

Fisheries development programmes and profile of beneficiaries in Chhattisgarh

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Abstract

Objectives: To study fisheries profile of Chhattisgarh, analyze fisheries development programmes implemented by Department of Fisheries (DoF) and to study profile of beneficiaries.

Methods/Statistical analysis: Information was collected from secondary sources namely annual reports of DoF, its website and focus group discussions. Interview schedule was used to document profile of 120 beneficiary fish farmers from Raipur district. Reliability of interview schedule was tested and was found acceptable. Cronbach alpha was computed with a value of 0.83, thus establishing the tau-equivalent reliability as acceptable for a lower bound estimate of the reliability of interview schedule.

Findings: Chhattisgarh has 1.665 lakh ha water area available for development of fisheries. During 2015-16, number of fisheries development schemes have been undertaken by DoF and 3/4th of farmers reported that they benefitted from assistance for retail sale/net and boat/fish seed production scheme, 50 to 70% of farmers from departmental training programmes, assistance for fish seed rearing in seasonal ponds, grants to fishermen co-operatives societies, assistance for fingerling stocking and 20 to 30% benefitted from reservoir and river development scheme, out of state study tour programmes and polyculture/prawn culture/ornamental fish culture programmes. Majority (65%) of fish farmers had only fisheries as their occupation, 27% also had agriculture and others were engaged in business/service. Fisheries interventions were perceived to have high potential to promote fisheries activities and well-being of fish farmers. Not many studies have been done with reference to fisheries development programmes so this study adds to the body of knowledge.

Application/Improvements: Interventions done for fish farmers have shown positive results. More efforts are needed for the schemes which have less number of beneficiaries.

Keywords: Fisheries, Development programmes, Chhattisgarh.

1. Introduction

Many people all over the world find a source of income and livelihood in fisheries and aquaculture sector. Most recent estimates indicate that 56.6 million people were engaged in the primary sector of capture fisheries and aquaculture. The proportion of those employed in fish farming has increased from 17 to 33%. Aquaculture has been responsible for the impressive growth in the supply of fish for human consumption. Not unexpectedly, world aquaculture production continues its growth and the newly released FAO aquaculture statistics has recorded another all-time high world aquaculture production of 106 million tons in live weight in the year 2015, with a total estimated first sale value of US\$163 billion [1].

With reference to India, it is reported that it is second largest fish producer and ranked second in aquaculture production. Fisheries are a sunrise sector with varied resources and potential, engaging over 14.50 million people at the primary level and many more along the value chain. Transformation of the fisheries sector from traditional to commercial scale has led to an increase in fish production from 7.5 lakh tons in 1950-51 to 107.95 lakh tons during 2015-16, while the export earnings from the sector registered around ₹33,441 crore in 2014-15 (US\$ 5.51 billion). Constituting about 6.30% of the global fish production and 5% of global trade, India is the second largest fish producing and second largest aquaculture nation in the world. The sector has shown a growth 5.2%, which mainly was due to inland fish production with 7.3% as reported by DAHD&F [2]. This statistics shows that inland sector is growing rapidly.

In aquaculture, Andhra Pradesh is a leading state and newly formed state like Chhattisgarh is not far behind. Chhattisgarh is the 6th largest fish seed producer and 6th largest fish producer of inland fisheries in the country. Its annual fish seed production has reached 14,915 lakh standard fry and 3.422 lakh tonnes fish. Fisheries sector contributed ₹3,422 crore to the GDP of state during 2015-16. State overall GDP contribution in fisheries sector is 1.57% as reported by DoF [3]. The state has 27 districts with Raipur as its capital. In the state, around 32% of the population belongs to scheduled tribes and 12% belongs to the scheduled caste. Available water in the state is 1.57 lakh ha out of which 1.47 lakh ha water area has been developed under fish farming i.e., 94% of the total water area.

During the year 2015-16, state fisheries department implemented various fisheries development programmes and 26,164 fish farmers benefited this year resulting in improved livelihoods. In this context, a study was done with the objectives of studying fisheries profile of Chattisgarh, documenting fisheries development programmes implemented by DoFand to study the profile of beneficiaries of these programmes in Raipur, Chattisgarh.

2. Materials and methods

The study was conducted in Raipur district of Chhattisgarh during 2016-17. Chhattisgarh has 27 districts and Raipur is the capital of Chhattisgarh. It has 4 blocks i.e., Tilda, Dharsiwa, Arang and Abhanpur. In accordance with the Annual Report of the Directorate of Fisheries, Raipur ranks 6th in fish and fish seed production followed by Janjgir, Dhamtari, Rajnandgaon, Raigarh and Gariyaband districts.

