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A STUDY ON FISH FEED MANUFACTURE WITH ITS NUTRITIONAL QUALITY AND IMPACTS ON FISH PRODUCTION

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ABSTRACT

This study was conducted to assess the procedure of fish feed production, analysis of nutritive value of feeds and its effect on growth of fish in selected fish farms. Five fish feed mills and fifteen fish farmers were randomly selected from Mymensingh district. Fish feeds were used by fifteen farmers among every three farmers used the feed of each mill. These feed Mills collect their Saudi Bangla and ACME fish feed are more preferable to the farmer due to higher protein and lipid content resulting more fish production. In this experiment, Saudi-Bangla fish feed mill (3843 Kg/ha/yr), Sunny fish feed mill (3761 Kg/ha/yr), Shushama fish feed mill (3581 Kg/ha/yr), Al-momen fish feed mill (3669 Kg/ha/yr), ACME fish feed mill (3796 Kg/ha/yr) was produce fish. Capital cost, operating cost, depreciation cost, total cost, revenue income and net profit were calculated and evaluated during the experimental period. In this study, those feed mills production capacity was 45000 ton/yr Saudi-Bangla fish feed mill, 45000 ton/yr Sunny fish feed mill, 35000 ton/yr Shushomo fish feed mill, 35000 ton/yr Al-momen fish feed mill,15000 ton/yr ACME fish feed mill. The fish production mainly carps and pangus were highly occurs chronologically Saudi-Bangla, ACME fish feed, Sunny fish feed, Al-momen fish feed, Shushama fish feed mill, respectively. Among those the nutritive value of Saudi-Bangla fish feed was the best than other fish feed.

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INTRODUCTION

The primary conditions for intensification of any culture depend on the natural and artificial feed. With the progress of technology and increasing demand different types of improved culture technique are now being practiced in our country. As a result huge quantity of supplementary feed has to provide to the cultured species. The demand has increased 1.5 times greater than the previous five years. So the prospect of aqua feed industry is very bright in our country. It is evident that for the proper nourishment of fish a balanced diet containing energy sources-with all essential fatty acids, protein-with all essential amino acids, vitamins and minerals are very vital. With the increasing demand of feed, many companies have established feed industry in different parts of the country. The popular feed companies in the market are Saudi Bangla Feed (Mymensingh), Quality Fish Feed (Gazipur), Aftab Feed (Dhaka), CP fish feed (Thailand), Paragon fish feed, Fresh Fish Feed (Dhaka), Niribili Feed (Cox's Bazar), Usha Feed (Jessore), Premium Feed (Jessore), Excel Feed (Dhaka), Titas Feed (Khulna),North Khulna Feed (Khulna), etc. Saudi Bangla Fish Feed, Sunny Fish Feed, ACME Fish Feed, Al-amin Fish feed Industries have become very popular in producing aqua feed in Mymensingh region.

A huge number of people of Mymensingh region are involved in aqua feed industries. However fish are fastidious eater in that, they require higher levels of dietary protein. Feed stuffs of vegetable origin are lower protein content compared with animal origin. An International Network of Feed Information Centre has been established a nutrients profile of feed stuffs which is maintain in many countries around the world. In Bangladesh, a large variety of indigenous raw materials and agricultural wastes which are rich in nutrients ultimately go waste without being properly utilized for useful purpose. Some of these are: fish meal, frog waste meal, oil cake, rice and wheat bran, leaves and vegetables, other animal and agricultural wastes. However, detail information about their availability, economy and biochemical composition are yet to be fully known. Knowing this information a systematic approach towards a sound and effective formulation and manufacture of fish feed from local ingredients can be made. The study might help, how to formulate and manufacture of the fish feed, quality of the feed, effects on fish growth, and some recommendation would be made which would help to improve the fish production and also awareness the farmer to know about good quality fish feed use in their aqua farms. The research has been undertaken to know about raw materials and production process of fish feed in selected feed mills, to evaluate the effect of feed on fish growth in various aqua farms and to analyze the cost benefit ratio in different aqua farms.

MATERIALS AND METHODS

Fish feed ingredients

The selected sites for data collection were located at major fish feed mills of Mymensingh region. The raw materials are commonly use in the feed mills were fish meal, dry trash fish, soybean meal, rapeseed, rice polish, mould inhibitor, vitamin premix, calcium and phosphorus, salt, meats bone meal, Di-calcium phosphate, non-antibiotic growth promoter, de-oiled DORB, choline chloride, vitamin, binder etc. This of ingredients used in selected five different feed mills.

