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Relative and Marginal Effects of Fish Production on Family Income Inequality in Tripura: Decomposition of *Gini* by Income Sources

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Abstract

The extent of income inequality, contribution of alternative income sources to inequality as well as their relative and marginal effects with special reference to fish production in the West Tripura district of Tripura state have been examined for the year 2003-04. The data have been collected from 60 fish-farming households in three selected blocks by multi-stage random sampling method. The *Gini* has been decomposed by income sources using the approach of Lerman and Yitzhaki, which views each source's contribution to inequality as the product of its own inequality, its share of total income, and its correlation with the rank of cumulative total income. The study has indicated that to make the family income distribution more equitable among the fish-farming households, the fish production has a pivot role to play.

Introduction

The analysis of income distribution has remained an area of intense research since the publication of the seminal works of Kuznets (1955) and Chenery *et al*. (1974). However, from the policy perspective, to answer the question, 'What impact does a marginal increase in a particular income source have on inequality?' is more important than measuring simply the extent of income inequality. Thus, the present paper has examined the extent

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of income inequality, contribution of alternative income sources to inequality as well as their relative and marginal effects with special reference to fish production in the West Tripura district of Tripura state for the year 2003-04.

Methodology

The study was confined to the West Tripura district which has the highest contribution to the fish production in the state of Tripura. The multi-stage random sampling method was adopted for the selection of fish-farming households. The West Tripura district was divided into sixteen rural development blocks out of which three development blocks, namely Melaghar, Bishalgarh and Mohanpur, were selected. Three villages from each of the selected development blocks were selected randomly from the list of villages having atleast five-hectare area under fish culture. Ultimately, a sample of 60 fish-farming households for each selected block, proportionately allocated to the villages (marginally adjusted), was obtained from the list of fish farmers. The data were collected with the help of specifically designed and pre-tested schedule.

Theoretical Framework and Analytical Tools

Several methods to measure inequality are available in literature and their characteristics have been discussed by different authors (Kakwani, 1980; Champernowne, 1972; Dasgupta *et al*., 1973). The use of *Gini* is not simply acceptable, it is also desirable (Shorrocks, 1982). Although *Gini* index is more sensitive to mean income than to income inequality (Sharma *et al*., 1994), this measure of inequality (but not variance-based measures like coefficient of variance) permits formation of the necessary conditions for stochastic dominance.

Shorrocks (1982) has demonstrated that there exists no unique way to decompose inequality. He derived what he calls "natural decompositions" of the *Gini*, in which each source's contribution to inequality equals the product of its share of total income and the pseudo-*Gini*. Lerman and Yitzhaki (1984) have developed an approach for decomposition of *Gini* which falls in the category of "natural decomposition". Their decomposition yields an intuitive interpretation of the elements making up each source's contribution to inequality. Viewing each source's contribution as the product of its own inequality, its share of total income, and its correlation with the rank of cumulative total income, appears more compelling and less arbitrary than other specifications of natural decomposition (where a source's contribution is the product of the income share and pseudo-*Gini*). An important advantage of this approach is its use in examining the marginal changes in the size of

an income source on overall inequality. The common approach used for examining the marginal changes is to compare inequality with and without the income source in question (Danziger, 1980; Reynolds and Smolensky, 1977). This approach amounts to asking the less meaningful question of what a total elimination of one source would do to inequality. Moreover, this approach can yield results that depend on ordering of sources. Lerman and Yitzhaki approach is free from these disadvantages.

Keeping in view the advantages of the approach developed by Lerman and Yitzhaki, it was used in the present study. The mathematical form of the approach adopted from Lerman and Yitzhaki (1984) is presented as follows:

$$G = \sum_{k=1}^{k} [R_k \times G_k \times S_k]$$

$$R_k = \text{cov}\ (y_k, F) \div \text{cov}\ (y_k, F_k)$$

$$G_k = 2\,\text{cov}\ (y_k, F_k) \div m_k$$

$$S_k = m_k \div m$$

where,

G = Overall/conventional *Gini*;

G_k = Relative *Gini* component of the k^{th} income source;

R_k = '*Gini* correlation' of the k^{th} income component with the rank of cumulative family income, which has the properties similar to Pearson's and the rank correlations;

S_k = Component of the k^{th} source's share in total income;

y_k = The k^{th} component of family income,

F = Rank of cumulative distribution of family income (obtained after arranging in ascending order);

F_k = Rank of cumulative distribution of the k^{th} income source (obtained after arranging in ascending order);

m_k = Share of the k^{th} income source in the family income; and

m = Total family income.

