

INLAND FISHERY IN A TRADITIONALLY VEGETARIAN STATE: A GUJARAT STORY

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BACKGROUND

India, Sri Lanka and Bangladesh have experienced a significant revolution in inland fishery production during the last 50 years. Inland fisheries include fisheries in rivers, canals, reservoirs, ponds and tanks, beels, oxbow lakes, derelict water bodies and brackish water. The total fish production in 1950-51 was 752 thousand tonnes, of which 218 thousand tonnes (nearly 29%) were from inland fisheries. Today the total fish production has increased by eight times reaching to 6186 thousand tonnes in 2002-03 with a share of nearly 52% (3205 thousand tonnes) from inland fisheries. That is production of inland fishery has increased by nearly 15 times from 218 thousand to 3205 thousand tonnes. Similar growth has been recorded in Bangladesh and Sri Lanka as well. Among the Asian countries, India ranks second in aquaculture and third in capture fisheries. The fishery has become the thrust area for its protein based nutritious food value and for its importance in livelihood for poor. So the planned outlay for fisheries was increased from Rs 51.3 million in the First Five Year Plan (1951-1956) to Rs 20697.8 million during the Ninth Plan for central and centrally sponsored schemes. The growth in inland fish production is spatial and intensive both, as scores of water bodies were brought under aquaculture and several schemes of development programmes in irrigation tanks and village ponds were introduced. The contribution of inland fishery sector as compared to the total GDP has also increased from 0.62% in 1970-71 to 1.38% in 1998- 1999. Fish production of inland sources has increased from 1536.25 thousand tonnes in 1990-91 to 2822.7 thousand tonnes during 1999-2000, which has nearly 49% share of inland culture fisheries². Similarly there is a rise of more than two folds in production from inland fisheries in Gujarat during the last three decades.

The fishery is a powerful livelihood for the rural poor, and it has food security and nutritional impacts too. There are people in villages of Adivasi area in Gujarat who do not have much access to green vegetables, live mainly on fish as their food³. At the same time, the rise of culture fishery has simultaneously strengthened complementarities as well as competition between irrigation and inland fishery water bodies. However, much of the research studies conducted so far have the attributes of growth, productivity, and advancement in technology of fisheries, rearing practices and government policies and initiatives. We, in this study, propose to discuss, what are the reasons and the dynamics behind this success story in Gujarat. Is it the strongly bonded institutional environment (at the macro-level) and institutional arrangements (at the local or the micro level)? If so, how these institutions are working together by solving their inherent conflicts particularly when these multi-purpose water bodies are used by different stakeholders in the environment of common property

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² Dehadrai, PV and Yadava, YS, State of the Indian Farmer: A Millennium Study – Fisheries Development, pp. 43-51, 2003.

³ We have come to know this from the people of remote places of Valia taluka of Bharuch, while travelled during our fieldwork.

Rajnarayan Indu and Santanu Ghosh International Water Management Institute, Anand regime (CPR). We like to investigate the role of institutions that nurturing the development of fisheries as a profitable economic endeavour through a 'real deal' in rural environment, and also the role of governance of such institutions for long-term growth and sustainability.

INLAND FISHERIES IN GUJARAT

Though traditionally a vegetarian state, Gujarat has shown a tremendous development in inland culture fisheries over the last three decades. The growth is admirable in spite of popular resistance to fish culture. The inland fish production in Gujarat, though have ups and down from 1971-72 to 2002-03, it has an upward trend in general. It was 14,167 MT in 1971-72, which has been increased to 34,267 MT in 2002-03 with the highest production of 80,068 MT in 1998-99. Surat tops the rank with a contribution of 31.99% of the total production of inland culture fisheries in Gujarat in 2002-03, and next to Surat is Bharuch having 23.80% share of the same. The major growth of inland fisheries has been seen in the village ponds and irrigation tanks. The percent share of production under FFDA ponds and tanks has gone up from 6.64% in 1998-99 to 10.26% in 2002-03 of the total inland fish production of Gujarat⁴. The growth has been both in terms spatial and intensive as well, as more and more number of village ponds were brought under fish culture and the serious practice of mixed poly-culture was introduced to increase the productivity of these ponds. However the productivity is still low only at 1245 kg/ha/year against the productivity of Punjab (4735 kg/ha/year), Andhra Pradesh (3500 kg/ha/year) and West Bengal (2950 kg/ha/year) (Productivity of Inland Culture Fisheries in India, 2002 ??). The major driver of the growth, as stated by the government fishery departments, has been the intervention of the FFDA's training in technology of fish culture and improved fish managements practices. But there has been very little understanding on the role played by the institutions as a driving force to the inland culture fishery revolution in the state.

OBJECTIVES

The objectives of the study are as follows:

1. To understand the factors which have caused explosive growth in culture fishery production in Gujarat.
2. To understand and analyse the institutional arrangement for leasing of water bodies for culture fishery and changes that have occurred in these over the past 50 years in Gujarat.
3. To analyse the interactions-conflicts and co-operation-between irrigators and fisher folk in inland water bodies.
4. To understand the impacts of 1, 2 and 3 on productivity, equity, livelihoods, employment, food security, nutrition of vulnerable section including women in rural areas.

METHODOLOGY

Case studies and exhaustive interviews are followed as the methodology for this study of fisheries, which are spread over three broad categories of common property regime and within formal and informal institutions. We have cases from:

1. Reservoirs used by irrigators and fisheries under Co-operative Management – 3 cases of reservoirs of more than 30 ha to 110 ha in sizes.

⁴ Gujarat Fisheries Statistics - 2002-03, Commissioner of Fisheries, Government of Gujarat, pp 40, 43, 52, Jan 2004.

2. Village Ponds or *Gam-Talavs* owned by Panchayats, but are leased out by the Panchayat through FFDA to private contractors. The ponds are used for domestic purposes, washing cattle and irrigation – 5 cases of 1 ha to 10 ha in size.
3. Private Fishponds dug in the private lands of fish farmers or by other entrepreneurs – 2 cases with 4 and 18 ponds.
4. We also have one case of co-operative, which owns its land and ponds both. It deals with fry and fingerlings at present. They have a plan for culture fisheries in near future. Since our focus is restricted only to inland culture fisheries in ponds and reservoirs, so we have not discussed this in details, however we have discussed the main issues of this society.
5. The cases from three broad categories, co-operative, private contractors and privately owned have been discussed in the perspective of New Institutional Economics. Transaction costs and pay-offs have been established using the information gathered during the field-visits.
7. We have used an open-ended checklist instead of structured questionnaires for collection of information to analyse. Besides visiting some sites at the villages, we also had focus group discussions in groups of Secretary/Chair Persons of Co-operatives, Contractors of village ponds and Private owners separately.
8. We also have interaction with the fishery department officials at various levels, fish traders and other players to understand and document the evolution of inland fisheries policy in the state and its impact on inland fisheries economy.
9. Synthesized the lessons received from the above.