To study the fisheries profile, information was collected regarding utilized water areas and its development, total numbers of fish farmers, trends of fish production in last twelve years, current district wise fish production and various fisheries development programmes undertaken. For this, information was collated from secondary sources like Annual Report of DoF and its website. To get additional information, Focus Group Discussion with officials of DoF was done.

Interview schedule with select parameters was used to document the profile of beneficiaries of fisheries development programmes. Information was collected on age, educational qualification, caste, religion, marital status, family type, family size, occupation and experience in fisheries. Reliability of the interview schedule was tested by 'Test Retest' method. Reliability coefficient was found to be acceptable with a value of 0.80. In addition, Cronbach alpha which is a function of the number of items in a test, the average covariance between item-pairs, and the variance of the total score was computed with a value of 0.83, thus establishing the tau-equivalent reliability as acceptable for a lower bound estimate of the reliability of interview schedule. To achieve the objectives of the study, 120 fish farmers were selected. From each of the four blocks of Raipur, 30 fish farmers were selected by using random sampling method.

3. Results and discussion

Study on fisheries profile of Chattisgarh revealed that a network of 31 large, small rivers and tributaries, flow from East to West and covering a length of about 3573 km in the state. As per the official website of Fisheries Department of Chhattisgarh, during the year 2015-16, the growth rate in fisheries has been 8.95%. Chhattisgarh state has a total of 1.665 lakh ha water area available for development of fisheries (2015-2016) which consist of 68,929 rural ponds and reservoir. However, till 2015-2016 total 1.572 lakh ha rural pond reservoir water areas have been utilized for fisheries advancement. Free accident insurance scheme is being provided for financial support to the fish farmers associated with a fishing business. For accidental insurance total 2,09,930 fish farmers have registered.

Table 1. Water area utilization

Type of water area	Area in Lakh ha	% Developed
Ponds	0.772	92.60
Reservoirs	0.800	94.00
Total	1.572	94.41

The freshwater fish farming plays an important role in the development of rural livelihoods of Chhattisgarh. Apart from direct self-employment opportunities from fish farming, pond fish farming offers diverse livelihood opportunities for operators farming employees of hatcheries and seed nurseries, and for seed traders and other intermediaries. State fisheries is mostly dominated in culture based fisheries in which most cultivable species are Indian Major Carps (IMC), Exotic carps and catfishes. At present more than 2.10 lakh fish farmers in the state depend on fisheries and aquaculture for their livelihood. A total of 1,315 fishermen co-operatives exist in the state. Information regarding utilized water area under fish culture, number of reservoirs on the basis of size with their area and a total number of fish farmers as obtained from DoF is presented in Table 1, 2.

Table 2. Number of reservoirs on basis of size and area

Reservoirs	No.	Water area (ha)
Large size	12	22,146
Medium size	21	25,610
Small	1,627	37,432

Chhattisgarh state has immense natural water resources in the form of river, reservoir, ponds and tanks, from which 1.572 lakh ha of water area has already been used for fish culture. Since 1995, all the water bodies were leased out by the local Panchayat Administration except for water area greater than 2000 ha. Village ponds and reservoirs up to 10 ha water areas are leased out by Gram Panchayat, 10-100 ha by Janpad (Block) Panchayat, 100-200 ha by Zila (District) Panchayat and more than 200 ha are auctioned by the Fisheries Department for a period of five years. Water bodies below 1 ha are allotted to individual fish farmers and water bodies above 1 ha are allotted to fishermen co-operative societies and Self Help Groups (SHGs) for a period of five years. DoF has reserved a small reservoir for procurement of brooders in each district. Farmers of Chhattisgarh have started fish culture in the pattern of Andhra Pradesh by introducing inputs such as feed and fertilizers. State and District wise fish and seed production of Chhattisgarh presented in Table 3.

