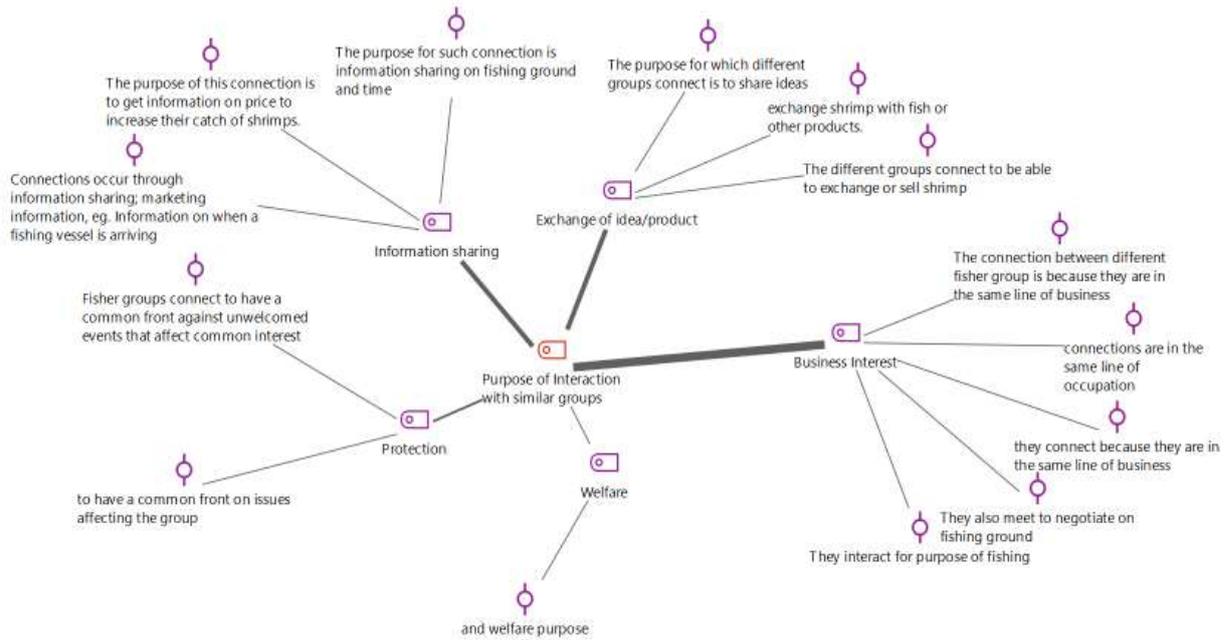


Fig.4: Project Map for Purpose of bridging (Between Group Interaction),  
 Source: MAXQDA 2018 output based on interview data

