COMPARATIVE STUDY ON THE UTILIZATION OF COMMERCIAL FEED AND HOME-MADE FEED IN CATFISH PRODUCTION FOR SUSTAINABLE AQUACULTURE

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Abstract

This study was designed to examine and -compare the utilization of commercial feed and home-made feed in catfish production. It was occasioned by the need to reduce the cost of feeding catfish which presently constitutes about 50-70% of operating costs of production. Data were collected using two, 3m x 2m x 1.5m, concrete ponds, A (for commercial feed) and B (for home-made feed), as well as current market prices. Results of data analysis using gross margin show that utilization of both feeds is profitable. However, the gross profit of pond B (N155,000.00) is about 97.5% above that pond A (N78, 500.00), implying that home-made feed is more cost effective and fish farmers must be encouraged to embrace its formulation and utilization. Lack of technology to produce pelleted and floating home-made feeds of 0.2 2mm necessitated the use of commercial feed to feed catfish from fry to post fingerling stages. Meanwhile, farmers can use unpelleted and sinking home-made feed at this stage, but utmost caution must be exercised to avoid water pollution, incidence of disease and death through suffocation and infection. Policy measures should be tailored towards more enlightenment campaigns, provision of electricity and good road network, reduction of import duties on pelleting machines and supporting fish farmers with micro-credits. This will enable the farmers to adopt and formulate cheap and high quality home-made feeds, expand production, to ensure sustainability

Key words: Comparative Study, Commercial Feed, Home-made Feed, Sustainable Catfish Farming.

Introduction

Total domestic fish production in Nigeria increased only slightly from 245,525 in 1981 to 562,963 in year 2003. Out of these figures, coastal/brackish water fisheries made up between 42.07% and 75.96% while the balance was from inland sources 'and aquaculture (Federal Department of Fisheries, 2004). Aquaculture is the husbandry of aquatic organisms, for example, fish, oysters, prawns and various aquatic weeds for human and animal consumption (Adikwu, 1999).

Fish farming as part of aquaculture has a potential of 650,000 to 1.2 million tonnes of fish annually in Nigeria. However, its production capacity was put by Osawe (2005) at 25,264 tonnes representing 3% offish production. This figure is made up of total output from all species of fish found culturable in the country including tilapia species, clarias species, heterobronchus species amongst others. In their separate studies, Adediran, (2002) Ugwumba and Orji (2007) suggested that sustainability of aquaculture and its ability to bridge the gap between demand and supply of table fish could be achieved through the adoption of fast growing, hardy and easy-to-breed catfish species like clarias, heterobronchus and heteroclarias.

Though the catfish species grow fast and arc hardy, their rale of growth depends largely on the quality of feed used for the culture. With reference to feed quality, Adediran, 2002 and Dada et al (2004) deduced that catfish species do well with any feed brand which contains between 35 and 50% crude protein.

Other nutrients to be include, but in smaller percentages are carbohydrates, fat and oil, fibre, vitamins and minerals. Fish feeds of high quality available in the market are costly. Consequently, cost of feed constitutes 60-70% of operating costs in catfish production (FAO, 1984; Adikwu, 1999 and Adeogun et a!, 2007).

Due to the intensive nature of aquaculture, natural feeds are insufficient to meet the nutritional needs of catfish for fast growth. It has become inevitably important to supplement with commercial or home-made feeds. Commercial feeds such as Coppens, Euro, and so on used by most catfish farmers in the country today seem very dear and might even be contributing more than 60-70% of the operating costs estimated by FAO and others above. There is, therefore, the need to examine and compare the costs of producing commercial feed and homemade feed with a view to identify the one that is cheaper, more cost effective and will guarantee aqua cultural sustainability. The specific objectives of this study are:

1. To describe commercial feed and home-made feed
2. To articulate costs and returns of both commercial and home-made feeds.
3. To compare profitability of both feeds
4. To make recommendations for aqua cultural sustainability.