Table 3. Fish and seed production trends

Year	Inland Fish production		Fish Seed Production	
	Fish production ('000 tonnes)	Growth rate (%)	No. of fish seeds produced (million fry)	Growth rate (%)
2004-05	120.07	8.1	457.48	24.30
2005-06	131.75	9.7	505.54	10.50
2006-07	137.75	4.5	591.68	10.50
2007-08	139.37	1.2	649.67	09.80
2008-09	158.70	13.8	675.00	03.90
2009-10	174.24	9.79	762.59	12.98
2010-11	228.21	30.97	839.69	10.11
2011-12	250.69	9.85	893.59	6.41
2012-13	255.61	1.96	1043.74	16.80
2013-14	284.96	11.48	1220.00	16.88
2014-15	314.16	10.24	1351.40	10.77
2015-16	342.29	8.95	1491.50	10.36

It is evident from Table 3, that fish and seed production has an increasing trend since 2004 onwards. It is important to note that fisheries development programmes were adopted in 2003-04. At present, Chhattisgarh is the 6th largest fish seed producer and 6th largest fish producer of inland fisheries in the country. Its annual fish seed production has reached 14,915.00 lakh standard fry and 3.422 lakh tones of fish. Fisheries sector contributed ₹3422 crores to the GDP of the state during 2015-16, which is 13.10% in the agriculture sector in Chhattisgarh. State overall GDP contribution in fisheries sector is 1.57% as per DoF [3]. All districts are involved in fish farming. Some districts are ahead in fish and seed production. Raipur district holds 6th rank in fish production. Information regarding fisheries resources in Raipur and available resources for fishery seed production is presented in Table 4, 5 which revealed that Raipur being the capital city has a number of hatcheries and rearing ponds.

Table 4. Fisheries resources in Raipur

Village pond				Irrigation pond			
Available		Under fisheries		Available		Under fisheries	
Pond	Water area (ha)	Pond	Water area (ha)	Reservoir	Water area (ha)	Reservoir	Water area (ha)
2639	5060	2375	4601	51	2271	48	2135

The second objective was to document the programmes undertaken by DoF. Enquiry into this revealed that after the formation of Chhattisgarh state, a Cabinet sub-committee meeting was formed to formulate and a new fisheries policy was recommended. After perusal of cabinet meeting, state government framed a new fisheries policy in the state and was released in March 2003. Thus, most of the state fisheries development programmes started in 2003 onwards.

These schemes are Fish seed production scheme, Development of reservoirs and rivers, Departmental training, out of state study tour, Polyculture, Prawn culture and Ornamental fish culture, Assistance for net and boat, Assistance for fish seed rearing unit, Assistance for fingerling stocking, Assistance for retail sale and Grant to registered fishermen co-operatives societies. The funding pattern of all these schemes is 100% by the state government. All these interventions/schemes are identified to have high potential to promote fisheries activities and wellbeing of the fish farmers and their community. Following is, therefore, the brief description of different programmes/schemes.

Table 5. Resources for fishery seed production in Raipur

Description	Chinese hatchery		Fish seed field		Rearing pond	
	Nos.	Water area (ha)	Nos.	Water area (ha)	Nos.	Water area (ha)
Departmental	34	77	38	46.63	589	153.29
Fisheries federation	09	39.69	01	0.50	5	1.00
Private area	26	78.00	21	28.93	127	53.29
Total	69	194.71	60	76.06	721	207.58

Fish Seed Production scheme: This is the state plan scheme and was introduced in 2003-04 with the objective of the development of aquaculture by providing healthy fish seed. Under the normal plan and tribal sub-plan, the main task of this scheme is to produce quality fish seed through scientific methods and fulfill the requirement of fish farmers who are residing in remote areas. Demand for fish seed for departmental reservoirs and rivers ranching is also met out under the scheme. Various component on which budget incurred is farm maintenance, electric charges, hatchery operation, seed production and rearing, feeding and rising of new infrastructure. For producing fish seed the existing 69 circular hatcheries, 60 fish farms and 721 individual rearing spaces with available water area of 415.01 ha are involved in fish seed production in Government and private sector. Present demand of fish seed production is placed at 98.16 crore standard fry against of which 153.71 crore fry have been produced in 2016.

Development of reservoirs and rivers scheme: This is another component of state plan scheme for development of reservoir and rivers of the state. This scheme mainly aims to maintain the biodiversity in natural resources like reservoirs and rivers by fish seed ranching. As per state policy of reservoirs, average water area up to 200 ha has been transferred to PanchayatRaj bodies for leasing out to the local fishermen co-operatives. According to the policy, three-tier Panchayats under their jurisdiction have a provision of leasing for fixed period of 10 years for the up to 200 hectares of irrigation reservoir to local fishermen. Recently amendments have been done. Water bodies of 200-1000 ha and above 5000 ha are leased out to fishermen co-operative societies by the Department. Water body above 1000-5000 ha is allotted to Chhattisgarh MatsyaMahasangh on a royalty basis. Chhattisgarh is mostly covered by Mahanadi and Godavari river systems. However, some area of the state has also some portion of Ganga and Narmada river systems.