THE NEW INSTITUTIONAL ECONOMICS (NIE)

Ronald Coase brought in the concept of New Institutional Economics (NIE) in 1937 through his article “The Nature of the Firm” with its explicit introduction of ‘transaction costs’ into economic analysis. Oliver Williamson later coined the phrase, “the new institutional economics” to differentiate from the “the old institutional economics”.⁵ Coases’s contention was without the concept of transaction costs, which was largely absent from neo-classical economic theory, it would be impossible to understand the working of the economic system, to analyze many of its problems in a useful way, or to have a basis for determining policy.⁶ Steven Cheung (1992) said that transaction costs exist everywhere except in a one-man Robinson Crusoe economy or as Coase put it that the transaction costs would be zero in a completely communist society or it would be absent in a perfectly competitive market.⁷ The economic development depends on specialization (division of labour), specialization calls for exchange, exchange has cost, lower the cost of exchange (transaction costs) more the specialization there will be, and greater the productivity of the system. But the costs of exchange depend on the institutions of a country: its legal system, its political system, its social system, its educational system, its culture, and so on. In effect it is the institutions

⁵ Coase, Ronald; The New Institutional Economics, The American Economic Review, Vol. 88, Issue 2, May 1998, pp 72-74

⁶ Coase, Ronald; The Firm, the Market and the Law, University of Chicago Press, 1988, p. 6 [Wang, Ning, Measuring Transaction Cost: An Incomplete Study, The University of Chicago, Feb., 2003]

⁷ Wang, Ning, Measuring Transaction Cost: An Incomplete Study, The University of Chicago, Feb., 2003

that govern the performance of an economy, and it is this that gives the “new institutional economics” its importance for economists.⁸

However, in this paper we try to understand the transaction costs in a common property regime, where the property rights is given to a particular person (private contractors) or to a group of persons (co-operative) for a definite period of time. If the rights of a common property is given to an authorised person or a group for a specified period, it can save the common property from its over exploitations and may not end up to a case of Hardins’s example of “Tragedy of Commons”. This may save from “institutional failure to control access to resources, and to make and enforce internal decisions for collective use”. “This concept has been used to explain over-exploitation in fisheries, forests, overgrazing, air and water pollution, abuse of public lands, population problems, extinction of species, misallocation in oil and natural gas extraction, ground water depletion, and other problems of resource misallocation (Stevenson, 1991)”.⁹ These people, who have been given the rights of the Common Property Resource (CPR) are to work and live under two different kinds of environment of institutions (a) the macro-level (institutional environment) and (b) at the local or micro-level (institutional arrangements). Institutional arrangements can be both formal (contracts, agreements) and informal (norms, customs and conventions etc). While formal institutional arrangements can be changed through legislation, political power, influence and so on, the informal institutional arrangements (like culture of a society, village culture) develop over long period of time and are thus not very amenable to change in a short span of time. Basically it is an environment of property rights and regimes for CPR and institutional arrangements, where the transaction costs are emerged – particularly in the case of fisheries in which the stakeholders are to play their game.

From the vast literature of NIE one can find the method of measuring the transaction costs in many different ways, but many of them agreed to that the transaction costs being inexplicit in nature can better be measured in indirect way or be understood the nature and its magnitude, than to reach it by direct method (Wang, 2003). Therefore in our case studies of fisheries in Gujarat, we followed more of narration of facts of transactions, which involved costs than to have the figures behind it.

There are the transaction costs of (1) finding out information what the relevant prices are, about an asset or the goods or services derived from its use, which can be taken as *ex-ante* cost; (2) negotiating and concluding contracts for a set of rights in such a way as to maximize the likelihood of the contracting parties meeting their obligations under the contract; and (3) monitoring and enforcing the performance of any contract that set for the property rights, and of ensuring compliance such that the transacting parties meet their respective obligations as negotiated and agreed upon in the contract, this may be taken as *ex-post* cost. Actually it is the degree of stakes that decides the transaction between the two transacting parties, so that the uncertainty of meeting the contract obligations is minimized. A fish farmer is to deal with the common property village pond leased in for a time period of ten years, say, hence his stake is higher than the other villagers, he has to bear the transaction costs so that he is able to complete his leased period, and get his return from his investments. But he tries to reduce his transaction costs by using his shrewd business acumen in a situation of uncertainty regarding compliance to the contractual agreement.

⁸ Coase, Ronald; The New Institutional Economics, The American Economic Review, Vol. 88, Issue 2, May 1998, pp 72-74

⁹ Adhikari, Bhim, Literature Review On The Economics Of Common Property Resources, Environment Department, University of York, February 2001

CASE STUDIES: EXPERIENCE IN BHARUCH DISTRICT

Bharuch district is situated in the south-central of Gujarat. In the north it has Anand and Vadodara district, in the west Narmada district, in the south Surat and the east there is Gulf of Khambat. It has 5253 Sq kms area with a total population of 13,70,104 that is 261 persons per Sq km. Among these population there are 21189 people are from fish farmer families (Office of the Asst. Dir. of Fisheries, Bharuch). The annual rainfall is 80 cm to 100 cm. Irrigated area is 523.54 Sq. kms. Main crops are cotton (as there are good coverage of black soil suitable for cotton), sugarcane, banana, wheat, paddy, pulses, groundnut, and mango. Sugarcane and banana came in the cultivation practice in abundance only after this district received canal water supply from the Ukai Right and Left Bank canals of Ukai dam. After availability of canal water from Ukai dam the cropping pattern of this district has been changed from rain fed crop like tur, jowar etc to sugarcane, banana and cotton.

Bharuch has a typical condition of its soil, which is saline due to salinity ingress from sea and water logging by canal irrigation from Right and Left Bank Canal of Ukai dam. The coastal saline area in Bharuch is 135 Sq Kms spread over in talukas like Bharuch, Vagra, Amod, Jambusar, Ankleshwar, and Hansot. Pre-monsoon water logged area in command area of URB (Ukai Right Bank) is 21.50 Sq Kms and ULB (Ukai Left Bank) is 20.40 Sq Kms.¹⁰ The cause of salinity other than salinity ingress from seawater is typical in Bharuch. The topsoil being black that is suitable for cotton, which has least percolation. The surface water used for irrigation is lost by evaporation rather than drainage leaving behind a crust of salt on the topsoil. Thus a huge cultivable area has become uncultivable for crops, which used to get good returns. Now farmers prefer to keep the area fallow or to cultivate for low-return crops, which can grow on saline soil. May be the alternative to get good return from this kind of saline land is to start fishery, which has very good return.