Supplemental Feeding

Normally, fishes feed on natural foods which comprise of living organisms found in ponds. Naturally foods in the ponds arc grossly insufficient to meet the intensive nature of modern fish farming which combines high stocking density with heavy feeding resulting in fast growth offish and curly harvest. Supplemental feeds were introduced to bridge the gap created by depleting natural 1iHi<ls. More so, with supplemental feeding, the farmer has the opportunity of regular contact with the fish during feeding and is equally sure of the completeness of the feed (i.e the feed contains all the m:ressary nutrients required for proper growth).

Supplemental feeds are of two major types:- (a) Commercial Feeds (b) Home-made Feeds

(a.) Commercial Feeds: These arc supplemental feeds prepared in large quantities and package in celloophane bags for safety. They are floating feeds of various weight {5kg, 10kg), and sizes (0.2mm, 0.5mm, 0.8mm, I mm, 2mm, 3mm, 4.5mm, 6mm, 8mm and 9mm). They are sold to fish farmers through the distribution outlets of the concerned agribusiness firms for profit. Presently many brands are available in the market such as Coppens, Dizengoff, Durante,Euro. Animal care and so on. \ 10kg bag sales between N4,400.00 andN5,000.00 at Onitsha in Anambra State.

(a)| The feedstuff used in their formulation as well as the percentage composition of the essential ingredients are equally indicated on the bags. For example, Coppens used in this study contains 42% crude protein, 13% crude fat, 1.9% crude fiber, 9.5% ash, 1.1% phosphorus and small quantities of vitamins and minerals. The feedstuffs used in the formulation include fish meal; full fat soybeans, wheat; fish oil; palm oil and premise. The crude protein content of all the brands vary between 32 and 42%. It is important to note that crude protein is the major component of a fish diet because fish flesh is composed predominantly of protein (Ella, 1987).

(b) Home-made Feeds: Home-made feeds are supplemental feeds prepared in small quantities as at when needed. They are of floating and sinking types. Their sizes vary between 4mm and 6mm, thus they are normally fed to juvenile and adult fishes. Production of home-made feeds is prompted by the need to reduce cost of fish feeds using local materials.

The feedstuffs utilized in the formulation of home-made feed used in this study include fish meal, wheat offal, corn, bi-calcium phosphate, full fat soya, biocyn, methionine, palm oil, vitamin and mineral premix. The percentage inclusion of the various ingredients to arrive at about 42% crude protein content is shown in Table 1 and was adopted from Ella, 1987 and Osawe, 2005. A 10kg bag of pelleted, floating home-made feed costs NI ,950.00.

Table 1: Composition of Home-made Feed for Catfish **(42% protein level)**

Ingredients	**Amount in Diet-**	Kg	
Fish meal	30.0	3.0	750.00
Blood meal	5.5	0.4	200.00
Soya bean meal ._ •	25.0	2.5	200.00
Biocyn	1.0	0.1	100.00
Methionine	1.0	0.1	100.00
Corn	10.0	1.0	200.00
Wheat offal	25.0	2.5	100.00
Palm oil	1.0	0.1	50.00
Vitamin of mineral premix	0.5	0.1	150.00
Di-calcium phosphate	1.0	0.2	50.00
Total	100	10.0	1,950.00

Source: Ella, 1987 and Osawe, 2005

Materials and Methods

This study was conducted in the Faculty Farm of Anambra State University, Igbariam Campus. Two, 3m x 2m x 1.5m, concrete ponds (A and B) were used in the study. Fresh wate&from a deep borehole was used to run a flow through aquaculture system for a period of 6 months'. The flowthrough system has been confirmed by Ugwumba and Orji (2007) to be cost effective.

The ponds were filled to one meter depth with fresh water and stocked with 300 Dutch Clarias juveniles each, procured from Zartech farm, Ibadan. The stocking density was 50 juveniles per square meter, though with the intensive system, one can stock between 200 and 250 per square; meter (Adediran, 2002).

