



## Effect of farm made feed on growth, yield and income of Indian major carps- A Front line Demo

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### Abstract

The higher costs of commercial fish feeds have made it necessary for pond fish farmers to the use of alternative feed types to feed cultured fishes in village ponds. Fish farmers of the district merely use commercial feeds and they mainly use farm-made types of feeds. A front line demo was carried out during the year 2021-2022 to obtain the optimum production by the use of farm-made fish feeds by small fish farmers on six major ponds at six locations in Chitrakoot district of Uttar Pradesh. Farm-made feeds containing locally available ingredients and we used rice bran (49%), Mustard oil cake (49%), Mineral mixture (1%) and common salt (1%). The farm-made fish feeds composed of above ingredients provided to 8 fish farmers for a period of 7 Month. The feeding rates were @2% body weight on daily basis following bag feeding method. The data was collected at the end of the year when farmers were harvested their stock. The yield and income was studied, It shows that the fish yield was higher in demo ponds that was 2732.84 Kg/ha with an average growth of 506.4 gm/individual, whereas in farmer practice it was 2270.0 kg/ha and 447.61 gm/individual simultaneously. The gross income was Rs. 218626.5 per hectare in demo pond fed with farm made feed and Rs. 172000.00 per ha in farmers pond fed with improper feeding components. The B:C ratio was 2.51 and 2.44 in demo and farmers practice. The farmers interviewed and they were found satisfied with yield and income. There is the need for small fish farmers of the district to be trained in formulation and production of nutritionally balanced and cost-effective fish feeds so as to increase fish production at lowest cost.

**Keywords:** Front line Demo, Fish farmers, fish production, supplementary feed

### Introduction

In India, carp culture is a widely used fish culture system by stocking of suitable fish species of different feeding habits and different layers in pond cultures with the fully utilization of entire natural food resources and spaces to increase fish production. Fish production is primarily dependent on good quality seed, proper stocking management, nutritional management and reduced environmental stress. The use of good quality seed could increase yield by up to 30% at same management level. The most popular fish species produced in pond culture practices are composed of catla (*Catla catla*), common carp (*Cyprinus carpio*), mrigal (*Cirrhinus cirrhosis*), rohu (*Labeo rohita*), and silver carp (*Hypophthalmichthys molitrix*).

Mostly the fish culture system followed in fresh water ponds are extensive and semi intensive culture. The farmers are simply stock fish seed with IMC and exotic carps without proper pre stocking pond preparation. Farmers were used rice bran and mustard oil cake without any ratio and quantity occasionally as supplementary feed. Sometimes fishes are dependent on natural feeds. In Chitrakoot district of Uttar Pradesh having more than thousands of fish ponds and these ponds are seasonal in nature and can only hold water for a few months, these ponds can be used to cultivate fast growing fish to get maximum yield and income. The objectives were to create awareness on farm made fish feed preparation and its utilization to enhance fish production.

Increased demand may lead to increase in the cost of feed ingredients and farm inputs; hence there is a need to identify other bi products that can be cost effective in fish farming sector. The aim of this demonstrations were to assess the overall productivity, yield, and cost-benefit analysis of carp

culture in ponds stocked with Indian major carps seed and feeded with supplementary feed composed of local available ingredients. The aim of this demo to disseminate the effects of farm made feed on the yield and the economic returns of fish farming.

### Material and Methods

This demonstration was performed on the growth and yield performance of fishes stocking with Indian major carps seed and fed with farm made supplementary to fishes for 8 months. The demonstration were conducted for two consecutive years 2021-22 and 2022-23 in Chitrakoot district at 6 farmers pond three in each years. The demonstration was given to the farmers keeping in mind about his traditional fish culture practice, indigenous knowledge, economic status and ecological conditions of the area. In Chitrakoot district, Most of the ponds are seasonal and rain-fed in nature, KVK have adapted farmers according to the interest of farmers. So that farmers can adopt it easily. The ponds stocked with three species of carp's viz. Catla (*Catla catla*), Rohu (*Labeo rohita*), Nain (*Cirrhinus mrigala*) were selected for demo and stocked with a similar stocking density, @ 10000 fingerling per hectare in earthen ponds. All ponds were having average water depth of 1.25 m during culture period. The ponds were rain fed, Traditional practice for fish farmers is to use mixture of mustard oilcake and rice bran as fish feed up occasionally to some extent. Now the prices of both the ingredients have increased and farmers are unable to afford to feed the stocked fish. The demonstrated feed contained composition consist 49% mustard oil cake, 49% rice bran, 1% minerals mixture and 1% salt by weight which are locally available at cheapest rate. The all ingredient grinded and well mixed as mash feed. The stocked fishes were feed