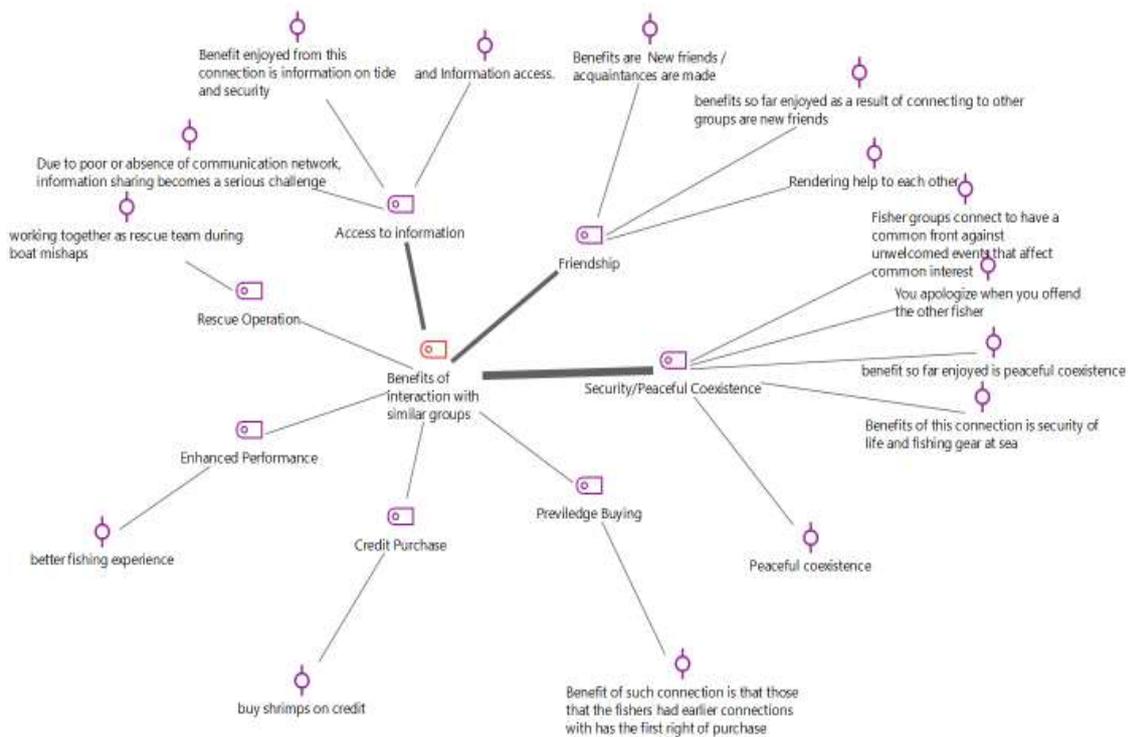


Fig 5: Project Map for Benefits of Between Group Interactions  
 Source: MAXQDA 2018 output based on interview data

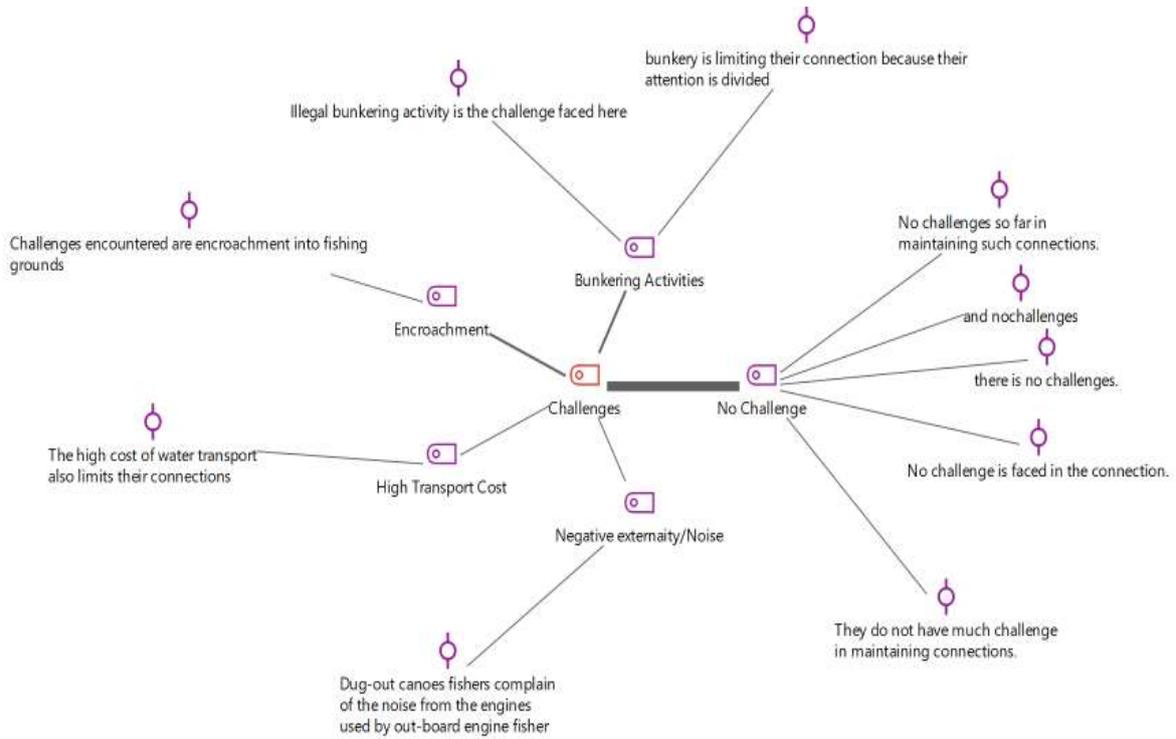


Figure 6: Project Map for Challenges of Between Group Interactions  
Source: MAXQDA 2018 output based on interview data.

