

UNDERUTILISED RESOURCE POTENTIAL AND ECONOMICS OF INLAND FISHERIES IN ORISSA

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ABSTRACT

Agriculture is the main occupation of Orissa farmers. Inland fishery in village ponds over the years has become an important source of subsidiary income and employment generation. The present study highlights the importance of inland fishery in Orissa, its potentiality and economics of inland fishery with respect to two management practices of fish farming viz, collective and private. The findings in the study suggest that there is an increasing trend in the demand of inland fishery for consumption purpose but is not met by the domestic supply of the State which could be due to the fact that less than half of the potential of the fishery sector is used in the State. Although there has been awareness about the potentiality of this sector as a source of additional income and employment in the rural area, the success of fishery as a business is relatively more in case of private entrepreneurs as compared to the village cooperatives and self-help groups. Corrective measures to enhance their awareness, technical and entrepreneurial skill amongst the groups may help in generating more income and employment in the rural sector in a State where 73 per cent of the main workers find their source of livelihood in the primary sector.

Introduction

The economy of Orissa is primarily agrarian and the State is the least developed one in the country. About 46.4 per cent of the people in the State are below poverty line as per the recent NSS reports. The share of agricultural sector in the Net State Domestic Product (NSDP) is about 40 per cent as compared to about 25 per cent for the country in the recent years. About 85 per cent of the people live in the rural areas

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and depend on this sector. The share of rural population in the State according to 1991 census was 86.62 per cent which marginally declined to 85.03 per cent in 2001. About 73 per cent of the total main workers are engaged in agriculture in the State. Thus, about 85 per cent of the total population depend on the primary sector for their livelihood. Agriculture being the major contributor of the primary sector, its growth is crucial for creating employment and generation of income in the State economy. But there has been instability in agricultural production in the State which is primarily due to erratic rainfall and recurrent natural calamities like drought, flood and cyclone. In this context it may be pointed out that out of the last 41 years 29 years have been abnormal years having occurrence of drought, flood and cyclone. Moreover, low productivity of the agricultural sector in Orissa is due to traditional farming practices, low use of yield stimulating inputs, uneconomical landholding (the per capita availability of land has declined from 0.39 in 1950-51 to 0.15 hectare in 2004-05), mostly rainfed agriculture, low capital formation and investment in agriculture etc. (Ibid, 2002).

Being the other contributors of the primary sector viz, animal husbandry, forestry, fishing, mining, fishery sector in Orissa has been recognised as one of the important allied activities of the primary sector. In fact, nature has endowed Orissa with opulent water resources suitable for immediate use and future expansion of this sector. The sustainable development of fisheries sector is desirable for balanced social, economic and regional development in rural areas. Needless to mention that fishery helps in augmenting food-supply, generating employment, raising nutritional level and earning sizeable income and foreign exchange.

There are two major sources of fish production in Orissa viz, marine and inland. Most of the produce from the marine sources are exported whereas a major proportion of the inland fish is used for domestic consumption. This could be due to the fact that majority of the people in Orissa have a preference for inland fish for consumption purpose. Inland fishery is contributing about 60 per cent of the total fish production in the State in the recent years. It has two major fishing practices viz; collective and non-collective. It may be pointed out that in the recent years many Self-Help Groups (SHGs) and village fisheries cooperative societies are taking interest in fishery by using the panchayat ponds on lease. Such type of management practice is referred to as collective fishery. On the other hand, the individual entrepreneurs are also taking up fishery as a profit making business venture which is referred to as non-collective fishery or non-collective management practice.

In this study, an attempt has been made to highlight the growth, importance, potential of fishery, demand and supply of fish in the State particularly for domestic consumption. Besides, a few case studies relating to the economics of inland fisheries with respect to both the fishing practices (collective and non-collective) in Orissa have been analysed.

The Objectives

The specific objectives of the present study are :

- (1) To give a brief outline of the fishery sector and its importance in the primary sector in Orissa and the share of inland fishery in it.
- (2) To highlight the potential of fish production with special reference to inland fishery and examining the demand-supply gap.
- (3) To analyse a few case studies in Orissa with reference to the economics of collective and non-collective inland fishing practices.