with given farm made supplementary feed by dip bag method. At the time of feeding started the average weight of fishes was taken to calculate final growth and yield at the end of demonstration period. The feeding was done between months of September to March @ 2% body weight. The yield, gross income and B:C ratio was calculated and compared with local practice. The Yield performance study was done after the end of the demonstration. Stocked fishes were harvested and weight was recorded. The weights of the fish were measured in gram (g) by using digital balance. From each demo, fish was randomly collected and the following parameters were measured: 1. Body weight gain (g):  $\text{Body weight gain} = (W_t - W_0)$  Where,  $W_0$  and  $W_t$  were live weight at the time of starting the demo and at the end of the demo. 2. Feed consumption, 3. Survival (%) =  $[\text{Total number of fish harvested} / \text{Total number of fish stock}] \times 100$  and Average yield per ha and compared with farmer practice. 4. Economic performance – Net Return = Gross Return - Gross cost. 5. B:C ratio =  $\text{Gross return} / \text{gross cost}$ .

### Result and Discussion

The fisheries play an important role in the development of socio-economic status of India, which helps in livelihood development, maintaining nutritional security and income generation. In aquaculture more than 60% expenditure of total fish production cost comes on feed cost that is considered as the major recurring expenditure in aquaculture. During culture, supplementary feeding has become an integral means of achieving greater productivity (De silva S.S. 1992)<sup>[1]</sup>. Supplementary feeding is the single most critical and expensive variable cost in intensive culture. Different commercial feeds for fish feeding are available in the markets but due to high cost resource poor fish farmers are unable to procure it. The non availability of factory made feed at local market is another issue. The utilization of agricultural bi product as feed ingredients is needed for sustainable development of the fisheries. Traditional practice of fish farmers is to use mixture of groundnut oilcake and rice bran or cereals as fish feed. Recently the prices of both the ingredients have increased and farmers are unable to afford to feed the stocked fishes (B N Paul *et al.* 2019)<sup>[2]</sup>. Feed has got a significant impact on the production and net income of farmed fish. The feed requirements of fishes vary in quantity and quality according to the feeding habits, growth stages of the species, types of natural food availability and environmental variations in the culture system.

The Indian carp culture sector has merely used pelleted feeds because of the non-availability of feeds and higher cost, with this demonstrations we prove the economic viability of the local available feed ingredients in fisheries sector. In carp poly culture system generally Catla, Rohu, Nain and Silver carp, Grass carp, Common carp are cultivated together. Mostly in our country farmers undertake traditional carp culture in earthen ponds. Fish production success in semi intensive culture equally depends on the pond productivity as well as supplementary feed. (ICAR-CIFA 2016 Extension series 24)<sup>[3]</sup>. The Rice bran and

