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Actor's roles and interactions in fishery innovation system: the case of Mubi zone, Adamawa state, Nigeria

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Abstract
The study examined the role of actors in fishery marketing innovation system in Mubi zone Adamawa state, Nigeria. Data for the study was collected through the use of structured questionnaire distributed to 96 respondents. Purposive and simple random sampling techniques was used as sampling procedures and descriptive statistics was used as analytical tools. The result revealed that fish rearers/breeders, fish marketers, fish drug dealers, feed millers, extension agents, research institutes, transporters and government agencies were the main actors in the innovation system. The analysis of the study indicated that actors perfumed the role of supplying of fish to consumers, training man power and other actors, supply of feeds to farmers/producer, supply of drugs to farmers/producers, technology generation and dissemination of generated technology. The major challenges affecting the innovation system were poor access to capital, insecurity/insurgency and inadequate personal startup capital respectively. Therefore, there is need to encourage the establishment of fish marketing association in the zone due to their roles in providing new ideas, good prices to both buyers and marketers. It was recommended that government/ non-governmental organizations (NGOs)/philanthropies needs to support the fish farmers/marketers in the innovation system and the public/government partnership should also provide security to tackle the problem of insecurity/insurgency in the innovation system and Mubi zone at large.

Keywords: Role, Actors, Innovation system and Mubi zone

Introduction
Agricultural innovation systems are a set of agents that jointly and/or individually contribute to the development, diffusion and use of agriculture-related new technologies which directly or indirectly influences the process of technological change in agriculture by improving its productivity (Tugrul and Ajit, 2002) [9]. Marketing of fresh fish passes through several market linkages and exchange points before they reach the final consumers. The marketing system and structure is one of the main circumstances of socio economic condition of the local people and production system of any area (Alam, *et al.*, 2010) [2]. It is a chain of different systems involved in marketing from production to consumption with intra and inter-linkages. At various stages in the marketing chain, fish has to be packed and un-packed, loaded and un-loaded to meet consumer demand. Each handling cost will not amount so much but the sum total of all loading can be significant, depending on the length of chain (Ali, *et al.*, 2008) [3]. An innovation actor is a person or group of persons who introduce and uses new/existing knowledge through a process that entails seeking information from various sources and integrating elements of the information into social or economic practices in a way that changes the behavior and practices of individuals, organizations or society Spielman *et al.* (2010) [8].
Innovation system study identifies the actors involved in fish marketing, determines their roles and gives an understanding of how they interact to generate, share, transfer knowledge and adopt new ideas so as to improve marketing performance. Innovation system brings about social interaction where different actors collectively introduce a new idea or improve on an existing idea. However, in Mubi zone, such collective interaction among actors particularly in the fisheries sub-sector has not been identified, rather, focus of previous studies has been on the economic aspect of fish productivity and marketing, hence, the need for this study.

Methodology
The study was carried out in Mubi Zone. It lies on latitude 9° 00' N to 11° 00' N of the equator and longitude 13°00 'E to 14°00'E of the green which meridian with a total land mass of 506.4Km^2 and a population size of 682,026 people (Census 2006). Mubi Zone is bounded with Borno State, Hong and Song, LGA and the republic of Cameroon to the North, West and East. The zone has a tropical climate which is determined by the movement of the Inter Tropical Convergence Zone (ITCZ), as well as the effect of relief (Ray, 2017) [7]. Rainfall begins in April, progressing and reaching its peak in July/August and stops most of the time in October. Average annual rainfall ranges between 998 mm and 1,262 mm. The areas just below the Mandara Mountains record the highest rains; rainfall intensity is high with rainy days making up to 87 % of the days with more than 20 mm of rainfall (Ray, 2017) [7].

Primary data was the main source of data collected with the use of well-structured questionnaire administered to 96 respondents on the role of actors in fishery marketing innovation system. Purposive and simple random sampling techniques were used for this study. Only fish rearers/breeders and marketers were selected for the study from the five (5) LGAs. But the major areas of concern were Mubi North, South, and Maiha LGA because of their relative importance in fish production and marketing. Descriptive statistics was used as analytical tool for the study. The tools include means, frequency distributions and percentages.

Results and discussion

Distribution of Actors according to their Major Roles in Fish Marketing Innovation System

The result presented in Table 1 shows the multiple responses distribution of actor's roles in fish marketing innovation system. It revealed that majority of respondents played the role of training man power, (32.09%), followed by production and sales of fish (20.52%), training other actors (18.66%), seeking government/private sector intervention (7.83%), technology generation (6.72%), dissemination of generated technology (5.97%), supply of fund and credit facility (5.60%), and others (2.61%) which is the lowest in the study area.

Table 1: Distribution of actors according to their major roles to fish marketing innovation system

Roles	Frequency	Percentage (%)
Training Man Power	86	32.09
Training of other Actors	50	18.66
Technology Generation	18	6.72
Dissemination of Generated Technology	16	5.97
Supply of Fund and Credit Facility	15	5.60
Seeking Government/Private Sector Intervention	21	7.83
Production and Sales of Fish	55	20.52
Others	7	2.61
Total	268*	100

***Source*:** Field Survey, 2019.
*Multiple Responses

Role of actors in fish marketing innovation system

The results in Table 2 below revealed the activities of actors in the study area. The result revealed that those involved in production and sales of fish to consumers played the role of training man power, production and sometimes selling of fingerlings to farmers/producers. Fish Marketers only were found to perform the role of sales of fish to consumers and training of other actors (such as new and young marketers) in various disciplines. It was also found that they set and transfer new price information. This suggests that, after training, such man powers are absorbed in various sectors to become part of the actors in the system. It further implied that they provided information to all other actors in the innovation system. This is in line with the findings of Madugu *et al.* (2019) [5] who observed that marketers perform the role of training other actors and price setting in cattle marketing innovation system of Adamawa State. They further observed that cattle marketers provide marketing information such as new market outlets (to other marketers and union members) where better value can be obtained for their product.