Methodology

The study is basically exploratory. The objectives of the study are three-fold. The first two objectives were addressed with an empirical analysis using time series data. For the third objective the case study method has been used and analysis is based on cross-section data. The cross-section data relate to the financial year 2003-04.

Data have been collected both from primary and secondary sources. Primary cross-section data have been collected from the fish farmers by personally contacting them. These data relate to the cases for culture fishery since culture fishery is the most important area in the fishery sector in Orissa so far as consumption, employment and income generation in the rural sector is concerned. The secondary data have been collected on production of marine and inland fish, export and import of fish, consumption of fish in the State etc. for about fifteen years from sources such as Economic Survey of Orissa, Directorate of Economics and Statistics, Orissa and Directorate of Fisheries, Orissa. However, since data on import, production of capture and culture fish were available for nine years, these have been used for demand estimation for the said period only. Production potential and rate of utilisation of the potential have been analysed using the secondary data collected from Economic Survey of Orissa and the Directorate of Fisheries, Orissa. The methodology adopted by the Directorate of Fisheries, Orissa for calculation of production potential has been adopted in this study.

A sample of ten case studies in two districts viz. Khurda and Sambalpur from different water bodies in culture fishery has been undertaken. Case study tanks were selected to represent different sizes, types of management such as fisherman cooperatives, panchayat management, and private contractors. Keeping the distinct agro-ecological characteristics of the State into consideration, coastal plains of Khurda district and western hilly region of Sambalpur district have been selected for the study. The following aspects were also taken into consideration while choosing the cases for an in-depth study and working out the economics of culture fishery.

1. Common situational analysis in the village: society, social structure and stratification, rural economy, demography, place of the fishery and farming community in the local social structure and economy.

2. Economics of fishing: investments required including lease charges, seeds, fertilisers, labour, and gross output, value of fish at prevailing price at the production centres.

Fishery Sector in Orissa – An Overview

The percentage contribution of the fishery sector to the NSDP from 1993-94 to 1999-2000 is given in Table 1. This may highlight the growth of the sector over the said time period. It may not be out of place to mention that the fishery sector as a component of the primary sector did not register a significant growth since the percentage contribution has been remaining at about 2.5 over the period from 1993 to 2000. This suggests that there has not been any perceptible change in the share of this sector over the period in spite of the fact that the State has immense water resources and tremendous scope for augmenting fish production for the growing fish-eating population besides generating rural employment. The total fishermen population in the State is 10.84 lakhs, out of whom the total marine fishermen population is about 3.2 lakhs and inland population is 6.8 lakhs (2000-01). Moreover, it has a very long coastline of 480 kms. The State has 6,70,017 ha of fresh water area and 4,17,537 ha of brackish water area. But these resources hitherto appear to have been untapped/undertapped which is evident from the constant share of this sector in the NSDP.

Table 1 : Contribution of fishery sector to net state-domestic product of Orissa

(Rs, in lakh)

Year	At current prices			At 1993-94 prices		
	Total NSDP	Contribution from fishery sector	Percentage contribution	Total NSDP	Contribution from fishery sector	Percentage contribution
1993-94	1586130	36056	2.27	1586130	36056	2.27
1994-95	1896025	43678	2.3	1652278	41146	2.49
1995-96	2327000	44080	1.89	1728127	41552	2.4
1996-97	2218930	57422	2.59	1612562	45620	2.83
1997-98	2743749	61880	2.26	1847057	51634	2.8
1998-99(P)	2985030	60364	2.02	1862971	48549	2.61
1999-2000(Q)	3272880	57523	1.76	1932931	48707	2.52

Source: Statistical Section, Directorate of Fisheries, Orissa.

