Short Note [Nota Corta]

ANALYSIS OF CONSTRAINTS TO AQUACULTURE DEVELOPMENT IN SUDANO-SAHELIAN REGION OF NIGERIA

[ANALISIS DE LAS LIMITANTES PARA EL DESARROLLO DE LA ACUACULTURA EN LA REGIÓN SUDANO-SAHELI DE NIGERIA]

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SUMMARY

The study was carried out to examine constraints to fish farming in Sudano-sahelian region of Nigeria. Data was collected using trained enumerators from all known and accessible fish farms in Katsina state. The findings of the research revealed that majority of the farmers (88.6%) were male, they are all married, and larger proportion (45.7%) is between 50 and 59 years of age, with 31.7% having postgraduate education, but majority of them (62.9%) are less than 5 years in the business. Analysis of constraints showed that disease infestation (51.5%), water quality (54.4%), Technical expertise (71.4%), high cost of feeding (94.3%), feed quality (57.1%), market availability (60%), inadequate capital (88.6%), and fish seed (62.9%) are constraints to aquaculture development in the region. Among the listed constraints, disease infestation, high cost of feeding, technical expertise and inadequate capital are more important because they exist at a severe level, while high cost of feed and inadequate were ranked as major constraints. Therefore for any meaningful development of aquaculture industry in the region, these constraints must be resolved.

Key words: Constraints; fish farming; fish seed; feed; Nigeria.

RESUMEN

El studio se realize para evaluar las limitantes a la piscicultura en la region Sudano-Sahelí de Nigeria. La información se recabó empleando encuestadores entrenados a partir de todas las granjas piscícolas conocidas en el estado de Katsina. Se encontró que la mayoría de los granjeros (88.6%) fueron hombres, casados y con una gran proporción (45.7%) con una edad entre 50 y 59 años y 31.7% con estudios de posgrado pero la mayoría (62.9%) tiene menos de 5 años en la actividad productiva. Es análisis de las limitantes mostró que las enfermedades (51.5%), calidad del agua (54.4%), asistencia técnica (71.4%), costo elevado de los alimentos (94.3%), calidad del alimento (57.1%), comercialización (60%), capital reducido y crías de peces (62.9%) son las principales limitantes para la acuacultura de la región. Siendo las principales, las enfermedades, costo de alimento, asesoría técnica y capital debido a su nivel e intensidad. Se concluye que para obtener un desarrollo significativo de la acuacultura de la región estas limitantes deben ser resueltas.

Palabras clave: Limitantes; acuacultura; cría de peces; alimento, Nigeria.

INTRODUCTION

Aquaculture provided nearly 50 percent of the annual world fisheries production with 110 million tonnes of food fish in 2006. Half of all aquaculture production is fin fish, a quarter is aquatic plants and the remaining quarter is made up of crustacean (such as shrimp, prawn, crabs) and clam, oyster and mussels (FAO, 2007). Aquaculture is the fastest growing food-producing sector in the world, with an average annual growth rate of 8.9% since 1970, compared to only 1.2% for capture fisheries and 2.8% for

terrestrial farmed meat production systems over the same period (Subasinghe, 2005). Although aquaculture activity in Nigeria started about 50 years ago (Olagunju *et al*., 2007) it has been growing at some 20% per year since 2003 and continues to attract many investors and new farmers (FDF, 2008). In 2010, aquaculture production in Nigeria reached 200,000 metric tonnes out of total 820,000 metric tonnes of fish produced, contributing about 24.4% of the domestic fish production (FAO, 2013). Though growth in aquaculture production in Nigeria is steady but it does not seem to be even and the growth is tending to be more prominent in southern part of the country. The development in aquaculture is more prominent in the southern part of Nigeria and this is more evident in the number of fish farms in each of the region, according to AIFP (2004), South east zone 114 farms, South-south 1,028, Southwest 906, North central 443, North east 62 and North west 105. Only 7 fish farms were recorded for Katsina state despite the state having a large number (40) of dams. It is therefore necessary to study the aquaculture practices in Katsina viz a viz the developmental level and challenges militating against its developments. This study was carried out to examine the constraints towards the development of aquaculture in Sudano-sahelian region of Nigeria with Katsina State as a case study.