Fish Feed Millers play a major role in production and supply of feeds to farmers/producers while Fish drug dealers supply them with drugs, minor diagnosis and treatment services. Transporters perform the role of transporting fish to another location over short or long distances. They further perform an overlapping role with marketers, implying that some members of the transport association were either marketers or service providers. Extension agents were found to play a major role of disseminating generated technologies to others actors in the innovation system, organizing awareness campaign, door to door visit and demonstration, provision of information to all other actors in the innovation system. This study is in agreement with that of Spielman *et al.* (2010) [8] and Madugu *et al.* (2019) [5]. Research institutes play a major role of generating new ideas (innovation) and training manpower in various disciplines. Lastly government agencies (AADP) was found to provide and establish policies that can improve the system, they provide government intervention programmes, furthermore, the Government sometimes provides funds through such agencies for awareness campaigns about new technologies and subsidies for agricultural inputs as reported by Madugu, *et al.*, (2019) [5].

Table 2: Distribution of Actors Role in Fishery Marketing Innovation System

Actors Roles
Fish Marketers - Training man power
- Training of other actors - Sales of fish to consumers
Fish Farmer/Producer - Training man power - Training of other actors - Dissemination of generated technology - Production and sales of fish
Fish Seed Miller - Training man power

- Training of other actors - Supply of feeds to farmers/producer	
Fish Drug Dealer - Training man power - Training of other actors - Dissemination of generated technology - Supply of drugs to farmers/producers	
Transporter - Transporting fish to another location - Provision of means of transport to - Move fish to another location	
Extension agent - Disseminating generated technologies -Organizing awareness campaign -Door to door visit and demonstration - Provision of information to all othe actors in the innovation system	
Research institutes - Generating new ideas (innovation). -Training manpower in various disciplines	
Government agencies (AADP)	-Establish policies that help to improve the innovation system. -Seek and provide intervention programmes - Sometimes provide funds for awareness campaigns, new technologies and subsidies.

***Source*:** Field Survey, 2019.

Challenges of Fishery Marketing Innovation System in Mubi Zone

The result presented in Table 3 shows the problems affecting fishery marketing innovation in Mubi zone. The results revealed that, the major problem of fishery marketing innovation system in the study area was poor access to capital (35.42%) which was as a result of inadequate sources of finance and collateral before obtaining loan, this was ranked the first and most severe problem in the system which implies that respondents had little access to capital which most of the time comes from NGOs and loan from commercial banks. However, insecurity/insurgency (32.29%) was ranked second most severe problem, this has forced actors to stay away from their marketing activities and also to protect their lives and properties which is in line with the findings of Awortu (2015) [4] and Adejumola and Tayo-Olajubutu (2012) [1] whom in their studies observed that Boko Haram insurgency had destroyed lives, properties and businesses in northwestern Nigeria, this have instilled fear and have prevented marketers from actively participating in marketing activities and carrying out marketing functions, thus, reducing interaction in the innovation process. Inadequate personal Capital to start up the business (11.46) ranked third in the innovation problems by limiting the operation and expansion of marketing activities in the study area, the problem of poor access to information and low participation in innovation process (2.08%) were ranked 7th and 8th respectively. This might be because most actors operate as individuals and not as union or association members, thus decisions might not taken collectively.

Table 3: Challenges of Fishery marketing Innovation System in Mubi Zone

Problems	Frequency	Percentage (%)	Rank
Poor Access to Capital	34	35.42	1st
Insectuity/Insurgency	31	32.29	2nd
Inadequate personal Capital	11	11.46	3rd
Unfavorable Gout Policies	7	7.29	4th
Low Literacy Level	5	5.21	5th
Competition with other Actors	4	4.17	6th
Poor Access to Information	2	2.08	7th
Low Participation in Innovation Process	2	2.08	8th
Total	96	100	

***Source*:** Field Survey, 2019.

Conclusion and recommendations

The key actors in fishery marketing innovation system in Mubi zone are fish Producers/breeders, fish marketers, fish drug dealers, feed millers, extension agents, research institutes etc. These actors perfumed the role of supplying fish to consumers, training man power, training of other actors, supply of feeds to farmers/producer, supply of drugs to farmers/producers, Technology generation, dissemination of generated technology and supply of fund and credit facility. The major problems affecting of fishery marketing innovation system in the study area were poor access to capital, insecurity/insurgency and inadequate capital respectively. Therefore, there is need to encourage establishment of fish marketing association in the study area because of their roles in providing new ideas and good prices to both buyers and marketers so as to improve the innovation system and there is also need for government/Non-governmental organizations (NGOs) and individual philanthropies to support the fish farmers/marketers in the innovation systems by providing

loan/credit/finance facilities. It is also recommended that security of lives and properties should be provided by both general public and government to tackle the problem of insecurity/insurgency in Mubi zone. This will allow actors to freely participate in marketing activities and in the long run improve the economy of the system.

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