Production, Export and Consumption of Fish: Information on the total fish production in Orissa, both from marine and inland sources, have been presented in Table 2. It may be observed that the share of marine fishery in the total fish production in the State has registered a decline in the time period from 49 per cent in 1985-86 to 37 per cent in 2003-04. But inland fishery has a major share in the total fish production in the State and the percentage of this has grown from little more than 50 per cent in 1985-86 to 62 per cent in 2003-04. It may be mentioned here that inland fishery has two components viz. fresh water fishery and brackish water fishery. Out of these two, fresh water fishery has a major share. The percentage of brackish water fishery in the total production of inland fishery has declined from 43 per cent in 1985-86 to about 12 per cent in 2003-04. This suggests the growing importance of fresh water fishery in the State.

Table 2 : Inland and marine fish production in Orissa (in Mt)

Years	Fresh water	Brackish water	Total inland fish	% of inland fish to total	Marine fish	% of marine fish to total	Total fish production
1985-86	31221	23906	55127	50.70	53581	49.30	108708
1986-87	32791	24209	57000	50.75	53324	49.25	112324
1987-88	41000	23500	64500	51.82	59960	48.18	124460
1988-89	43365	24600	67965	52.29	60120	47.31	129985
1989-90	50500	25370	75870	49.34	77895	50.66	153765
1990-91	58720	22040	80760	50.81	78190	49.19	158950
1991-92	65120	22760	87880	48.05	95030	51.95	182910
1992-93	70830	22930	93760	43.99	119380	56.01	213140
1993-94	116370	11990	128360	55.26	103920	44.74	232280
1994-95	123960	10810	134770	52.31	122890	47.69	257660
1995-96	121941	12903	134844	52.25	123199	47.75	258043
1996-97	127293	16203	143496	51.81	133462	48.19	276958
1997-98	135636	16782	152418	49.41	156081	50.59	308499
1998-99	145006	14898	159904	56.26	124329	43.74	284233
1999-2000	124861	10442	135303	51.79	125935	48.21	261238
2000-01	125114	13442	138556	53.36	121086	46.64	259642
2001-02	147400	20660	168060	59.69	113893	40.39	281953
2002-03	154237	19964	174201	60.23	115009	39.77	289210
2003-04	165594	24477	190071	62.02	116880	37.98	306451

Source: Economic and Statistical Abstract of Orissa, Directorate of Economics and Statistics, Orissa, 1991, Economic Review, Government of Orissa (1995, 2005), Statistical Section, Directorate of Fisheries, Orissa.

Table 3 summarises the information on export of marine and inland fish from Orissa to outside the State and abroad. It is observed that about 70 to 80 per cent of the total export of fish comes from the marine source whereas export of fresh water fish is about 10 per cent of the total export over the period of fifteen years. There could be several reasons for such a trend. In this context figures presented in Table 4 may be referred to. It may be observed that over the period of fifteen years the percentage of fresh water fish used for domestic consumption is consistently increasing. Out of the total consumption of fish, about 44 per cent was from fresh water source in the year 1985-86 which increased to 70 per cent in the year 2003-04. This could be due to the fact that export of marine fish is important from the point of view of earning an income particularly in the coastal region. Secondly, most of the fish eating population in Orissa has preference for inland fishery particularly fresh water fish for consumption purposes.

Thus, the findings presented in Tables 2, 3 and 4 suggest that inland fishery is relatively more important for consumption in the State. However, this has two major sources i.e. brackish water and fresh water fishery. Fresh water fishery is relatively more important for consumption. It comes from two major sources viz, culture and capture sources. The suppliers of culture fishery are the fresh water fish farmers, village fishery cooperative societies and other village groups who are taking fishery as an income generating activity in different parts of the State. Capture fishery mainly comes from the reservoirs. Table 5 summarises the production of fresh water fish from these two important sources. Comparing the two sources, culture fishery constitutes about 80 per cent of the fresh water fish production in Orissa.