Feed production

Different fish feed mill produce different types of feed. Feed production at five different feed mills is shown below in Table 1.

Collection and preparation of feed samples

The most popular commercial fish feeds are Saudi-Bangla fish feed, Sunny fish feed, Shushama fish feed, Al-momen fish feed mill and ACME fish feed. Starterand grower feeds used in this study were collected directly from interviewed fish farmers.The samples were taken from the refrigerator and kept in room temperature for few hours. Then the required amount of samples were finely ground by a mortar and kept in airtight container for subsequent chemical analysis.The analysis of feed was carried out in the Fish Nutrition Laboratory of the department of aquaculture in the Faculty of Fisheries, Bangladesh Agricultural University (BAU), Mymensingh. The laboratory had available facilities for the determination of proximate composition viz. moisture, crude protein, crude lipid, ash, crude fiber and carbohydrate. The proximate composition of different commercial fish feeds were analyzed in duplicate according to standard procedure given in Association of Official Analytical Chemists (AOAC, 2000).

Table 1. Feed production at five different feed mills

Feed name	Saudi-Bangla fish feed mill	Sunny fish feed mill	Shushomo fish feed mill	Al-momen fish feed mill	ACME fish feed mill
Starter-1	Produce	Produce	Produce	Produce	Produce
Starter-2	Produce	Produce	Produce	Produce	Produce
Starter-3	Produce	Produce	Produce	Produce	Produce
Grower	Produce	Produce	Produce	Produce	Produce
Sinking	Produce	Produce	Produce	Produce	Produce
Floating feed	–	–	–	–	–
Poultry feed	–	Produce	–	Produce	–
Cattle feed	–	–	–	–	–
Duck feed	–	–	–	–	–
Other feed	–	–	–	–	–

Processing and analysis of data

After the data collection, the collected data were summarized, tabulated and analyzed according to the objectives of the study. A tabular method of analysis was followed in analyzing the collected information.

Fish production

Location and selection of target fish farmers

The selected sites were located at fish farmer of Mymensingh region in Bangladesh. Various categories of fish farmers were selected on the basis use of different mills feed. Fifteen fish farmers randomly selected of which three users from each feed mill.

Cost Benefit Analysis

Total operating cost

The total operating cost was calculated by using the following formula:

Total operating cost = Human labor cost + Fingerling cost + Feed cost + Fertilizer cost + Fish poison + Lime + Miscellaneous**.**

Depreciation

The depreciation cost was calculated using the following formula:

$$\text{Annual depreciation cost} = \frac{\text{Fixed/capital cost} - \text{Salvage value}}{\text{Useful life}}.$$

Total capital cost

The total capital cost was calculated by using the following formula:

Total capital cost = Land used cost + Bank interest

Total cost

The total cost was calculated by using the following formula:

Total cost = Total capital cost + Total Operating cost

Revenue income

The revenue income was calculated using the following formula:

Revenue income (BDT) = Production (kg) × Unit price (BDT)

Net Profit

The net profit was calculated using the following formula:

Net profit = Total revenue income – Total cost

Cost Benefit Ratio

The cost benefit ratio was calculated by using the following formula:

$$\text{Cost Benefit Ratio} = \frac{\text{Total benefits}}{\text{Total cost}}$$

RESULTS AND DISCUSSION

Fish feed production

Cost and collection of ingredients are shown in Table 2.

Table 2. Average raw material costs of fish feed production

Item	Source	Price/Kg
Fish meal	Own country	50
Dry trash fish	Own country	40
Rice polish	Own country	18
Vitamin premix	Own country	225
Calcium and phosphorus	Own country	9
Salt (NaCl)	Own country	8
De-oiled DORB	Own country	15
Binder	Own country	30
Non-antibiotic growth promoter	Other country	296
Meats bone meal	Other country	26
Die calcium phosphate	Other country	40
Rape seed	Other country	19
Mould inhibitor	Other country	38
Choline chloride	Other country	36
Soybean meal	Other country	37

Nutritional composition of different fish feed:

Nutrition is the most important factors of fish feed. Appropriate nutritional composition help to fish perfectly growth. Nutritional compositions vary species to species, size to size and age to age of fish.