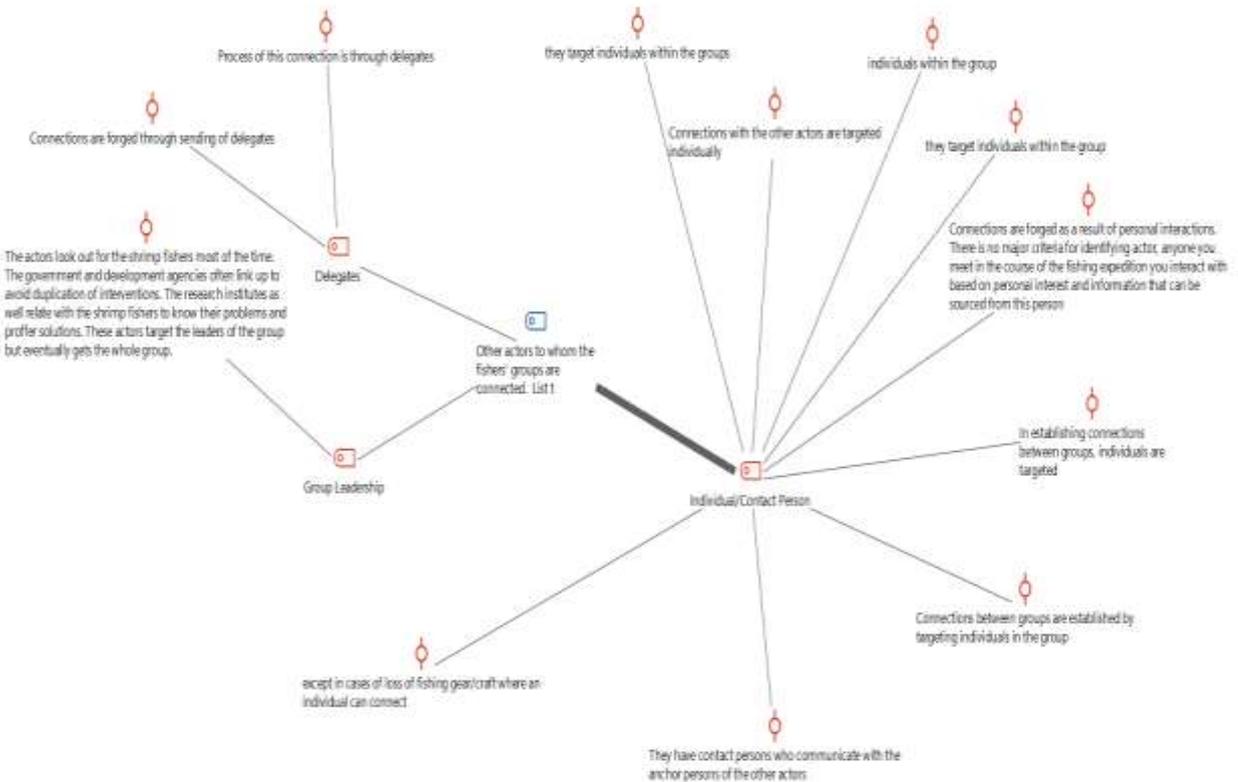


Figure 7: Project Map for Network Bonding and Linkages,Source: MAXQDA 2018 output based on interview data

**Table 2: Factors contributing to fishers group strength in Borokiri Kozo**

	Score	Rank
Regulation/law	0	4 <sup>th</sup>
Cooperation & love	2	2 <sup>nd</sup>
Oath taking	3	1 <sup>st</sup>
Dues & contribution	1	3 <sup>rd</sup>

**Table 3: Factors contribution to fishers' group strength at Ikpukulu**

	Score	Rank
Fishing gear	2	1 <sup>st</sup>
Compromise	2	1 <sup>st</sup>
Endurance	1	2 <sup>nd</sup>
Timeliness	1	2 <sup>nd</sup>

