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Characteristics of Capture and Culture Fishery Production in Kainji Lake Basin, Nigeria

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Abstract

The study analysed capture and culture fish production in National Institute for Freshwater Fisheries Research (NIFFR) adopted villages in Kainji Lake Basin, Nigeria for the year 2020. A total of 170 respondents from 300 respondents in NIFFR-adopted villages were selected through a random sampling technique. Data for the study were collected through a structured interview schedule. Data collected were analysed using descriptive and inferential statistics (Percentage, Mean, standard deviation and Regression analysis). Results revealed that almost half (44.1%) of the respondents were involved in capture fishery while 32.4% were involved in both capture and culture fish. Respondents output mean for captured cat fishes were ($\bar{x}$ =1414.36), tilapia ($\bar{x}$ =1000.29) and lates ($\bar{x}$ =600.83), while culture catfish was ($\bar{x}$ =515). It was also observed that 29.4% of the respondents involved in fish culture practices had better income than 9.4% who only rely on capture fishery. The study showed that capture fishery formed the main occupation of people and produce the highest number of fish marketed in the study communities. The government at all levels should assist fishers financially to practice fish farming and do more in regulating fishing activities on the water bodies to sustain capture fisheries.

Introduction

Fish culture involves raising selected fishes in an enclosure environment with adequate management and supervision for economic benefits. It requires deliberate human effort such as pond construction, pond fertilization, stocking, feeding and pond management. Fish Capture is the exploitation of aquatic organisms from the natural water bodies such as seas, lakes, reservoirs, rivers and streams among others (Retrieved from: https://nptel.ac.in/courses/120108002/8). Global capture fisheries production in 2018 reached a record of 96.4 million tonnes, an increase of 5.4 percent from the average of the previous three years while aquaculture fish production reached 82.1 million tonnes (Food and Agriculture Organization of the United Nations 2020). In China, An estimated 59.51 million people were engaged (on a full-time, part-time or occasional basis) in the primary sector of capture fisheries (39.0 million people) and aquaculture (20.5 million people) in 2018 (F.A.O 2020).

In the past decades, aquaculture has received attention and been on the increase in Nigeria till 2016 when started decreasing. In the year 2011, the production was (221,128tonnes), (2012; 253,898tonnes), (2013; 278,706tonnes), (2014; 313,231tonnes), (2015; 316,727tonnes), (2016; 306,767tonnes), (2017; 296,191tonnes), (2018; 291,323tonnes), (2019; 289,543tonnes) and Capture fisheries (2011; 635,486tonnes), (2012; 668,754tonnes), (2013; 721,355tonnes), (2014; 759,828tonnes), (2015; 710,331tonnes), (2016; 734,731tonnes), (2017; 916,283tonnes), (2018; 878,155tonnes) and 825,013tonnes in 2019 (NBS, 2017) (Obasi and Adeoye 2022). Capture fisheries account for 75% (97, 49, 238Mt) and aquaculture fishery contributed the remaining 25% (32, 33, 717Mt) with an assumption that by 2023 the gap between the aquaculture and capture fisheries will be about 40% (Obasi and Adeoye 2022). The distribution pattern between fish production in capture fishery and aquaculture fishery shows that capture fishery still remains the highest producer of fish in the fishery sector. Despite the contribution of aquaculture to the fisheries subsector, a large amount of the fish supply comes from the capture fisheries. This affirms the findings of Oladimeji (2018) that artisanal fishery is still an engine of economic growth in both the micro and macroeconomics of the fishery sector in Nigeria.

Capture fishery is the main occupation that sustained the livelihood of people in riverine communities of Kainji Lake basin, Nigeria. Oladimeji (2019) also reported that artisanal fishing is the main source of livelihood for those residing in riverine communities. Over a few decades, pond culture has been seen as a main tool or alternative to bridge the gap between demand and supply to ensure a sustainable fishery. Therefore, fish culture has been growing rapidly, especially in the Kainji lake basin, Nigeria which could be attributed to the deliberate research effort of the National Institute for Freshwater Fisheries Research (NIFFR) in the area. Moreover, in order to meet the challenges of fish demand in Nigeria, all sectors contributing to fish production need more attention. This is evident as aquaculture has been given more attention in recent times at the expense development of artisanal fishers in which only culture fishery cannot supply all the raw materials and nutritional requirements for both industrial and domestic use respectively, therefore, less emphasis on artisanal fishery will do us more harm than good. Thus, this study examined the level of production of capture and culture fishery in NIFFR-adopted villages with recommendations on how to bridge the gaps between the two by scaling up the production.

