# Improving shrimp fishers' fishing and bargaining abilities through social networks knowledge transfer in Rivers State, Nigeria

[1]Komi, G.W.* and [2]Isubikalu, P.

1Department of Animal and Environmental Biology, Faculty of Science, University of Port Harcourt, PMB 5323, East-West Road, Port Harcourt, Nigeria.

2 Department of Extension and Innovation Studies, College of Agricultural and Environmental Sciences, Makerere University, P.O.Box 7062,Kampala, Uganda.

Corresponding author (Email: gentle.komi@uniport.edu.ng)

**ABSTRACT**
The knowledge of the use of fishing gear and the ability to negotiate price depend on the information available to the fishers. They draw on social relationships to acquire information relating to fishing opportunities, contributing to knowledge that underpins decision making and behaviour. Shrimp fishers from eight fishing ports in Rivers State, were surveyed to assess how the knowledge obtained by social network members influence their fishing and bargaining abilities. A mixed method design was employed using qualitative and quantitative approaches in which four focus group discussions (FGDs) and survey of 125 shrimp fishers were conducted using interview guide and semi-structured questionnaire. Data were analysed using SPSS software and content analysis. Results showed that 97.6% of the respondents obtained knowledge through handed down traditions. Over eighty percent (88%) of the respondents obtained knowledge from friends and neighbours while 53.6% obtained knowledge through electronic media. Knowledge transfer improved the ability to use fishing gear by more than double while bargaining ability improved average sales of shrimps from ₦1,866.00 to ₦5002.02 per kilogram. Statistically, there were no significant differences ($p > 0.05$) in the number of gears operated, length of fishing duration and quantity of shrimps caught before and after acquiring knowledge; however, significant differences ($p < 0.05$) existed in the bargaining ability and selling cost per kilogram of shrimp after acquiring knowledge from shrimp fishers' social networks. The study concludes that knowledge of shrimp fishing and bargaining abilities was better transferred through handed down traditions and social networks of friends and neighbours. Furthermore, cooperatives helped stabilize the bargaining system to improve sales.

**Keywords:** Socializing, gear, price, prawn, Southern Nigeria

**INTRODUCTION**
This study focuses on social networks among shrimp fishers in Rivers state with respect to the fishers' living standards. Moore and Westley (2011) describe social networks as patterns of vertical and horizontal relationships, or "ties", among actors which comprised of various types of social relationships from casual to close bonds. While, Noll, (2002) defined living standard in

terms of the knowledge base of an individual or society, the enlightenment which improves the skills of individuals to achieving their desired goals. Hence, this paper considered how knowledge which is a measure of living standard is transferred within shrimp fishers' social networks. According to Mohammad *et al.* (2016), knowledge transfer is the acquisition and utilization of new sets of knowledge-based resources, this could include new fishing gear that require special skills to operate. But fishers also draw on social relationships to acquire information relating to fishing opportunities, contributing to knowledge that underpins decision making and behaviour (Turner *et al.,* 2014).

Engagement in social networks can provide benefits for fishers, although such advantages gained may not be equally distributed. In as much as information sharing social networks may contribute to fishing success, for example, high lobster landings and better pricing, the knowledge gained from the network on use of gear can reduce over exploitation of the fishery. Identifying fishers who are knowledgeable in a network provides opportunity to government agencies and researchers to access a range of information on others' fishing behavior. Such fishers may be able to assist government and researchers in collecting information on the distribution of fishing opportunities, the state of the fishery, and the ways in which fishers use their knowledge to adapt to change and management interventions (Turner *et al.,* 2014).

According to Barnes *et al.* (2016), segregation, a common characteristic in social networks is important because it can inhibit communication and learning across groups, causing knowledge and behaviours to become localized in social space. Knowledge, therefore, is an asset and a measure of standards of living among fishers (Noll, 2002). Apparently, it is not known how knowledge of the use of fishing gear and bargaining by shrimp fishers in Rivers State has influenced use of fishing gear and ability to negotiate price for the shrimps caught.

