J Krishi Vigyan 2019, 7 (2) : 36-39 DOI : 10.5958/2349-4433.2019.00007.2

Comparative Study of Composite Fish Culture and Local Practices of Fish Culture in Surguja District of Chhattisgarh

Pradeep Kumar Singh

Krishi Vigyan Kendra, Mungeli
Indira Gandhi Krishi Vishwavidyalaya, Raipur 492 001(Chhattisgarh)

ABSTRACT

A multilocational trial on composite fish culture (CFC) was carried out to evaluate growth, yield and economic analysis of fish culture during three successive years 2014-2016 in Surguja district of Chhattisgarh, India. The study revealed that growth of Silver carp and Catla is better than that of other fish species in composite fish culture (CFC). Fish yield was more in CFC than the traditional fish farming system in all locations under study with the highest harvest of 42.0q/ha. An increment of fish harvest up to 164 per cent was recorded by adopting CFC. Gross profit to the tune of Rs. 4.22 *lakh* and Rs. 2.55*lakh*/ha were recorded from CFC and local practice with a net profit of Rs. 2. 95 *lakh* and Rs. 1.5 *lakh*/ha and benefit-cost ratio of 2.36 and 1.83, respectively.

Key Words: Benefit: Cost ratio, Composite Fish Culture, Yield.

INTRODUCTION

Fishery in Chhattisgarh is mostly based on culture in Rural tanks. There is a large cultivable fresh water area in Chhatisgarh in the form of ponds, tanks and reservoirs etc., of which only small part is utilized for fish culture. According to the census (2015-16), the fishery production in Surguja District covers an area of 745 ha. There is a tremendous gap between the demand of 325t/annum and supply of 120 t/ annum of fish in the district.

The fish growers of the state traditionally growing different varieties of fishes in poly culture method were species ratio and water quality management is not been practiced. Fishes are fed with locally available feed materials like rice bran, mustard oil cake, groundnut oil cake etc. In this practice, proper stocking density and selection of compatible species is also not maintained. There are many fish culture technologies available and the Composite Fish Culture (CFC) system is the most sustainable for this region. In this system, distinctive compatible species of Indian and Exotic carps of different feeding habits are stocked and cultured in the same pond so that all its ecological niches are utilized by the fishes. Present investigation was an attempt to quantify the yield advantages of CFC over the local traditional fish culture system. Effort has also been made to find out economic sustainability of CFC in the study area for logical analysis and adoption by the fish growing community of the district.

MATERIAL AND METHODS

The study was carried out during the years 2014-2016. The experiment was carried out in Ajirma, Batwahi, Bangalipara (Ambikapur) and Mahaveerpur villages of Surguja District, Chhattisgarh geographically located between 23° 37' 25'' and 24° 6' 17'' north latitudes and between 81° 34'40'' and 84° 4'40'' east longitudes. Fingerlings of Catla (*Catla catla*), Rohu (*Labeo rohita*), Mrigala (*Cirrhinus mrigala*), Grass Carp (*Ctenopharyngodon idella*), Common carp (*Cyprinus carpio*) and Silver carp (*Hypophthalmichthys molitrix*) were stocked in a ratio 2 Catla: 2 Rohu: 1.5 Mrigal: 2 Silver carp: 1 Grass carp: 1.5 Common carp (Mahapatra *et al,* 2006) @ 7000 fingerlings/ ha.

Corresponding Author's Email: singhpk_aqua@yahoo.co.in

The management practices in composite fish farming can be categorized as pre-stocking, stocking and post-stocking management. The major steps followed in pre-stocking management were aquatic weed clearance by manual effort, eradication of predatory and weed fish by repeated netting, manuring by using cow dung 1000 kg/ ha/ month and liming with quick lime @ 2000 kg/ ha/yr for regulating pH of pond water. One third quantity of total amount of lime was applied as initial dose and rest was applied in seven split doses after checking pH of the pond water. In stocking management, transportation of fingerling is one of the most important steps. In the present investigation, transportation of fingerlings was done in the early morning hours with oxygen packing from Darima Government Fish Hatchery located at Surguja District, Chhattisgarh. Acclimatization of the fingerlings was also done by putting the Oxyzen packed polythene bags in pond water for 15 min followed by addition of excess water in the same bag and releasing the fishes slowly in the pond for reducing the stress related to temperature fluctuation. Supplementary feeding of Mustard oil cake and rice bran with a mixing ratio of 1:1 in addition of vitamin – mineral mixture was done @ 2-3% of body weight of fishes. Manuring was also done once in a month to maintain water quality of the ponds. Sampling for checking the health and growth were also done once in two months.

RESULTS AND DISCUSSION

Present study revealed that CFC has many advantages over local practice of fish culture. Talukdar and Sontaki (2005) described various advantages of CFC. Different fish species *viz.* Silver carp, Catla, Mrigala, Grass Carp, Common carp and Rohu harvested from Ajirma, Batwahi, Bangalipara (Ambikapur) and Mahaveerpur villages of Surguja District showed that growth of silver carp and catla was better than other fish species in CFC. Silver carp and Catla was recorded to grow faster with an average size of 930g and 845g, respectively in eight months of culture period. This might be attributed to balance feeding to the fishes as well as manuring of pond in CFC and consequently optimum production of phytoplankton and zooplankton which were basic food for silver carp and catla, respectively (Amir *et al*, 2013).