The study examined capture and culture fishery production in NIFFR Adopted Villages in Kainji Lake Basin, Nigeria. Specifically, the study:

- identified aspects of fisheries respondents are involved in
- ascertain respondents' output level in capture and culture fishery
- determine the value of capture and culture fish produced in the study area

Methodology

The study was carried out in NIFFR-adopted communities in Kainji Lake Basin, Niger State, bounded on the south of Niger State and north of Kebbi State, Nigeria. Simple random sampling was used to select five villages (Monai, Mussawa, Tunga Alh. Dambaba, Cover Dam, and Malale) from 10 villages at 50% to make a total number of 170 respondents from 300 respondents that are more involved in both capture and culture fishery production in NIFFR-adopted Villages. Data were collected through a structured interview schedule containing both open and closed-ended questions. Data collected were analysed using descriptive statistics such as percentage, mean and standard deviation while regression analysis was used to ascertain the contribution of selected independent variables to respondents' output level.

Results and Discussion

Aspects of Fisheries Respondents are Involved

Figure 1 shows the fisheries aspect of the respondents. A larger proportion (44.1%) of the respondents were caught from the wild (capture), 32.4% were involved in both capture and culture fish, while 20.6% and 2.9% were into marketing and fingerlings production respectively. This implies that capture fishery formed the primary and main livelihood occupation of the respondents which could be traced to the fact that fishing has been the aged occupation of the people in the area. Another reason may be due to the accessibility and availability of various aquatic organisms in the natural water bodies. This finding corroborates the finding of Lisbdnet (2022) that the river provides a habitat for many aquatic species such as fish varieties, hippopotamus, crocodiles, sea cows and birds. However, as capture fisheries become unsustainable due to the decrease of fish in natural stock, respondents are diversifying to fish farming and other aquaculture value chain as alternative livelihoods other than fishing to generate more income.

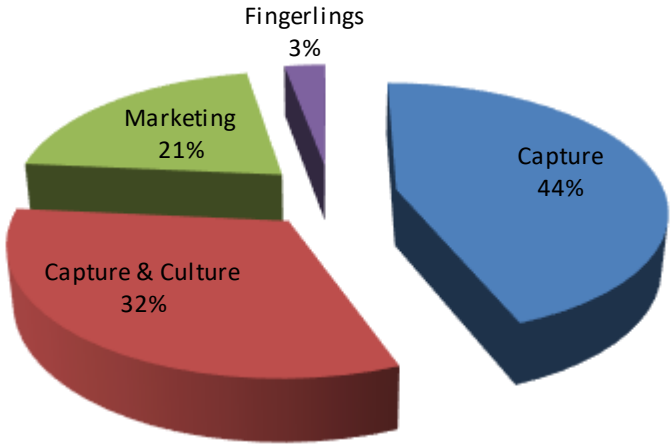

Figure 1: Fisheries Aspect

Quantity of cultured and capture fish

Table 2 shows the year 2020 respondents' average quantity of captured cat fish (58,150kg), Tilapia (28,025kg), Lates (18,000kg) and other fish species (1,270kg), while culture catfish output was 43, 775kg. This implies that the catfish species is the most captured and cultured fish in the area, which could be due to its acceptability, adaptability and ability to tolerate unfavourable environment. This is in agreement with the study of Omeje, Achike, Arene, Faleke, Manuwuike and Usman (2021) that catfish has no form of religious or cultural norms prohibiting its consumption in Nigeria, making it a generally acceptable fish in Nigeria. Furthermore, practicing fish farming (cultured fisheries) is characterized by high capital that limit production, which gives way to increasing activities in wild-captured fisheries in the Kainji lake basin. This is supported by the work of Achoja (2020) that due to extremely high cost of inputs and inadequate capital, fish farmers, like other farmers in the agricultural sectors need external funding such as cooperative loan for the development of aquaculture.

Table 2: Quantity of cultured and capture fish

Fish type	Average Qty (kg)/year	Min.	Max.	Mean	SD
Capture					
Catfish	58,150	210	3000	1414.36	956.58
Tilapia	28,025	35	4000	1000.29	1447.02
Lates	18,000	170	1500	600.83	468.69
Others	2,750	150	150	150	0.00
Total	**106,950**	**565**	**11650**	**3165.84**	**2872.29**
Culture					
Catfish	43,775	100	1600	515	431.42
Total	**43,775**	**100**	**1600**	**515.00**	**431.42**

Source: Field Survey 2020

Value of Fish Marketed

The monetary value of fisheries activities (capture and culture) in the study area is shown in Table 4. The average annual monetary value of different species of fresh fish market in the area was (Captured cat fish = #34,890,000), (Lates = #10,815,000), (Tilapia = #8,407,500), (Other captured fish species = #762,000) and (Cultured cat fish = #28,453,750). This shows that most of the respondents rely on capture fishery. This is obvious in the total amount (#44,829,000) of fresh fish captured and marketed in the area. Also, the study finds out that the continuous decline in capture fisheries and increase in demand for fish in Kainji Lake Basin has contributed to the growth of the fish farming business in the area. This is in support of the findings of Nwabeze, Faleke, Tanko and Malgwi (2019) that the continuous decline in capture fisheries of the Kainji lake basin paved way to the cultured fish business in the area. However, the monetary value recorded in culture fisheries in the area was low, despite the effort of NIFFR to improve fish farming production and their standard of living. This could be attributed to the poor attitude and economic status of the respondents to diversify to aquaculture and other agricultural enterprises in the area.