Statistics shows that Nigeria gets over US$70 million in export each year from this subsector (Gillet, 2008; National Bureau of Statistics, 2017) having 95% of the coastal population surviving directly or indirectly on fisheries (Tafida *et al.*, 2011; Anyawu *et al.,* 2011; Ahmed, 2013). Although shrimps are valuable and money generating venture contributing to Nigeria's gross domestic product (GDP), the fishing communities are living below the average national standard even in comparison with the non-fishing communities (Pegg & Zabbey, 2013, NBS 2017). It is evident that shrimp fisher has poor living standard which is seen in their average earnings, accommodation facilities and level of education (Onoja *et al.*, 2012; Blythe *et al.*, 2014; Lawal *et al.*, 2016). There is paucity of how knowledge of fishing and bargaining is transferred among shrimp fishers in fishing communities of Rivers State, Southern Nigeria.

According to Turner *et al.* (2014) knowledge is transferred through Social networks. Knowledge of fishing and bargaining among network members is generated largely from the quality of information shared in the network. The shrimp fishers in Rivers State network among themselves and other fishers in neighbouring fishing communities and have business partners at the other nodes of the shrimp value chain. Similar social networks are reported in Sweden (Sandström & Rova, 2010), Hawaii (Barnes-Mauthe *et al.*, 2013) and Mozambique (Blythe *et al.,* 2014). Moore and Westley (2011), Barnes-Mauthe *et al.* (2013) and Barnes *et al.* (2016) argued that

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the stronger and diverse a network the better for fishers' knowledge and skills. This therefore implying that fishers' knowledge is transferred through social networks that exist among them.

Knowledge dissemination through social network opens opportunity for people to be able to widen their access to resources and other actors and the collective action of a network facilitate mutual benefit of its members (Woolcock, 1998; Bebbington, 1999). Studies conducted in Mexico, Bangladesh and South Africa have shown that strong social networks were pivotal in improving living standard among fishers (Sunde and Isaac, 2008; Cinti *et al.,* 2010; Buayan 2014). According to Bebbington (1999), Sseguya, *et al.* (2014) networks of interactions linking individuals in communities are critical in enabling access to income, skills and other benefits. Strong networks of interactions linking market actors help open market possibilities to rural producers and increase their ability to turn their assets into income for improved standards of living (Bebbington, 1997; North and Cameron, 1998; Sseguya, *et al.*, 2009).

A similar concept of standard of living is that of 'capabilities' described by Amartya Sen. This approach is based on a view of living standard as a combination of various 'doings and beings' with quality of life to be assessed in terms of the capability to achieve valuable functioning" (Sen, 1993 in Noll, 2002). The knowledge gained from fishers' social networks through information sharing has been found to improve the skills of fishers to achieving success in fishing (Turner *et al.*, 2014). Therefore, in this study, knowledge transfer is measured in terms of the ability of network members to use shrimp fishing gear and bargain shrimp price.

Earlier studies conducted on shrimp fisheries in Nigeria did not take into account knowledge transfer in social networks of fishers but rather challenges and prospect of shrimp fishing and farming (Pegg & Zabbey, 2013), need for the review of fisheries laws (Nwosu, *et al.*, 2011) and fishers livelihoods in coastal communities (Tawari and Devies, 2010; Onoja *et al.,* 2012).

However, the way shrimp fishers' network and how this influences their knowledge, access and use of fishing gear for the improvement of the shrimp fishers' living standards is fuzzy. Apparently, it is not clear how the shrimp fishers obtain their knowledge and how access and use of knowledge influence their fishing and bargaining abilities needed to improve their living standards. Therefore, this study seeks to establish how knowledge transfer in social networks influences shrimp fishers' fishing and bargaining abilities in coastal communities of Rivers State, Southern Nigeria.