The income source's inequality contribution (I), relative income inequality (RII) and relative marginal effect (RME) for the k^{th} source of family income are obtained as follows:

$$I_k = R_k \times G_k \times S_k \div G$$

$$RII_k = I_k \div S_k$$

$$RME_k = I_k - S_k$$

where,

Rk, $Gk_{,}$ S_K and G have the same meanings as defined earlier.

Results and Discussion

Fishery Resources of Tripura

Fish is an important food item for about 95 per cent population of the Tripura state (Sarkar, 2002). The aqua-resources of Tripura include reservoirs, lakes, rivers and rivulets (10000 ha), ponds/tanks (9070 ha) and mini barrages (4270 ha). All these aqua-resources comprise only 2.22 per cent of the total geographical area of the Tripura state. There were about 93870 fish farmers in the state in 2001-02. The basic secondary data on fisheries for Tripura, which highlight its importance in the state, have been given in Annexure I.

Fish Production System in West Tripura

In India, many fresh water aquaculture production systems are being followed to grow carps and other species, a high-yielding polyculture production system better known as 'composite fish culture system' is the widely adopted technology among the Indian fish farmers (Sinha, 1991). In this system, ponds are stocked with compatible indigenous and exotic carps, which have different feeding habits. Therefore, this system provides comparatively a far greater output of fish than those that are stocked with an equal number of either indigenous species or exotic species (Srivastava *et al*., 1990).

In the study area, 98 per cent sampled fish farmers were found to follow polyculture of carps (Table 1). About 2 per cent followed polyculture of carps and prawns. Rohu, followed by mrigal, catla, common carp and silver carp were the most preferred fish species cultured in the study area. Other important fish species were grass carp, bighead and Japani punti. A few uncommon fish species, namely gonia, tilapia, calbasu, bata and pangas, were also found to be cultured by less than 2 per cent fish-farming households.

The species-mix and stocking rate are two important determinants of economics of pisci-culture. The ratio of fish species stocked (on the basis of fingerlings stocked) under different species-mix along with percentage of fishing households following them and the average stocking rate (fingerling No. per acre) have been shown in Table 1. The stocking rate was found very high in the existing production system in the study area as compared to that in the scientific composite fish culture (Table 1).

Table 1. Percentage of fishing households, ratio of fish species stocked under different species-mix , stocking rate and production pattern, West Tripura district, Tripura: 2003-04

Species-mix	Per cent households	Rohu	Catla	Mrigal	Common carp	Silver carp	Grass carp	Bighead	Stocking rate (fingerling No./acre)
i.	26	0.20	0.08	0.15	0.40	0.14	0.03	-	7800
ii.	30	0.21	0.10	0.50	0.14	0.05	-	-	9200
iii.	21	0.32	0.18	0.21	0.30	-	-	-	5400
iv.	6	0.18	0.06	0.17	0.31	0.16	0.01	0.11	10500
v.	3	0.52	0.11	0.37	-	-	-	-	1000
vi.	12	Polyculture of carps plus one or two indigenous fish species (Japani punti, gania, tilapia, calbasu, bata, pangas, etc.)							
vii.	2	Polyculture of carps and prawns							
Scientific species-mix*		0.30	0.25	0.15	0.20	0.10	-	-	3000
Production (% to total)		25.16	16.58	22.65	17.75	15.60	1.02	0.89	-

* Anonymous (2002)

The important fish species-mix were:

(i) Rohu + catla + mrigal + common carp + silver carp + grass carp,
(ii) Rohu + catla + mrigal + common carp + silver carp,
(iii) Rohu + catla + mrigal + common carp, and
(iv) Rohu + catla + mrigal + common carp + silver carp + grass carp + bighead.

On the basis of per cent share in total seed stocked by the sampled households, mrigal (33.11%), common carp (24.78%) and rohu (24.36%) were the dominant fish species. A comparison of the existing ratio of fish species-mix and the recommended one revealed the deviations from scientific fish culture in the study area.

On the basis of production, rohu was the most dominant fish species constituting more than 25 per cent of the total fish produced, followed by mrigal (23%), common carp (18%), catla (17%) and silver carp (16%).

It was observed that the farmers utilized multi-sources for procuring fish seed, but fish traders/commission agents emerged as the most important source since 61 per cent farmers procured fish fingerlings from this source. The private hatcheries (18% fish farmers), government hatcheries (11% fish farmers) and own hatcheries (7% fish farmers) were other sources of fish fingerlings.