We have three groups of fisheries cases (mentioned above) from Co-operatives, Private Contractors and Privately owned. From the co-operatives group: 3 Co-operatives from Adivasi area of Valia taluka – Baldeva Matsya Udyog Sahakari Mandali at Kup, Pingot Matsya Udyog Sahakari Mandali at Punpunja and Bhanguriya Matsya Udyog Sahakari Mandali at Bhanguriya. From the group of private contractors – we have 5 Private Contractors of '*Gam Talav*': one each from Shera, and Hansot in Hansot taluka, one from Kankaria in Amod taluka, one from Sisodra in Ankelswar taluka and one from Jantran in Jambusar taluka. From the group of privately owned fisheries we have 2 cases, one Private Limited Company and one private contractor, both own their ponds in their owned land. We also have one case of co-operative, which owns its land and ponds both, but since it deals with fry and fingerlings we have not discussed its case in details here, since our focus is on fisheries.

THE VILLAGE PONDS IN BHARUCH

The taluka-wise village ponds of Bharuch District are given in the Table – 1. There are 136 ponds of less than 10 ha in the district. Of them 117 are village ponds popularly known as '*Gam Talav*'. Though only 19 are recorded as privately owned ponds, but in our finding there is one private limited company, which alone has 18 ponds in their premises at Sisodra village in Ankelswar Taluka; we know another 4 more privately owned ponds in Hansot taluka. Hence the private ponds are more in numbers than the figures given by the department of fisheries at Bharuch. Among 117

¹⁰ Source: Harun, SM Rafael, Salinity of Gujarat, SAVE, Ahmedabad, 2004

village ponds, 78 (66.7%) of them are used for fisheries, either by cooperatives or by private lessees or by private owners.

The village ponds in our case studies are of the size from 1 ha to 8 ha. All these have multi-users in villages. They are used for fisheries as well as for domestic purpose, cattle's bathing, and also some of them are used for irrigation. Thus there are institutions of domestic users, cattle owners' community, irrigators, which are to be faced by the fishing contractors. Conflicts are developed and solved, and fisheries of the ponds are continuing. But how they are solved, what is the transactions cost taking place, what is the modus operandi to solve the conflicts either by money, muscle or wits to negotiate the conflicts – are the quests of this paper.

Table – 1: The Spread of Village Ponds of <10 Ha Size in Bharuch District

Taluka	Total Ponds Nos	Village Ponds Nos	Private Ponds Nos	Total Area of Taluka Ponds Ha	Total Area of Village Ponds Ha	Total Area of Private Ponds Ha	Perennial Ponds Nos	Seasonal ponds Nos	Fisheries in Practice in Vill. Ponds Nos
Bharuch	18	15	3	37.50	34.00	3.50	11	7	7
Ankleswar	16	8	8	42.95	24.45	18.50	14	2	12
Hansot	17	16	1	43.85	41.85	2.00	17	0	17
Jambusar	32	32	0	116.51	116.51	0.00	30	2	18
Vagra	25	22	3	84.69	81.69	3.00	23	2	12
Amod	13	13	0	27.60	27.60	0.00	8	5	8
Jhagaria	6	4	2	10.80	9.80	1.00	6	0	1
Valia	9	7	2	13.50	12.00	1.50	4	5	3
Total	136	117	19	377.4	347.9	29.5	113	23	78
% of Ta. Totals	100	86.03	13.97	100	92.18	7.82	83.09	16.91	57.35
% of Vill. Ponds		100	16.24		100				66.67

Source: Office of the Asst. Dir. of Fisheries, Bharuch [Figure as on 31 march 2004]

CO-OPERATIVE EXPERIENCE

In all, we have examined three co-operative societies. They are engaged in fisheries and are in Valia taluka. As this taluka is mostly inhabited by adivasis, the three co-operatives are comprised mostly of adivasis. Obviously, there are some commonalities among the three co-ops, so we have put them in as one set, to analyse the common factors among them (Table – 2). The uncommonness has been discussed separately.

Table – 2: Co-operative of Irrigation Tanks in Valia Taluka of Bharuch [Ref: 2004]

		Baldeva Matsya Udyog Sahakari Mandal	Pingot Matsya Udyog Sahakari Mandal	Bhangaria Matsya Udyog Sahakari Mandal
Sl No.	Items	Co-op A	Co-op B	Co-op C
1	Ownership	MI Dept	MI Dept	Zilla Parishad
2	Size of the Reservoir	116 ha	93 ha	32 ha
3	Established	1989	1986	1990
4	Villages covered	7 Villages	7 Villages	3 Villages
5	Members	42	96	24
6	Active Members	30	40	24
7	Share Capital Rs	10,120	4,000	1,000
8	Value of one share Rs	10 + 1	10 + 1	10 + 1
9	Member can buy	> 1	> 1	> 1
10	Minimum	1	1	1
11	Dividend declared	12%	Nil	Nil
12	Turnover in 2004 Qty Fish	13 ton	6.183 ton	NA
13	Turnover in 2004 Qty Prawn	2 ton	0.526 ton	NA
14	Labour charge to Members for Fish Rs	20	15	15
15	Labour charge to Members for Prawn Rs	100	50	50
15a	Total Production of Fish Kg	13000	6183	NA
15b	Total Production of Prawn Kg	2000	526	NA
16	Total sale in 2004 Rs	790000	290690	70000
17	Expenses in 2004 Rs			
18	Lease	38000	32000	5000
19	Fish Seed	50000	90000	15000
20	Prawn Seed	100000	100000	10000
21	Cost of Net etc	50000	17000	NA
22	Salary and TA DA etc	60000	9000	7500
23	Labour charge to Members for Fish Rs	260000	92745	15000
24	Labour charge to Members for Prawn Rs	200000	26300	NA
25	Total Expenses in 2004 Rs	758000	367045	52500
26	Gross Profit in 2004 Rs	32000	-76355	17500
27	Per cent of profit/loss over expenses	4.2%	-20.8%	33.3%
28	Total Transaction Cost: TC (Rs)	15000	6000	0
29	TC/P x 100 (%) TC over Profit	46.9	-7.9	0.0
30	TC/S x 100 (%) TC over Sales	1.9	2.1	0.0
31	TC/E x 100 (%) TC over Expenses	2.0	1.6	0.0

Source: Field Survey

The reservoirs of co-ops A and B are under the Minor Irrigation department while the reservoir of co-op C is under Zilla Parishad. We collected the information from the secretaries of the societies. They recalled their information regarding sales and expenses of the last year, which had asked for. Baldeva and Bhangaria Matsya Udyog Sahakari Mandal (co-ops A and B) have made profit of 4.2%

Rajnarayan Indu and Santanu Ghosh International Water Management Institute, Anand and 33.3% respectively, in the last year over their expenses, but not the Pingat Matsya Udyog Sahakari Mandal (co-ops C), who lost 20.8% over its expenses. The return is very poor compare to village pond fisheries managed by private contractors, which we shall see in the next section.

