



Constraints of inland fish production and marketing in Northern Dry Zone of Karnataka: A descriptive study

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Received : 12.03.2022 ; Revised : 29.04.2022 ; Accepted : 10.05.2022

DOI: <https://doi.org/10.22271/09746315.2022.v18.i2.1599>

ABSTRACT

The present study was undertaken to analyze the constraints involved in production and marketing of inland fish in Vijayapura and Bagalkote districts of the Northern Dry Zone of Karnataka. The study was based on primary data and the simple random sampling procedure was adopted to choose inland fish farmers and marketing intermediaries. The major constraints faced by respondents in production and marketing of inland fish are high mortality of fish, non-availability of quality fish seed, inadequate financial assistance, high perishability of produce, huge competition, lack of proper storage facilities etc. Provision of need based training to the fish farmers can enhance the returns from fish farming as well as can encourage the farmers to invest further and providing scientific storage facilities to the marketing intermediaries helps to handle the produce in large quantity and leads to improve in fish production.

Keywords: Constraints, inland fish farming, marketing, production, ranking.

India is one of the world's largest fish producers, accounting for 7.58 per cent of global production. Fisheries and aquaculture continues to be a major source of food, nutrition, income, and livelihood for millions of people, contributing 1.24 per cent to India's Gross Value Added (GVA) and 7.28 per cent to the agricultural GVA (2018-19). From 2014-15 to 2018-19, India's fisheries sector had exceptional growth, with an average annual growth rate of 10.88 per cent. From 2014-15 to 2018-19, India's fish output increased by 7.53 per cent on a yearly basis, reaching an all-time high of 137.58 lakh metric tonnes in 2018-19 (NFDB, 2020).

Karnataka is the country's ninth-largest producer of fish which has a 320-kilometer-long coastline, a 27,000-square-kilometer continental shelf, 5.65 million hectares of varied inland water resources, and plenty of room for fisheries development. The 8000 hectares of brackish water provide ample opportunities for fish farming. In the state, there are around 9.61 lakh fishermen active in various fisheries operations, with 3.28 lakh in the maritime sector and 6.33 lakh in the inland sector. During the year 2017-18, the state's total inland fish production was 1.88 million tonnes (Anon., 2018).

Karnataka's total inland fish production was 1,58,568 MT. The top three fish-producing districts are Shivamogga, Mandya and Bellary with 17,443 MT, 12,924 MT and 10,388 MT, respectively. Karnataka accounts for around 4.64 per cent of India's total fish production. The Karnataka State is divided into the 10 various agro-climatic zones. The Northern Dry Zone (NDZ) of Karnataka is one of main drought prone agro climatic zone of the state. Among the 9 districts of NDZ,

Vijayapura was the third highest (4,744 MT) and Bagalkote was the third lowest (3,349 MT) in fish production (Anonymous, 2018). The activity of fisheries and aquaculture is less observed in this zone and farmers possessing farm ponds are taking up the inland fishery activity. There is very few literature available regarding fisheries and aquaculture in the study area.

Though it has been revealed from the previous studies that fish farmers in the study area have received a significant amount of income from inland fish farming activity, production and income from fisheries are not as expected due to a number of issues such as lack of institutional support, seed-related issues, high input costs, unfavourable fish prices, middlemen involvement, a lack of infrastructure facilities, and pond-related issues (Harish Kumar *et al.*, 2020). Similar limits and other difficulties comprising of 33 constraints identified from literature have been grouped into technological, social, administrative, economic, infrastructural and extension constraints (Pandey *et al.*, 2014) and similar constraints have been discovered in a few studies on the fish farming industry in other Indian states (Rahaman *et al.*, 2013). As a result, an attempt has been made to investigate fish farmers' perspectives of the constraints related to production and marketing in Karnataka's Northern Dry Zone.

