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A Comparative Profit Analysis of Catfish (*Clarias Gariepinus*) Production in Ughelli, Delta State, Nigeria.

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Abstract
This research was conducted using the same feeding regime and stocking density to determine the effect of using two different fish rearing facilities (earthen pond and concrete tank) of the same size (9m x 9m x 1.4 m) each on the profitability of fish raised to market size in six months. Results showed that final mean weight (initial mean weight 13g/fish of catfish (*Clarias gariepinus*) was greater in earthen pond (0.62 kg) than in concrete tank (0.53 kg). Despite the higher survival rate of 70% recorded in concrete tank as against 65% for earthen pond, the results further showed that the size of fish harvested affected the biomass, which negatively affected the profitability. The fish harvested from the earthen pond gave a profit margin of ₦78,770.00 as against the ₦61,000.00 from concrete tank pond. The profit margin difference of ₦ 17,765.00 realized between the two structures demonstrates that, final mean weight of fish reared to market size was greatly influenced by culture media.
Keywords: Profit margin, concrete tank, earthen pond, catfish.

INTRODUCTION

Fish is suitable for complementing high carbohydrates diets typical of the low income group in Nigeria (Areola, 2007). As it is known, fish is a cheap source of animal protein and has no religious taboo or any known cultural limitation affecting its consumption unlike pork and beef meat (Eyo, 2001). However, local fish production has been below consumption with imports accounting for about 48.8 million United State dollars in 2002 (CBN, 2004). Fish farming therefore has been recognized as a viable means of increasing domestic fish production in Nigeria as fish supplies from the open waters and lagoons continue to decline (Atanda, 2007). Recent investment in aquaculture has beenfocused towards catfish farming in Nigeria (Abdullah, 2007). Kamthorn and Miller, 2006, for example, found out that about 90% of farmed fish in Nigeria is catfish which is now a major attraction to private sector investors in Nigeria.

Currently, investment in catfish is still growing especially with the renewed awareness being created by the government of Nigeria through the presidential initiative on fisheries and aquaculture (Miller and Atanda, 2004). According to Ross and Waten, 2005, the type of culture medium used and their management has been found to have a significant influence on fish farm profitability. Fish culture medium and their accessories add up to a large portion of fish farm capital (Hankins *et al*, 1995). As a result of this, there is need to choose the best production system with appropriate operating strategy to optimize fish profitability.

In Nigeria, particularly in Ughelli, there are different ways used by fish farmers to raise fishes for sale or for family consumption. They could be raised in plastic drums or bowls or unused canoes as well as in constructed concrete tanks and in earthen ponds. For the purpose of this work, the profit margin for concrete tank and earthen pond were considered as they are the commonest methods used in raising fishes. Following this, the total variable cost was deducted from the total revenue to obtain the profit margin used for the analysis.

METHODOLOGY

The study was carried out at Raeomo Farms Nigeria Limited, located in Ughelli, the headquarters of Ughelli-North Local Government Area of Delta State, Nigeria. The farm has facilities for both earthen ponds and concrete tanks. Both the earthen pond and a flow through system concrete tank measuring 9m x 9m x 1.4m were stocked with 900 fingerlings of catfish (*Clarias gariepinus*) with initial mean weight of 13g/fish. The fishes were raised for six months before they were harvested. Before stocking, poultry droppings in jute bags were used to condition the concrete tank while hydrated lime at the rate of 1000kg/ha was applied to the earthen pond before water was introduced. The fishes in the culture media were subjected to the same feeding regime in terms of quantity and quality were maintained while the water quality were monitored using YSI Do Meter, electronic p^H meter and mercury-in-glass thermometer, for the dissolved oxygen, p^H and temperature respectively. The water quality so maintained makes it good to compare the profit margin from the two culture media.

RESULTS AND DISCUSSION

Dissolved oxygen (DO), acidity level (P^H), temperature and nitrate levels were accessed for the two culture media. The parameters were similar for the two media (see table 1). This might be because the

experiment was carried out in the same environment with the same source of water. By implication, this shows that the differences in the yield and profit margin could not be attributed to water parameters.

