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Contribution Analysis of the Use of Alternative Feed in Catfish Business Media Ground Pools in Labuan Tabu Village Banjar Regency

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Fish cultivators with catfish farming business conditions so far use a combination of commercial feed and alternative feed, and the sensitivity is also calculated if the catfish cultivator uses all commercial feed whether the business is still feasible, so that the contribution of alternative feeds to catfish farming can be known. The aim of this research is to analyze the contribution of using alternative feeds in the catfish business in Labuan Tabu Village, Banjar Regency. This research was conducted in Labuan Tabu Village, Banjar Regency, South Kalimantan Province. Determination of respondents in this study were taken from catfish cultivators in Labuan Tabu Village, Banjar Regency, as many as 3 people. The contribution of the use of alternative feeds to

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catfish farming in ground pond media in Labuan Tabu Village, Banjar Regency, it was concluded that Respondent I: Contribution of alternative feed was 91.74%, Respondent II: Contribution of alternative feed was 70.48%, and Respondent III: Contribution alternative feed as much as 62.5%.

Keywords: Catfish; alternative feed; contribution; ground pond.

1. INTRODUCTION

Ground ponds are the oldest cultivation places or containers used by humans, for fish cultivation containers in almost all corners of the world. The construction of earthen ponds that will be used for fish farming is strongly influenced by the selection of the right location. The excess of the pond is its biological richness. Because the soil that forms the bottom of the pond is a place for the growth and development of various organisms that support fish life. These organisms can also be useful as natural food for fish [1]. The business conditions of the earthen pond in the village of Labuan Tabu are such that the earthen pond is generally made of plowed and then processed land and the location of the land is far from the population. Catfish is one of the leading fishery sectors in the market and has potential in food security as a source of animal protein. There is quite a lot of public interest in consuming catfish as a source of animal protein because catfish has an affordable price, easy processing and tastes good [2]. Efforts that can be made to meet community demand are cultivators increasing catfish production.

Catfish is a fish that is widely consumed by people in Indonesia, high nutritional content and relatively cheap, the price of catfish is one of the people's choices. In the seafood tent shop business, demand for catfish reaches 5.22% of the 16 types of fish/poultry available on the menu at seafood tent stalls [3]. Feed is an important component in fish farming activities. Alternative feeds have a source of protein to sustain the survival and growth of fish, alternative feeds also have a major contribution to catfish farming. The increase in the price of fish feed without an increase in the selling price of cultivated fish is a problem that must be faced by every fish cultivator. Efforts to find alternative feeds, namely natural feeds that are affordable and easy to obtain, continue to be carried out in order to reduce production costs.

Feeding must also pay attention to quality and quantity, so that it is in accordance with the nutritional needs needed by fish. Quality feed has complete nutritional content, easily digested by fish and does not contain harmful substances [4]. Alternative feed is used as additional feed for catfish farming to save business expenses so that the need for fish feed is met. According to data from the Association of Animal Feed Companies (GPMT), manufactured fish feed production in 2017 was only 1,555,939 tons, while the demand for fish feed in the same year reached 8,650,260 tons. For 2018, the demand for feed will increase to around 9,667,620 tons and in 2019 it is estimated to reach 10,800,960 tons. Problems with growing catfish can be studied and researched whether this business is feasible and provides a suitable profit contribution to be used as a main business and meets the needs of fish farmers with the conditions of the catfish farming business so far using a combination of commercial feed and alternative feed, and sensitivity is also calculated if catfish cultivators use entirely commercial feed whether the business is still viable, so that the contribution of alternative feeds to catfish farming can be known. The aim of this research is to analyze the contribution of using alternative feeds in the catfish business in Labuan Tabu Village, Banjar Regency.

2. MATERIALS AND METHODS

This research was conducted in Labuan Tabu Village, Banjar Regency, South Kalimantan Province. The determination of respondents in this study was taken from catfish cultivators in Labuan Tabu Village, Banjar Regency. The research location is located in the village of Labuan Tabu, Martapura District, Banjar Regency.

In this study, 3 farmers were taken as respondents by means of census sampling or saturated sampling by collecting data if all elements of the population were investigated one by one.

