CONSTRAINTS TO SUCCESSFUL FISH FARMING IN ABAK LOCAL GOVERNMENT AREA OF AKWA IBOM STATE, NIGERIA

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ABSTRACT

The constraints to successful fish farming in Abak Local Government Area of Akwa Ibom State were investigated. The study area was stratified into clans with a frame survey; and a random sampling method employed to select the thirteen fish farms, with each designated farming units- from where the data were collected. Information was collected with the use of questionnaires and personal interview, transformed into data and computed with simple percentages for this work. It was discovered that despite the abundant aquaculture potentials of the study area in terms of land, local feedstuffs, good climate and perennial streams; the impact of harvested fish was yet to be felt in the area. Lack of feasibility study on sites selection, poor fish culture management methods, poor pond construction amongst others, were some of the major constraints of fish farming in the study area. However, proper feasibility study on fish farm project, site selection, knowledge of fish farm management practices, fingerling transportation from the hatchery; and a running capital are some of the measures that would remove the constraints.

Keywords: *Fish farming, hatchery, Abak local government area*

INTRODUCTION

The phrase "no farmer, no nation" entails how important and inevitable, farmers generally are, with respect to food production and the food security of any nation. It is quite obvious that food ranks first among the basic needs of man hence right from the prehistoric times, man's greatest activity on earth had been centering on food production and food security for the home. According to Mijindadi (1982), no activity so preoccupies the human race as the production, preparation and consumption of food; not even wars, love or money. This is because human beings are complex biochemical organisms that need constant fuel (food) to provide the needed chemical potential energy for the body's metabolic activities. Agriculture plays a very important role in improving the living standard of the people and remains the key to address issues of reduction of poverty, food security, natural resources management and environmental sustainability to mention a few.

While some farmers cultivate on land root crops, cereal, vegetables etc. for food; raise livestock and poultry for meat, milk and eggs as the case may be; others (fish farmers) farm for fish in water for their high nutritional components. Fish form an important constituent of human diet in supplying essential nutrients for a healthy living. The momentum of fish farming has spread tremendously across the country in recent times since its inception in 1942. Saltia (1990) reported of the presence of 5,500 fish ponds in the country; and a yield per hectare of 1.5 tons in small scale ponds and between 3.0-4.0 tons on commercial ponds.

The Federal Department of Finance (FDF) and UNDP (1992) cited in Adikwu (1999) has reported a total of 7,823 fish ponds in the country with only 92 in Akwa Ibom State. Ibru (2005) has estimated the existence of about 1.75 million ha of fresh water area; and 500,000 ha along the creeks, to be suitable for fresh water aquaculture and mariculture respectively. Presently, Nigeria's total domestic fish production stands at 640,000MT from both marine and fresh water with an effective demand of 1.6 million metric tones and a yearly fish importation of 700,000MT to cushion the supply-demand gap (Fish Network, 2009). Aquaculture contributes only about 80,000tonnes (Atanda, 2009). This production figure is too low, considering the several decades of aquacultural practices in Nigeria since 1942 and the rich potentials for aquaculture development that abound in terms of land, perennial water bodies, abundant rainfall, rich soils successful culturable species and available local feed stuffs (Ita, 1980; Essen, 2005). Whereas Ikpe (1996) has made a potential estimate of aquaculture production of 600,00 tones per annum but only 80,000 tones is produced at present. This attests to the fact that constraints are eminent. This work seeks to highlights, the constraints to successful fish farming in Abak Local Government Area in Akwa Ibom State.

METHODOLOGY

Abak Local Government Area is located in the rain forest belt of the Niger Delta region of Nigeria between longitude $07^{0}27^{l}$ 06^{ll} - $07^{0}50^{l}$ 06^{ll}E and latitude $04^{0}50^{l}$ 27^{ll} - $50^{0}50^{l}$ 90^{ll}N. It is naturally endowed with a large expanse of fertile land of clay, sandy and loamy soils. The study area has perennial streams, abundant rainfall of over 250mm per annum, available local feedstuffs that could be compounded for fish feed, a total landmass of 305 km^2 and a population of over 700,000 by 2006 census gazetted into 5 clans and 91 villages. The local government area was stratified with a frame survey into 5 clans. The sampling population was the fish farmers. The fish farms were randomly selected for the study with each designated a sampling unit.

Thirteen structured questionnaires were administered to registered fish farmers in the study area; out of which only ten were completed and returned. Personal interviews and direct observations were also used to supplement the instruments for data collection. The data obtained for the study are computed on tables, obtained the mean and expressed in simple percentage.