**Table 4: Factors contributing to fisher group strength in Andoni**

	Score	Rank
Integrity of members	1	5 <sup>th</sup>
Generosity	0	6 <sup>th</sup>
Unity	4	2 <sup>nd</sup>
Fairness	2	4 <sup>th</sup>
Socializing	3	3 <sup>rd</sup>
Rules	5	1 <sup>st</sup>

## DISCUSSION

Maya-Jariego, Querevalú-Miñán, Varela and Ávila (2017) in describing the network structure of small-scale fisheries of Lobitos (Peru) in Latin America stated that

*“Local communities of artisanal fishermen are organized into highly cohesive, densely connected groups with high levels of social control. Fishermen spend a great deal of time socializing with each other at the harbor, during communal celebrations and activities, on boats and at the usual meeting places, talking about the state of the sea and fishing activity. However, they are careful to share as little information as possible about the key factors that increase catches. Strong relational integration coexists with secrets in fishing.”*

A similar scenario occurs at the shrimp fishing settlements in Rivers State where there is high level of integration among various actors before, during and after fishing activities. Some respondents rightly pointed out that:

*“Some information shared by fishers on catches at some fishing ground was only to divert attention of other fishers from where there was heavy catches”.*

This proves true the ‘integration that co-exists with secrets’ (Maya-Jariego *et. al.* 2017). Agumagu and Adesope (2012) noted that groups are important as they serve as an avenue for human interaction, achievement of common goals, foster sense of human dignity, respect, recognition, mutual assistance, and an avenue for leadership development and improvement. The findings in the study agree with Asiabaka and Asiabaka (2010) where they pointed out that groups are formed by

people who come together to make contributions and accept a fair share of the risks and benefits of their undertaking.

The study identified nearly fifteen factors to determine group strength in shrimp fishing communities of Rivers State. Namely: rules and regulation/laws, cooperation/love, oath taking, dues/contributions, possession of fishing gear, fishers’ compromise for coexistence, endurance at sea, timeliness to fishing ground, integrity of members, generosity, group unity, fairness to members and socializing culture. These factors are useful for the coexistence of shrimp fishers and used in common-pool resource management as highlighted by Ostrom in Hoffman (2013).

Meanwhile, Asiabaka and Asiabaka (2010) noted that the effectiveness of a group depends on the individuals’ attraction to the group. They went further to point out that the attraction of an individual to a group is determined by the groups goals, programmes, size, incentive, motivation of the person, attractiveness of the other persons in the group and if the group serves as means of satisfying member’s needs. Cartwright and Zander (1968) in Asiabaka & Asiabaka (2010) enumerated the characteristics of a cohesive group to include:

- High attendance in meeting
- Members speak of group as ‘we’
- Group members seems happy and friendly
- Members work together for common goal and are willing to take responsibilities.

However, Vachette, King and Cottrell (2017) reported that bonding, bridging and linking promotes cooperation among actors in addressing disaster and enhancing resilience among the locals. These social variables are also responsible for the coexistence of shrimp fishers in Rivers State.

The relationship among the shrimp fishers is an indication of social network at work through interactions and reciprocal dealings among the fishers (Samah and Shaffril, 2018). In contrast, Gwentyth *et al.* (2018) reported that community social connectedness did not modify the relationship between household income and food security as the rich are likely to be richer and the poor get poorer due to availability of resources at their disposal.

## CONCLUSION

The expectation of shrimp fishers had not been fully met with regards to attracting government to subsidize inputs; however, grouping and cooperation among the shrimp fishers had helped the fishers in their immediate security need. Formation of groups based on external motivation from government and donor agencies was said to produce weak groups which disintegrate easily compared with those formed from fishers' initiative. Most group goals aimed at contributing to assist their members in need, such groups are bounded by rules and penalties. However, it is by choice to become a member of a group which is demonstrated by payment of statutory fees, drinks and oath of good conduct. Interventions for poverty alleviations through skills acquisitions and input supplies can be more effective if facilitated by local social networks in fishing communities.

Finally, network bonding, which comes in the form of planned or unplanned within-group interactions, is a significant factor for bridging with similar fisher groups. Some of the challenges in forming and maintaining interactions with other groups include bunkering activities, high transportation costs, negative externalities and encroachments into fishing grounds. Linkage of a fisher's group with other actors or bodies is done through individuals/contact persons, delegates and group leadership. Overall, the data suggest that bonding within a fisher's group actually stimulates linkages with other actors or bodies.