The method used in the contribution analysis is descriptive analysis to determine the contribution of alternative feeds to the total income received from catfish farming business. Contribution analysis is used to determine the role of alternative feeds in catfish farming.

Fig. 1. Map of research locations

The criteria used in the contribution analysis, namely:

<50% : Less Contributing
>51-74% : Contribute
>75% : Very Contribute

The criterion of <50% is stated to be less contributing because the use of alternative feeds does noThave an important role in catfish farming.

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The criterion of >75% is stated to greatly contribute to the catfish farming business because iThas an important role in the catfish farming business.

Tilapia aquaculture in earthen ponds is said to be profitable if the revenue value is greater than the total expenditure.

According to Wardhani [2], Profit Formula:

$$\pi = TR - TC$$

Information:

π = Profit or Profit (Rp)
TR = Total Revenue or Total Revenue (Rp)
TC = Total Cost (alternative feed) or Total Cost incurred (Rp)

Febriyanti, R. 2013. Profit formula:

$$TR = P \times Q$$

Information:

TR = Total Revenue or Total Revenue (Rp)
P = Price or Selling Price (Rp)
Q = Quantity or Production (Kg)

Total Cost Formula:

$$TC = FC + VC$$

Information:

TC = Total Cost (total cost to be incurred in catfish farming)
FC = Fixed Cost
VC = Variable Cost (Variable Cost)

3. RESULTS AND DISCUSSION

The contribution analysis criteria used in this study, namely:

<50% : Less Contributing
>51-74% : Contribute
>75% : Very Contribute

The criterion of <50% is stated to be less contributing because the use of alternative feeds does noThave an important role in catfish farming.

Criteria > 51-74% stated that alternative feeds have contributed to catfish farming business.

The criterion of >75% is stated to greatly contribute to the catfish farming business because iThas an important role in the catfish farming business.

Respondent I

Use of alternative feeds = 10.000 kg

Use of commercial feed = 30 sack / 900 kg

Percentage = $\frac{10.000\ kg\ x\ 100}{10.900\ kg}$

Percentage = 91,74 %

Based on the results of interviews with respondent I, catfish farming uses alternative feeds in the form of self-produced feed. The alternative feed used is made from the composition of bran and dried fish/salted fish. Alternative feeding alternated with commercial feed in the form of floating feed. The use of alternative feeds in catfish farming by Respondent I was 91.74%.

In determining the criteria with a total percentage of 91.74% included in the criteria <75%, it means that the use of alternative feeds contributes highly to catfish farming by Respondent I.

Respondent II

Use of alternative feeds = 4000 kg
Use of commercial feed = 67 sack / 1.675 kg

Percentage = $\frac{4.000\ kg\ x\ 100}{5.675\ kg}$

Percentage = 70,48 %

Based on the results of interviews with respondent I, catfish farming uses alternative feeds in the form of self-produced feed. The alternative feed used is made from egg composition (factory waste). Alternative feeding alternated with commercial feed in the form of floating feed. The use of alternative feeds in catfish farming business by Respondent II was 70.48%.

In determining the criteria with a total percentage of 70.48%, it is included in the criteria <51-74%, meaning that the use of alternative feeds contributes to the catfish farming business by Respondent II.

Respondent III

Use of alternative feeds = 4000 kg

Use of commercial feed = 80 sack / 2.400 kg

Percentage = $\frac{4000\ kg\ x\ 100}{6.400\ kg}$

Percentage = 62,5 %

Based on the results of interviews with respondent I, catfish farming uses alternative feeds in the form of self-produced feed. The alternative feed used is made from egg composition (factory waste). Alternative feeding alternated with commercial feed in the form of floating feed. The use of alternative feeds in catfish farming by Respondent III was 62.5%.

In determining the criteria with a total percentage of 62.5%, it is included in the criteria of <51-74%, meaning that the use of alternative feeds contributes to the catfish farming business by Respondent III.