Table 3. Capacities of different types of fish feed mills

Mill No.	Installed capacity (ton/yr)	Actual production (June, 2010-June, 2011) (ton/yr)	Average Price (ton)	Total sale of feed (BDT)	Percent of capacity utilization
Saudi-Bangla fish feed mill	45000	34997	29475	1031547509	77.77
Sunny fish feed mill	45000	31273	29967	937210150	69.50
Shushama fish feed mill	35000	24500	29466	721906776	70.00
Al-momen fish feed mill	35000	24197	29962	724984605	69.14
ACME fish feed mill	15000	9842	28945	284904500	65.61
Average	35000	24962	-	-	70.40

Table 4. Nutritional composition of different fish feed.

Mill No.	1		2		3		4		5	
	Starter (%)	Grower (%)	Starter (%)	Grower (%)	Starter (%)	Grower (%)	Starter (%)	Grower (%)	Starter (%)	Grower (%)
Moisture	10.06	11.03	12.66	12.31	12.29	8.49	12.36	14.30	12.17	11.26
Lipid	7.60	4.32	5.02	8.36	9.69	10.49	7.21	7.38	8.61	9.75
Crude Prorein	27.89	25.66	24.27	22.00	27.52	24.37	25.62	23.18	26.09	24.70
Ash	16.76	14.40	19.90	15.47	14.75	21.13	13.48	16.11	21.17	20.88
Crude Fibre	5.80	6.05	6.45	7.56	5.45	6.85	4.26	5.85	6.05	6.40
Carbohydrate	31.89	38.54	31.70	34.30	30.30	28.67	37.07	33.18	25.91	27.01

1. Saudi-Bangla fish feed mill, 2. Sunny fish feed mill, 3. Shushama fish feed mill, 4. Al-momen fish feed mill, 5. ACME fish feed mill

Estimation of returns

Most of the fish farmers were trained by different organization and they are accustomed to keeping record of their fish farming expenditure and economic returns. Pond books maintained by the fish farmers helped the researcher to get reliable information about the existing fish production (kg/ha/yr) in the locality. Species and fish feed mill wise average fish productions in the surveyed areas are given below.

Fish production by fish farmers

Table 5. Costs per hectare of fish ponds

Cost items	1	2	3	4	5	Cost (Tk/ha)	Percent (%)
Operating cost							
Human labor cost	2500	2700	3000	2900	2900	14000	9.34
Fingerling cost	4000	4000	3000	3000	3500	17500	11.67
Feed cost	9800	9880	9960	9880	9880	49400	32.96
Fertilizer cost	4517	3755	4000	3500	3000	18772	12.52
Fish poison	500	500	500	500	500	2500	1.66
Lime	1015	1010	965	950	1000	4940	3.29
Miscellaneous	300	500	400	400	400	2000	1.40
A. Total variable cost	22632	22345	21825	21130	21180	109112	72.80
Capital cost							
Land use cost	5000	4500	5300	5000	4900	24700	16.48
Bank interest	3865	3115	3000	2866	3211	16057	10.72
B. Total fixed cost	8865	7615	8300	7866	8111	40757	27.19
Total gross cost (A+B)	31497	29960	30125	28996	29291	149869	100

1. Saudi-Bangla fish feed mill, 2. Sunny fish feed mill, 3. Shushama fish feed mill, 4. Al-momen fish feed mill, 5. ACME fish feed mill

Table 6. Fish production (kg/ha) used by Saudi-Bangla fish feed mill

Species of fish	Average production (kg/ha)	Final weight (g)	Average price (Tk/kg)	Total price (Tk)
Rui	657	300-800	95	62415
Catla	311	400-600	90	27990
Mrigal	367	300-500	85	31195
Bata	157	100-200	110	17270
Silver carp	610	500-800	80	48800
Grass carp	251	500-900	90	22590
Pangas	712	500-800	75	53400
Tilapia	620	200-500	100	62000
Sarpunti	158	120-200	90	14220
Total	3843			339880

Table 7. Fish production (kg/ha) used by Sunny fish feed mill

Species of fish	Average production (kg/ha)	Final weight (g)	Average price (Tk/kg)	Total price (Tk)
Rui	635	250-750	95	60325
Catla	298	350-500	90	26820
Mrigal	375	250-400	85	31875
Bata	120	100-150	110	13200
Silver carp	690	400-600	80	55200
Grass carp	203	400-700	90	18270
Pangas	680	300-600	75	51000
Tilapia	610	400-600	100	61000
Sarpunti	150	100-150	90	13500
Total	3761	-	-	331190