The Network Theory of social capital described by Lin (1999) suggests that access to and use of resources is embedded in social networks. This also implies that knowledge shared within social network groups exposes members to learn new skills, improve performance and get a better reward. Through social networks, shrimp fishers can accrue asset that can provide advantages to individuals or groups (Coleman 1988, Lin 1999). Recent review by Marchiori & Franco (2019) allude to the fact that organizational knowledge begins with knowledge generated by individuals which became acceptable by an organization and run as organizational knowledge. However, knowledge transfer begins with knowledge acquisition followed by its dissemination among social groups.

Apparently, the status of ecological knowledge in developing countries is still largely based on traditional knowledge of

those who exploit the resources for their daily living, most of which are tacit or learned from parents (Campbell & Barlow, 2017; Braga *et. al.,* 2018).

Fishers in the rural areas appear not conversant with the regulations on use of fishing gear as they discuss freely the different nets, they used in fishing shrimps. As noted by Campbell & Barlow (2017), lack of common language skills is a substantial barrier to communicating techniques in developing countries. There are also huge differences in socioeconomic conditions between the populations of developed countries and those of under-developed countries. Many people in under- developed countries are subsistence users of wild shrimp resources. They are characterized by having little education and no other skills than fishing to earn a living. In the event they lose the fishery resource, they struggle to earn a living. This suggests weak resilience or high vulnerability among rural subsistent fishers in developing countries.

Campbell & Barlow (2017) observed that differences in culture are the most complex set of challenges to meet in any project aimed at transferring knowledge. As noted by Campbell & Barlow (2017), two overriding factors essential in knowledge transfer project are: the selection of staff with empathy and respect for cultural differences and the second being to facilitate long-term partnerships, which allow participants to build trust and develop personal relationships.

In the present study in Southern Nigeria, culture determines the job description and association of the shrimp fishers. The male folks were more involved in fishing while the female counterparts process and sell the products. Involvement in focus group discussion was bias in favour of the male folks.

Apparently, Social network has both positive and negative influences on knowledge transfer. In a positive sense, development of a strong personal relationship between the technology donor and the recipient is often crucial. In the absence of a strong personal relationship and trust between the two, it is very difficult to get timely and open feedback. The negative aspect of social networks is nepotism, a long-standing historical practice, which can work well when those being appointed have the right skill sets. It was, for example, one reason for the success of the British Navy in the 18th century, where the vast majority of the ships' officers and the commanders in every successful battle had gained their appointments through the "interest" of influential relatives (Rodger, 1986: In Campbell & Barlow, 2017).

Campbell & Barlow (2017) surmised that providing training in specific techniques is the most adequate way of knowledge transfer, but even so there may be obstacles, reason being that people everywhere tend to be resistant to being told what they should do by outsiders. However, there is transfer of knowledge between different stakeholders' groups, not solely between science and fisheries - a traditionally unidirectional way of knowledge transfer (Hörterer, Schupp, Benkens & Buck, 2018). Knowledge transfer can only be successful if the knowledge is wanted and needed by the recipients though the processes are often quite slow. In transferring knowledge or techniques, it is essential to be sensitive to the biophysical, and especially cultural and political, differences between regions

## MATERIALS AND METHODS
### Study Area
Shrimp fishers from eight purposively selected fishing ports in Rivers State, Southern Nigeria were surveyed from

February to April 2018 to assess how the knowledge obtained by social network members influence their fishing and bargaining abilities. The fishing communities were; Ikpukulu (Okirika Local Government Area), Andoni waterfront, Bundu waterside (Port Harcourt LGA), Nkpor Village, Mgbuodohia (Obio/Akpor LGA), Okokiri, Oyorokoto and Muma (Andoni LGA) of

