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Analysis of Emerging Economic Incentives for Fisher Folks from Dredging of the Niger River in Niger State, Nigeria

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Abstract

This study examined the socio-economic impact of the Lower Niger dredging *vis-à-vis* the anticipated socio-economic incentives on the fisher folks' community in Baro, Niger state Nigeria. A simple random technique was used to select 60 fisherfolks using a well-structured questionnaire. Data obtained were analyzed using descriptive and inferential statistics. Result indicated a net increase of N2, 965.00 (USD 18.53) per month in the gross margin of the fisher folk and a marginal increase of N174.96 (USD 1.08) per after the dredging activities. This could be due to the increase in socio-economic livelihood activities brought about by enhanced accessibility of the community and more robust inland water way transportation. Conversely, it was discovered that some fish species no longer exist after dredging and 43.3% of the fisher folks spent above 10 hours per day to make a substantial catch after dredging compared with 13.3% of the same fishing time before dredging. It was however concluded that, although, the dredging project include both positive and negative impacts, the negative impacts are short-term and could be minimized if appropriate mitigation measures such as erosion and turbidity control, provision of water shed where fish nurseries would be raised, provision of adequate fishing gears and training on new fishing techniques as well as value additions to fish product are put in place.

Keywords: *Baro, Impact Assessment, Dredging, River Niger, T-test*

Introduction

Nigeria is blessed with huge natural water resources of over three thousand (3,000) kilometres of inland waterways. In addition, she has a coastline of 853 Km bordering the Atlantic Ocean in the Gulf of Guinea, a maritime area of 46,300km between 0-20m depths and an Exclusive Economic Zone area of 210,500 km2 (Tobor, 1993). This water resource plays a key role in the country by serving as a source of livelihood for many farmers, fishers and herders, as a transportation route in areas that are otherwise poorly connected and as a source of energy to generate hydropower electricity.

The vast inland, brackish and marine bodies of water are home to numerous fin and shell fish resources. Fishery resources represent the foci of the livelihood activities of villages along the banks of the river Niger. Fishery activities are executed through two main methods in Nigeria namely artisanal or capture fishery and fish farming or aquaculture. Artisanal fishery is the harvesting of fish from rivers, streams, lakes and ponds by small scale fishermen using both traditional and modern fishing gears. It is the most important of fishery production in Nigeria and accounts for over 90% of her fishery production (Ogunbadejo *et al*., 2007).

In Nigeria, there are more than 6 million coastal and riverine artisanal fisher folks along the 46,300Km^2 of maritime area and 125, 470.82km2 of inland water bodies. They contribute 85% of domestic fish consumption in Nigerian (Fish for All Submit, 2005). Artisanal fishing is not a full-time activity, but rather it is integrated with farming and other activities. In many cases, fishing is vital to the livelihood of those engaging in it and provides high quality food and employment to others through the market system. (Aquaculture and Inland Fisheries Project Newsletter, April 2004). In general, aquaculture has been one of the major economic activities in the coastal areas. But, the development of aquaculture within the mangroves and swamps however is handicapped by poor drainage and high salinity of the soils, which are both difficult and expensive to control. Also, the transportation of fish and fish products over the water has been difficult.

Given the importance of the lower River Niger to the country, the federal government, sometimes before February 1999, the (then) Petroleum Trust Fund (now the Ecological Fund) initiated a project to dredge and maintain a navigation channel of about 573 km in the Lower Niger River from Baro to Warri. River dredging refers to the removal of soil or other materials from the bottom of a river, lake, or ocean harbour (Brain, 2009). The materials removed from underwater are called spoil. Dredges are used to deepen and/or widen waterways, to facilitate navigation, provide fill material for raising submerged land above water, build dikes or prepare for the

installation of underwater foundations, as well as to dig up underwater deposits of precious metals or valuable marine life (Doifie-Ola, 2005).

Hence, the dredging of River Niger was aimed at reducing the environmental impact on the River, Niger, open up the hinterland and ease the human and goods transportation. In view of the foregoing, the study was carried out to describe the socio-economic characteristics of the fisher folks, examine the cost and returns of the fisher folks before and after the dredging of the river and to analyze the impact of the dredging of the river on the livelihood of the fisher folks in the study area

Methodology

Study Area

The study was carried out in Baro town, Niger State, Nigeria. Baro is located in the west central part of Nigeria; Originally Baro was a small village of the Nupe people, selected by the British as Nigeria's link between rail and river transport used for loading river craft with Northern Nigeria's cotton crop. However the Baro-Kano line is no longer in use because another railroad was built farther north. Agriculture (fishing and farming) is the major occupation in the town with most of the farmers cultivating mainly.