Table 8. Fish production (kg/ha) used by Shushama fish feed mill

Species of fish	Average production (kg/ha)	Final weight (g)	Average price (Tk/kg)	Total price (Tk)
Rui	580	300-650	95	55100
Catla	295	400-500	90	26550
Mrigal	355	300-500	85	30175
Bata	170	100-160	110	18700
Silver carp	550	300-500	80	44000
Grass carp	230	400-600	90	20700
Pangas	658	300-650	75	49350
Tilapia	580	350-600	100	58000
Sarpunti	163	100-120	90	14670
Total	3581			317245

Table 9. Fish production (kg/ha) used by Al-momen fish feed mill

Species of fish	Average production (kg/ha)	Final weight (g)	Average price (Tk/kg)	Total price (Tk)
Rui	660	400-600	95	62700
Catla	310	350-600	90	27900
Mrigal	386	400-550	85	32810
Bata	120	100-140	110	13200
Silver carp	550	250-400	80	44000
Grass carp	223	300-500	90	20070
Pangas	670	300-600	75	50250
Tilapia	580	400-600	100	58000
Sarpunti	170	100-150	90	15300
Total	3669			324230

Table 10. Fish production (kg/ha) used by ACME fish feed mill

Species of fish	Average production (kg/ha)	Final weight (g)	Average price (Tk/kg)	Total price (Tk)
Rui	668	250-700	95	63460
Catla	288	300-600	90	25920
Mrigal	380	200-500	85	32300
Bata	167	100-200	110	18370
Silver carp	539	500-800	80	43120
Grass carp	251	500-900	90	22590
Pangas	750	400-800	75	56250
Tilapia	590	200-500	100	59000
Sarpunti	163	120-200	90	14670
Total	3796			335680

Yield

It appears from five fish feed mills in Table-8 to Table-12 that the average production of fish used by five feed mills feed represent 3843, 3761, 3581, 3669 and 3796 kg/ha/yr respectively.

Gross return

Gross return is the value of fish produced in money terms. This is calculated by multiplying the total amount of production by their respective market prices. Gross return from fish production were 339880, 331190, 317245, 324230 and 335680 Tk/ha respectively.

Net return

Per hectare net returns from fish production was calculated by deducting gross costs from gross returns. It can be noted that per hectare net return were Tk 190011, 181321, 167376, 174361, and 185811, respectively.

Cost Benefit Ratio (BCR)

Cost benefit ratio of fish farm were 2.26, 2.20, 2.11, 2.16, 2.23 for five groups of fish farmers who used feeds of five different feed mills. Among them Saudi-Bangla feed user farmers and ACME feed users farmers got highest profit than others. The finding justifies that benefit ratio was higher than one, suggesting that there is a bright potential for fish development used by above five mills feed.

Sustainability of fish feed mills and fish farming enterprise mainly depends on its economic viability and profitability. A simple cost and return analysis were done on the basis of both cost and full cost to determine the profitability fish feed and pond fish production was highly profitable business (Zaher and Mazid 1993). Use of higher level of inputs usually results in higher outputs, consequently higher investments produces higher gross and net return on per unit water body of ponds (Rahman, 1995; Biswas, 1990). Higher net return from the pond fish production is influenced by the price of outputs and economic use of both material inputs and labor (Rahman, 1995). On the other hand, Shohel (1998) reported that the fish production is largely influenced by a combination of fish seed, fish feed and the number of fingerling stocking.The average Installed capacity of different fish feed mills 35,000 (ton/yr), Processing capacity 24,962 (ton/yr), Percent of capacity utilization 70.40%. To increase more production need to increase the different capacities. FAO (2005) designed a survey on the formulated animal and aqua feeds industry in sub-Saharan Africa. This document contains five country reviews (South Africa, Nigeria, Cote d'Ivoire, Kenya and Zambia) and one regional synthesis paper on the animal and aqua feed industry in sub-Saharan Africa. The mean moisture value starter and grower feed were of Saudi Bangla fish feed Sunny fish feed mill, Shushuma fish feed mill , Al-momen fish feed mill and ACME fish feed mill are 10.06%, 12.66%, 12.29%, 12.36%, 12.17% and 11.03%, 12.31%, 8.49%, 14.30%, 11.26% respectively. Maximum moisture content starter feed in Sunny fish feed was 12.66%, minimum moisture content starter feed in Saudi-Bangla fish feed was 10.06%. Maximum moisture content grower Al-momen fish feed was 14.30%, minimum moisture content starter feed in Saudi-Bangla fish feed was 8.49%. Dry feeds contain 8-10% moisture while the water content of moist feed ranges from 17 to 40% or more (Lall, 1991). Roy (2002) reported that a diet containing 9.8% moisture appears to be more suitable for GIFT tilapia, which was more or less similar with the present findings.