Rivers State. The choice of Rivers State and the fishing communities was because they were leading in shrimp production. Rivers State is a state in Niger Delta Region (Figure 1). The region accounts for over 90 % of the country's shrimp production (Food and Agricultural Organization of the United Nations, 2000; Nwosu *et al.*, 2011).
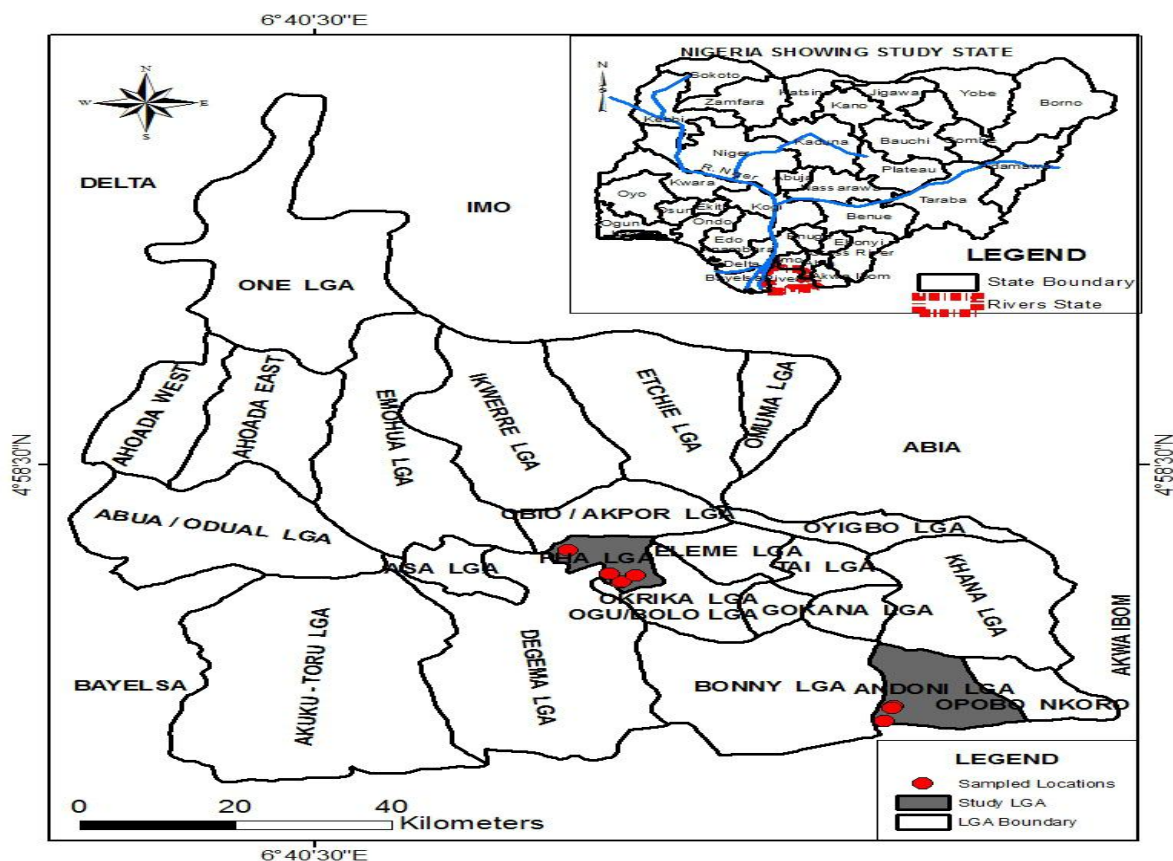


**Fig. 1.** Map of study sites.
Source: Komi (2018)

Rivers state 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)

**Research Design**
A mixed method designs was employed using quantitative and qualitative approaches. Four focus group discussions (FGDs) (Table 1) and

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survey of 125 shrimp fishers from eight fishing ports grouped into three axes (Andoni, Borokiri and Eagle Island) were conducted using a guide and semi-structured questionnaire respectively. The questionnaire obtained information on the sources of knowledge and how the knowledge acquired impacted on their fishing and bargaining skills

while the FGDs established the strength of social network/group and draws consensus on issues of divergent opinions.

**Study Population and Sampling Procedure**
The study populations were drawn from accessible shrimp fisher folks who harvest shrimps from the sea and estuaries to support their household livelihood.