According to Anggraeni et al. [5] the use of alternative feeds can have an impact on catfish health. The effects of alternative feeds on catfish health, including disease incidence, immune response, and general condition of catfish can be studied. Alternative feeds can affect the water quality in aquaculture ponds. For example, levels of ammonia, nitrate, phosphate, and other relevant parameters can be monitored and compared between ponds using alternative feeds and conventional feeds [6]. Arisandi et al's research [7] explains that one important aspect of fish farming is feed efficiency, namely the extent to which the feed provided is utilized by the fish. Measurement of feed efficiency in catfish fed alternative feeds. Feed efficiency can be calculated based on the ratio of feed consumed to fish growth. Feed efficiency between alternative feeds and conventional feeds can be compared and evaluated.

Sutanto [8]. The use of alternative feeds can provide an opportunity to develop local feeds that are more independent and reduce dependence on imported fish feeds. Potential local alternative

feeds that can be used in catfish farming in various regions, as well as their benefits in reducing dependence on imported feed. The potential for developing alternative feeds that are sustainable and environmentally friendly, such as feeds derived from renewable natural resources or using new feed technologies that are more efficient and sustainable [9].

The results of the analysis of the advantages of using alternative feeds in catfish farming in soil ponds in the village of Labuan Tabu, Banjar Regency, South Kalimantan Province, were carried out by taking samples of 3 catfish cultivator respondents.

RESPONDENT I

The profit analysis consists of the total cost which is the total cost incurred in one production period (3 months) multiplied by the amount of production in one year 4 times per year. Investment costs for catfish farming in soil pond media for catfish farming, namely.

Based on the investment costs obtained from buying land for making ponds, costs for making ponds (digging soil), grinding machines are used for making alternative feeds (bran and dried fish), arco is used for goods and land transportation facilities etc. , black nets are used for fish nursery, drain pipes are used for inlet and outlet water channels, scoops are used for moving, sorting or harvesting fish and buckets are used as containers when feeding/containers for moving fish, the total investment cost is Rp. 26,347,500 . Fixed costs are obtained from depreciation costs, labor wages and pool rent, namely.

Fixed costs are costs incurred by cultivators consisting of depreciation, labor wages for 2 people and rent for a pool of 7,000 m^3 thaThas been purchased, for land use costs whose prices are getting higher every year, from the calculation results it is Rp. 80,347,500 per year. Variable costs consist of the price of seeds, bran, dried fish and commercial (floating) feed and diesel, namely.

Based on the results of the study, the variable costs for one production period consisted of catfish seeds, bran and dried fish used to make alternative feeds, commercial feed (floating) and diesel fuel used as fuel for grinding machines, variable costs incurred by cultivators per year amounted to Rp . 391,480,000. Meanwhile, based on the results of the analysis of fixed costs and variable costs, operational costs are obtained, namely.

Based on the research results, Respondent I obtained a profit of Rp. 128,172,500 per year . One of the problems in the catfish farming business is the high price of commercial feed, the solution to overcoming the price of commercial feed is to combine feed with alternative feeds. In Respondent I's catfish farming business, the alternative feed used is bran and dried fish which are then processed using a grinder specifically for making fish feed. Feeding catfish during nursery using full commercial feed, during enlargement using commercial feed and alternative feed. Pre-harvest 3 days before harvest using commercial feed.

RESPONDENT II

The results of the analysis of the advantages of using alternative feeds in catfish farming in soil ponds in the village of Labuan Tabu, Banjar Regency, South Kalimantan Province, were carried out by taking samples of Respondent II catfish cultivators, namely.

Table 1. Cost investment

No	Cost Investment	Vol	Unit Price (Rp)	Amount (IDR)	EU (Th)	Depreciation (Rp)
1.	Land	7,000m^3	200,000	1,400,000,000	-	-
2.	Pool Building Costs	18 pcs	4,000,000	72,000,000	5	14,400,000
3.	Grinding Machine	1 piece	70,000,000	70,000,000	20	3,500,000
4.	Arco	2 pieces	650,000	1,300,000	5	260,000
5.	Black Net	20 pcs	750,000	15,000,000	5	3,000,000
6.	Pipeline	300m	-	50,000,000	10	5,000,000
7.	Scrap	15	35,000	525,000	4	131,250
8.	Bucket	15	15,000	225,000	4	56,250
Total						**26,347,500**

Table 2. Cost fixed (FC)