The absence of cultured fish in the local markets, despite the enormous aquaculture potentials that abound in the study area was what prompted this research to highlight the constraints to successful fish farming in Abak Local Government Area of Akwa Ibom State. Questionnaires, personal interviews and direct observations were used as instruments to collect information from 13 registered fish farmers in order to find immediate and lasting solutions to them, revive interests in the abandoned fish farms, as well as encourage greater productivity in fish farming business. The thirteen registered fish farmers were:

1 Get fish farm, Midim water side - Abak clan
2 Global fish farm, Ikot Obioko - Otoro clan
3 Sunday N. Ekanem's fish farm - Ikot Ekang, Abak clan
4 Loreto's Girls Juniorate fish farm -Eriam, Afaha Obong clan
5 Loreto's Girls Juniorate fish farm -Eriam, Afaha Obong clan
6 Utubro's modern fish farm, Utu Abak, - Abak clan
7 Ukpe fish farm, Utu Abak - Abak clan
8 Multipurpose community fish farm, Ibagwa - Abak clan.
9 Demark fish farm, Nto Otong - Midim clan
10 Bisa fish farm, Ikot Afaha -Abak clan
11 Elder Umoren's fish farm, Midim water side - Abak clan
12 Thaddius A. Udo's fish farm, Nto Otong - Midim clan
13 Met community fish farm, Ibagwa - Abak clan.

RESULTS AND DISCUSSION

Table 1: Summary of Responses of fish Farmers on General Information

Nature of farm operation (a) Part -time	80%
(b) Full -time	20%
Number of fish farms in the study area	32 ponds
Functional fish farm	80%
Non-functional fish farm	20%
Reasons for non-functional fish farms	
Lack of running capital	50%
Farms poor returns	10%
Inadequate extensive services	5%
Erosion threats to ponds	5%
Insufficient water supply	10%
Lack of government assistance	20%
Sex of fish farmers	
Female	10%
Male	90%
Marital status of farmers:	
married	80%
Unmarried	20%
Level of education:	
primary education	50%
Secondary	20%
Polytechnic/College	20%
University	10%
Nature of ownership of farm by:	
Inheritance	50%
Outright purchase	50%
Size range of ponds between	
10x8m (small ponds)	70%
20x30m (large ponds)	30%
Feasibility studies on fish farm: Yes	40%
No	60%
Technical/Expertise advice on site selection : Yes	20%
No	80%

Source: Survey, 2010

Table 2: Summary of Responses on Management Practices

Preparation of pond bottom before stocking:		Yes	90%
		No	10%
Stocking of recommended density		Yes	30%
		No	70%
Fish Spp stocked:	Tilapia Spp		40%
	Feather back		10%
	Catfish		15%
	Heterobranchus		15%
	Clarias		20%
Sources of fish fingerlings/procurement:		Hatchery	80%
		Wild	20%
Fish feedstuff used:	Blood meal		10%
	Poultry feed		20%
	Maize grain (ground)/fishmeal		15%
	Wheat offal		20%
	Growers marsh		30%
	Rice and bean (Kitchen waste)		5%

Sources of water supply:	Perennial stream	30%
	Bore hole	50%
	commercial water tanker	20%
Stocking period for the spp	3 -10 months	100%
Form of marketing pond fish	Fresh	100%
Marketing channels for pond fish:	local markets	80%,
	bars	10%
	restaurants	10%
Fish handling/processing methods:	Washing with water only	100%
Employment of labours to secure/manage the farm		70%
Daily routine management practices		
Feed fish, clear the dykes, check disease out		70%
Change water/check water level		30%
Satisfaction with farm output:	Satisfied	60%
	Not satisfied	30%
Reasons for not being satisfied:	Lack of running capital	20%
	High cost of feeds	20%
	Inability to pay staff	10%
	Low return from investment	10%
	Inadequate water supply/fingerlings	10%
	High rate of mortality	10%
	Poor management method	10%
	No government assistance	10%

Source: Survey, 2010

Table 3: Summary of Constraints to Successful Fish Farming

No feasibility studies on farm site selection	60%
No technical advice on fish farm operation	90%
Seepage in the pond	70%
No loan facility/Govt. aid	90%
Lack of perennial/constant sources of water supply	50%
Inadequate fingerlings supply	60%
Overstocking of ponds	60%
Not feeding fish at 5% body weight	70%
Not using device to circulate dissolved oxygen at night in large ponds	80%
Non purchase of improved fish variety by hybridization/ biomanipulation	60%
Not practicing routine maintenance/ checking of water quality parameters in the ponds	80%
No intermediate fishing or test cropping	70%
Cannibalism by shooters in the ponds	70%
Poaching in the farm	60%
Predation by wild animals/exotics	60%
Stunted growth due to proliferation/overcrowding of some spp (Tilapia)	50%
Feedings fingerling before and during transportation which is detrimental to health	80%
Not using transquilizers to calm aggressive spp when transported from hatchery	90%
Not transporting fingerlings early in the morning to minimize fish mortality	80%
Not ensuring adequate aeration of the receptable carrying fingerlings by supplying diffused air/oxygen bags	80%
High rates of mortality recorded in fish fingerlings	60%