Lime, cow dung, rice bran and oil cake were the important inputs used by 79, 82, 72 and 68 per cent of the fishing households. Chemical fertilizers were used by 14 per cent of the sampled households. The important fertilizers applied were urea and single super phosphate. Pellet feed was used by 8 per cent of the farmers and 11 per cent were incurring expenses on healthcare/ disease control. Only 6 per cent fishing households reported using none of the inputs, except seed. About 90 per cent of the fish ponds were perennial and a majority (≈87%) of the fish farmers were practising fish culture in ponds owned by them.

Area, Production, Yield and Average Annual Income Estimates

The average pond area per household, average fish production per household, average fish yield, average annual income per household from fish production as well as total income from all the sources for selected rural development blocks of the West Tripura district of Tripura state, namely Melaghar, Bishalgarh and Mohanpur, have been presented in Table 2. The average pond area and average fish production per household were the highest in the Melaghar block (1.02 ha and 1485.80 kg, respectively), whereas for the overall situation, i.e. the West Tripura district, the respective figures were 0.49 ha and 666.45 kg.

Table 2. Area, production and yield of fish, and average annual income, block-wise, West Tripura district, Tripura: 2003-04

Area	Average pond area per household (ha)	Av. fish production per household (kg)	Average fish yield (kg/ha)	Average annual income per household (Rs)	
				Fish production	Total income
Melaghar block	1.02	1485.80	1456.53	60859	123068
Bishalgarh block	0.17	283.74	1674.59	15438	65202
Mohanpur block	0.18	105.36	575.12	5511	70621
West Tripura district	0.49	666.45	1373.37	28874	88127

A perusal of Table 2 reveals that fish production contributed, on an average, about 33 per cent to the total income. Its contribution was as high as 49.45 per cent in the Melaghar block, whereas it was about 24 per cent in case of the Bishalgarh block and less than 8 per cent in the Mohanpur block.

In the Mohanpur block, 95 per cent fish farmers were found culturing fish for subsistence only, using the traditional methods of fish culture. The expenses on inputs like seeds, lime, fertilizers and feeds were negligible. Consequently, the average fish production per household as well as average fish yield had been very low.

A majority of fish producers in the Melaghar and Bishalgarh blocks were found commercialized practising semi-intensive fish culture due to which the average fish yields were high.

Distribution of Fish-farming Households (Source-wise Income)

The source-wise income distribution of fish-farming households along with average income has been given in Table 3. A majority of the fish farmers produced paddy in the study area. The average income per fish-farming household from paddy production was the highest for the Mohanpur block, followed by the Bishalgarh block. The government job, which contributed towards the family income of 31.11 per cent of fish farmers, was the most remunerative source of income. The percentage of fish-farming households earning income from government jobs was the highest in the Mohanpur block, followed by the Melaghar block.

The Decomposition Estimates

In the present study, the non-farm family-income sources, namely private job, government job, self-employment and labour, and the farm-income

Table 3. Distribution of fish farming households, income source-wise, West Tripura district, Tripura: 2003-04

(Av. income in Rs/annum)

Income source	Melaghar block		Bishalgarh block		Mohanpur block		West Tripura distt.	
	No.	Av. income	No.	Av. income	No.	Av. income	No.	Av. income
Private job	7 (11.67)	27800	12 (20.00)	23429	8 (13.33)	38600	27 (15.00)	29176
Govt. Job	19 (31.67)	83354	14 (23.33)	51420	23 (38.33)	70357	56 (31.11)	70856
Self-employment	7 (11.67)	30200	21 (35.00)	45792	23 (38.33)	22214	51 (28.33)	32629
Labour (non-farm)	11 (18.33)	17288	22 (36.67)	13500	15 (25.00)	18611	48 (26.67)	16043
Fish production	60 (100.00)	60859	60 (100.00)	15438	60 (100.00)	5511	180 (100.00)	28874
Paddy production	36 (60.00)	11360	31 (51.67)	14967	30 (50.00)	22917	97 (53.89)	15834
Vegetables production	26 (43.33)	10120	14 (23.33)	9600	25 (41.67)	3817	65 (36.11)	8064
Fruits production	9 (15.00)	1383	2 (3.33)	1500	17 (28.33)	2950	28 (15.56)	2312
Milk	15 (25.00)	3070	3 (5.00)	4500	17 (28.33)	4170	35 (19.44)	3700
Fish seed production	12 (20.00)	41925	2 (3.33)	36975	0 (0.00)	0	14 (7.78)	41925
Others	19 (31.67)	9792	17 (28.33)	8470	13 (21.67)	18313	49 (27.22)	11564
Total	60 (100.00)	123068	60 (100.00)	65202	60 (100.00)	70621	180 (100.00)	88127