Table 3: Value of fish marketed

Capture and Culture fishery Activities	Annual Income (#)	Mean	SD
Capture			
Cat fish	34,890,000	4,025,000	3746240.58
Lates	10,815,000	1, 605,000	1556620.69
Tilapia	8,407,500	800,700	667600.02
Other species	762,000	15,000	139000.00
Sum	**44,829,000**		
Culture			
Catfish	28,453,750	11,484,583	10670121.42
Sum	**28,453,750**		

Source: Field Survey 2020

Factors affecting output level

An R^2 value of 0.702 indicates that 70.2% of respondents' output can be explained by the selected independent variables. Table 4 reveals that independent variables that significantly contributed to respondents' output level were age (β= 0.597), household size (β=-0.525), experience in fishery (β= 0.747) and constraints (β=-0.557). The result implies that the aforementioned variables predicted the output level of fisher folks in the study area. Therefore, respondents' output level could be affected by their age, number of household members, years of experience in fishery and problems faced in the fishing activities. This was so by the fact that the older the fishers, the lower the output level. Furthermore, Farmers with more years of experience are well informed and carry out their duties efficiently. This is supported by the findings of Yuni, Aziz and Rahim (2020) that age, experience, number of dependent family members and fishing time significantly contributed to income earned by fishers.

Table 4: Factors affecting output level

Variables	β	t
Constant		3.652
Age	0.597	5.022*
Household size	-0.525	-4.614*
Experience in fish farming	0.747	5.437*
Constraints	-0.557	-4.811*

*P≤0.05. R= 0.838, R^2=0.702, Adjusted R square= 0.653, Std. The error of the Estimate = 1.34594

Conclusion and Recommendations

The domestic level of fish production has not met its demand. Capture fishery formed the main occupation of people and produce the highest fish marketed in the study communities. To boost fish production in Nigeria, fish culture has to be encouraged without neglecting the development of capture fishery. Therefore, more attention needs to be given to fish farming in these communities as natural stock is depleting every day. The government at all levels should also assist people financially to practice fish farming and do more in regulating fishing activities on the water bodies to sustain capture fisheries.

References

Achoja, F.O (2020). Determinants of credit rating of cooperative fish farmers: Evidence from Delta State, Nigeria*. Journal of agriculture and food environment, 7(2) Pp 45-57*

Capture of Fisheries. Retrieved 15th December 2022 from: https://nptel.ac.in/courses/120108002/8

Food and Agriculture Organization of the United Nations (2020). The State of World Fisheries and Aquaculture 2020. Sustainability in action. Rome. Retrieved 15th December 2022 from: https://doi.org/10.4060/ca9229en

Lisbdnet (2022). What animals live in rivers? Retrieved from: https://lisbdnet.com/what-animals-live-in-rivers

Nwabeze, G.O., Faleke, S., Tanko, M and Malgwi, Y.Y (2019). Strategies Use by Smoked Fish Marketers in Kainji Lake Basin, Nigeria. *Journal of Agricultural Extension Vol.23 (1), Pp 54-65*

Obasi, E.U and Adeoye, R.L (2022). Empirical study of capture fish production in Nigeria. *International Journal of Fisheries and Aquatic Studies Vol. 10(4), Pp 61-65*

Oladimeji, Y. (2019). Livelihood Diversification among Artisanal Fishery Households in North-Central and North-Western Nigeria. *Ethiop.J.Appl.Sci. Technol. Vol.9 (1): 46-59*

Oladimeji, Y. (2018). Assessment of Trend of Artisanal Fish Production in Nigeria Vis-a-Vis Implications on Economic Growth*. Nigerian Journal of Fisheries and Aquaculture 6(1): 37 – 46.*

Omeje, J. E., Achike, A.I., Arene, C.J., Faleke, S. A., Manuwuike Q.C. And Usman, G.A (2021). Socio-economic determinants of net-income in fish farming in Kainji Lake Basin, Nigeria*. Global Journal of Agricultural Sciences vol. 20, Pp 53-61*

Yuni, H., Aziz, S and Rahim, H (2020). An analysis of fisher household economic behaviors in Gorontalo City. *Journal of Riset Pengembangan Ilmu Pengetahuan vol. 20, (1).*