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

| S/N | Fishing Community | No of males | No. of females | Total |
|-----|-------------------|-------------|----------------|-------|
| 1.  | Borokiri          | 7           | 0              | 7     |
| 2.  | Ikpukulu          | 6           | 1              | 7     |
| 3.  | Nkpor             | 8           | 0              | 8     |
| 4   | Okokiri           | 10          | 1              | 11    |

According to Oso and Onen (2009), an accessible population is part of the target population which the researcher can reach, and use as sampling frame from where the researcher can draw a sample. Accessibility to shrimp fishers in coastal communities in Southern Nigeria is limited by the difficult water terrains, poor transportation system and militant activities. Hence, more resources including time and finance are required (Lawal *et al.,* 2016). This study therefore draws its samples from accessible population of shrimp fishers in the Andoni, Okrika, Port Harcourt and Obio/Akpor Local Government Areas (LGAs) of Rivers State.

**Cross-sectional survey**
Face to face interview was conducted on 125 shrimp fishers who were purposively selected from eight fishing communities in four Local Government Areas. A list of accessible shrimp fishers was generated by each fishing community leader as a sampling frame. Shrimp fishing being a specialized fishery with small sample population, 95% proportionate stratified sampling strategy was adopted to determine the number of fishers to be selected from each of the communities (Lawal *et al.,* 2016; Ssebagala *et al.*, 2017).

From each fishing community, a simple random sampling strategy was used to determine the shrimp fishers to participate in the one-on-one survey. A questionnaire containing structured and semi -structured questions were used to collect data on; fishers' sources of knowledge, price, quantity of shrimps caught, duration at sea, as well as factors affecting shrimp price.

**Data Analysis**
The data obtained were subjected to content analysis and SPSS software 2019. Content analysis was used to identify the major fishing gears, proficiency in operating gear and some factors affecting price of shrimps. Knowledge of fishing and bargaining acquired by shrimp fishers belonging to a network was determined by identifying the source of the knowledge. Paired samples t-test was used to compare difference in Knowledge of shrimp fishers in relation to bargaining ability, price, quantity of shrimps caught, duration at sea.

The study assumes that there is a relationship between knowledge acquired from networks and the ability to use fishing gear and to negotiate shrimp prices. The ability to use fishing gear was therefore measured in terms

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of: Number of gears a shrimp fisher operates (number), Duration at sea (hours), Quantity of shrimp caught (Kg) and subjected to paired samples T-test. Whereas, ability to negotiate shrimp prices was measured in terms of factors that affect the fixing of shrimp price e.g.: distance from fishing ground to market, cost of hiring boat, cost of buying/construction of boat, cost of fuelling boat, cost of labour, and others. These were analysed using percentages.

**RESULTS**

**Sources of Knowledge on Shrimp Fishing**
The shrimp fishers belong to at least two fishing groups and majority of them interact with members of their network four times a week. Figure 2, indicates that 32% of the respondents have received group training as against 68% without group training while Table 2 shows the other means through which respondents get knowledge of fishing and bargaining. The percentage of the respondents who got knowledge of fishing and bargaining through handed down traditions was the highest, accounting for 97.6% of respondents.
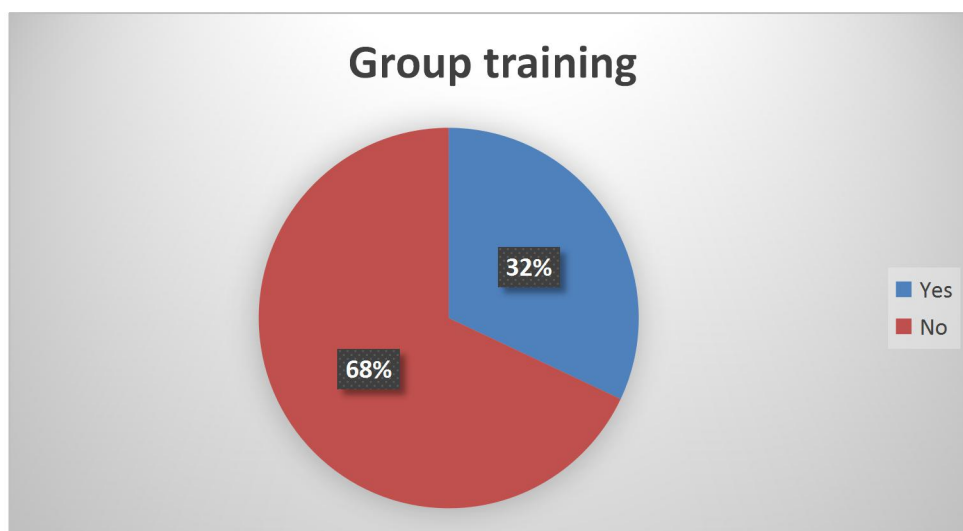