MATERIALS AND METHODS

This study was conducted in the Northern Dry Zone of Karnataka. The Northern Dry Zone consists of nine districts *viz.*, Bellary, Raichur, Vijayapura, Davangere, Belagavi, Koppal, Bagalkote, Dharwad and Gadag dis-

districts. Vijayapura and Bagalkote districts were purposively chosen based on researcher convenience and by looking at the third highest and third lowest fish production districts for the year 2018-19 (Anonymous, 2018). The list of inland fish farmers was collected from Fisheries Research and Information Center, Bhutnal, Vijayapura and Fishery Department office in the respective districts. From selected districts, sixty fish growers (30 each from two districts) were selected randomly. From each district one fish market was selected and from each market 30 market functionaries were selected randomly. Thus sample size consists of 120 respondents. The data were collected by the survey method with the help of pre tested semi-structured interview schedule.

During the pre-testing survey and from the literature and expert consultations, ten problems were identified in fish production such as, inadequate financial assistance, theft and pilferages, high mortality of fish, lack of natural feed, water scarcity, non-availability of quality fish seed, natural predator problem, diseases of fish, lack of extension services and unfavourable prices of fish.

With respect to fish marketing eight constraints were identified related to high price fluctuations, huge competition among market functionaries, inconsistent supply of fish, high perishability of the produce, non-availability of specific fish species, lack of proper storage facility, high shop rent and unsuitability of market yard. Constraints faced by the respondents were ranked according to the Garrett's score.

Garrett Ranking Technique

In order to conduct this investigation, inland fish farmers and market functionaries were requested to identify specific challenges in the growing and marketing of fish. In the schedule, all known constraints were enumerated, and they were asked to rank the problems in order of importance (Rahaman *et al.*, 2013). The ranks given by them were quantified using Garrett Ranking Technique using the following formula:

$$\text{Per cent position} = \sum_{j=1}^n \left[\frac{(R_{ij} - 0.5)}{N_j} \right] \times 100$$

Where,

R_{ij} = Rank given for the i^{th} item by the j^{th} individual, and

N_j = Number of items ranked by the j^{th} individual

The per cent position of each rank was converted to scores by referring to table given by Garret and Woodworth (1969). Then for each factor, the scores of individual respondents were summed up and divided by the total number of respondents for whom scores were gathered. The mean scores for all the factors were ranked, following the decision criterion, that more the value and better the farmers' opinion.

RESULTS AND DISCUSSION

Socio-economic profile of inland farmers

The socio economic indicators like gender, age, education, family size and occupation were studied for the in-depth analysis of socio-economic characteristics of fish producers in Vijayapura and Bagalkote districts. The results are presented in Table 1

Gender

It could be observed from the table that 95 per cent of the respondents in the overall study area were male. In Vijayapura and Bagalkote districts, the proportions of male respondents was 93.33 per cent and 96.67 per cent, respectively and were the decision makers and does lot of physical work related to pond management.

Age of the respondents

Age of respondents is an important determinant in estimating the potential productive human resources (Thejeswini, 2015). Age of the sample respondents was divided into three groups namely young age group (< 35 year), middle age group (35 to 50 years) and old age group (> 50 years). In both districts, majority of the fish farmers (56.67 per cent) belonged to middle age (35 to 50 years). In Vijayapura district 30 per cent of the respondents belonged to the group of young age and 13.33 per cent belonged to old age group while in Bagalkote district 23.33 per cent and 10 per cent of respondents belonged to young and old age groups, respectively. The young and middle age group were energetic and willing to adopt the new technology than the old farmers (Thejeswini, 2015).

Educational status

Based on education level, respondents were classified into different categories such as, illiterate, literate's upto primary, high school, college (Pre University Course - PUC) and graduate level. About 40 per cent of the respondents in Vijayapura district were graduates while it was only 13.33 per cent in the case of respondents from Bagalkote district and for the overall study area graduated respondents were 26.67 per cent. Majority (33.33 per cent) of respondents in Bagalkote district were studied only up to primary while it was 13.33 per cent in Vijayapura district. For the pooled data of respondents of both the districts, 25 per cent attained high school, 23.33 per cent studied up to primary, 16.67 per cent studied up to college (PUC) and 8.33 per cent were illiterate. Educational status of fish farmers revealed that majority of the fish farmers were literates in both Vijayapura (93.33 %) and Bagalkote (90 %) districts, who pursued their education from primary to graduation level. Inland fisheries being a less adopted investment enterprise in the study area, it has been perceived by