No.	Cost Fixed (FC)	Vol	Unit (Rp)	One Year (Rp)
1.	Shrinkage	-	-	26,347,500
2.	Labor Wages	2 people	1,000,000	24,000,000
3.	Pool Rent	1 (7,000 m^3)	2,500,000	30,000,000
Total				**80,347,500**

Table 3. Variable cost (VC)

No	Cost Variable (VC)	Vol	Unit Price (Rp)	Cost / production (Rp)	Volume /Year	Cost / year (Th)
1.	Seed	100.000 Tails	2 00	2 \0.000.000	4	80.000.000
2.	Bran	5.000 Kg	4 000	20000000	4	80000000
3.	Dried Fish	5000 kg	9 000	45 000000	4	180,000 ,000
4.	Commercial Feed (Float)	30 sacks (900 kg)	390,000	11,700,000	4	46,800,000
5.	Solar	90 L	13,000	1,170,000	4	4,680,000
Total						**391,480,000**

Table 4. Total cost operational per year (TC)

No.	Cost	Price (Rp/Th)
1.	Cost Fixed (FC)	80,347,500
2.	Cost Variable (VC)	391,480,000
Total		**471,827,500**

Operating costs are the sum of fixed costs plus variable costs used as the total expenditure.

Table 5. Acceptance (TR)

Production	Volume (Q)	Unit Price (Rp)/(P)	Acceptance / production (Rp)	Vol Production /Th	Acceptance / year (Rp)
Catfish	7,500 Kg	20,000	150,000,000	4	600,000,000

Profit/ Profit (π) = Revenue (TR) – total cost operational (TC)
= Rp . 600,000 ,000 – Rp. 471,827,500
= Rp . 128,172,500

Table 6. Cost investment

No	Cost Investment	Vol	Unit Price (Rp)	Amount (IDR)	EU (Th)	Depreciation (Rp)
1.	Land	2000m^3	200,000	400,000,000	-	-
2.	Pool Building Costs	15 pieces	4,000,000	60,000,000	5	12,000,000
3.	Black Net	4 pieces	750,000	3,000,000	5	600,000
4.	Pipeline	70 sticks	150,000	10,500,000	10	1,050,000
5.	Arco	2 pieces	650,000	1,300,000	5	260,000
6.	Pan	2	800,000	1,600,000	5	320,000
7.	furnace	2	100,000	200,000	5	40,000
8.	Bucket	5	15,000	225,000	4	56,250
9.	Scrap	3	35,000	10 5000	4	26,250
Total						**14,352,500**

Based on the investment costs obtained from buying land, the cost of making ponds, digging services, etc. , black nets are used for nursery, drainpipes are used for inlet and outlet water in the pond, arco is used for conveyance of goods, pans are used to seize chicken eggs (factory waste), the furnace is used to support the pot, the bucket is used as a container when feeding / a container for moving fish and a scoop is used to move fish. The costs incurred by cultivators are Rp. 14,352,500, from the depreciation cost data then proceed with the calculation of fixed costs, namely.

Fixed costs are costs incurred by cultivators consisting of depreciation, labor wages and land rent, from the calculation results of Rp. 17,952,500 per year. Variable costs consist of the price of seeds, chicken eggs (factory waste), and commercial feed (sinks), namely.

Based on the calculation results, the variable cost is Rp. 157,640,000 consisting of the purchase of fish seeds, chicken eggs (factory waste) used as raw material for making alternative feeds and commercial feed (drowning). Meanwhile, based on the results of the analysis of fixed costs and variable costs, operational costs are obtained, namely.

Operational costs are obtained from the sum of fixed costs and variable costs, a calculation of Rp. 175,592,500, to find out the total costs received, it can be calculated using the acceptance table as follows in Table 10.