The important users of these reservoirs other than fishermen co-operatives are the irrigators. But these co-ops of fisheries did not have any difficulties with irrigators, as the societies do not interfere against the lifting of water by the farmers confirmed the secretaries. Keeping this kind of 'good' relation with irrigators helped them to avoid conflicts, which would have been very expensive for the society to negotiate, as huge costs of transaction would have been incurred between two institutions. Hence they would like to abstain from conflicts even at the cost of low production of fish. This is possible when many of the members are in the CCA of the reservoirs. They are the beneficiaries of the both, irrigation and fisheries from the same CPR – the reservoirs concerned.

Being co-operatives, they are getting lots of subsidies from the government that has reduced their *ex-ante* transaction cost for giving training to their members and other paper cost etc. They get stipend for their training regarding fisheries technology from FFDA. They get subsidy of 50% for buying vehicles like tempo, which they use for carrying fish to the distant markets. They even get 50% subsidy to buy cycles for their members with rear carrier box, which they use for selling fish in the local market. The members get subsidy for constructing their small houses under 'Awas Yojana'.

Of the three co-ops the most successful one is from Kup village named Baldeva Matsya Udyog Sahakari Mandal with the reservoir size of 116 ha. The secretary Mr. Dineshbhai told us that besides getting subsidies he also arrange many a time interest free loans, diwali gifts, dinners to members etc. to keep them to their satisfaction. In the reference of year 2004 the society disbursed 12% dividend to their members, other two societies could not. Dineshbhai's co-op gives Rs.5/- extra i.e. Rs. 20 per kg of fish (other societies give Rs. 15 per kg of fish) as wages for harvesting; also it gives Rs.50/- more per kg i.e. Rs.100/- for prawn harvesting (other societies give Rs.50/- per kg only). Mr. Dineshbhai said that he gives more wages because the society earns more from the sales, particularly prawns.

Probably to appease their members the society had to spend a lot for their welfare, which is being subsidised from the government and thereby reducing societies' transaction costs. It may be since these families had lost their cultivable land during the construction of the reservoir, they are now being given subsidies by the government. Even then this Baldev society in the year before last, had spent Rs.40,000/- for diwali bonus, gift and dinner. Last year the society has given Rs.10,000/- to members as interest free loans. They also give some education allowances to their members for their children besides other allowances. If we add all these expenses it comes around more than Rs.30,000/- per year over and above other explicit production cost. This may be taken as a transaction cost for the society. May be for the secretary himself, who does not like lose his position.

We have serious questions here, i.e. why and how this society can afford this kind of cost? When we asked about the holding of shares we have come to know that a member can hold more than one share. Then obviously who is holding more shares will earn more from the dividend. **But what we** saw in secretary's home, which is palatial bungalow among the other adivasi houses or huts, fitted with all modern amenities like TV, telephone etc. He owns a car and a tractor too. The chairperson of the society was in the meeting, who kept him mute although. We saw him served tea to us at secretary's home. During our visit to his home, the secretary was always brooding that his family lost

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35 acres of land during the construction of this reservoir. The secretary said that he being a paid servant of Rs.5000/- per month did not hold any share. He has a cultivation income, probably quite high and also has a good political relationship in the district. We could not investigate if there is any malpractice. But what exactly revealed is this that this society is working under one-man show. The Chairman, though he owns 50 shares but his mute behaviour put us a feeling that he does not any say in society, which is also a few persons' or one person's play and no 'equity' is working for which the co-op is intend to. The government has given the opportunity to people through fisheries co-op societies who had lost their land under reservoirs but now those have become more of a private firm than a society.

Co-op societies are to buy seeds from government but in reality they also purchase from private sources, which we have come to know from source itself and put them in the reservoirs more than the seed-area ratio [5000 fingerling per hectare] to get more production. The catch may be here for the Mr Secretary of Baldeva society, who used the reservoir as part of his own pond, as most of the time he was counter arguing that his family had lost 35 acres of cultivable land under the present reservoir.

All these secretaries of the study co-ops do not prefer subsidy to continue, they accept subsidy since it is available. They all have a common complaint of silting on the bed of the reservoir. The silting has reduced the depth of reservoirs and hence there is impact on the production of fishes in the reservoir. The productivity of fish at Baldev co-ops is only 112 kg/ha/year followed by 66 kg/ha/year Pingot co-ops. We feel the productivity is very low and therefore the production and income, or there me mis-information.

The fourth co-operative named Nangol Matsya Udyog Sahakari Mandal is a society of 25 years old but revived only in 1993-94. Before the present members, it was run by some people from outside. The membership is consists of 90% of adivasis. They have dug up 12 ponds in 9 ha of fallow saline land. Large part of this land is owned by patels of the village. Their activity is restricted to production of spawn to fry and fry to fingerlings. Under the guidance of the FFDA officials they got the schemes for adivasis and started this spawn to fingerlings. Govt. of Gujarat started a scheme for water logged saline soil development in 1991 in which Govt. declared 25% subsidy for excavation of ponds to be used for fisheries. These intelligent members who are the owners (7 owners) of this 9 ha land took the opportunity of these scheme. They get the seed from the government to rear up to fry and fingerlings; therefore they are to sell the products to the government only. The sell proceeds are distributed as labour-wages to the 70 members of the society. They get direct cheques on the name of members with a differential wages for fry and fingerlings. So they have to depend on government courtesy to lift the products. Timely lifting gives the opportunity to earn more because they can get the next lot of seed for production. Govt. don't supply the seeds more than once and hence the lift of production also for once in a year.

The canal passes from a distance of one and half km by this co-operative. But they don't get water of the canal to the pond by gravitation as the ponds are in higher level than the canal. They want to bring some sweet water of the canal to mix with the salty water of the ponds to use for prawn and culture fisheries. For this they have dug up two wells in their field. They wanted to lift water from canal using diesel pump but could not manage with the officials of irrigation department. The transaction did not work with the irrigation department.

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We could not find initially the basic interest of the secretary who is from patel community. Later we came to know that he also had ownership of the part of the total land, and many people say that he makes forging in paying to the adivasi members from their cheques, as these people are not literate. He also sells fry and fingerlings to the private buyers as told by a buyer himself.