**Fig. 2.** Participation in group training

However, 88% of the respondents got knowledge of fishing and bargaining through friends and neighbours. This is one of the commonest means of information among end-users of information. Other sources of information that build up their knowledge of fishing and bargaining include Organized training workshop for network (32%), skill acquisition centres (0.8%) and electronic media (53.6%).

**Table 2:** Rivers State Shrimp Fishers' Sources of Knowledge

| Variables | Frequency | Percentage |
|---|---|---|
| **As a member of a group, have you had any group training?** | | |
| Yes | 40 | 32.0 |
| No | 85 | 68.0 |
| **Organized training workshop for network members** | | |
| Yes | 40 | 32.0 |
| No | 85 | 68.0 |
| **Skill acquisition Centre** | | |
| Yes | 1 | 0.8 |
| No | 124 | 99.2 |
| **Handed down traditions** | | |
| Yes | 122 | 97.6 |
| No | 3 | 2.4 |
| **Friends and Neighbours** | | |
| Yes | 110 | 88.0 |
| No | 15 | 12.0 |
| **Electronic Media (radio, television, etc.)** | | |
| Yes | 67 | 53.6 |
| No | 58 | 46.4 |

Source: Field survey 2018. Sample size N = 125

### Shrimp fishing gear

In rating of fishing and bargaining abilities among respondents before and after knowledge acquisition (Table 3), the shrimp fishers' ability to operate fishing gear increased more than double with mean increase from 1.36 to 3.21 times. The shrimp fishing gear operated are cast net, long line, beach seine net ('otutogbor'), drag net, sunken cast net (bilema), scoop net, trammel net (Oyenma), and mini trawler net with wooden frame attached to a boat (Nkoto). Over 80% of the respondents said they were excellent in using their fishing gear. However, over 95% of shrimp fishers' network members indicated that they operate all fishing gear excellently well after knowledge acquisition. Notable innovation based on knowledge transfer was demonstrated in the use of Oyenma fishing net.

Trammel nets (Oyenma) is a locally designed fishing/shrimping net type having three to five panels of netting suspended from a common row of floaters and attached to sticks with bottom line. The outer open walls of netting have mesh larger than the targeted fish and the interior netting have smaller mesh sizes. The inside nets hang loosely in-between the preceding outer nets. A fish swimming from any side passes through the large mesh outer panel, strikes the large mesh panel forming a sac or pocket in which the fish is trapped. The net may be used at the surface, mid-water, or at the bottom. A fisher may choose to anchor the Oyenma net or allow it to drift (Ukwokor, Nkoto).

Oyenma is difficult to set effectively in deep waters due to the current of the water. Formerly, it was attached to a tall stick from ground level to the surface water and catches a number of different species of fish. But presently, it is anchored with short sticks in water while floaters are used at the surfaces with lines or ropes connecting it as practised

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at Oyorokoto fishing port. Indeed, this trap is the only means to intercept large schools without a costly investment in vessels. Because current may be too much during the rainy season there is the tendency of losing the net which will result into ghost fishing with nets made of synthetic fibres or nylon.

**Knowledge and price determinants**
The difference in time duration to catch shrimp before and after acquisition of knowledge was not significant (5.12 to 5.55) hrs. The quantity of shrimps caught did not increase with acquisition of knowledge, suggesting that there were other factors such as incessant crude oil spills, seasons and overfishing leading to shrimp depletion and decline in quantity of catch. However, the impact of knowledge on price bargain was significantly high (₦1,866.00 to ₦5002.02) with knowledge acquisition (Table 3).