The results of weight gain, survival rate, biomass and feed weight observed in the two culture media are presented in table 2. Weight gain was not noticeable for the first two months of the experiment in both culture media. At the end of the third month, there was 35g difference in the weight gain in favour of the earthen pond. The fishes in the concrete tank leveled up the gain in weight by the end of the fifth month. However, at the end of the experiment i.e the sixth month, weight gain in the earthen pond became higher by 92g. Despite the higher fish weight gain noticed in the earthen pond, the percentage survival rate was lower than that of the concrete tank. At the end of the experiment, 65% survival rate was recorded in the earthen pond as against 70% for the concrete tank. The lower survival percentage noticed in the earthen pond could be attributed to the presence of predators like frog, toad, and crab which are better controlled with the concrete tanks. The feeding ratio was based on the weight of the survived fishes; as reflected in the feeding rate. The biomass weight difference was not too pronounced between the two media.

The harvest and investment returns from the two culture media are presented in table 3. More fishes (650 out of the initial 900) were harvested from concrete tank as against 550 pieces for the earthen pond. The average fish weight from the earthen pond was 0.62kg (620g) as against 0.53kg (530g) for the concrete tank pond. The total expenditure was a little bit lower for the earthen pond. A total sum of ₦120, 000.00 was spent for the management of the earthen fish pond as against ₦127, 875.00 for the concrete tank. More importantly, the profit margin from the earthen pond was higher (₦78, 000.00) as against ₦ 61,005.00 for the concrete tank.

This was attributable to the fact that fishes harvested from the earthen pond (on the average 0.62kg) and consumed lesser feed despite the higher mortality rate of 35% as against 30% of those raised in the concrete tank. Again, the fact that the earthen pond mimics nature may be responsible for its high yield in terms of fish size.

Although, the quantity of fish harvested in the concrete tank was higher, the smaller size and more feed consumed negatively affected the profit margin. From the profit recorded for the two media, it can be concluded that both are profitable if well managed. The mortality rate in the earthen pond and concrete tank of 35% and 30% respectively were due to cannibalistic tendencies of the fishes and not pilfering since the experiment was carried out in a fenced premises with adequate security in place. In order to achieve better result, uniform-sized fingerlings of higher initial mean weight can be stocked.

Table 1. Mean values for the water quality parameters for the two culture media.

Earthen Pond					Concrete Tank			
Day	**DO (mg/l)**	**P^H**	**Temp (^oC)**	**NO_3 (mg/l)**	**DO (mg/l)**	**P^H**	**Temp (^oC)**	**NO_3 (mg/l)**
0	7.01	6.86	25.50	2.20	6.90	6.82	25.50	0.20
30	6.85±0.01	6.68±0.01	25.3±0.01	0.20±0.003	6.80±0.02	6.85±0.02	25.5±0.02	0.21±0.001
60	6.90±0.02	7.00±0.02	25.5±0.02	0.21±0.002	6.83±0.01	6.19±0.01	25.5±0.01	0.22±0.001
90	6.64±0.02	6.98±0.01	25.3±0.01	0.21±0.001	6.75±0.01	6.98±0.02	25.2±0.01	0.22±0.002
120	6.72±0.01	7.10±0.01	25.2±0.02	0.22±0.002	6.78±0.02	6.10±0.01	25.3±0.02	0.21±0.002
150	6.89±0.02	6.87±0.02	25.5±0.01	0.23±0.001	6.84±0.02	7.05±0.01	25.2±0.03	0.23±0.002
180	7.02±0.02	6.50±0.01	25.4±0.02	0.20±0.001	6.77±0.01	6.50±0.02	25.4±0.02	0.22±0.001

Source: Field survey, 2009.

Table 2. Average fish weight, survival rate and biomass of catfish (*Clarias gariepinus*) reared in earthen pond and concrete tank for a period of six months. Density: 900 pieces/81m^2.