Table 7. Cost fixed (FC)

No.	Cost Fixed (FC)	Vol	Unit (Rp)	One Year (Rp)
1.	Shrinkage	-	-	14,352,500
2.	Pool Rent	1 (2000 m^3)	800,000	9,600,000
3.	Labor Wages	1 person	500,000	6,000,000
Amount				**17,952,500**

Table 8. Variable Cost (VC)

No	Variable Cost (VC)	Vol	Unit Price (Rp)	Cost/ Production (IDR)	Vol Production	Cost/ Year (IDR)
1	Seed	40.000 Tails	2 00	8.000.000	4	32.000.000
2	Chicken Eggs (factory waste)	4.000 Kg	4 000	16 000000	4	64 000000
3	Commercial Feed (drowning)	67 sacks	230000	15 . 41 0000	4	61,640,000
Total						**157,640,000**

Primary data: 2023

Table 9. Total cost operational per year (TC)

No.	Cost	Price (Rp/Th)
1.	Cost Fixed (FC)	17,952,500
2.	Cost Variable (VC)	157,640,000
Total		**175,592,500**

Table 10. Acceptance (TR)

Production	Volume (Q)	Unit Price (Rp)/(P)	Revenue / production (Rp)	Revenue / year (Rp)
Catfish	3000 Kg	Rp. 20,000	Rp. 60,000,000	Rp. 240,000,000

Primary data: 2023

Profit/ Profit (π)= Revenue (TR) – total cost operational (TC)

= Rp . 240,000 ,000 – Rp. 175,592,500

= Rp . 64,407,500

The results of research on Respondent II obtained a profit of Rp. 64,407,500 per year. The problem that occurs in catfish farming is the price of commercial feed (sinks) so that the price is more economical compared to the price of commercial feed (float), but the provision of commercial feed (sinks) is slower than commercial feed (floats). To overcome these problems, Respondent II used alternative feed in the form of chicken eggs (factory waste) to reduce feed expenditure. Respondent II used commercial feed during the nursery period of approximately 4-6 weeks. During the enlargement period using commercial feed (drowning) and alternative feed. Before harvesting, 3-7 days using commercial feed (drowning).

RESPONDENT III

Profit analysis consists of the total cost which is the entire cost incurred in one production period (3 months) multiplied by 4 times the production in one year. The investment cost of catfish farming in soil pond media in catfish farming conducted by Respondent III uses the calculation, namely.

Based on the investment costs obtained from buying land, the cost of making ponds, digging services, etc. , black nets are used for nursery, drainpipes are used for inlet and outlet water in the pond, arco is used for conveyance of goods, pans are used to seize chicken eggs (factory waste), the furnace is used to support the pot, the bucket is used as a container when feeding / a container for moving fish and a scoop is used to move fish. The costs incurred by cultivators are Rp. 13,901,500, from the depreciation cost data, proceed with the calculation of fixed costs. Fixed costs are obtained from the costs of depreciation and maintenance of cultivation facilities, namely.

Fixed costs are costs incurred by cultivators consisting of depreciation, labor wages and land rent, from the calculation results of Rp. 25,901,500 per year. Variable costs consist of the price of seeds, chicken eggs (factory waste), and commercial feed (float), namely.

Based on the calculation results, the variable cost is Rp. 235,200,000 consisting of purchases of catfish seeds, chicken eggs (factory waste) which are processed into alternative feed and commercial feed (float). Meanwhile, based on the results of the analysis of fixed costs and variable costs, operational costs are obtained, namely.

Operational costs are obtained from the sum of fixed costs and variable costs, a calculation of Rp. 175,592,500, to find out the total costs received, it can be calculated using the revenue table as follows in Table 15.

Table 11. Cost investment

No	Cost Investment	Vol	Unit Price (Rp)	Amount (IDR)	EU (Th)	Depreciation (Rp)
1.	Pool Building Costs	15 pieces	4,000,000	60,000,000	5	12,000,000
2.	Black Net	4 pieces	750,000	3,000,000	5	600,000
3.	Pipeline	10 sticks	625,000	6,250,000	10	625,000
4.	Arco	2 pieces	650,000	1,300,000	5	260,000
5.	Pan	2 pieces	800,000	1,600,000	5	320,000
6.	furnace	2 pieces	100,000	200,000	5	40,000
7.	Bucket	5 pcs	15,000	75,000	4	18,750
8.	Scrap	5 pcs	35,000	17 5,000	4	43,750
Total						**13,901,500**

Table 12. Cost fixed (FC)

No.	Cost Fixed (FC)	Vol	Unit	One Year (Rp)
1.	shrinkage	-	-	1,901,500
2.	Labor Wages	1 person	1,000,000	12,000,000
3.	Land Rent	1 (3000 m^3)	1,000,000	12,000,000
Amount				**25,901,500**