**Table 3:** Paired Samples T-Test of fishing and bargaining abilities of shrimp fishers before and after acquiring knowledge

| | | Mean | Std. Deviation | Std. Error Mean | Lower | Upper | T | Df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| Pair 1 | No. of gear operated before and after acquiring knowledge | -.34400 | .68514 | .06128 | -.46529 | -.22271 | -5.613 | 124 | .000 |
| Pair 2 | Bargaining abilities before and after acquiring knowledge | .00800 | .20064 | .01795 | -.02752 | .04352 | .446 | 124 | .657 |
| Pair 3 | Length of fishing duration before and after acquiring knowledge | -1.84800 | 1.75543 | .15701 | -2.15877 | -1.53723 | -11.770 | 124 | .000 |
| Pair 4 | Quantity of shrimp caught before and after acquiring Knowledge | -1.64800 | .86375 | .07726 | -1.80091 | -1.49509 | -21.332 | 124 | .000 |
| Pair 5 | Cost of a Kilo gram of shrimp before and after acquiring knowledge | -.36736 | 2.34000 | .20930 | -.78162 | .04690 | -1.755 | 124 | .082 |

95% Confidence Interval of the Difference

From Table 3, Pair 1, Pair 3 and Pair 4 are significant (P<0.05). We therefore accept the null hypothesis that there were no significant differences in the number of gears operated, length of fishing duration and quantity of shrimp caught before and after acquiring knowledge from social networks. However, Pair 2 and Pair 5 were significant (P>0.05) wherefore we reject the null hypothesis and accept the alternate which assumed that there was a difference in the bargaining ability and selling cost per kilogram of shrimp after acquiring knowledge from fishers' social networks.

Further probing into what influences shrimp price (Table 4) indicates that cost of labour was highest (91.2%). Other factors include cost of fuelling boat (47.2%), distance from fishing ground to market (31.2%), cost of buying boat (23.2%) and cost of hiring boat (12.8%). In addition, some of the shrimp fishers said season, oil spill pollution, and dredging activities had influenced price.

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**Table 4:** Factors affecting shrimp price in Rivers State

| Variables | Frequency | Percentage |
|---|---|---|
| **Distance from fishing ground to market** | | |
| Yes | 39 | 31.2 |
| No | 85 | 68.0 |
| **Cost of hiring boat** | | |
| Yes | 16 | 12.8 |
| No | 108 | 86.4 |
| **Cost of buying/construction of boat** | | |
| Yes | 29 | 23.2 |
| No | 95 | 76.0 |
| **Cost of fueling boat** | | |
| Yes | 59 | 47.2 |
| No | 65 | 52.0 |
| **Cost of Labour** | | |
| Yes | 114 | 91.2 |
| No | 11 | 8.8 |

Source: Field survey 2018. Sample size N = 125

**Other factors affecting the price of shrimp:**
**Season**
The respondents claimed that season and tide were equally responsible for the price shrimps were sold. In a season of abundance and bumper harvest supply is more than demand so the price drops in comparison with a season of scarcity. During scarcity, it is regarded as bad season and the few kilograms caught are sold at exorbitant prices.

**Oil Pollution**
The incessant crude oil spillage in Ikpukulu and Mgbodohia contributed to the pollution of the aquatic ecosystem leading to death of fishes including shrimps. A respondent stated clearly that: '*oil pollution from spills and illegal refining (bunkery) of petroleum products in our creeks had driven away the fish and shrimps so the few caught have become more expensive*' (Middle age male shrimp fisher, Eagle Island, 20th Feb. 2018).