Table 3 : Export of fish from Orissa to outside the State & abroad (in MT)

Year	Marine fish	% of total	Fresh-water fish	% of total	Brackish water fish	% of total	Total export
1	2	3	4	5	6	7	8
1985-86	32148	67.92	4184	8.84	10997	23.24	47329
1986-87	33194	68.42	4394	9.01	11136	22.86	48724
1987-88	35976	68.82	5490	10.50	10810	20.68	52276
1988-89	36072	66.57	6351	11.72	11760	21.70	54183
1989-90	46737	70.83	7070	10.71	12178	18.46	65985
1990-91	43900	73.41	8000	13.38	7900	13.21	59800
1991-92	55100	73.37	9100	12.11	10900	14.51	75100
1992-93	69200	76.80	9900	10.99	11000	12.21	90100
1993-94	60300	77.61	11600	14.93	5800	7.46	77700
1994-95	71900	80.16	12400	13.82	5400	6.02	89700

(Contd.)

Table 3 (Contd.)

1	2	3	4	5	6	7	8
1995-96	71455	79.42	12194	13.55	6322	7.03	89971
1996-97	73404	80.34	10183	11.15	7777	8.51	91364
1997-98	83659	83.30	11421	11.37	5345	5.32	100425
1998-99	68381	79.55	10875	12.65	6704	7.80	85960
1999-2000	69914	82.90	9984	11.84	4436	5.26	84334
2000-01	61755	82.25	6256	8.33	7070	9.42	75081
2001-02	60522	78.79	7569	9.85	8724	11.36	76815
2002-03	61294	75.14	7690	9.43	12585	15.43	81569
2003-04	62956	70.71	11344	12.74	14728	16.55	89028

Source: Statistical Section, Directorate of Fisheries, Orissa.

**Table 4 : Local consumption of fish in Orissa (in Mt)
(From own production)**

Year	Marine fish	% of total	Fresh water fish	% of total	Brackish water fish	% of total	Total
1985-86	21433	34.92	27037	44.05	12909	21.03	61379
1986-87	20130	32.68	28397	46.10	13073	21.22	61600
1987-88	23984	33.23	35510	49.19	12690	17.58	72184
1988-89	24048	31.72	39014	51.47	12740	16.81	75802
1989-90	31158	35.50	43430	49.48	13192	15.02	87780
1990-91	34290	34.58	50720	51.16	14140	14.26	99150
1991-92	39930	37.03	56020	51.97	11860	11.00	107810
1992-93	50180	40.78	60930	49.52	11930	9.69	123040
1993-94	43620	28.22	104770	67.78	6190	4.00	154580
1994-95	50990	30.35	111560	66.42	5410	3.22	167960
1995-96	51744	30.78	109747	65.29	6581	3.92	168072
1996-97	60058	32.36	117100	63.10	8426	4.54	185594
1997-98	72422	34.81	124215	59.70	11437	5.50	208074
1998-99	55948	28.22	134131	67.65	8194	4.13	198273
1999-2000	56021	31.67	114877	64.94	6006	3.40	176904
2000-01	59331	32.15	118858	64.40	6372	3.45	184561
2001-02	53371	26.12	139831	68.16	11936	5.82	205138
2002-03	53715	25.87	146547	70.58	7379	3.55	207641
2003-04	53924	24.73	154751	71.01	9746	4.46	217923

Source : Statistical Section, Directorate of Fisheries, Orissa.

Table 5 : Fresh water fish production from culture and capture sources (in Mt)

Year	Culture	% of total	Capture	% of total	Total
1995-96	93079	73.33	28862	23.67	121941
1996-97	92927	73.00	34366	27.00	127293
1997-98	99980	73.70	35656	26.30	135636
1998-99	98386	67.84	46620	32.16	145006
1999-2000	88105	70.56	36756	29.44	124861
2000-01	92439	73.88	32675	26.12	125114
2001-02	112845	76.55	34555	23.45	147400
2002-03	119795	77.67	34442	22.33	154237
2003-04	133617	80.69	31977	19.31	165594

Source : Statistical Section, Directorate of Fisheries, Orissa.