Sampling Technique

The town was purposively selected because of the proximity to the Niger River and due to the extent and degree of dredging. Also, Baro town is one of the important areas covered by the dredging activities (of the Lower River Niger) and it is predominantly dominated by fisherfolks. Baro town is divided in to two communities namely Baro and Baro Esun. The list of fishermen in these communities formed the frame from which a sample of 30 fisherfolks was randomly selected from each of these two communities making a sample size of 60 fisherfolks.

Source of Data

The data collected was tailored to get adequate information on the objectives. Data used for this study were obtained from primary and secondary sources. The primary data was a cross sectional data obtained through the administration of a set of structural questionnaire, observation and focus group discussions. The information sought included educational background, family size, fishing inputs, revenue from fish and so on. Focus group discussion was used to obtain general view of the community.

Methods of Data Analysis

The tools used in this study were descriptive statistics, and gross margin analysis. Descriptive statistics such as mean, percentage and frequencies were used to describe the socio-economic characteristics of the fisher folks and the cost benefit and gross margin analysis were used to examine the cost and returns of the fisher folks before and after the dredging of the river. The cost benefit and gross margin analysis were used to determine the cost and expenses incurred during production as well as the profitability of the business before and after the dredging. The costs include costs of fuel, repairs, and bait, line, hooks, spare parts etc. The benefits refer to the revenue, which help farmers achieve their objectives of a project. In this case, the benefit is the returns/profit from the enterprise before and after the dredging project. The profit was calculated according to Arene, (2002) as

$$\Pi = TR - TC$$

Where:

Π = Net Profit (Net farm income), TR = Total Revenue, TC = Total Cost

Gross margin is the difference between total revenue and total variable cost (TVC). Since the interest of the researcher is on the short-term run cost and revenue, the fixed capitals is not included in the computation of gross marginal analysis. Total gross margin was also obtained based on the method outlined by Arene, (2002). This was computed for both before and after the dredging project.

$$GM = \frac{\sum TR - \sum TVC}{\text{One month}}$$

Where: GM = Gross Margin, TR = Total Revenue, TVC = Total Variable Cost.

T-test was employed in this study to analyze the impact of the dredging of the river on the livelihood of the fisher folks in the study. Mean incomes of fisher folks before and after the dredging of the River after being determined by gross margin analysis were therefore compared using T-test.

Results and Discussion

The socio-economic characteristics of the fisher folks are shown in Table 1.

Table 1: Socio-Economic Characteristics

Variables	Frequency	Percentage
Age		
Below 30	4	6.7
30 – 39	28	46.6
40 – 49	16	26.7
Above 49	12	20.0
Total	60	100.0
Sex		
Male	40	66.7
Female	20	33.3
Total	60	100.0
Household size		
Below 5	16	26.7
5 – 10	32	53.3
Above 10	12	20.0
Total	60	100.0
Education		
No education	8	13.3
Quranic education	4	6.7
Primary education	8	13.3
Secondary education	12	20.0
Post secondary education	28	46.7
Total	60	100.0
Fishing experience (in years)		
Below 10	2	3.3
10 – 19	28	46.7
20 – 29	20	33.3
30 – 39	2	3.3
40 – 49	4	6.7
Above 49	4	6.7
Total	60	100.0
Secondary Occupation		
Farming	18	30.0
Teaching	12	20.0
Trading	17	28.3
Drivers	4	6.7
Hunting	5	8.4
Boat/Net making, repairs	2	3.3
Herbal Doctor	2	3.3
Total	60	100.0

Source: Data Analysis, 2012

Male respondents had a frequency of 40 representing 66.7 % while 33.3% of the respondents were female. Mean and median age is 39 years, and a modal age of 40. The youths below 40 years participated most actively in fish production and accounted for 53.3% of the respondents. Majority of the respondents, 93.3% are married with an average household size of 9. With 55.5% having a size of 5 -10 The figures in the Table 1 also show that most of the fisher folks, 46.7% had post secondary education while 13.3% had no form of education. The overall picture is that 86.7% of the fisher folks attended one level of education or another so, they would be able to understand the effects of the dredging to the fishing activities. It was observed that the fishermen engaged in other occupations as well as fishing. These activities/occupations are carried out when fishing is low, when the river is not conducive for fishing. The study showed that 30.0% of the fisher folks engage in farming. This may be due to the presence of arable farmland. Also, 28.3% of fisher folks were traders, probably becomes the dredging activities opened up new markets. Teaching, hunting, etc were other sources of income for the fishermen. Table 1 also shows that the fisher folks started the enterprise at a very early age. Out of a total sample of 60 respondents, 46.7% had fishing experience of 10-19 years while 33.3% had 20-29 years of experience. The average years of fishing experience is 21 years. Table 2 shows the costs and returns to fisher folks per month before and after the dredging project.