Commercial feed (Coppens) and the home-made feed were fed to the fishes in ponds A and B respectively, two times daily, morning and evening. Both feeds which possess floating quality were broadcasted on the water till the fish stopped eating. Daily removal of settlable solids and other wastes at the ponds' bottoms through the waste pipes enabled the fish to survive for about one week without suffocation before the water is completely changed.

Data collection was through primary and secondary sources. Descriptive statistics of percentages, simple averages and tables were employed for data analysis. In addition, profitability of the two units was computed using analysis of costs and returns (c.i gross margin analysis) by Adegeye and Ditto' 1985; Beierlein et al, 2003 as given below:

GM = TR TVC

Where,

GM = Gross Margin (gross profit)

TR -•= Total Revenue - product of output and unit, price of output

"TVC = Total Variable Costs - operating costs.

Results mid Discussions

Table 2 below shows revenue and cost figures for the two ponds as well as their gross margins (gross profits). Results indicate that cost of feed constituted 70.9% of the total variable costs it-, (operating cost) of production in pond A against 50.7% in pond B. This implies that the homemade feed is cheaper and more cost effective. The high cost of the commercial feed may be attributed to added costs due to import charges, handling cost as well as transportation ad mark-ups by the marketers.

Table 2: Revenue and Cost Figures for Pond A (commercial feed) and Pond B (home-made feed)

Items	Pond A (W)	Pond B (W)
Total Revenue		
Output value - 600kg at N450.00 each	270,000.00	270,000.00
Variable costs		
Fingerlings 300 at £420.00 each	6,000.00	6,000.00
Feeds	135,000.00	58,500.00
Fuel & Diesel	10,500.00	i 0,500.00
Contingency & transport	40,000.00	40,000.00
TOTAL Variable costs	191,500.00	115,000.00
aifT ©toss Margin (TR- TVC)	78,500.00	155,000.00

Source: Field survey, 2007

Profitability analysis gave a gross profit of $478, 500.00 (33.61%) for pond A and Nl?5,000.00 (66.38%) for pond B. This shows that the gross margin (gross profit) of pond B is about 97.5% above that of pond A, and goes to confirm that the utilization of home-made feed to feed c;ili1sh from juvenile stage is cheaper, more profitable, more efficient and must be embraced by fish farmers to

increase their productive capacity and ensure sustainability.

Recommendations

Costs of fish feeds especially commercial feeds constitute more than 50% of the operating costs of catfish production. Any attempts to reduce these costs further will enhance profitability of the fish farming business by encouraging farm expansion and entrance of new entrepreneurs. Based on the foregoing, the following are proffered:

I. Enlightenment campaigns should be intensified by relevant government agencies through seminars, workshops and so on, to inform fish fanners of the advantages of utilization of home-made feeds in catfish production, and the methods of formulating high quantity pelleted feeds that compare favourably with the imported ones using available local materials.

2. Government should ensure that basic infrastructural facilities such as electricity and good roads reach all parts of the society. This will further reduce the costs of providing adequate water, processing of the feeds and transportation of necessary items and personnel.

3. Reduction of import duties on commercial feeds and pelleting machines will further reduce their costs. In addition, government and donor agencies should encourage local fabrication of cheap but efficient machines through grants and loans to organizations and individuals involved in machine fabrication.

4. Fish farmers must be supported with micro-credits to enable them procure the necessary ingredients used in fish feed formulation which today are being competed for by human nutrition and other animal husbandry practices.

Conclusion

Though commercial feeds should be used to kick-start catfish production in order to minimize loss through water pollution and deaths, formulation and utilization of cheaper home-made feeds of comparable quality by fish farmers from juvenile stage is the antidote to high operating costs of production, because it ensures adequate profitability and therefore will guarantee aqua cultural sustainability.

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