MATERIAL AND METHODS

Study area

The study was carried out in Katsina State, which is a very important state in the Sudano-sahelian region of Nigeria, the state lies between Latitudes 11^0 to 13^0 N and Longitudes 07^0 to 8^0 30' E (NARP 1994). The state can be classified into two zones in term of climate which are the tropical continental and semi arid continental. The southern part of the state (from Funtua to Dutsim-Ma) belongs to the former with total annual rainfall figures ranging from 1000mm around Funtua to over 800m around Dutsim-Ma. The north of Katsina State (from around Kankia to the extreme northeast) has total rainfall figures ranging from 600-700mm annually. Generally, climate varies considerably according to months and seasons. A cool dry (harmattan) season from December to February; a hot dry season from March to May; a warm wet season from June to September a less marked season after rains during the months of October to November, characterised by decreasing rainfall and a gradual lowering of temperature (Cometonigeria, 2011).

Data collection and analysis

Trained enumerators were used to collect data from all the known and accessible fish farms in the state, the data collected has two sections which are respondents' socio-economic characteristics and constraints to aquaculture. The data on constraints to aquaculture development was collected using a four point scale which included; not a constraint, not severe, severe and very severe. All the data collected were analysed using descriptive statistics, while likert scale was used to elicit the important ones among the constraints. The likert scale was done as described by Tsado *et al*., (2012), 4 = Very severe, 3 =Severe, 2 = not severe, and 1 = not a constraint. The mid points were sum up (1+2+3+4) to 10 and divided by 4 to obtain a mean of 2.5. Any constraints with cut-off of 2.5 and above is regarded as major constraint, between 1.5 and 2.4 is regarded as a minor constraint while below 1.5 is classified as not a constraint.

RESULTS AND DISCUSSION

The result of the socio-economic characteristics (Table 1), showed that majority of the respondents (88.6%) were males while only 11.4% were females, though generally fish farming is dominated by male in Nigeria but the extreme domination in the study area can be attributed to the peculiarities of the study area where the females are known to stay more indoor (Dauda and Yakubu, 2013). The age range of the respondents was between 30 and 69 years, with majority of them (45.7%) fell between 50 and 59 years while only 2.9% fell between 60 and 69 years, 28.6% and 22.8% fell between 30 – 39 years and 40 – 49 years respectively and they are all married, the respondents' age represented active working age and this tend to enhance their productivity because of their agility. Large proportion of the respondents' (31.4%) have postgraduate qualification while majority (74.3%) have tertiary education, this level of education tends to support fast growth of aquaculture development in the study area because majority of the respondents' will not have problem in learning new skills that will increase their knowledge of fish farming, they also have the intellectual capacity to search for information on their own especially at this period where the whole world is global village. All the respondents' but one is the farm owner, therefore any information they give as regards constraints facing their farms tend to be reliable because they are the highest decision maker in their enterprise. Majority of the farms (62.9%) are relatively new farms with less than 5 years in operation while a total of 80% are less than 10 years in operation. This findings supported the result of AIFP (2004), who recorded only seven farms for the whole of Katsina State, however the total number of thirty-five reported in this study as against seven in 2004, corroborated the position of FDF (2008) that stated that aquaculture has been growing steadily in Nigeria since 2003.

Table 1. Socio-economic characteristics of the respondents'

Respondents' Characteristics	Frequency	Percentage
Sex		
Male	31	88.6
Female	4	11.4
Total	**35**	**100.0**
Age		
30 – 39	10	28.6
40 – 49	8	22.8
50 – 59	16	45.7
60 – 69	1	2.9
Total	**35**	**100.0**
Marital Status		
Married	35	100.0
Educational level		
Postgraduate	11	31.4
Graduate	7	20.0
Diploma/NCE	8	22.9
Secondary school	4	11.4
Primary school	2	5.7
Quranic education	2	5.7
Non-formal education	1	2.9
Total	**35**	**100.0**
Position in the farm		
Owner	34	97.1
Farm manager	1	2.9
Total	**35**	**100.0**
Years in Operation		
0 – 5	22	62.9
6 – 10	6	17.1
11 – 15	5	14.3
16 – 20	2	5.7
Total	**35**	**100.0**