Note: Figures within the parentheses denote percentages to total.

sources, namely fish production, paddy, vegetables, fruits, milk, fish seed production, were considered. The income from sources like pensions/transfer payments, piggery, poultry, farm labour, etc. was included under the 'others' head of income source. The estimates of the decomposition analysis have been presented in Table 4.

The income from the fish production contributed the largest share to family income (S_k) in the Melaghar Block (49.45%) and the West Tripura district (32.76%), and the second largest share, after income from the self-employment, in the Bishalgarh block (23.79%). In the Mohanpur block, the share of income from fish production was 7.80 per cent, whereas income from the government jobs contributed the largest share (38.74%), followed by paddy production (16.23%).

The inequality in the distribution of income (G_k), source-wise, was found highest in fish seed production for the overall situation, i.e. the West Tripura district, due to the fact that a majority of the fish-seed producers were in the Melaghar block. But, the same coefficient in the Melaghar block also showed a higher income inequality. This was due to less number of households producing fish seed (20% only) and also relatively high average income from fish-seed production (after government job and fish production) (Table 3). The distribution of income from private jobs was found the most uneven amongst the sources considered, in respect of all the blocks under study. The income from the labour (non-farm) was evenly distributed. The income distribution from fish production was also relatively better, as compared to that from other sources.

A highly positive correlation between income from fish production and rank of cumulative family income (R_k) was observed for the overall situation as well as the Melaghar block, whereas in the Bishalgarh and Mohanpur blocks, the *Gini* correlation coefficient was 0.51 and 0.30, respectively. The positive correlation shows the potential in enhancing family income by increasing income from fish production. The *Gini* correlation for income from fruit production was found negative in the Melaghar block and West Tripura district, and income from dairy in the Melaghar block. This was due to the reason that a majority of the households producing fruit and milk did not have income from high income generating sources like government jobs, private jobs, self-employment, etc.

The magnitude of conventional *Gini* (G), which is the product of R_k, G_k and I_k, revealed a fair distribution of family income in the study area. The family income inequality was found maximum in the Melaghar block (0.4542), followed by West Tripura (0.4255), Bishalgarh (0.3978) and Mohanpur (0.3022) blocks. This showed that distribution of family income was relatively better in the Mohanpur block than other blocks under study.

Table 4. Impact of alternative income sources on family income inequality, West Tripura district, Tripura: 2003-04

Income source	R_k	G_k	S_k	I_k	RII_K	RME_k
Melaghar block						
Private job	0.0155	1.6736	0.0275	0.0016	0.0572	-0.0260
Govt. job	0.4358	1.1982	0.2148	0.2469	1.1499	0.0322
Self-employment	0.0545	1.6606	0.0299	0.0060	0.1992	-0.0240
Labour (non-farm)	0.0082	0.0000	0.0274	0.0000	0.0000	-0.0274
Fish production	0.8587	0.6657	0.4945	0.6224	1.2587	0.1279
Paddy production	0.0711	0.8740	0.0563	0.0077	0.1368	-0.0486
Vegetables production	0.0069	0.8513	0.0501	0.0006	0.0129	-0.0495
Fruits production	-0.2226	1.5971	0.0016	-0.0013	-0.7829	-0.0029
Milk	-0.3235	1.3983	0.0061	-0.0061	-0.9960	-0.0121
Fish seed production	0.4981	1.5419	0.0665	0.1124	1.6910	0.0459
Others	0.1304	1.3396	0.0252	0.0097	0.3846	-0.0155
Total	-	**0.4542**	1.0000	1.0000	-	-
Bishalgarh block						
Private job	0.2735	1.6203	0.0722	0.0804	1.1142	0.0082
Govt. job	0.5034	1.4391	0.1811	0.3298	1.8212	0.1487
Self-employment	0.4412	1.2066	0.2419	0.3237	1.3381	0.0818
Labour (non-farm)	0.1193	0.0000	0.0773	0.0000	0.0000	-0.0773
Fish production	0.5127	0.4667	0.2379	0.1431	0.6015	-0.0948
Paddy production	0.3787	0.9175	0.1186	0.1036	0.8734	-0.0150
Vegetables production	0.1379	1.4115	0.0338	0.0165	0.4893	-0.0173
Fruits production	-	-	-	-	-	-
Milk	-	-	-	-	-	-
Fish seed production	-	-	-	-	-	-
Others	0.0239	1.2772	0.0373	0.0029	0.0768	-0.0344
Total	-	**0.3978**	1.0000	1.0000	-	-
Mohanpur block						
Private job	0.1608	1.6075	0.0759	0.0649	0.8551	-0.0110
Govt. job	0.5475	1.0690	0.3874	0.7503	1.9365	0.3628
Self-employment	0.1592	1.0854	0.1223	0.0699	0.5716	-0.0524
Labour (non-farm)	0.1471	0.0000	0.0659	0.0000	0.0000	-0.0659
Fish production	0.3048	0.3002	0.0780	0.0236	0.3027	-0.0544
Paddy production	0.1146	0.9223	0.1623	0.0567	0.3497	-0.1055
Vegetables production	0.2508	1.1070	0.0225	0.0207	0.9187	-0.0018
Fruits production	0.0599	1.3642	0.0116	0.0031	0.2702	-0.0085
Milk	0.1387	1.2852	0.0164	0.0097	0.5898	-0.0067
Fish seed production	-	-	-	-	-	-
Others	0.0037	1.4807	0.0576	0.0010	0.0180	-0.0566
Total	-	**0.3022**	1.0000	1.0000	-	-