**DISCUSSION**
Majority of the respondents have not had group trainings (68.0%). The respondents upheld the view that they did not gain the knowledge of fishing and bargaining through

organized training workshop for network members (68.0 %), skill acquisition centre (99.2%), and electronic Media (radio, television (46.4%). But agreed to have gained knowledge from friends and neighbours (88%) and handed down traditions (97.6%). This finding shows that knowledge transfer from parents to offspring was still dominant among shrimp fishers in Rivers State. Furthermore, the information obtained from interactions with friends and neighbours in the same business of shrimps contributes largely to the knowledge base and living standard of the shrimp fishers.

The respondents said they could operate at least one fishing gear before acquiring knowledge, but after obtaining knowledge from different sources, they claim they can operate an average of three fishing gears. This shows that their abilities improved, more than two times their original ability to operate fishing gear after acquiring knowledge. The respondents assessed their ability to negotiate prices (bargaining skill) as fair (39.2%) and poor (28.0%) before exposure to training and other sources of knowledge while majority assessed their ability to be very good (77.6%)

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after obtaining knowledge from social networks. Shrimp fishers stay an average of 5.18 hours on the sea to catch shrimps before acquiring knowledge, but after being knowledgeable, they spend an average of 5.55 hours on the sea to catch shrimp. Could it be that they take more time to practice what they have learnt in the training, or maybe they have been more careful to observe all shrimp management practices? That may not be the case, as statistical evidence showed that length of fishing duration was not dependent on knowledge from social networks. It is also possible that due to environmental factors such as pollution and migration of fish to high sea, the fishers spend longer time travelling on the sea. Reported cases of oil pollution and environmental degradation in the Niger Delta posit strong threat to fish growth and recruitment. Therefore, overfishing and poor recruitment could contribute to fishers spending longer times on sea and catching few fishes. According to Seisay & duFeu (1997), Lake Kainji experience a reduction in mean sizes i.e. length and weight of fish species and changes in species composition due to both recruitment and ecosystem overfishing.

The respondents were of the view that they catch an average of 15.02 Kg of shrimps per day before training, but 9.58 Kg of shrimps per day after obtaining knowledge. This suggests that acquisition of knowledge could make fishers catch shrimps sustainably. Consequently, a kilogram of shrimp before acquiring knowledge was sold for ₦1,866.00 while after acquiring knowledge it was sold for ₦5002.02. This implied that knowledge had significantly improved their bargaining ability.

Consequently, Braga *et al.* (2018) reported that fishers have local ecological knowledge that has the potential to assist in the conservation of depleted natural resources such as fishes and shrimps. The fishers are knowledgeable in understanding the migration pattern, fishing grounds and seasons. Campbell & Barlow (2017) opined that there are two common modes of knowledge transfer. The first being the transfer of specific skills, while the second is the transfer of more general experience. Specific skills transfer usually comes as a request from the intended beneficiaries or recipient organization or a third party such as an organization funding a development or aid project. Such skill transfer may include training exercises in fishery assessment methods and or boat mishap emergency response.

Whereas, Kumaran *et al.* (2017) surmised that shrimp farmers significantly differ in their knowledge level across east and west coasts of India and recommended that Shrimp farmers should have adequate knowledge and adopt better management practices (BMPs) for successful crop production; fishing skills are transferred among members of fishers social groups. Among shrimp fishers in Southern, Nigeria for example, the local ecological knowledge shared border on location of fishing grounds, information on seasonal catch likelihood and fish migration pattern.

Similarly, Campbell & Barlow (2017) advocated that in the use of training to transfer knowledge and skills such training exercises should incorporate local examples, and those running the training should be aware that the techniques may not all be applicable in the circumstances of the recipient regions, even though they requested for it.

**CONCLUSION**
The study concludes that knowledge of shrimp fishing and bargaining abilities were

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transferred through social networks that existed among shrimp fishers who got knowledge from handed-down traditions from parents and through friends and neighbours. Social network in form of cooperative helped in stabilizing the bargaining system to improve sales of shrimps. In the study, cost of labour, season, oil pollution and other extraneous variables such as inflation largely determined the fixing of shrimp price within the study area. Further study is recommended on the impact of social vices on knowledge transfer among fishers in fishing settlements of Rivers state.

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