Source: Survey, 2010

Table 1 which provides data on the background of the farmers shows that majority of the fish farmers were on part-time, while those on absentee ownership;

spent 2-12 years in the business after which they abandoned their farms, blaming it on lack of running capital, poor returns, inadequate extension services, erosion threats on pond dykes, insufficient water supply and lack of government assistance to revitalize the business. The farmers were mostly males, married and the level of education of majority are primary. The farmland for the venture were gotten by inheritance and outright purchase habouring a total of 32 ponds of which only 6 were not functional.

The ponds size ranged from 10 x 8m - 20 x 30m for small ponds and 30 x 20 - 150 x 130m for large ones. About 40% of the farmers had feasibility studies and technical advice on site selection respectively. Table 2 shows the summary of responses of fish farmers to management practices. About 90% prepared the pond bottom, limed and fertilized with inorganic or organic fertilizer. The species generally cultured were Tilapia spp; Clarias spp., Heterobranchus spp, Heteroclarias hybrids, fresh water catfish and feather back. About 30% of the farmers stocked the ponds between 3 -5 fingerling per square meter. The highest stocking density were those of Bisa farms with 70 x 80m pond area with 5/m^2 and the least of 3 fingerlings/m^2 of multipurpose community fish farm with a pond area of 20 x 30m^2. The stocking/growth period ranged from 3-10 months or above depending on the species and the culture system employed. About 80% of the farmers got their fingerlings from the hatchery while 10% procured theirs from the wild. Feedstuffs used in feeding the fish include; blood meal, poultry feed, maize grain (ground), fish meal, wheat offal, growers marsh, rice/beans (Cooked and ground) and kitchen waste. Water supply for the ponds came from perennial streams, bore holes and commercial water tanks. At harvest, about 80% of the farmers marketed their products in fresh form in the local markets while the rest were patronized by the operators of bars and restaurants. Washing with water was the only method for fish handling. About 80% carried out the daily routine management practices of feeding fish, clearing of dykes and checking for disease outbreak, while the remaining 20% other than feeding fish checked water quality, seepage, and water level. About 60% of the farmers were satisfied with the farm output; while the remaining 30% complained of high cost of feeds, inability to pay staff due to low return from investments, inadequate water supply, high rate of fish mortality, poor management method among other things.

Equally, on fish farmers response on fish fingerlings transportation, it was revealed that 80% could transport their fingerlings by maintaining low temperature and ensuring moderate movement of the receptable. However, only 10% of them carried oxygen bags/diffused air to ensure adequate aeration; transport fingerling in the morning hours as well as use transquilizers for aggressive fish spp according to Okoko (1996). Other farmers fed the fingerlings before and during transportation - the practice which must have added with other factors to record the 90% casualty during and after stocking.

Table 3 gives a summary of the constraints to successful fish farming in the study area. About 90% response by farmers were recorded for lack of technical advice on fish farm operation, lack of loan facility/government aid and non-use of transquilizers to calm aggressive fish spp. 80% indicated the non-use of device to circulate dissolved

oxygen at night in large ponds and non-practicing of routine checking of water quality, bad practice of feeding fingerlings before and during transportation which aided mortality; non-transportation of fingerlings early in the morning to ensure survival; and inadequate aeration of the receptable which affected the survival of fingerlings.

70% of the farmers had water seepage in their ponds. They could not feed fingerlings at 3% body weight and adult at 5% body, to evoke proper growth or practice test cropping hence cannibalism by shooters was eminent in the fish ponds. Moreover, 60% of the farmers had no feasibility study on their farms or access to improved fish variety gotten through hybridization for their farms. There were inadequate fingerling supply, overstocking of ponds, poaching, high mortality rates for the fingerlings due to stress, lack of constant water supply and stunted growth resulting from proliferation and overcrowding as per Tilapia spp. Fish culture is a very lucrative venture. Good water quality, knowledge of fish farm management, choice of culturable species, site selection, good construction of culturable enclosures and proper farm management are uncompromising factors that determine success in fish farming.