PRIVATE CONTRACTOR EXPERIENCE

The inland culture fisheries of Gujarat got a boost only after the establishment of FFDA (Fish Farmers' Development Agencies) in the state, in 1976. FFDA played a very important role in introducing technology and educating the fish farmers for developing Intensive Fish Culture Program (IFC). After FFDA's involvement in developing fisheries many water bodies came under fisheries. The state had vested all the government water sheets at the disposal of the fisheries in 1973. However a lease policy for operating them was finalized in 1976 and subsequently amended in 1982, 1990, 1992, 1995, 1996, 1997 and 2003. The present lessees of the village ponds are to carry on their fisheries under the new lease policy of July 2003.

The previous lease policy was for a short period of 3 years and was given to beneficiaries in a pecked order like, first beneficiary belonging to BPL family (IRDP beneficiary), second if no IRDP beneficiary comes forward, pond is to be leased out to local poor fisherman who is ready to employ local fishermen for fish catch, third to the local fishermen's cooperative and fourth if all the three beneficiaries do not come forward, pond is to be leased out to any other person through auction/tender giving wide publicity for the same and fifth if all the three beneficiaries don't come forward, pond is to be leased out to any other person through open auction/tender giving wide publicity for the same. Beneficiaries are to be selected under items first to third after publicity through newspapers. If more beneficiaries come forward through such advertisement, the pond is to be leased out to the person having the least income among all.

The latest lease policy of July 2003 is open to all for a longer period of 10 years to be renewed after first 5 years. This auction policy is open to all irrespective of beneficiaries as earlier. The auction is organized completely by FFDA and fisheries department of the state. Government will publish advertisement for the ponds to be leased out in two major daily newspapers. Before the auction of the pond FFDA should receive a resolution regarding auction of the ponds from the Gram Panchayat for the concerned ponds. The upset price is settled at Rs.500 per ha for a pond. Tender form should be bought at Rs.25/- and a 10% of the upset price to be given as earnest money by DD to the FFDA. The lease is awarded to the highest bidder. The lease amount that is received at the auction by the FFDA is given to the concerned panchayat after deducting the administrative expenses of the FFDA including expenses of advertisement.

FFDA will conduct the auction at Jilla Panchayat Office in the presence of DDO (District Development Officer). FFDA has the authority for making discontinuation of the lease contract if lessee has been found to do any misconduct. This new policy has given opportunity to private contractors to come in, as the auction is open to all and there is no pecked order for beneficiaries. Since the lease period is longer than 7 years, the lessee has chance to recover his investment without taking any 'hurried procedure' in culture fisheries to earn more in less time i.e. they do not have to go in for frequent catching of fish and putting seeds more than the prescribed quantity. This policy also helps to get bank loans for longer period as the banks were ready to provide finance only if lease duration was longer than 7 years. The policy has become more legal than earlier, contractors

Rajnarayan Indu and Santanu Ghosh International Water Management Institute, Anand cannot run away now under this new policy. There was no emphasis on the development of the pond earlier, now in some places contractors are requested to care of the ponds. Only 10 village ponds were given on lease till December 2004 in Bharuch under this new lease policy of 15 July 2003.

We have summarised the 5 cases of private contractors in Table – 3. This will say about the common features of income and expenditure of these contractors.

Table – 3: Private Contractors of Village Ponds in Bharuch [Ref: 2004]

Sl No.	Items	Shera Contractor 1	Hansot Contractor 2	Kankaria Contractor 3	Sisodra Contractor 4	Jantran Contractor 5
1	Ownership	Vill Panch	Vill Panch	Vill Panch	Vill Panch	Vill Panch
2	Size of the Ponds	5 ha	11 ha	2 ha	16 ha	8 ha
3	Lease taken in the year	2003	2001	2002	2001	2002
4	Lease for years	5 years	5 years	3 years	3 years	3 years
7	Upset Price of Lease Rs	Nil	Nil	Nil	40000	65000
8	Lease Amount Fixed per year Rs	10000	10500	5000	76500	227000
5	Water in the pond fed by	Canal fed	Rain fed	Rain fed	Canal fed	Rain fed
6	Irrigation use area	2 ha	Nil	Nil	5 ha	Nil
14	Total sale in the 2004 Qty Fish	2.5 ton	7 ton	3 ton	12 ton	
15	Total sale in the 2004 Qty Prawn	400 kg	600 kg	0	0	
16	Total sale in the 2004 Fish Rs	75000	210000	90000	360000	
17	Total sale in the 2004 Prawn Rs	80000	120000	0	0	
18	Total sale in the 2004 Misc Fish Rs	20000	0	0	0	
19	Total sale in the 2004 Rs	175000	330000	90000	360000	*800000
20	Expenses in 2004 Rs					
21	Lease	10000	10500	5000	76500	227000
22	Seed Fish and Prawn	25000	70000	5000	40000	100000
23	Cleaning of weeds	5000	0	6000		0
24	Chowkidar	12000	0	6000		0
25	Feed	50000	25000	5000		0
26	Netting	6000	30000	3000	12000	0
27	Transportation of Selling fish	0	0	1500	3000	0
28	Ice cost	0	0	1200		0
29	Other Expenses eg Chuna	0	0	500		0
30	Total Expenses	108000	135500	33200	131500	327000
31	Gross Profit (P)	67000	194500	56800	228500	*473000
32	% of profit/loss over expenses	62%	143%	171%	174%	*145%
33	Total Transaction Cost: TC (Rs)	20000	30000	15000	5000	30000
34	TC/P x 100 (%) TC over Profit	29.9	15.4	26.4	2.2	6.3
35	TC/S x 100 (%) TC over Sales	11.4	9.1	16.7	1.4	3.8
36	TC/E x 100 (%) TC over Expenses	18.5	22.1	45.2	3.8	9.2

Source: Field Data *expected

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All these contractors are making profit from 62% to 174% of their total expenditure in the last year; whereas in coop the profit is found to be very less. But it is told that fish become big in size and increase weight if they are in bigger and deeper water bodies, as in reservoir than in pond. Per hectare yield is 500, 636, 1500 and 750 kg respectively in Shera, Hansot, Kankeria, and Sisodra villages, in Jantran village production is continuing. The yield in co-op A and B, is 129 and 72 kg per ha respectively. It seems that either co-ops have hidden their production or they are inefficient in increasing production.

When the profit is high, percent of Transaction costs is low with respect to explicit expenditure [Table – 3] compared between the four cases of private contractors of ‘Gam *Talav*’.