Fish seed stocking in Rivers and Anicuts: As per instruction and recommendation by Prakkalan Committee of Assembly of Chhattisgarh Department new programme for fish seed stocking in rivers and anicuts of the State for the year 2015-16 has been started. Departmental training: This programme is mainly for improving the knowledge and skill of fish farmers and improving their livelihood conditions by providing training through the state plan schemes. Under these schemes general, tribal and scheduled caste fishermen are being trained with modern scientific methods of fish culture, capture, net making, boat rowing are taught for a duration for 10 days. Each fisherman is paid for ₹1,250/- which includes. 75/- per day scholarship, Nylon twine worth value of ₹400/- and ₹100/- is also given along with travel fare and other expenses. After implementation of this scheme 6,000 fishermen have been benefitted in 2015-16. Out of state study tour: This is the state fisheries scheme introduced in 2003-04. Apart from the local trainees, the progressive fish farmers of different sector of the state are sent to other states to learn advanced techniques of fish culture. For this Government provides ₹2500/- per trainee and expenses are met for 10 days for out of state tour. This includes training allowance of ₹750/-, ticket fare of ₹1500/- and miscellaneous expenditure ₹250/-. After implementation of this scheme 450 fishermen have been benefitted in 2015-16. Polyculture-Prawn culture and Ornamental fish culture: This is the state fisheries scheme introduced in 2007-08. This scheme is mainly for providing financial assistance to fish farmers for development of fisheries. Under this scheme, the scheme of grants for prawn culture and ornamental fish culture has been implemented for general and scheduled caste/tribefish farmers.

Under the scheme, there is a provision of grant of ₹15,000/- for purchase of prawn seeds and ₹12,000/- for fish seeds for maximum amount of three years for fertilizers etc. (first year ₹7,500/- second year ₹4,965/- and third-year ₹2,535/-). After implementation of this scheme 409 fishermen have been benefitted in 2015-16. Assistance for net and boat: This was introduced in 2007-08, with the objective of providing fishery equipment to beneficiaries in the state. Assistance to tribalfish farmers and other fish farmer towards support for net/boat for fishing was provided. There is a provision of ₹30,000/- for boat and a net. The funding pattern of this scheme is 100% by the state Government. After implementation of this scheme, 856 fish farmers have benefitted in 2015-16. Assistance for fish seed rearing unit: This scheme was implemented in the year 2007-08 for the purpose of developing spawn culture in the village area. Spawn stocking of seasonal ponds is of 0.50 hectares area. For stocking of spawn 100% grant is provided by the DoF.

In the year 2015-16, a total of 204 ponds were supported by the new promotion units. Assistance in fingerling stocking: The funding pattern of this scheme is 100% by the state Government Assistance, for SC, ST and General Category fish farmers. Fingerling stocking in ponds is taken up at a provision of 50% subsidy, ₹ 2000/- for the purchase of fingerling for 5 years assistance. In the year 2015-16, 7,149 pond owners have benefitted by this scheme. Assistance for retail sale: This is the state fisheries new scheme that has been taken up in 2010-11. Assistance is given to SC, ST and General category fish farmers for purchase of ice box, weighing machine, fish quality checker machine etc. Provision of ₹ 6000/- is made to each beneficiary for purchasing the necessary equipment for fish selling. In the year 2015-16, total 363 fish farmers have benefitted from this scheme.

Table 6. Beneficiaries of fisheries development programmes

S. No.	Programmes			%	
				Not Benefitted	Benefitted
	Fish seed production			24.2	75.8
	Development of reservoirs and rivers			67.5	32.5
	Departmental training			30.8	69.2
	Out of state study tour			78.3	21.7
	Poly culture, prawn culture and ornamental Fish culture			79.2	20.8
	Assistance towards net and boat			22.5	77.5
	Assistance towards fish seed rearing in seasonal ponds			33.3	66.7
	Assistance towards fingerling stocking			43.3	56.7
	Assistance towards retail sale			22.5	77.5
	Grants towards registered fishermen co-operatives societies			40.0	60.0