## ACKNOWLEDGEMENTS

We are grateful to the Carnegie Corporation of New York who fully sponsored the programme, through the Regional Forum for Capacity Building in Agriculture (RUFORUM) who coordinated the grant (RU/2012/DRS/01) at Makerere University, Kampala.

## STATEMENT OF NO CONFLICT OF INTEREST

We the authors of this paper declare that there are no conflicting interests in this publication.

## REFERENCES

- Agumagu, A.C and Adesope, O.M (2012) Basic module concepts in group dynamics: a guide for Agriculture and other social scientists. Vinaco Universal Resources, Port Harcourt, Nigeria. Pp 1-67
- Asiabaka, C.C., and Asiabaka, I.P (2010) Group dynamics: A guide to development work. Owerri, Nigeria. Hudson-Jude publishers. Pp 1-15
- Barnes-Mauthe, Arita, Allen, Gray, Leung (2013). The influence of ethnic diversity on social network structure in a common-pool resource system: implications for collaborative management. *Ecology and Society*, 18 (1)
- Birendra, KC, D. B. Morais, E. Seekamp , J. W. Smith and M. N. Peterson (2018) Bonding and Bridging Forms of Social Capital in Wildlife Tourism Microentrepreneurship: An Application of Social Network Analysis *Sustainability* pp. 315; doi:10.3390/su10020315
- Bodin, Ö. and B. I. Crona. (2009). The role of social networks in natural resource governance: What relational patterns make a difference? *Global Environ. Chang.*, 19:366-374.
- Carlsson, L. (2000). Policy networks as collective action. *Policy studies Journal* 28(3):502–520.
- Centola D (2010). The spread of behavior in an online social network experiment. *Science* 329(5996):1194–1197.
- Creswell, J.W. (2007). Qualitative inquiry and research design: Choosing among five approaches (2nd ed.). Thousand Oaks, CA: Sage.
- FAO (2000). Report of the four GEF/UNEP/FAO regional workshop on reducing the impact of tropical shrimp trawl fisheries, 15 – 17 Dec. 1999, Lagos, Nigeria. FAO Corporate Document Repository, Fisheries and Aquaculture Department. *FAO fisheries Report* No. 627 15-17
- Grafton, R.Q. (2005). Social capital and fisheries governance *Ocean & Coastal Management* 48(9–10), P. 753-766
- Gwentyth O. Lee, Pamela J. Surkan, Jon Zelner, Maribel Paredes Olortegui, Pablo Peñataro Yori, Ramya Ambikapathi, Laura E. Caulfield, Robert H. Gilman and Margaret N. Kosek (2018). Social connectedness is associated with food security among peri-urban Peruvian Amazonian communities, *SSM-Population Health*, <https://doi.org/10.1016/j.ssmph.2018.02.004>
- Hahn, T., P. Olsson, C. Folke, K. Johansson, Trust-building, knowledge generation and organizational innovations: the role of a bridging organization for adaptive management of a wetland landscape around Kristianstad, Sweden, *Hum. Ecol.* 34(4):573–59.
- Hoffman, C. M. (2013). "Building Upon Common-Pool Resource Theory to Explore Success in Transitioning Water Management Institutions". *Dissertations & Theses in*