Case 1 of Private Contractors

Mr. Manilal Raojibhai Patel (age 33) came from Valsad to Bharuch to earn his lively hood after his graduation. He got connection with some of his brother’s friends who were working in the Bharuch collector’s office as a personal assistant. Through this new friendship with the PA of the then DC (District Collector) they founded a partnership fishery in Hansot of Bharuch district. This people got loan of Rs.8 lakhs from Bank Of Baroda in 1995. They got the technology from the FFDA. They did the fishery in a 5 ha area of water spread in Padi village of Hansot taluka. Manilal spent with them nearly 8 years. A flood came in 1997 and a high tide in 1998, which caused a good amount of loss from their profit, as the fishes were killed and over spilled out. In 1998 all these people dissolved their business and Manilal was to leave empty handed. He went back to his native village. It was the story of 1998. After 4 years of his unemployment he came back again to Hansot taluka in 2002 and met some of his old known FFDA officers. He got some clues from them to get a pond on lease with a lower upset price in the village Shera, which is 14 km away from Ankleshwar city. A new venture started in the life of Manilal.

Shera is a village of 400 households with a population of 1500. The population is mixed of Brahmin, Prajapati, Patel, Darbar and Adivasi. The part of the village population is devotees of Late Shree Pandurag Shastri know as “Swadhaya Parivar”. Manilal being a tribal got a space in the lane of the village, where most of the swadyayees (followers of Swadhaya are known as swadhayayees) stay. This village has a change in the cropping pattern from Tur and Cotton to Sugarcane, Cotton and Paddy after the availability of canal irrigation.

The village pond of 5 ha has two parts of 3 ha and 2 ha. He took the pond on lease at Rs.10, 000/- (upset price) for 3 years initially in 2003. He got subsidy for the first two years. Pond has a CCA (Cultivable Command Area) 800 Bigha. The inlet from canal is in higher altitude than the pond, so during the monsoon the excess water used to overflow from the other side of the pond and flooded a portion of the residential area in the village. Before he was given this pond on lease the sarpanch of the village put a condition that he should make a wall at the middle of the pond, which would hold the excess flow of water that would save the residence of the village. He did a calculation of this transaction and pay-off and then agreed upon to the proposal of the sarpanch. He spent Rs.40,000/- for this purpose. He feels that he gets “*Duva*” [good wishes] from all the villagers. He accepted this transaction cost for a high pay off in the next few years. He had not only earned the profit from the fisheries but also received a lot of respect from the villagers. From the Table-3 the percent of transaction cost over profit is nearly 30%, when distributed Rs.40,000/- in two years as Rs.20,000/- each. In the same year of he also has invested for a well near the pond. People now get much sweet water for their drinking from the well. He has earned further good wishes from the

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villagers. The villagers are using the pond for irrigation, drinking and other domestic purposes. He cannot use *chuna* and other fertilisers because the water of the pond gets sipped into the well near the pond, which is being used for drinking. He has only to spend for a night watchman to prevent poaching, which is very less. His habit of keeping good relation and his honesty helped getting seeds and other inputs for one year of credit from a hatchery owned by a former FFDA officer.

In 2004 he refunded all of his loans, which he took from his father, brothers and sisters. He is awaiting a big leap in his life in near future.

Case 2 of Private Contractors

Mr.Fakkrudin Usman Raili (age 39) hails from a Muslim family. People of the village used to take “*Rail*”(the judgement) from his grandfather thus his family is known as “*Raili*” [who gives judgements] family at Hansot village in Hansot taluka. He was being trained and guided by one of the FFDA officers, which reduced his transaction cost for collecting information for this venture. Hansot is a village of 8000 families with a population of 32,000. The village is 20 km away from Ankleshwar city. The village population has very mixed castes of Patels, Baniyas, Adivasis, Muslims and Machhis. The village has a big advantage not getting flooded, though situated on the bank of Narmada. It has never got flooded – there is a saying that “*Bharuch dubi jaye pan Hansot Na dube*” i.e. Bharuch can be flooded but not Hansot. There is a change in the cropping pattern of the village from Jowar to Sugarcane. When he took two “*Gram Talav*”(7 acres and 4 acres of sizse) on lease there was no auction held. He was given the lease for 5 years in 2001 at Rs.10,500/-. The same ponds were on lease for Rs.7000/- previously.

As elsewhere, here also the fisherman families are valued at the lower rung in the society As told to us, this family used to do some good work in general to the village so, they were not been marginalized as the story told by Mr.Fakkrudin. When he was in standard 4 in his school, he was badly attacked by small pox. He was about to die but village people irrespective of hindus and muslims prayed for his life. Though he lost one of his eyes he is still surviving. Once they were told to stop doing any fish farming in both the “*Gam Talav*”. They did not do any fisheries for two years. As a result in the following year the water of the pond was full of insects and weeds that even the cattle could not get into the water. So in the next of that year Gram Panchayat agreed to give the ponds on lease for fisheries to the person who would agree to clean the pond at his own cost and start fishery. Mr.Fakkrudin had agreed to this and spent Rs.55,000/- for cleaning the ponds. He earned a good name in the village. Then onwards he never lost the faith of the people and continues to get the lease. His transaction cost for remaining and concluding the contracts is nearly a Rs.30,000/- in a year, which is nearly 15% over profit. His transaction costs include subscription for Ganpati Puja, Navratri, Ramjan, spending on medicine for poor people besides cleaning and taking care of the ponds. He does not spend much on preventing poaching as he has a very good reputation in his village. So others take care of poaching from his ponds. In case some one from outside did the mischief of poaching, he has arrangement to catch the culprit and if law doesn't care of this culprit he shows his muscles to solve it. His transaction cost restricted to the village institutions.

Recently in 2003 he has invested in purchasing saline lands and dug out 4 ponds, 3 km away from Hansot. He set up these privately owned fisheries with a partner using his experience from the “*Gram Talav*”. So his transaction cost of learning information became almost negligible. His

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investment of total Rs.2,86,200 /- consists of digging of ponds, cleaning plants including paperwork and registration (paper and registration cost is Rs.15,000/-). But in this privately owned ponds he has to spend Rs.36,000/- in a year for preventing poaching. His total sell from all these 4 ponds is Rs.1,55,000/- in the last year. Last year's seed, feed and harvesting cost is Rs.39,000/-, therefore he has earned gross profit of Rs.1,16,000/- from his privately owned ponds. These privately owned ponds have transaction cost of Rs.36,000/- for preventing poaching, which is 31% of gross profit. The part of the privately owned ponds could be put under the section of Privately Owned Fisheries, but then we are again to introduce Mr Fakkruddin. Her we told to talk about his endeavour in the field of fisheries.