A comparative picture of both the components of fresh water fish shows that production of culture fishery is growing at a faster rate consequent upon larger demand for it in the State. However, the increased demand of fresh water fish does not seem to be met by the local production and hence there seems to have been a shortfall of supply which has necessitated import of fresh water fish from the neighbouring States particularly Andhra Pradesh for consumption purpose. It is, therefore, necessary to briefly analyse the demand and supply of fresh water fish and estimate the gap.

Demand-Supply Gap and Resource Utilisation : Table 6 gives information on production, export, import and local consumption of fresh water fish from the year 1995 to 2004. The local demand of fresh water fish has been calculated by adding the net of export and import to the total production. The demand-supply gap and its proportion to total production has been calculated and presented in the said Table. It is observed that there has been a shortfall of supply of fresh water fish to the tune of about 20 per cent on an average of the total demand during the last decade. The shortfall is met by the import which has registered an increasing trend. Such a shortfall could be due to untapped resources and non-utilisation of pisciculture potential in the State. In this context, it may not be out of place to examine the existing resource potential in the fishery sector as per the estimates of the Department of Fisheries, Government of Orissa.

Table 6 : Production, export, import, local consumption demand of fresh water fish in Orissa from 1995 to 2003 - 04 and demand - supply gap (in MT)

Year	Production of fresh water fish	Export	Local consumption (Production-Export)	Import	Local demand for consumption (Col 4+5)	Demand supply gap	Demand supply gap as % of production
1995-96	121941	12194	109747	30000	139747	17806	15
1996-97	127293	10183	117100	35000	152100	24807	19
1997-98	135636	11421	124215	40250	162215	26579	20
1998-99	145006	10875	134131	43530	177661	32655	23
1999-00	124861	9984	114877	42200	157077	32216	25
2000-01	125114	6256	118858	41985	160843	35729	28
2001-02	147400	7569	139831	34025	173856	26456	18
2002-03	154237	7690	146547	35706	182253	28016	18
2003-04	165594	11344	154751	35706	190457	24863	15

Source: Directorate of Fisheries, Orissa.

The Resource Potential and its Use : The resource potential for the fishery sector with special reference to inland fishery and the output-stock ratio for both marine and inland fishery have been presented in Table 7. Inland fishery resource potential and the output stock ratio have been obtained on the basis of estimated yield per unit area and total area for different inland sources. The figures have been based on the estimated figures of the Directorate of Fisheries, Orissa for the five-year period from 1995 to 2000.

Table 7 : Output-resource stock ratio (1995-2000) (In tonnes)

Category	Output	Resource potential	Ratio(%) of output to resource potential
Marine	132200.4	3,00,000	44.07
Inland	93325.8	2,44,502	38.17
Total	188208.6	5,44,502	34.55

Source: Unpublished data, Directorate of Fisheries, Govt. of Orissa.

N.B. These figures have been calculated by the Directorate of Fisheries, Orissa.

From the above Table it is observed that 44 per cent of the marine and 38 per cent of the inland fishery resources of the resource potential are utilised annually. Thus, on the whole, only about 35 per cent of the total resource potential is annually exploited. Such a low utilisation of resources could be due to several factors. These could be social, political, financial, technical and/or managerial etc. One of the important factors for the low utilisation may be the motivation of the people to undertake fishery as a profit making venture. In this context, it may be mentioned that "demonstration effect" is one of the motivating forces for undertaking such enterprise where the people may generate income and employment for themselves.

In the next section a few case studies have been analysed highlighting the performance of two types of management i.e. collective and non-collective fish farming (with respect to the inland fishery keeping its importance in view). This would give an opportunity to judge the effect of the demonstration effect and provide some guidelines for inducing the people to take up fishery extensively and utilise the untapped resource potential.