Table 13. Variable cost (VC)

No	Cost Variable	Vol	Unit Price (IDR)	Cost / production (IDR)	Production Vol	Cost / year (Rp)
1	Seed	60.000 Tails	2 00	12.000.000	4	48.000.000
2	Chicken Eggs (factory waste)	4.000 Kg	4 000	16 000000	4	64 000000
3	Commercial Feed (float)	80 sacks	385 000	30,800,000	4	123,200,000
Total						**235,200,000**

Primary data: 2023

Table 14. Total cost operational per year (TC)

No.	Cost	Price (Rp/Th)
1.	Fixed Cost (FC)	25,901,500
2.	Variable Cost (VC)	235,200,500
Total		**261,101,500**

Primary data: 2023

Table 15. Acceptance (TR)

Production	Volume	Unit Price (Rp)	Acceptance / production (Rp)	Acceptance / year (Rp)
Catfish	4000 Kg	20,000	80,000,000	320,000,000

Profit/ Profit (π) = Revenue (TR) – total cost operational (TC)
= Rp . 320,000 ,000 – Rp. 261,101,500
= Rp . 58,898,500

Based on the results of calculations using the profit formula, a result of Rp. 58,898,500 per year. The problems in the catfish farming business carried out by Respondent III are the same as the other respondents. To overcome the problems that occur, Respondent III uses alternative feeds in the form of chicken eggs (factory waste) and commercial feed (float). During the nursery period, commercial feed is used, during the rearing period the feed used is commercial feed (float) and alternative feed. Then 3 - 7 days before harvest, catfish are given commercial feed (float).

4. CONCLUSION

The contribution of the use of alternative feeds to catfish farming in soil pond media in Labuan Tabu Village, Banjar Regency, can be concluded that:

Respondent I: The contribution of alternative feed is 91.74%, based on contribution analysis criteria, namely > 75%, meaning that alternative feed in catfish farming by Respondent I contributes high

.

Respondent II: The contribution of alternative feed is 70.48%, based on contribution analysis criteria, namely > 51-74%, meaning that alternative feed in catfish farming by Respondent II contributes.

Respondent III: The contribution of alternative feed is 62.5%, based on contribution analysis criteria, namely > 51-74%, meaning that alternative feed in catfish farming by Respondent III contributes.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Firdausi. Fish cultivation in ground pools. Inland Fisheries Research Bulletin; 2009.

2. Wardhani. Histopathological description of the skin and gills of catfish seeds (Clarias sp) infected with saprolegnia sp and which have been treated with betel leaf extract. Journal of Aquaculture and Fish Healt; 2017.
3. Kurniawati. Business Analysis and Development Strategy for Seafood Tent Stalls. Banjarbaru; 2020.
4. Yunaidi. Application of artificial pellet feed to increase the productivity of freshwater fish farming in Jerukagung Srumbung village. Magelang; 2019.
5. Anggraeni N, Nugroho RA, Aziz A. The effect of feeding alternative agricultural wastes on the growth and feed efficiency of catfish (*Clarias gariepinus*) in Ground Ponds. Journal of Indonesian Swamp Aquaculture. 2021;9(1):1-10.
6. Haryanto A, Prayogo C. Increasing production of dumbo catfish (*Clarias gariepinus*) by Providing Alternative Feed from Agricultural Waste. Indonesian Fisheries Research Journal. 2020;26(2): 111-120.
7. Arisandi D, Sugiarto T, Agus A. The Effectiveness of Fish Pellets and Alternative Feeds as Feed for Dumbo Catfish (*Clarias gariepinus*) in Ground Ponds. Journal of Capture Fisheries Management. 2021;10(1):45-54.
8. Sutanto R. The effect of alternative feeding based on organic materials on the growth of dumbo catfish (*Clarias gariepinus*) in Ground Ponds. Journal of Fisheries and Maritime Affairs. 2020;11(1):55-62.
9. Mustafa A, Sudiarto W. Effect of Alternative Feeding on Growth Performance and Feed Efficiency of Dumbo Catfish (*Clarias gariepinus*) in Ground Ponds. Journal of Fisheries and Maritime Affairs. 2018;9(2):111-117.

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