Earthen pond (Size: 9m x 9m x 1.4m)							Concrete tank (Size: 9m x 9m x 1.4m)						
Day	**Ave. wt. (g)**	**Survival (%)**	**Biomass (Kg/81m^2)**	**Feeding ration (g/91m^2/day)**	**Feeding ration (Kg/91m^2/30days)**	**Feeding rate (% body wt./day)**	**Day**	**Ave. wt. (g)**	**Survival (%)**	**Biomass (Kg/81m^2)**	**Feeding ration (g/81m^2/day)**	**Feeding ration (Kg/81m^2/30days)**	**Feeding rate (% body wt./day)**
0	13	100	13.0	675	21.80	4.5	0	13	100	13.0	675	21.80	4.5
30	58	88	49.0	1,455	45.90	2.5	30	63	92	56.50	1,680	51.95	2.5
60	128	72	89.0	2,655	81.60	2.5	60	128	82	102.0	3,045	92.90	2.5
90	278	68	179.0	3,565	109.20	1.5	90	243	80	194.0	3,845	116.90	1.5
120	418	65	219.0	4,365	133.50	1.5	120	373	72	260.5	5,175	156.80	1.5
150	492	65	291.0	5,805	176.20	1.38	150	492	70	320.0	6,365	192.50	1.38
180	620	65	363.0	Harvest	Total=568.2kg	Harvest	180	528	70	369.0	Harvest	Total=632.85kg	Harvest

Source: Field Survey, 2009.

Table 3. Expenditure, income and profit margin from catfish production using earthen pond and concrete tank.

	Earthen Pond	Concrete Tank
Cost of fingerlings at ₦16.00 each	₦14,400.00	₦14,400.00
Cost of locally made fish feed at ₦2,500/bag (15kg/bag)	₦94,700.00	₦105,475.00
Fertilizer/liming/pond preparation/pond maintenance	₦5,000.00	₦3,500.00
Cost of harvesting	₦3,500.00	₦2,500.00
Number of fishes harvested	550 pieces	650 pieces
Average weight of fish at harvest	0.62kg	0.53kg
Total weight of fish cropped (kg)	568.2kg	632.85kg
Mortality recorded	315 pieces	270 pieces
Cost of occasional sorting and counting	₦2,500.00	₦2,000.00
Number of bags of feed consumed (15kg/bag)	38 bags	42 bags
Kilogram of feed fed	568.2kg	632.85kg
Total expenditure	₦120,100.00	₦127,875.00
Gross income	₦198,870.00	₦188,880.00
Profit margin	₦78,770.00	₦61,005.00

Source: Field Survey, 2009.

CONCLUSION

The results from this study shows that the impact of fish rearing medium cannot be over-emphasized for the overall performance results of fish production. Profitability from the production of fish is a function of the final weight gain and the fish survival rate which in turn is dependent on knowledge in fish production and the application of the technical management practices acquired by the farmer. The profit margin difference of ₦17, 765.00 between the earthen and concrete tank ponds, despite been subjected to the same condition indicated that earthen pond is more productive than concrete tank pond. Since optimal stocking of existing structures often leads to substantial increase in fish production and income, producers are more favored using more sophisticated facilities. This study recommends that, those systems that allow per space increase in stocking density with clean and often aerated water should be encouraged.

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REFERENCES

Abdullah, A.Y. (2007): Evaluation of Fish Farming Potentials in Nigeria. An Approach through the use of Geographic Information System (GIS). Ph.D. Thesis. University of Abuja, p. 168.

Areola, F.O. (2007): Fish marketing and export potentials of fish and fisheries products of Nigeria. A paper presented at the educative and informative aqua cultural workshop and aqua cultural exhibitions tagged: Sustainable fisheries livelihood: Management and food security in Nigeria. On 23rd February.

Atanda, A.N. (2007): Freshwater fish seed resources in Nigeria. Assessment of freshwater fish seed resources for sustainable aquaculture. FAO Fisheries Technical Paper. No. 501 Rome, FAO. 628.

Central Bank of Nigeria (CBN) (2004): Statistical Bulletin. Pp 264-267.

Eyo, A.A. (2001): Fish processing technology in the Tropics. New Bussa, University of Ilorin Press, Nigeria. Pp 403.

Hankins, J.A., Summerfelt, S.T., Durrant, M.D. (1995): Impacts of Feeding and stock Management strategies upon Fish Producton within Water recycle systems. In: Timmons, M. B. (ed.): Aquaculture Engineering and Waste Management, Northeast Regional Agricultural Engineering Service, Ithaca, New York. pp. 70 – 86

Kamthorn, P., Miller, J. (2006): Manual on catfish hatchery and production. A Guide for small to medium scale hatchery and farm producers in Nigeria. Aquaculture and Inland Fisheries Project (AIFP), National programme for Food Security (NSPFS). p.29.

Miller, J.W., Atanda, A.N. (2004): Inventory of Fish Farms in Nigeria. Aquaculture and Inland Fisheries Project, National Special progamme for Food Security. p. 148.