Contd

Table 4. Impact of alternative income sources on family income inequality, West Tripura district, Tripura: 2003-04 — *Contd*

Income source	R_k	G_k	S_k	I_k	RII_K	RME_k
			West Tripura district			
Private job	0.1369	1.6555	0.0503	0.0268	0.5326	-0.0235
Govt. job	0.4854	1.2445	0.2513	0.3567	1.4198	0.1055
Self-employment	0.1990	1.3471	0.1025	0.0646	0.6300	-0.0379
Labour (non-farm)	0.0764	0.0000	0.0488	0.0000	0.0000	-0.0488
Fish production	0.7820	0.6982	0.3276	0.4204	1.2831	0.0928
Paddy production	0.1728	0.9196	0.0979	0.0365	0.3734	-0.0613
Vegetables production	0.1496	1.1152	0.0392	0.0154	0.3921	-0.0238
Fruits production	-0.0163	1.6356	0.0040	-0.0002	-0.0628	-0.0042
Milk	0.0416	1.5070	0.0082	0.0012	0.1473	-0.0070
Fish seed production	0.4865	1.8224	0.0340	0.0708	2.0836	0.0368
Others	0.0660	1.3955	0.0363	0.0079	0.2164	-0.0285
Total	-	**0.4255**	1.0000	1.0000	-	-

Notes: R_k = 'Gini correlation' of the k^{th} income component with the rank of cumulative family income; G_k = Relative Gini component of the k^{th} income source; S_k =Income share of the k^{th} source, I_k =The k^{th} income source's inequality contribution; RII_k= The k^{th} income source's relative income inequality; RME_k = Relative marginal effect for the k^{th} source of family income.
Figures in bold denote conventional Gini (G)

In the Melaghar block, the income from fish production contributed to the extent of 62.24 per cent towards family income inequality due to its highly positive correlation coefficient (R_k) and the highest share (S_k). This source of family income contributed 42.04 per cent to the conventional *Gini* obtained for the West Tripura due to the highest share (S_k) in the Melaghar block. In the Bishalgarh and Mohanpur blocks, the contribution of income from fish production towards family income inequality was only 14.31 and 2.36 per cent, respectively, but the contribution of income from government jobs was the highest (32.98 and 75.03%, respectively) due to relatively higher values of R_k, G_k and S_k. The other important source of inequality in income distribution for the Bishalgarh block was self-employment, contributing to the tune of 32.37 per cent.