CASE STUDIES

Comparative Analysis of Economics of Fishery in Collective and Non-collective Farming

Ten case studies relating to inland fishery have been presented in this section. All the cases have been divided into two groups i.e. collective and non-collective fish farming. Collective farming is managed by village groups (Yubak Sanghs, Self-Help Groups etc.) whereas non-collective farming is managed by individual proprietors. These cases are from two districts viz, Khurda and Sambalpur (one in the coastal plain and the other in the western hilly region of the State). They are selected from different water bodies in culture fishery keeping the distinct agro-ecological characteristics of the State into consideration. Out of the ten cases, three each are from collective and non-collective farming practices from the district of Khurda and two each from the same types of management practices from the district of Sambalpur. Economics of both the types of fish farming practices have been presented in Table 8a and 8b. A comparative analysis of fishing, as a business for the two types of management/ operation, has been highlighted. Table 8a summarises the information on collective fish farming and Table 8b summarises information on non-collective fish farming.

These Tables give the overall summary of the ten cases which we have selected from ten different villages in the above mentioned two districts. The figures presented here have been calculated per annum basis. To calculate the profit we have taken the total cost and revenue. Total cost includes total fixed cost and total variable cost. The cost, revenue, profit and production have been calculated per acre of water body.

Table 8a : Details of cases of collective fish farming

Cases	Ownership & location	Size of water body (acres)	Actual lease amount (Rs)	Offset lease amount (Rs)	Cost/acre		Total cost (Rs)/acre	Total revenue (Rs) /acre	Profit Rs. /acre	Production (quintals) /acre
					Fixed	Variable				
1	Balunkeswara Masya Samiti Guapur Khurda	2.5	750	750	3700	2000	5700	26500	20800	10(2650)
2	Srirampur Gramya Samiti, Bhoi Sahi, Khurda	2	750	750	2500	1500	4000	18200	14200	7(2600)
3)	Village Community Khajuria pada, Khurda	1.13	750	750	3500	1200	4700	21675	16975	8.5(2550)
4	Azad Yubak Sangh, Katapali, Sambalpur	14	750	1200	4500	3500	8000	23375	15375	8.5 (2750)
5	Village Farmers Group, Kadaligarh, Sambalpur	3	750	3000	4000	16000	20000	32400	12400	12(2700)
Avg.		4.52	750	1290	4118.6	4699.4	8818	24374	15556	10.94(2228)

Note: Figures in the parentheses are the average price per Qtl of fish at the production centre in 2003-04.

Table 8b : Details of cases of non-collective fish farming (private)

Cases	Ownership & location	Size of water body (acres)	Actual lease amount (Rs)	Offset lease amount (Rs)	Cost/acre		Total cost (Rs)/acre	Total revenue (Rs) /acre	Profit Rs./acre	Production (quintals) /acre
					Fixed	Variable				
1.	Sarakana Fish Seed Farm (Pvt.) Ms Balakrusna Sahu and Mr. Nrusingha Charana Panda Sarakana	11		10000	14000	15500	29500	61500	32000	22(2795)
2..	Jayadev Khatei, Bhubaneswar	1.5	Own	Own	17000	15000	32000	47000	15000	19(2474)
3.	Kanakdurga Fish Food Pvt. Ltd Mr. E.S. Rao and Mr. B.V. Rao Bubaneswar	47	—	8000	20000	30000	50000	85250	35250	31(2750)
4	Mr. Artatrana Baxi Densargi, Sambalpur	7.5	—		12000	12000	24000	51000	27000	20 (2550)
5	Mr. Yubraj Seth Babubandh, Sambalpur	5.4	851	1481	15000	18000	33000	53000	20000	20(2650)
Avg.		14.48	851	6493.667	17824	24726	42550	74895	32345	27.42(2731)

Note: Figures in the parentheses are the average price per Qtl. of fish at the production centre in 2003-04.

Source: Case Studies Field Data.

Findings and Observations

From the results of the case studies presented in the Tables, it is found that the average size of the pond in case of collective farming is 4.52 acres, whereas in case of non-collective case it is 14.48 acres which is much higher than the collective case. This is observed to be a common feature of the overall Orissa with a few exceptions since in most of the collective farming cases the groups are taking the panchayat ponds on lease, the area of which usually varies from 1 to 10 acres. The private entrepreneurs take up relatively larger area on commercial basis.