Table 2: Costs and Returns to Fisher Folks per Month before and after Dredging

Items	Before (N)	After (N)
Canoe	6008.33	6008.333
Cost of fish line	541	855.33
Hook	222.33	553.33
Cost of cast net	292	406
Cost gears	3150	3150
Engine cost	66583.3	66483.33
Cost of spare parts	2644	4774
Total fixed cost	**79441**	**82230**
Depreciation cost (*at 5 years with salvage value=0)*	**15888**	**16446**
Fuel and Oil	3966.67	11813.33
Bait	449.17	17211.67
Repairs	1233.33	3555.33
Total variable cost	**21537**	**49026**
Total cost	**100978.3616**	**131257**

Sales	106833	135583.3
Gifts	816.67	1473.33
Family consumption	2486.67	3533.33
Total revenue	**110136.64**	**140590**
Gross margin	**88599**	**91564**
Net income	9158.28	9333.242

Source: Data Analysis, 2012

From Table 2, the gross margin of N88599 and net enterprise income of N9158.28 were obtained before the dredging project while the gross margin of N91564 and net income of N9333.24 were obtained after dredging. This shows that more income is earned after the dredging project which may be due to the increase in population of the community. It may also be because the community has been opened up due to the dredging project.

The hours spent in fishing per day before and after dredging are shown in Table 3.

Table 3: Hours Spent in Fishing per Day before and After Dredging

Variables	Before Frequency	After Frequency
Below 5	23 (38.3)	10 (16.7)
5 – 10	29 (48.3)	24 (40.0)
Above 10	8 (13.3)	26 (43.3)
Total	60 (100.0)	60 (100.0)

*Figures in parenthesis ( ) are percentages

Source: Data Analysis, 2012

Table 3, indicates that the majority of the respondents, 48.4% spent 5-10 hours in fishing before the dredging but 43.3% spent above 10 hours after dredging. This may be because dredging project has affected the adopted fishing methods of the fisher folks, thereby increasing the number of hours spent in fishing. It may also be due to the reduction in the fish density caused by the increase in turbidity during dredging. The t-test of the fisher folks is shown on Table 4.

Table 4: T-test of the Fisher folks Annual Fishing Mean Income

	Mean Income	Standard Error
Before	85090	1916
After	99398	2838

T-test = 4.1779
P = 0.01

Source: Data Analysis, 2012

Table 4 shows the T-test with a value of 4.1779 and a significance of 0.01 showed that dredging was significant. Hence, the dredging of the river has impact on the livelihood of the fisher folks in the study area

Conclusion

It was observed that most of the fisher folks started the enterprise at a very early age. But, farming, trading and teaching, were other major sources of income apart from fishing. Also, the fisher folks earned more returns after the dredging project than was earned before the project. However, more time was spent in fishing/day after the dredging than before. These may be because dredging project has affected the adopted fishing methods of the fisher folks, thereby increasing the number of hours spent in fishing. It may also be due to the reduction in the fish density caused by the increase in turbidity during dredging. The negative effects of the dredging project include the destruction of farmland, reduction in fish-catch and erosion, positive impacts include the creation of jobs, increased sales, easy transportation and the provision of social amenities.

However, although, dredging project include positive and negative impacts, the negative impacts are short termed and coupled with the fact that the positive impact outweighed the negative impacts. The negative impact could be minimized if certain mitigation measures are put in place and the positive impacts are well harnessed.

Since the dredging project affects the fish-catch and time spent in fishing, Government should provide adequate fishing gears and training on new fishing techniques to improve the fish catch. Measures should also be put in place to reduce the turbidity of the water which also affects the fish catch.

Also, the riverbanks should be properly managed. Installation of floodgates and other erosion-control devices and the re-vegetation of the riverbanks are necessary mitigation measures needed to control the destruction of farmlands and erosion. The river deposits from the dredging activities should also be cleared.

Finally, there should also be continuous and proper maintenance of the project to prevent further silting of the river.

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