The mean crude protein value of ACI fish feed, Fresh fish feed , Mega fish feed, Aftab fish feed, CP fish feed, Saudi Bangla fish feed and Quality fish feed are 23.15%, 23.92%, 24.24%, 25.85%, 23.74%, 26.65% and 31.67%, respectively. Minimum crude protein content was found in ACI fish feed (23.15%) and maximum crude protein was in Quality fish feed 31.67%. In ACI fish feed crude protein was high because lipid was low. The protein requirement of fish is influenced by various factors such as fish size, water temperature, feeding rate, availability and quality of natural foods, overall digestible energy content of diet. Roy (2002) reported that a diet containing 27.87% protein appears to be more suitable for GIFT tilapia. The mean crude lipid values of starter and grower feed were of Saudi Bangla fish feed, Sunny fish feed mill, Shushuma fish feed mill, Al-momen fish feed mill and ACME fish feed mill are 7.60%, 5.02%, 9.69%, 7.21%, 8.61%, and 4.32%, 8.36%, 10.49%, 7.38%, 9.75% respectively. Maximum crude lipid of starter feed found in Shushama fish feed 9.69% and minimum crude lipid of starter feed found in Sunny fish feed 5.02%. There is an inverse relationship between protein and lipid content. Maximum crude lipid of grower feed found in Shushama fish feed 10.49% and minimum crude lipid of grower feed found in Saudi-Bangla fish feed 4.32%. There is an inverse relationship between protein and lipid content. Lipid content might be low due to improper storage facilities.