In all the locations under study congenial water temperature for fish growth was observed from April to October. Monsoon rainfall during June to September favoured fish culture in the District. It was noted that, the fish yield was more in CFC than traditional fish farming system in all locations under study. Average fish yield recorded in CFC was 38.3 q/ha, 37.3 q/ha and 40.2 q/ha during 2014, 2015 and 2016, respectively as compared to 23.35 q/ha, 23.88q/ha and 24.63q/ha during the aforesaid period (Table 1). This might be attributed to pre-stocking, stocking and post-stocking management practices. Gradual increase in fish productivity in CFC over local practice might be due to the residual effect of incorporation of inputs *viz.* lime, manure and feeding materials in the same pond over the years. Similar observations were also made by Manjappa *et al*(2017) and Kund *et al*(2010). An increment of fish harvest to the tune of 164 , 156 and 163per cent was recorded by adopting composite fish farming in the year 2014, 2015 and 2016, respectively (Table 1).

Economic analysis of fish farming in CFC and local practice was made to evaluate the sustainability of CFC. Average total cost of production over the period of 2014-2016 was Rs. 1.15lakh and Rs. 84,667 in CFC and local practice, respectively (Table 2). Variation in the cost of production in different years was due to variation in cost of inputs. More cost of production in CFC as compared to the local practice is due to balance feeding, manuring, liming and using chemicals in the former system. Mean yield of fishes obtained from these two systems were 38.6 q/ha and 23.95q/ ha. Gross profit to the tune of Rs. 3.86lakh and Rs. 2. 39lakh /ha were recorded from CFC and local practice with a net profit of Rs. 2.71lakh and Rs. 1.54lakh/ ha, respectively. This gave an average benefit-cost ratio of 2.36 in CFC and 1.83.

Table 1. Average yield (q/ha) of fishes in CFC and local practice of fish farming.

Year	Ajirma	Mahaveerpur	Batwahi	Bangali Para (Ambikapaur)	Av. yield
Average yield (q/ha) of fishes in CFC					
2014	39.4	38.5	36.6	38.6	38.3 (164%*)
2015	39.2	36.45	35.2	38.45	37.3 (156%*)
2016	42.2	38.2	38.6	41.6	40.2 (163%*)
Average yield (q/ha) of fishes in local practice					
2014	23.25	22.45	22.5	25.2	23.35
2015	25.8	23.2	22.9	23.6	23.88
2016	25.5	24.6	23.8	24.6	24.63

Note: *Fish yield Increase in CFC over local practice (%)

Table 2: Economics of fish farming in CFC and local practice during the study period.

Parameter	CFC				Local practice			
	2014	2015	2016	Av.	2014	2015	2016	Av.
Total Cost of production (Rs.*Lakh*/ha)	1.15	1.1	1.2	1.15	0.8	0.85	0.89	0.84
Mean yield of fishes (q/ha)	38.3	37.3	40.2	38.6	23.35	23.88	24.63	23.95
Gross profit (Rs. *Lakh* /ha)	3.83	3.73	4.02	3.86	2.33	2.38	2.46	2.39
Net returns(Rs. *Lakh* /ha)	2.68	2.63	2.82	2.71	1.53	1.53	1.57	1.54
Benefit Cost Ratio	2.33	2.39	2.35	2.36	1.92	1.81	1.77	1.83

Sale price of fish per kg @ Rs.100/-.

Total cost of production includes cost of labour for pond preparation and management, fertilization application, liming, netting etc and material cost like fish fingerlings, feed, fertilizer, lime etc. in the local practice. The result reflects that production of fishes and profitability was more than double in CFC over the local practice which is because of adoption of good management practices. Anantha *et al* (2014), Chouhan (2015) and Singh (2007) also reported that those farmers, who have a tendency to maximize their earnings, have higher adoption of Composite Fish Farming System.

CONCLUSION

Results showed that CFC could be a beneficial venture for optimum utilization of land and water resources of Surguja District of Chhattisgarh. Adoption of this technique will open avenues for self-employment, supplement the income of the farmers and enhance fish production.

REFERENCES

Anantha P N, Sahoo P R, Dash A K, Pati B K, Jayashankar P and Singh S R K (2014). A study on community based aquaculture promoted by KVK-Khordha, Odisha, India. *Current World Environ* **9** (3), 947-951

Chouhan Pushpa (2015). Comparative study of fish production and earning from fish culture in two years in Barwani district, MP, India. *Res J Anim Vety and Fishery Sci* **3** (7): 5-8

Imrana Amir, M Afzal, Tahir Hussain, Asmara Iram, Sumara Naz and Fakhra Saif (2013). Effect of varying species ratios of Silver carp (*Hypophathalmicthys molitrix*) and Mrigal (*Cirrhinus mrigala*) at constant density on pond fisheries in Composite fish culture. *J Agril and Biol Sci* **8** (8): 616-620

Kund G C, Mishra R and Sethi P K (2010). An economic analysis of composite fish culture ponds in Sundergarh district, Orissa. *Asian J Anim Sci* **5** (2): 139-141

Mahapatra BK, Vinod K, Mandal BK, Bujarbaruah KM (2006). *Composite Fish Culture*. Technical Bull. No. 20, ICAR-RC NEH, Barapani, Meghalaya: 1-11

Manjappa N , Patil Ravidragouda and Pavadi Prakasha (2017). Potential use of village tanks and farm ponds for aquaculture in Karnataka, India – A case. *Int J Res Applied, Natural and Social Sci*. **5** (10), 45-50

Singh Kehar (2007). Economics and determinants of fish production and its effects on family income inequality in West Tripura District of Tripura. *Indian J Agri Econ* **62** (1): 113-125

Talukdar P K and Sontaki B S (2005). Correlates of adoption of composite fish culture practices by Fish farmers of Assam, India. *The J Agril Sci* **1** (1)**:**12-18.

Received on 04/02/2019 Accepted on 16/03/2019