The relative measures offer more appropriate comparisons. The inequality components as a percentage of income share (RII_k) and the relative effects of marginal increase in each source (RME_k) revealed that the sources like government job, fish production and fish-seed production in the case of Melaghar block; private job, government job and self-employment in the Bishalgarh block; self-employment in the Mohanpur block; and government job, fish production and fish-seed production in the West Tripura had exhibited direct impact on the family income inequality. With the one unit increase in

the income from fish production, the income inequality, on an average, increased by 0.13 and 0.09 units for the Melaghar block and the West Tripura district, respectively. This source of family income exhibited reverse effect on the inequality, i.e. with one unit increase in income from this source, the income inequality decreased by 0.09 and 0.05 units in the Bishalgarh and Mohanpur blocks, respectively. Amongst the income sources that exhibited a positive correlation with family income, self-employment, labour, paddy and vegetable production in the Melaghar block, labour, paddy and vegetables in the Bishalgarh block, and all sources considered, except the government jobs in the Mohanpur block and except self-employment, fish production and fish seed production in the West Tripura district, exerted reverse effect on income inequality.

It is seen from the income inequality analysis, under the overall situation (West Tripura), that the government job stands close behind the fish production and its RME_k is marginally higher than that of fish production. Hence, both sources of income have a strong impact in making the distribution of family income more equitable.

Conclusions

The study has revealed that the fish production is one of the most important sources of income in the West Tripura district of Tripura state. This income source has depicted a positive correlation with the total family income of the fish farmers. The distribution of income earned from fish production among the fish-farming households has also been relatively better as compared to that from other sources, except the non-farm labour income. But income from fish production has contributed the highest to the family income inequality in the Melaghar block and the West Tripura district (overall situation), where its marginal effects have been obtained positive. The contribution of income from fish production towards overall income inequality has been relatively lower in the Bishalgarh and Mohanpur blocks, where it has exhibited reverse effects on family income inequality. Thus, in order to make the family income distribution more equitable among the fish-farming households in the study area, fish production has a pivot role.

The income inequality can be improved by increasing fish production. There is enormous scope to increase fish yield (i.e. to the level of 3000 kg/ha/year from the present level of less than 1400 kg/ha/year). It can be achieved by formulating suitable policies/programmes for overcoming the constraints. The important constraints associated with fish production in the West Tripura have been (i) financial constraints, (ii) management constraints, and (iii) extension constraints. There is a need to enhance composite fish culture for commercialization of fish production. The income from fish

production can be augmented further on sustainable basis by promoting integrated aquaculture (with animal husbandry, crop production, poultry, duckery, etc.).

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Annexure I

Tripura fisheries at a glance, 2003-04

Sl No.	Item	District				Total
		North	Dhalai	West	South	
1	Culturable water area (ha)	2963.91	1297.36	5017.48	4011.73	13290.48
2	Capture water area (ha)	1388.09	1128.79	1185.93	4175.95	7878.76
3	Total water area under fisheries (ha)	4352.00	2426.15	6203.41	8187.68	21169.24
4	Culture fish production (MT)	3016.63	1286.78	5716.27	4152.62	14172.30
5	Capture fish production	316.97	209.86	74.10	209.77	810.70
6	Total fish production (MT)	3333.60	1496.64	5790.37	4362.39	14983.00
7	Total fish seed production (lakhs)	114.81	109.31	412.13	413.25	1049.5
8	No. of departmental fish farms	5	2	9	6	22
9	No. of co-operative societies	17	13	44	60	134
10	No. of share holders	1683	3128	6461	6638	17910
11	Water area in co-operative sector (ha)	28.15	9.88	128.77	93.20	260.00
12	Fish seed production in co-operative sector (lakhs)	0.90	2.30	25.25	52.20	80.65
13	Fish production in co-operative sector (MT)	13.850	54.480	144.000	171.870	384.200
14	Total number of fish farmers	18737	9925	26634	38574	93870
15	No. of full time fishermen	3676	1686	5926	10637	21925
16	No. of part time fishermen	4448	3423	8494	9614	25979
17	No. of occasional fishermen	4374	2848	8678	9460	25360
18	No. of total fishermen families	3298	2514	6911	9650	22373
19	No. of Fish Farmers' Development Agencies (FFDA)	1	1	1	1	4
20	Minibarrages - No.	2593	4103	4466	11872	23034
	Area (ha)	669.03	903.94	919.12	1777.91	4270.00
21	Ponds/Tanks - No.	14127	6082	24822	30998	76029
	Area (ha)	1391.72	747.81	3570.25	3362.22	9072
22	Area of departmental fish farm (ha)	28.93	7.96	40.25	78.79	155.93
23	Area of FFDA fish farm (ha)	7.20	…	1.80	7.00	16.00
24	No. of self-help groups (fisheries and related)	29	31	75	162	307

Source: Compiled from different reports/documents of Directorate of Fisheries, Tripura