Table 1: Socio-economic characteristics of the fish farmers in the study area

Particulars	Vijayapura (n=30)		Bagalkote (n=30)		Overall (N=60)	
	Fish farmers (no.)	%	Fish farmers (no.)	%	Fish farmers (no.)	%
GENDER						
Male	28	93.33	29	96.67	57	95
Female	02	06.67	01	03.33	03	5
Total	30	100	30	100	60	100
AGE (years)						
Young (<35 years)	9	30.00	7	23.33	16	26.67
Middle (35-50 years)	17	56.67	17	56.67	34	56.67
Old (>50 years)	4	13.33	6	20.00	10	16.66
Total	30	100	30	100	60	100
EDUCATION						
Illiterate	2	06.67	3	10.00	5	8.33
Primary	4	13.33	10	33.33	14	23.33
High school	7	23.33	8	26.67	15	25
College (PUC)	5	16.67	5	16.67	10	16.67
Graduation	12	40.00	4	13.33	16	26.67
Total	30	100	30	100	60	100
FAMILY SIZE (No.)						
Small (2-4)	4	13.33	5	16.67	9	15
Medium (5-6)	11	36.67	17	56.67	28	46.67
Large (>6)	15	50.00	8	26.66	23	38.33
Total	30	100	30	100	60	100
MAIN OCCUPATION						
Agriculture	23	76.67	25	83.33	48	80
Government Service	4	13.33	1	03.33	5	8.33
Business	2	6.67	2	06.67	4	6.67
Labour	1	3.33	2	06.67	3	5
Total	30	100	30	100	60	100

Table 2: Land holding and experience of fish farmers (N=60)

SI. No.	Particulars	Vijayapura	Bagalkote	Overall
I	Land holding (acres)			
1.	Rainfed	7.88 (37.08)	3.9 (40.29)	5.89 (38.10)
2.	Irrigated	13.37 (62.92)	5.78 (59.71)	9.57 (61.90)
	Total	21.25 (100.00)	9.68 (100.00)	15.46 (100.00)
II	Pond size (m ²)	30×30	30×30	30×30
III	Experience in farming (Years)	13	16	14
IV	Experience in fish farming (Years)	2.5	4	3.25

Note: Figures in parentheses indicate percentage to the total.

Table 3: Constraints faced by inland fish farmers (N=60)

Constraints	Garrett's Score	Rank
High mortality of fish	75.45	I
Non-availability of quality fish seeds	63.33	II
Inadequate financial assistance	61.05	III
Theft and pilferages	59.00	IV
Lack of natural feed	48.95	V
Lack of extension services	43.90	VI
Natural predator problem	43.16	VII
Water scarcity	37.90	VIII
Unfavourable prices of fish	34.82	IX
Diseases of fish	30.43	X

Table 4: Constraints faced by market intermediaries in marketing of fish (N=60)

Constraints	Garret Score	Rank
High perishability of the produce	70.23	I
Huge competition among market functionaries	64.79	II
Lack of proper storage facility	58.08	III
Inconsistent supply of fish	56.08	IV
High price fluctuations	54.63	V
Non-availability of specific fish species	37.58	VI
High shop rent	33.46	VII
Unsuitability of Market yard	25.15	VIII

these sample farmers mostly because of their education and enabled them to invest in inland fisheries to get additional returns besides other crops.

Family size

Among the total respondents, majority (46.67 %) lived in medium size family group (5-6 members). In Vijayapura and Bagalkote districts, 36.67 per cent and 56.67 per cent of respondents belong to medium family group. Fifty per cent of respondents in Vijayapura district were living in large families while only it was 26.66 per cent in Bagalkote district. Only 15 per cent of respondents in the study area belonged to small family group.

Family sizes of the respondents are an important factor determining the availability of family labour and the ability to work save and invest in inland fisheries. The ample availability of owned work force all over the year reduces the need of hired labour and also reduces risk in a way required supply of labour force in time. Most of the respondents were belonging to the medium (5-6 members) and large (>6 members) family groups.