Case 3 of Private Contractors

Mr.Rameshbhai Karsanbhai Vaghela (age 31) is from a fisherman family. For him the knowledge of fisheries is hereditary. After completion his S.S.C. he started with his father in their family business. But in 2002 his father had some family dispute with his brother and Karsanbhai with his son Rameshbhai was in a great trouble. They used to stay in Amod in Jambusar taluka, which is 40 km from Bharuch city. During this difficult time Rameshbhai was introduced by his cousin to an elderly person named Aswinbhai who was working in a ginning factory at Amod. Aswinbhai has good amount of income from cultivation say about Rs.6 lakhs in a year from his native village. Knowing the distressful condition of Rameshbhai, Aswinbhai offered cash money to Rameshbhai and encouraged him for taking ponds on lease and requested him to start family business of fisheries. Rameshbhai put Aswinbhai as a partner. Today he has 10 ponds on lease by these two years within a stretch of 2 km to 45 km. Two of them are under new lease and rest of them are under old lease system. The sizes of ponds are varying from 0.5 ha to 3 ha. Out of 10, 7 ponds were taken on lease in 2003. Out of these 10 ponds he got income from 4 ponds after harvesting, rest are yet to be harvested.

We have shown in Table-3, the accounts of one of these 4 ponds, which is in Kankeria village, 2 km from his residence at Amod. This pond is 2 ha in size and there are no irrigation conflicts and there was not upset price and he got it for 3-year lease at Rs.5000/- per year in 2002 under old lease system. His total expenditure including lease fees was Rs.33,200/- and sale of Rs.90,000/-, therefore the gross profit is Rs.56,800/-. Out of total expenditure his patrolling for preventing poaching is Rs.12,000/-, which is 36% of total expenditure. His profit over expenses is 171%, which means a low transaction cost with a very high pay off.

Case 4 of Private Contractors

Mr.Prem Jaiswal and Mr.Mahesh Patel are the partners of Maharaja Fisheries. They took up a pond of 16 ha on lease at Sisodara village in Ankleswar taluka, which is 8 km from Kosamba, the nearest city. The village has population of 3500 comprise of Brahmin, Rajput, Patels And Tribals. The cropping pattern changed from Cotton to Sugarcane when the canal irrigation came from Ukai Right bank canal. Recently Sugarcane cultivation declined because of increase in saline condition in the subsoil. These happens due to the over irrigation and absence of natural drainage and the bed of the canal has not cement plastered. The pond has 50 acres of cultivable command area. They use this pond water for paddy cultivation also. The pond has a feeder from Ukai Right bank canal.

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Maharaja Fisheries has taken lease this pond for 3 years from 2001 at Rs.76,500/- when the upset price was Rs.40,000/- before then the same pond was given on lease at Rs.1,12,000/- when the upset price was the same. In the last year they had total sale of Rs.3,60,000/-, incurred expenses of Rs.1,31,500/- and earned a gross profit of Rs.2,28,500/-, which is 174% of the total expense. They do not have any problem of poaching.

Mr.Jaiswal is postgraduate in Entomology from the University of Pune, and was working in FFDA as officer for 16 years, so he did not have to spend any extra for acquiring knowledge required for fisheries. He and his partner do not believe much of loss due to poaching. Mr Jaiswal's estimates not more than 20% loss due to poaching, so he does not spend much on preventing poaching. But if we evaluate 20% loss of the production from his pond due to poaching is Rs.72,000/- (20% of 12000 kg=2400 kg x Rs.30=Rs.72,000/-), which is not a small amount in a year. His reputation in fisheries industry is so much that he may not have to face the problem of poaching in his leased in pond at Sisodara. The same Farm has a Hatchery of their own in the same village. The Hatchery is designed according to Chinese specifications. This gentleman, Mr Prem Jaiswal did his office work with zeal to learn. His learning is giving him the profit of joy in the world of fisheries of Bharuch.

Case 5 of Private Contractors

Mr. Allauddin and Mr.Usmanbhai Khilji are the lessees of a village pond in Jantran village in Jambusar taluka. They are partners for the same pond. The Village has 800 households with nearly 3500 populations of nearly 50% each from hindu and muslims. This Village is absolutely rain fed, having a crop of desi cotton. Similarly the pond of 8 ha also rain fed. It is 12 feet deep and never dries up in the whole year. Upset price for the lease was Rs.65,000/- which they have taken at Rs.2,27,000/-, more than 3 times of upset price. Earlier the same pond was given on lease at Rs.1,95,000/- whose upset price was Rs.50,000/-.

Till the date of our interview they had spent Rs.3,27,000/- and they are expecting an annual sale of Rs.8,00,000/-, meaning gross profit of Rs.4,73,000/-. This village has some 'rules of the game', one of them is that lessee cannot sell fish to the villagers more than Rs.30 per kg. Previous lessee sold fish at more than Rs.35/- or Rs.40/- per kg to the villagers and he was disqualified to continue as lessee, therefore the present lessees do not take any chance and not only sell at Rs.30/- per kg but also give away as gifts to many of the villagers including Panchayat members, which the present investigators witnessed. If we evaluate the total value of gifts, which will be more than Rs10,000/- per year because 70% population of the village takes fish. The present lessees spend more than Rs.30,000/- for welfare of the village like marriage, education and medicine etc. They never come into conflicts with the other users of the pond even cattle bathing, even when the cattle crossing the pond several times in a day. They never have to spend separately for poaching. These [Rs 10,000 + 30,000] Rs.40,000/- is their transaction cost for them with village institutions.

PRIVATE OWNERS EXPERIENCE

The private owners, we mean owners of the land in which they have dug their ponds, which is very common in West Bengal, Orissa and also in Tamil Nadu. We have three such cases. One of them has a complete fishery, which we have included here for discussion. The other two though dug their ponds but one is busy with modern Chinese system of hatchery and other one is busy with rearing spawn to fry, and fry to fingerlings and they sell the product to government sponsored fisheries like co-operatives and 'Gam Talavs'. Since we have restricted our study with fisheries only we shall not include these two cases in our discussion.

A private fishery named say, ABC Private Limited Company started an 18-pond fishery on the saline land of Sisodra village in Ankelswar taluka about 45 kms from Bharuch city. From the following Table – 4 we can see that using a systematic modern technology in fisheries one can get a production of 6000 kg/ha/year against Gujarat's average yield of 1245 kg/ha/year.