Roy (2002) reported that a diet containing 9.48% lipid appears to be more suitable for GIFT tilapia, which was more or less similar with the present findings. The mean ash values of starter and grower feed were of Saudi Bangla fish feed, Sunny fish feed mill, Shushuma fish feed mill , Al-momen fish feed mill and ACME fish feed mill are 16.76%, 19.90%, 14.75%, 13.48%, 21.17%, and 14.40%, 15.47%, 21.13%, 16.11%, 20.88% respectively. Maximum ash of starter feed found in ACME fish feed 21.17% and minimum ash of starter feed found in Al-momen fish feed 13.48%. Maximum crude lipid of grower feed found in Shushama fish feed 21.13% and minimum ash of grower feed found in Saudi-Bangla fish feed 14.40%. Bhuiyan (2002) found that the diet containing 11.02% ash appears to be more suitable for carp polyculture. Roy (2002) reported that a diet containing 12.92% ash appears to be more suitable for GIFT tilapia, which was more or less similar with the present findings.The mean crude fibre values of starter and grower feed were of Saudi Bangla fish feed, Sunny fish feed mill, Shushuma fish feed mill , Al-momen fish feed mill and ACME fish feed mill are 5.80%, 6.45%, 5.45%, 4.26%, 6.05%, and 6.05%, 7.56%, 6.85%, 5.85%, 6.40% respectively. Maximum crude fibre of starter feed found in Sunny fish feed 6.45% and minimum crude fibre of starter feed found in Al-momen fish feed 4.26%. Maximum crude fibre of grower feed found in Sunny fish feed 7.56% and minimum crude fibre of grower feed found in Al-momen fish feed 5.85%. Roy (2002) reported that a diet containing 10.75% crude fiber appears to be more suitable for GIFT tilapia. A certain amount of fiber in feed permits better binding and moderates the passage of feed through alimentary canal. However, it is not desirable to have a fiber content exceeding 8-12% in diets for fish, as the increase in fiber content would consequently result in the decrease of the quality of an unusable nutrient in the diet (De Silva and Anderson, 1995), which was lower than the present findings.The mean carbohydrate values of starter and grower feed were of Saudi Bangla fish feed, Sunny fish feed mill, Shushuma fish feed mill , Al-momen fish feed mill and ACME fish feed mill are 31.89%, 31.70%, 30.30%, 37.07%, 25.91%, and 38.54%, 34.30%, 28.67%, 33.18%, 27.01% , respectively. Maximum carbohydrate of starter feed found in Shushama fish feed 37.07% and minimum carbohydrate of starter feed found in ACME fish feed 25.91%. Maximum carbohydrate of grower feed found in Saudi-Bangla fish feed 38.54% and minimum carbohydrate of grower feed found in ACME fish feed 27.01%. Ali (2008) found that the diet containing 13% CHO appears to be more suitable for Nile tilapia. Bhuiyan (2002) found that the diet containing 34.53% CHO appears to be more suitable for carp polyculture. Roy reported that a diet containing 29.18% CHO appears to be more suitable for GIFT tilapia, which was more or less similar with the present findings. Cost Benefit Ratio (CBR) is an important indicator about the profitability of fish culture operation. The benefit cost ratio was found to be 1.84 in the present study. A much similar level of CBR was noted RMC (1995) for credit, contact and demonstration farmers of Mymensingh Aquaculture Extension Project (MAEP). Shohel (1990) estimated the value of CBR to be 2.02 which revealed that for investment of 1.00 taka, the economic return is 2.02 taka.In this study, the CBR valve of Saudi-Bangla Fish Feed mill, Sunny Fish Feed mill, Shoshomo Fish Feed mill, Al-momen Feed mill and ACME Fish Feed mill was 2.26, 2.20, 2.11, 2.16 and 2.23 respectively.This is more or less similar with Shohel (1990).Studies conducted by other researchers (Islam, 1987; Islam and Dewan, 1987; Rahman, 1995; Amin, 1998; Shohel, 1998; Rahman, 1998) indicated that fish production under mono and polyculture systems were highly profitable. For polyculture (per hectare per year) gross cost, gross income and net return stood at Tk. 149869, 275185 and 125316 respectively. These levels of lucrative economic return were possible due to use of scientific method and efficient management of material inputs of different fish feed mill. Saudi-Bangla fish feed mill (gross cost, gross income and net return stood at Tk. 31497, 339880 and 190011), Sunny fish feed mill (gross cost, gross income and net return stood at Tk. 29960, 331190 and 181321), Shushomo fish feed mill (gross cost, gross income and net return stood at Tk. 30125, 317245and 167376), Al-momen fish feed mill (gross cost, gross income and net return stood at Tk. 28996, 324230 and 174361), ACME fish feed mill (gross cost, gross income and net return stood at Tk. 335680,29291 and 185811).Biswas (1990) reported to have achieved fish yield as high as 4534 kg/ha/yr from carp polyculture with gross and net return of Tk. 47680 and Tk. 37910 per hectare, respectively. A similar level of yield was also reported by Khaleque *et al.* (1998) from Kishoregonj and Mymensingh districts. Average fish production cost, gross return and net return determined by Khaleque *et al.* (1998) were the Tk. 86916 Tk. 166350 and Tk. 79437 ha/yr respectively. Educational status of the fish feed mill owner and fish farmer plays a vital role for the proper management and utilization of the new technology. Fish feed production is a sensitive and profitable business for this reason the every people of this sector to know proper knowledge of feed production, distribution and uses.

CONCLUSION

This study was based on questionnaire interview on fish feed mills and fish farmers in Mymensingh region. Fish feeds were used by fifteen farmers among which every three farmers used the feed of each company. All the fish feed mill and fish farm were randomly selected from the study area. The study was conducted from July to September, 2011. This study might help in different ways to enhance quality fish feed production and fish production. As fish feed is the key input having strong influencing on the productivity of fisheries, balanced fish feed with superior quality is essential for the successful farm operation. As a principal source of animal protein, fish production has to be increased manifold to meet the requirement in Bangladesh. The fish feed production system at Mymensingh region was satisfactory. The findings of the study indicated that the profitability of fish feed production was quite satisfactory and had attracted interest of the entrepreneurs of Bangladesh. The fish feed industry is performing a vital role in the development of fishery sector in Bangladesh. Through more participation of the entrepreneurs and patronization from the government agencies, the industry would be able to contribute more in the development of fishery sub-sector of the country in near future.

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