Occupation

With regard to occupational structure of sample fish consumers, the larger proportion of the sample farmers in Vijayapura district (76.67 %) and Bagalkote district (83.33 %) were involved in agriculture. Overall, the majority (80 %) of the respondents were practicing agriculture, followed by 8.33 per cent in Government

Service, 6.66 per cent in business and 5 per cent were occupied as labourers.

With respect to occupation, for almost all farmers, agriculture was heritable occupation from their parents because of their landholdings followed by in Government Service (8.33 per cent) due to their education status.

Table 2 presents the average land holding and experience in farming and fish rearing. Overall, respondents were holding an average size of 15.46 acres while it was 21.25 and 9.68 acres in Vijayapura and Bagalkote districts respectively. An average area under the rainfed in Vijayapura and Bagalkote districts were 7.88 and 3.9 acres, respectively and under irrigated were 13.37 and 5.78 acres, respectively. An average size of the pond in both the districts was 30x30 sq.m. In Vijayapura district, the respondents were having an experience of 13 years in agricultural activity while it was 16 years in Bagalkote district. With regard to experience in fish culture, the respondents belonging to Vijayapura district were having 2.5 years of experience, while the respondents of Bagalkote district were having 4 years of experience.

Constraints faced by inland farmers

Table 3 shows the Garrett Scores of constraints related to fish production in the study area. It is observed that high mortality of fish was the major constraint faced by the inland farmers with the Garrets score 75.45 (I) followed by non-availability of quality fish seed (II, 63.33). The other constraints faced by producers (inland

farmers) were inadequate financial assistance (III), theft and pilferages (IV), lack of natural feed (V), lack of extension services (VI), natural predator problem (VII), water scarcity (VIII), unfavourable prices of fish (IX) and diseases of fish (X).

Among the ten identified problems in fish production, high mortality of fish was found to be main problem followed by non-availability of quality fish seeds because of lack of training in the care and management of fingerlings at the initial stages and lack of awareness about stocking rate and proper feeding for fishes in different layers of waterbody. Training related to appropriate fish feed preparation should be imparted to the inland fish farmers for proper growth of fingerlings. Extension agencies should approach inland fish farmers and inform them about subsidies, schemes and regarding training facilities. Need based training needs to be provided to the inland fish farmers to develop skills in fish production. Incentives in terms of good quality fingerlings, provision of fishnets and other equipment at subsidized rate would encourage more individuals to take up the fish production activity (Dambatta *et al.*, 2016).

Constraints faced by marketing intermediaries

Table 4 presents the marketing constraints encountered by market intermediaries. The Garrett analysis indicates high perishability of the produce as the major problem faced during marketing and assigned the first rank followed by huge competition among market functionaries (II), lack of proper storage facility (III), inconsistent supply of fish (IV), high price fluctuations (V), non-availability of specific fish species (VI), high shop rent (VII) and unsuitability of market yard (VII).

The constraint high perishability of the produce (Garret's score: 70.23) followed by huge competition among market functionaries (Garret's score: 64.79) were the major problems because of high perishability combined with the lack of proper storage facilities, quality deteriorates which result lower income to the intermediaries. According to the perception of market intermediaries high perishability combined with the cut throat competition is the most damaging aspect of fish business (Rahaman *et al.*, 2013).

It is concluded that the inland fish farming is a profitable enterprise that can be taken as subsidiary occupation by the farmers who owned farm ponds in their land as it generates the additional income. This

paper analyzed the constraints in production and marketing of inland fish in Vijayapura and Bagalkote districts in the Northern Dry Zone of Karnataka and the results showed that high mortality of fish is the major constraint because as farmers were recently adopted the inland fishing activity they need training with regard to feeding and handling of fishes at fingerling stage so that the production can be increased. Provision of scientific storage facilities to the marketing intermediaries helps in handling the produce in large quantity and leads to improvement in fish production. Similar constraints are observed over different areas of country, the results maybe generalized and suitable policy measures can be taken for further increase in fish production.

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