- Natural Resources*. Paper 66. <http://digitalcommons.unl.edu/natresdiss/66>
- Igbokwe, E.M. and Enwere, N.J.(2001). Participatory Rural Appraisal in Development Research. New Generation Books, Enugu. Pp.44- 46
- Isubikalu, Prossy (2007). Stepping–stones to improve upon functioning of participatory agricultural extension programmes: Farmer Field Schools in Uganda. Wageningen Academic Pub. The Netherlands.Pp 1-35
- Jansen, Harrie (2010). The Logic of Qualitative Survey Research and its Position in the Field of Social Research Methods [63 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 11(2), Art. 11, <http://nbn-resolving.de/urn:nbn:de:0114-fqs1002110>.
- Jenkins, L. D., K. R. Thompson, L. Bourillon and S. H. Peckham (2016). The scope of fisheries learning exchanges for conservation. *Marine Policy*, doi.org/10.1016/j.marpol.2016.05.025i
- Komi,G.W.,P. Isubikalu, N. Turyahabwe,O.M. Adesope,G.J.Agea and S.Okodudu (2018).Drivers of social network and their implications on group formation among shrimp fishers in Rivers State. Paper presented at the Sixth African Higher Education Week and RUFORUM Biennial Conference 2018, October 22-26, 2018, Kenya.
- Lawal, Jim-saiki, P.O. Obatola, E.J. Giwa, T.A. Alhaji (2016). Socio-Economic Analysis of Artisanal Fishing Operation in West and East Axes of Lagos State, Nigeria *World Journal of Agricultural Research*, 4(1):31-35.
- Lin, N (1999). Building a Network Theory of Social Capital *Connections* 22(1):28-51
- Marsh, D., and M. Smith (2000). Understanding policy networks: towards a dialectical approach. *Political Studies* 48:4–21
- Maya-Jariego, I, J. F.Querevalú-Miñán, Lourdes G. Varela and Javier Ávila (2017). Escape the lion cage: Social networks by catch zones of small-scale fisheries in the oil settlement of Lobitos (Peru). *Marine Policy* 81: 340-349
- North, D.C. (1990) Institutions, Institutional Change and Economic Performance. Cambridge University Press, New York. <http://dx.doi.org/10.1017/CBO9780511808678>
- Nwosu, F.M., E.O. Ita and U.I. Enin (2011). Fisheries Management in Nigeria: A case study of the marine fisheries policy. *International Research Journal of Agricultural Science and Soil Science* vol. 1(3) 070-076pp
- Oso, W.Y. and Onen, D. (2009). General Guide to writing research proposal and report, Nairobi: The Jomo Kenyatta Foundation. Pp1-40.
- Ostrom, E. (2005). *Understanding institutional diversity*. Princeton University Press, Princeton, New Jersey, USA.Pp 15- 376
- Samah, A. A., and Shaffril, H. A. M. (2018). Sustainable livelihood for a better Adaptation towards Climate Change among Small Scale Fishermen in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 8(1), 420–433
- Sandström, A., and C. Rova. (2010). Adaptive co-management networks: a comparative analysis of two fishery conservation areas in Sweden. *Ecology and Society* XX(YY): ZZ. [online] URL: <http://www.ecologyandsociety.org/volXX/issYY/artZZ/>
- Ssebaggala G.L, Kibwika P, Kyazze F.B and Karubanga G (2017). Farmers’ Perceptions of Rice Postharvest Losses in Eastern Uganda.*Journal of Agricultural Extension* 21 (2) <https://dx.doi.org/10.4314/jae.v21i2.3>
- Turner, R. A., N. V. C. Polunin, and S. M. Stead (2014). Social networks and fishers’ behavior: exploring the links between information flow and fishing success in the Northumberland lobster fishery. *Ecology and Society* 19(2): 38. <http://dx.doi.org/10.5751/ES-06456-190238>
- Vachette,A., King, D and A. Cottrell (2017). Bonding, bridging and linking social networks: A qualitative study of the emergency management of Cyclone Pam, Vanuatu. Asia Pacific Viewpoint, Victoria University of Wellington and John Wiley & Sons Australia, Ltd. doi: 10.1111/apv.12150
- Wahyuningsih, Muhammad Arhim and AgusPurwanto (2017). Fisherman Social Network InTanakeke Island Takalar Regency South Sulawesi Province. Presented at *Sahid Jaya Hotel Makassar- International Conference on Natural and Social Sciences 2017*. PalopoCokroaminoto University, Makassar, March 12-13, 2017 <http://journal.uncp.ac.id/index.php/iconss/article/view/562>.
- Watts DJ (1999) Small Worlds: The Dynamics of Networks Between Order and Randomness. Princeton University Press, Princeton (retrieved 5<sup>th</sup> Jan 2019) <https://press.princeton.edu/titles/6768.html>
- Woolcock, M. (2001). The place of social capital in understanding social and economic outcomes. *Can. J. Policy Res.*, 2:11-17.