Production and profitability per acre is higher in case of non-collective farming or private fish farming than that of the collective cases. The average production of non-collective cases is 27.42 quintals per acre per annum whereas that of collective cases it is 10.94 quintals/acres per annum. Profit accrued through fishery in non-collective case is Rs.32,345 per acre per annum which is much higher than the profit earned in case of collective fishery which is Rs.15,556 per acre per annum. The Tables also reflect the degree of intensiveness for fish cultivation in case of non-collective farming as compared to the collective cases which have been reflected through cost distribution of the cases. Collective fishery in general is not intensive, but non-collective or private entrepreneurs are having intensive culture.

The average prices at which the fish sold at the production site are relatively more (about Rs.2731 per quintal) in case of non-collective cases as compared to the collective ones (about Rs.2228 per quintal). Low price coupled with low average production is observed in case of collective farming whereas both of these are more in case of non-collective farming. In this context, it may be pointed out that the prevailing retail price was about Rs.50 per kg of fish (2003-04), but the prices at the production centre for collective and non-collective farming have been observed to be Rs. 22 and Rs.27, respectively. This suggests that profitability is lower in both the cases due to the lack of proper market linkages and a good share of the profit goes to the intermediary. Thus, on the basis of the above, one can conclude that the non-collective (private) fishery is relatively more successful so far as the inland fishery is concerned.

Conclusions and Suggestions

On the basis of findings and observations the following conclusions emerge:

- a) The primary sector is contributing about forty per cent to the State domestic product in Orissa with 85 per cent of the population depending on it for their livelihood. About 73 per cent of the main workers depend on agriculture. Though agriculture is the main occupation of Orissa farmers, fishery in village ponds over the years has become an important source of subsidiary income and employment generation in the rural areas particularly for those who perceive it as good livelihood option during the summer months when there is no employment from agriculture. This is corroborated by findings on the growing

importance of inland fishery which constitute about 62 per cent of the total fish production in the State.

- b) There has been an increasing demand for inland fish for consumption purpose in the State which has been growing every year with the growing population. But a part of the demand is fulfilled by importing fish from nearby States in spite of the fact that more than 50 per cent of the potential for inland fishery still remains unutilised. Although the production in the last few years has shown an increasing trend, a lot still remains to be done. The fresh water fish farmers could utilise the untapped resources so as to meet the local demand of fresh water fish. This in turn would generate additional income and employment in the rural sector.
- c) From the field study it was observed that there has been a growing awareness about pisciculture in the rural areas. The village cooperatives, self-help groups and village Yubak Sanghs are showing interest in taking up pisciculture as a subsidiary occupation to earn additional income. In a few cases it was observed during the field study that farmers are converting their agricultural lands and taking up culture fishery since they are finding fishery to be a better livelihood option and more remunerative than growing paddy. The findings from the case studies suggested that the rate of productivity and profitability are significantly more in case of private entrepreneurs as compared to the cooperatives and village groups. This may be explained by several factors such as lack of entrepreneurial skill, lack of working capital amongst the members of the village groups and more importantly demerits of collective responsibility and accountability.
- d) The most common problems faced by the fishing community particularly the cooperatives relate to a) high cost of inputs such as raw material, cost on pond preparation and capital equipment, b) access to timely and adequate credit without collaterals, c) linkages with markets, d) lack of sector specific infrastructure (cold storage, electricity, roads, etc.)

The Task Ahead

Although agriculture is the main occupation of the farmers in the State of Orissa, fishery in village ponds in recent years has become an important source of subsidiary income. This becomes more relevant for the poor communities who perceive it as an important livelihood option during the lean period. Since the village fishery cooperative societies, Yuvak Sanghs and SHGs (particularly women SHGs) are taking up fishery as an income generating activity, there is a need to address some of the problems such as finance and technical and managerial skills so as to increase the productivity. Moreover, with a demonstration effect more number of groups may be interested and use the unutilised resource potential.