Analysis of constraints to fish farming in the study area (Table 2), revealed that disease infestation is a constraint to fish farming in the state, a total of 51.5% of the respondents agree to this though only 22.9% reported it as a severe constraint, and this can be attributed to intensive type of fish farming practiced by most commercial farms (Qi *et al*., 2009). The observation is also in line with that of Bondad-Reantaso *et al*. (2005) who noted that disease is a primary constraint to the culture of many aquatic species, impeding both economic and social development in many countries. Majority of the respondents (77.1%) noted that both pest/predator and theft are not constraint, while none of them reported pest/predator as severe or very severe constraint, 2.9% reported theft as severe so also as very severe constraints. Water availability is not also a constraint in the study area generally, 65.7% agree to this but it is a severe constraint in Dutsin-Ma local government area and this attests to presence of very few number of fish farm in the area despite her level of development. Majority of the respondents (54.4%) reported water quality as a constraint, though only 8.6% and 2.9% noted it as a severe and very severe constraint respectively. The problem of water quality can be among the factors responsible for disease infestation in farm because this in line with the position of Akinwole and Adeola, (2012) who stated that poor water quality can have adverse effect on the growth and well being of cultured fish species. Technical expertise is another major constraints as adduced to by 71.4% of the respondents, this may be due to the fact that fish farming is relatively new in the state, however only a few tertiary institutions are offering Aquaculture and Fisheries in the North-western region and hence the relative scarcity of the experts. High cost of feeding is another important constraint to fish farming, a total of 94.3% agree to it while majority (51.4%) reported it as a severe constraint, 17.1% noted it a very severe constraint. The report of high cost of feeding as a constraint is not limited to only the study area but it affects aquaculture development generally, especially in Africa, this is in line with the position of Dasuki *et al*., (2014) who stated that one of the major factors militating against the development of aquaculture in Africa is high cost of feed. Feed quality is also reported as a constraint by 57.1% of the respondents though majority 51.4% did not take it a severe constraint, a similar report was for market availability where 60% of the respondents agree it is a constraint but only 11.4% and 5.7% reported it as severe and very severe constraint. The problem of market availability can be attributed to the long age tradition of the study area with meat consumption (Dalhatu and Ala, 2010), relatively newness of fish farming industry in the study area and high cost of cultured fish. Inadequate capital is another important constraint, 88.6% of the respondents classified it as a constraint, while majority 48.6% reported it as a severe constraint, and 14.3% reported it as a very severe constraint. Problem of capital is a general problem of farming in Nigeria, as there is no agricultural loan in the real sense of it while the conventional loan is not available to farmers who have no collateral, the high rate of interest will not also make it attractable to a fish farmer. The last but not the least is fish seed whose 62.9% regarded as constraints but 60% reported as not severe. The problem of fish seed is still an important problem militating against aquaculture development in Nigeria (George *et al*., 2010,) but the country is gradually overcoming that due to development of several private hatcheries in the country in the last two decades, and overtime as knowledge increase it will be well reduced in the study area as well. The likert scale ranking revealed that only High cost of fish feed

and inadequate capital constituted major constraints while disease infestation, water quantity and quality, technical expertise, feed quality, market and fish seed availability are regarded as minor constraint.

Table 2. Constraints faced by aquaculture development in the study area.

Variable	Not a constraint (%)	Constraint (%)	Severe (%)	Very severe (%)	Sum	Mean	Overall rating
Disease infestation	17 (48.6)	10 (28.6)	8 (22.9)	0 (0.0)	61	1.7	Minor constraint
Pest/Predator	27 (77.1)	8 (22.9)	0 (0.0)	0 (0.0)	43	1.2	Not a constraint
Theft	27 (77.1)	6 (17.1)	1 (2.9)	1 (2.9)	46	1.3	Not a constraint
Water quantity	23 (65.7)	8 (22.9)	2 (5.7)	2 (5.7)	53	1.5	Minor constraint
Water quality	16 (45.7)	15 (42.9)	3 (8.6)	1 (2.9)	59	1.7	Minor constraint
Technical expertise	10 (28.6)	16 (45.7)	6 (17.1)	3 (8.6)	72	2.1	Minor constraint
Cost of feeding	2 (5.7)	9 (25.7)	18 (51.4)	6 (17.1)	93	2.7	Major constraint
Feed quality	15 (42.9)	18 (51.4)	2 (5.7)	0 (0.0)	57	1.6	Minor constraint
Market availability	14 (40.0)	15 (42.9)	4 (11.4)	2 (5.7)	64	1.8	Minor constraint
Inadequate Capital	4 (11.4)	9 (25.7)	17 (48.6)	5 (14.3)	93	2.7	Major constraint
Fish seed availability	13 (37.1)	21 (60.0)	1(2.9)	0(0.0)	58	1.7	Minor constraint

CONCLUSION

The findings of this study has established that there are several constraints militating against the development of aquaculture in the Sudano-sahelian region of Nigeria under which Katsina State fell, though the influence of this constraints may vary from not severe, severe to very severe, however they all have to be resolved before there can be a meaningful development in aquaculture industry which is an important and fastest growing food sector in the world now. Very important among these constraints are high cost of feeding and inadequate capital.

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