Table – 4: Private Owners of Inland Ponds Fisheries [Ref: 2004]

Sl No.	Items	ABC Pvt Ltd Co
		Sisodra
1	Ownership of land	31.5 acres
2	Size of the Ponds	18 ha
3	Land Purchased 31.5 acre Rs 12500 per acre	393750
4	Water in the pond fed by	Canal fed
5	Total sale in the 2004 Qty Fish [*6 ton per ha]	108000
6	Total sale in the 2004 Fish Rs [Rs 32/-per kg]	3456000
7	Total sale in the 2004 Rs	3456000
8	Expenses in 2004 Rs	
9	Pond Reclamation	150000
10	Seed Fish	15000
11	Feed	200000
12	Netting	50000
13	Chowkidar, Supervisor etc Salary	70000
14	Other Expenses including fixed cost	100000
15	Total Expenses	585000
16	Gross Profit	2871000
17	% of profit/loss over expenses	491%
18	Total Transaction Cost: TC (Rs)	50000
19	TC/P x 100 (%) TC over Profit	1.7
20	TC/S x 100 (%) TC over Sales	1.4
21	TC/E x 100 (%) TC over Expenses	8.5

Source: Field Data * as told by the Director

The saline land was barren for years. Mr Choudhury, the director of ABC Pvt Ltd, came all the way from Assam in 1996 to start a shrimp hatchery in this brackish water. He gave up the prawn culture in 2000 and changed over to inland carp culture in 2001 after getting suggestions from the fisheries department of Bharuch. He lost about Ra 80 lakh (as he told) and learned how not to do the prawn culture. One can say that this is a very high transaction cost he had to pay for a least pay-off or rather a negative pay-off, which forced him to leave prawn culture. This cost one can put as a transaction cost for learning/information (Adhikari, Bhim; 2001).

His selection of site very well planned. It is only 45 kms from Bharuch and about 15 kms from Ankelswar. The saline low land is in the command area of Ukai Right Bank [URB] canal, where he could get supply of fresh water from the canal. The land they purchased is at a lower level than the height of the canal. They got assured water supply from URB canal. The then Commissioner of

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Fisheries suggested that land should be declared as non-agriculture (NA) land, and specifically written that the 'land be used for fisheries', which is an agricultural activity. However there is a 'definition dichotomy' between the land used for fisheries and the land used for non-agriculture informed Mr Choudhury. His land revenue is still not finalised. He has already spend for this purpose approximately Rs 50,000/- for typing document, advocate fees, petrol for moving between Bharuch and Gandhinagar etc, besides his business time for so many years. One can take this as transaction cost for contractual purposes, which is not related directly to his production cost. This amount is definitely smaller than the amount he is getting in return from the 18-pond fisheries. And that is why he is able to tolerate this snap expenditure. This is a cost of decision making for the property from the part of the government, which is being borne by Mr Choudhury for negotiating it.

He has another kind of cost like spending some amount to get his volumetric water bill low from the canal authority. This amount is approximately Rs 20,000/- in a year including the some Deepavali gifts. Though secured about his rights of his fish farm since it is on his purchased land even then he has to go for this kind of operational costs. He has a good number of staff; some of them were brought from Bengal. His monthly salary bill is nearly Rs 70,000/-. So does not have spent any extra for preventing poaching as a few numbers of staff members stay in the farm compound. We recollect here the comment of Adhikari as "The transaction costs of fisheries management was categorized into three major cost items: (a) information costs (b) collective fisheries decision-making costs and (c) collective operational costs. They found that whether or not the difference in the total costs of fisheries management between centralized government management and co-management is significant, there is significant difference in the **costs** at the different stages of management." (Adhikari, Bhim; 2001)

Mr Choudhury wants to increase his productivity to 10 thousand tonnes per hec per year like the productivity found in Andhara Pradesh. In the last year his Company has earned profit of Rs 28,71,000, which nearly 500% of the expenditure.

After a long discussion with Mr Choudhury, we found that they have taken this fishery as a private factory.

MAKING SALINE AREA PRODUCTIVE

Saline area in Baruch District is significantly high. It has costal and inland salinity as well. The inland saline area is man-made by over irrigation. This is mainly restricted to right and left canals of Ukai Dam. The floors and sides of canals are not cemented and natural geographical drainage is poor, which caused the water logging and eventually made the area saline. The Monsoon Water Logged Area in Command Areas (0-1.5 m water table) in Ukai Right-Bank Canal area is 2150 ha and for Ukai Left-Bank Canal 2040 ha, that is 4190 ha of land is saline and not used for crops which can fetch good returns to the farmers (SAVE). So they left it as uncultivable or fallows.

There is a thumb rule calculation (as told by a FFDA official) that in a one-hectare pond with a maximum of 7500 fingerlings one can have 3000 kg of fish, which can fetch Rs 90,000/-in a year if sold at Rs 30/- per kg. The expenses could Rs 40,000/- at the higher side. Therefore the gross income from one-hectare pond is Rs 50,000/- in less than a year. This is definitely much more lucrative income proposal in compare to low return crop grown on saline land or keeping the land fallow. Earlier the practice of fisheries was stigmatised, which gradually now taking a different views, like in the case of Poultry or of Beauty Parlour, which were earlier a job from the people of low rung

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in the society. Now many well to do farmers and other industrial houses big or small are coming forward to (big house like Hindustan Liver Ltd for Prawn Culture, and from small house like Mr Choudhury of ABC Pvt Ltd). At present Surat Fish Market imports 8000 kgs of *Robu* and *Catla* etc every day from Andhra Pradesh. So there is a demand-supply gap to have an entry in the market.

POACHING

Poaching is a un-sports-man-like and illicit work. This happens mainly in ponds and reservoirs areas. The poachers are mischievous, some people do it for fun and some people do it for need. In AKRSP (Netrang), we find that give net and boat to the poorest of the poor to catch fish from the reservoir without being a member of the co-ops. When asked about the legality, the officer sparked in telling that let the poorest of the poor is survived first. So the opinion differs! This is not the case everywhere. In any case owners lose their catch. So they spend a good amount of money to stop this. If need be they become 'toughy' to solve this problem, either tying with police or policing by chowkidars or by self help.

However, as many places we have travelled in Bharuch district and discussed this matter none of them told that poaching is a tough problem for them. However, they do not lose more than 20% percent of the total catch. The loss depends on variety, whether it is *Robu* or *Catla* or Prawn. The first one makes a loss of 30 rupees a kg, where as second one makes a loss of rupees 200 per kg. A sixteen year experienced person in FFDA also said that genuine poaching could not attribute to more than 20% of the total catch. Though it is 20% seems 'not much' to some persons, but amount wise it is not a small some of money. If we take the 20% of sale value of the poaching, for example, for the co-operatives would have lost Rs 14,000 to 1,58,000 of sale value, Private Contractors from Rs 18,000 to 72,000 and for the Pvt Ltd Company it is Rs 6,91,000. If the cost of preventing poaching is higher than the loss then one think poaching is not a big thing. However in our data cost of preventing poaching is not more than the loss through poaching.

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