The results presented on tables 1, 2 and 3 reveal that fish farming in the study area was not limited to any sex or educational background. The farmers generally had no pre-knowledge on fish culture/management techniques. The absence of or little extension services enjoyed; and part-time nature of most farmers worsen the management situation, thus less than 80% of the fish farmers abandoned their farms for reasons of poor returns from investment, lack of running capital, erosion problems-steming from poor site selection and lack of feasibility studies. Others were lack of credit facility, seepage due to poor construction works and non-availability of fish seeds.

Essen (2005) has listed successful culturable species in Akwa Ibom State but about 60% of their choice of reared fish did not reflect the list. Good pond management would use water testing kits to determine the necessary water parameters. This and other routine practices would detect fouling of water through feedstuff, ammonia problem, dissolved oxygen, temperature etc. Pond fish strives well in a good quality water with mean temperature of 19 - 23^{0}C, pH of 6.5 - 9.0, stocking density of 3 - 5/ m^2, provision of balanced feeds, maintenance of feeding time and feeding at 3%/body weight for fingerlings and 5%/body weight for the adult. A BOD of 2.00mg/dm^{-3} indicates that the water is polluted and unsuitable for aquatic life (Moses, 2002).

Fish were fed with blood meal, poultry wastes, maize extract, fish meal, growers mash, wheat- offal, kitchen wastes, cooked rice and beans. Most local feedstuffs which abound in the study area such as: cassava leaves, palm oil cake/slug, brewers waste spent grain), cassava flour (dry), cow stomach, palm kernel cake, rice brain, sugar cane fibre, sweet potatoes, blood meal (fresh), fish wastes and yam tubers (Miller1976), were not used in the study area.

Water quality and its availability is very important for aquatic organisms. Only farms located along streams had permanent supply of water while those depending on

borehole and mobile water tankers had intermittent and insufficient water supply. Parker (1995) stated that management is the secret ingredient to successful aquaculture practices, and involves having knowledge on the species cultured, sources of species, habitat, seed stock and breeding, accepted culture methods, stocking rates, feeding, diseases, processing, and marketing. According to him, environmental issues which poss problems and challenges to aquaculture industry include: wastes feed and excretory products, reduced water resources, endangered species, multiple uses of water and pollution from other sources.

The constraints to successful fish farming in the study area include: (a) lack of capital for investment; (b) high cost and non-availability of fish feeds; (c) exploitation by greedy fishery consultants; (d) diseases outbreak/mortality, (e) poor management methods by employees, and (f) inadequate extension services. Others are: lack of feasibility study before establishment of farm, poor pond construction by non-experts resulting in seepage, pond cracks and drainage difficulty, inability to compound balanced fish feed with the basic ingredients from the abundant local feedstuffs to evoked proper fish health/growth, high productivity and for higher food conversion ratio to fish fresh; inability to procure farm inputs such as; fish fingerlings, fertilizers, feedstuffs (Miller,1996) and dragnets at affordable rates. Only few farmers had access to purchase improve fish variety raised through hybridization and biomanipulation.

CONCLUSION AND RECOMMENDATIONS

The enormous obstacles placed by nature, individual farmers, and associated functionaries, do not allow fish farming to be successful in Abak, despite the availability of resources for fish farming. The greatest obstacles are water, lack of initial studies to properly locate the farm structure and capital to run the fish farming business. Based on the findings of the study, the following were recommended to encourage fish farming activities.

a) The fish farmersfolks should form/organize themselves into co-operative societies, in order to attract government assistance or loan facilities from Banks.

b) Government should subsidize the cost of farm inputs such as fish seeds (fingerlings), fertilizers, lime, water testing kids, culture tanks and fishing gears/crafts

c) Fishery agencies should promptly organize seminars, workshops, conferences and extension services to broaden the knowledge of the fish farmers in the fish farming business in the study area.

d) Farmers should adopt the use of tranquilizer such as quinaldine (5-10ppm) or Mss222 or sandoz when carrying aggressive species.

e) Government should renovate/empower all non-functional government

hatcheries in the state so as to provide adequate/all year-round fish fingerlings for easy access to fish farmers.

f) Farmers should utilize the local feedstuffs that abound in the study area and compound them into a balanced diet to reduce management cost as well as evoke proper fish health/growth.

g) Farmers should first of all carry out feasibility studies in their selected sites before the actual construction to ascertain water parameters, soil nature and types, water holding capacity, plankton communities, and the possible culturable fish species, etc.

h) Fish farmers in the study area should practice test-cropping to avoid cannibalism by shooters and also maintain proper sanitary conditions to chase away other predators such as snakes, toads, birds, etc.

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