mustard oil cake (MOC) is the cheapest and most commonly available feed ingredients. (Jhingran VG. *et al.* 1988)<sup>[4]</sup>. The stocked fishes are feeded with farm made feed prepared in combination with Mustard oil cake and Rice bran (1:1)+ 1% mineral mixture by dipped hanging bag method. Appropriate rations determination for cultured fish is important to achieving maximum productivity. Because feeding rate affects nutrient requirements in fish. (Talbot C.1985)<sup>[5]</sup>. The feed was given by hanging of poly bag filled with prepared farm made feed in pond. To avoid spoiling feed quantity was calculated for three days @ 2% body weight and filled in bag for hanging and refilled empty bag again. The excessive feeding does not necessarily result in higher growth. Beyond a certain level, excessive feeding has no influence on the growth and result in poor growth (De Silva SS *et al.*,1995)<sup>[6]</sup>. A field demonstration was conducted on fish farming on feeding of stocked fishes with farm made feed. Fish Feed is one of the major component of fish production. KVK Chitrakoot conducted front line demonstration of farm made fish feed at 3 farmer's field in 3.0 ha area during two consecutive years. Feed composed of 49% rice bran+49% Mustard oil cake, 1% salt and 1% Mineral powder and feed @ 2% body wt by bag methods. Azim *et al.* (2002) and Islam *et al.* (2008)<sup>[7]</sup> also reported that mineral mixture @2% influenced the growth and survival of carp fingerlings on the basis of specific growth rate and harvested fish biomass. The demonstration was given for one hectare area each and farm made feed demonstrated for 7 month period. 3 month feed given under demo and rest 4 month feed was given by farmer itself of same composition. The data was also collected from farmers practice pond. In individual survey of farmers practice the feed composition and ingredient was not similar, it was different from time to time at different inclusion level of ingredients. Commonly they use rice bran, wheat flour and mustard oil cake in undefined ratio and feeding was done by broadcasting methods. The result shows in table-1 that the average mean weight gain of individual fish was about 380.24gm in 6 month culture period. The Mean average weight obtained during harvesting was found 506.40gm. Table-2 indicated that the yield obtained from demo pond was 2732.84 kg/ha with 2.09 FCR value whereas farmer practice gave the yield of 2270 Kg/h with 2.60 FCR of given feeds. Table -3 shows the economic performance of demonstration as well as farmers practice. It indicate that the fish yield was obtained with demonstration of farm made feed by spending Rs. 87250 and getting gross income of Rs. 218625.50 per ha with net income of Rs.131650/ha. The B:C ratio of demonstration was 2.51 and farmer practice gives the net income of Rs. 101900/ha with B:C ratio of 2.44. Farm-made feed is not only cost effective, but can also efficient use of available feed ingredients in the locality and generate employment and livelihoods to the farm families. Its uses can produce higher yield at minimal cost.

**Table 1:** Details of Demonstration-

Year	No. of ponds	Fish Species	Average Weight at starting of Demo(Gm)	Average Weight of Demo (Gm)	Average weight Gain(Gm)
2021-22	03	Catla, Rohu, Nain	125.11	521.67	396.56
2022-23	03	Catla, Rohu, Nain	114.21	491.13	376.92
	Mean		119.66	506.40	380.24

**Table 2:** Yield Performance-

Year	Demonstration				Farmers practice				% Increase
	Feed consumption/ha	Average Individual growth (Gm)	Average yield (Kg/ha)	FCR	Average growth (Gm)	Average yield (Kg/ha)	Feed consumption/ha	FCR	
2021-22	5950 Kg	396.56	2741.67	2.17	454.1	2320.0	6010 Kg	2.59	18.17
2022-23	5450 Kg	376.92	2724.0	2.00	441.12	2220.0	5780 Kg	2.60	22.70
Mean	5700 Kg	386.74	2732.84	2.09	447.61	2270.0	5895 Kg	2.60	20.39

**Table 3:** Economic Performance-

Year	No. of ponds	Economics of demonstration (Rs.)				Economics of Farmers practice (Rs.)			
		Gross cost	Gross Return	Net Return	B:C ratio	Gross cost	Gross Return	Net Return	B:C ratio
2021-22	03	97000	219333	122333	2.26	75000	162400	87400	2.16
2022-23	03	77500	217920	140420	2.81	65200	181600	116400	2.78
Average		87250	218626.5	131376.5	2.51	70600	172000	101900	2.44

**Conclusion**

In the district Chitrakoot fish farmers are mainly using farm-made feeds in feeding pond fish. They are depended solely on farm-made feeds but the composition is not at required level. In the farm-made feeds farmers are mainly using locally available ingredients and their inclusion levels varied based on availability and financial arrangements. So, the composition of farm made feed ingredients should be assessed for the cost effectiveness and growth performance analysis. The Optimum yield benefits can be obtained by the use of farm made feed based on local available materials. The Fish farmers should be trained regularly how to prepare nutritionally balanced good quality fish feeds with local ingredients and best keeping quality. The FCR is another aspect for fish farmers; they need high FCR feed for better income. By the efficient use of feed resources, farmers can obtain yields more than 2500 kg/ha/year. The result of demonstration help the farmer to use supplementary feed based on rice bran and mustard oil cake (1:1 ratio) with inclusion of 1% mineral mixture+ salt at a ration level of 2% body weight of carp used as feed for growing carps fish. The results of the demonstration could help fish farmers to get maximum yield in a shorter period for the carps fed with farm made feed. To enhance adoption rate, there is a need to undertake field demonstration, technology assessment, dissemination and training programs for fish farmers from time to time.

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