Grant to registered fishermen co-operatives societies: This is the state fisheries scheme introduced in 2003-04. Assistance upto ₹3 lakh is given to cooperative society for three years towards purchase of instruments and other items. As per the Government policy, water bodies above 1 ha are to be leased out to co-operatives. Financial assistance to fishermen cooperatives in the form of loan and subsidies is provided under this scheme. Fishermen Cooperative Society are provided subsidy up to a maximum of ₹25,000/- for three years. Out of 120 fish farmers selected for the study, all had benefitted from more than one scheme. Details of the same are presented in Table 6. All beneficiaries had benefitted from more than one scheme. A perusal of Table 6 reveals that a total of 77.5% of fish farmers have benefitted from the scheme of assistance for retail sale/net and boat, 75.8% benefitted from fish seed production scheme, 69.2% from departmental training programmes, 66.7% from assistance for fish seed rearing in seasonal ponds, 60% from grants to registered fishermen cooperatives societies, 56.7% from assistance for fingerling stocking, 32.5% from reservoir and river development scheme, 21.7% from out of state study tour programmes and 20.8% from Polyculture-prawn culture/ ornamental fish culture programmes.

The third objective was to study the profile of beneficiaries. Keeping this in mind various aspects of the fish farmers viz; age, educational qualification, caste category, religion, marital status, family type and family size, occupation and experience in fisheries were recorded. It was found that majority of farmers (86.7%) belong to middle age group (i.e. 30-60 years), followed by old age group (i.e. >60 years). Only 3.3% of the fish farmer's population belong to the younger age group (i.e. up to 30 years). Similar findings have been observed in study by [4]. However, that study focused on women fish farmers of Chattisgarh.

A total of 29.2% of fish farmers were found to be having a secondary level of education, followed by primary (25.8%), 16.7% of fish farmers had higher secondary education, 13.3% of them were illiterate and few i.e., 11.7% and 3.3% had graduate and post-graduate level educational qualification respectively. Out of the 120 fish farmers, majority of them (95.8%) belong to the Other Backward Class (OBC). Majority (99.2%) of the fish farmers were Hindu. All fish farmers were married. Majority (75.8%) of fish farmers had joint family setup and only 24.2% had nuclear family setup. A total of 68.3% of fish farmers had 6-10 members family size compared to 20.2% having a small family size of 1-5 and only 11.7% of large family size (>10).

A total of 65% had only fisheries as their occupation, 27% also had agriculture and others have business and service also and 39.2% of fish farmers had 11-20 years of experience in fisheries followed by 30.8% having <10 experience, 18.3% having 21-31 year experience. Other than studies by [5-9] not many studies have been done with reference to fishfarmers of Chattisgarh. Study [5] was devoted to fish farmers who were involved in traditional fish processing work. Study by [10, 11] focused on women involved in fisheries work in Chattisgarh. In absence of similar studies in Chattisgarh comparisons could not be made. However, study [7] has reported about the socio-economic status of people involved in fish marketing in one of the districts in Chattisgarh, but this study is limiting in its sample size.

4. Conclusion

It is clear from the study that a number of schemes/programmes are in progress by the DoF in Chattisgarh and number of fish farmers has been benefitted from these schemes. These interventions are identified to have high potential to promote fisheries activities and well-being of the fish farmers. With reference to the fish farmers, about 65% of fish farmers had only fisheries as their occupation and across all age groups. Some fish farmers (13.3%) reported that they were illiterate, showing that the schemes have also benefitted those who are not educated. Out of 120 fish farmers selected for the study, fish farmers had benefitted from more than one scheme. So it can be concluded that schemes for fisheries development are showing growth and yielding benefits inter alia through sound policies and strategies backed by strong research programmes by national and regional Governments and knowledge sharing.

Regional Consultation Meeting by NitiAyoghad provided their suggestions that the private entrepreneurs/farmers should be encouraged through different schemes to construct fish ponds on their private lands and enhance fish rearing activities. For increasing fish productivity new technologies relating to fishing sector like use of cage in ponds, use of new species may be encouraged through specialized schemes.

5. Acknowledgements

The authors would like to thank Dr. Gopal Krishna Director, ICAR-CIFE for his support. Authors are indebted to the fish farmers and DoF; Chattisgarh who shared the information for research purposes.

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The Publication fee is defrayed by Indian Society for Education and Environment (www.iseeadyar.org)

Cite this article as:

Arpita Sharma, Gaiind Singh. Fisheries development programmes and profile of beneficiaries in Chhattisgarh. *Indian Journal of Economics and Development*. Vol 6 (4), April 2018.