Imparting technical and managerial skills to these groups are warranted since the collective farming is not efficiently working as compared to the non-collective ones. In this context it may be pointed out that Fish Farmers' Development Agencies (FFDAs) are operating in every district in Orissa as part of a Centrally sponsored programme and by the end of 2004-05 about 48000 fish farmers have been trained to boost up production of fish. Besides this, the Government of Orissa is in the process of developing 34 reservoirs under different development programmes to increase the production through capture fishery. Moreover, about 977 primary fishermen societies have been registered and working till 2004-05. However, these societies could cover only 10 per cent of the total fishing population in Orissa and they are mainly in the marine fishery sector. Formation of fishery cooperative society or SHGs to take up pisciculture may help increasing the production. But this will depend on the demonstration effect of the existing collective ventures. These findings suggest that the relatively inefficient collective farming characterised by significantly less profit may lead to a demonstration effect in the negative direction. Thus, to counter this negative effect the collective farming has to be made more efficient. To achieve this, State government has a larger role to play in addressing some important issues which make the collective farming less efficient. The measures the Government of Orissa may take could be as follows:

Enhancement of the Leasing Period : At present, a Cooperative society / Yuvak Sangh / SHG group are granted lease of Panchayat Ponds for a period of 3 to 5 years. In this connection it may be pointed out that after getting the lease the members have to invest money from their own sources for the preparatory work for intensive pisciculture. Although the cash flow may start after a year or so, a positive profit after the break-even will start accruing after two/three years. But at this time the lease period is almost at the end. This may lead to lack of interest amongst the members to invest working capital towards the end of the lease period which may lead to decline in the profit. This issue needs to be addressed by the government, may be by enhancing the lease period particularly when a cooperative society or SHG group is the leasee.

Financial Linkages to the Cooperative Fish Farming : Very often, the SHGs, the Yubak Sanghs and the Cooperatives are facing the problem of working capital to invest in seed, feed and regular maintenance particularly in the initial year. Therefore, after the group is given the lease of the pond for pisciculture, the government functionaries should help in linking the groups to the financial institutions.

Ensuring Effective Forward and Backward Linkages through Cluster Approach: Linkages for raw material in terms of accessibility of the groups to seeds and other raw materials and linkages to markets is a necessary condition for profitability in fish farming. It has been observed that very often the groups are selling the produce to the intermediaries who give them a lesser price. The government may develop a mechanism with which they can have direct access to the market so that they get a better price.

Forward and backward linkages can be strengthened using a cluster approach which could be initiated by the government. It may be mentioned that at present in the industrialised and developing countries, there is increasing evidence of clustering and networking which can help small and medium enterprises boost their competitiveness. Small Scale Enterprise clusters are domains to effectively implement support initiatives aimed at enlarging the production base, conquering market niches, accessing export markets, triggering growth, offering employment opportunities and redressing regional economic imbalances. It may again be mentioned that the key problem faced by most of the community based and also private fish firms is relative isolation and size. Isolated fish firms are unable to achieve economies of scale, lack negotiating power, find it difficult to specialise and have limited access to credit, technology and markets. These firms can significantly increase their comparative advantages by cooperating with one another and building linkages with private or public service providers. The small firms can thus build their competitive strength through cost reduction, value chain upgradation, and exploitation of collective economies of scale. Cluster development in fish sector can help in reducing firms' isolation by strengthening linkages among all actors of the cluster (Fish firms, larger enterprises, support institutions) in order to coordinate their actions and pool their resources for a common development goal.

Clustering may help the fishery sector in bulk purchase/common purchase, bulk discount, accessibility to credit through Group guarantee and strengthening the forward linkage (Common marketing). In this context the Government may help the clusters in the areas such as a) create awareness, instill confidence by organising meeting, exposure visits for the members of the groups b) capacity building and regular handholding through developing amongst them the technical and managerial skill. This may lead to income redistribution in the rural areas particularly those who are engaged in this sector.

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