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A SOCIO - ECONOMIC ANALYSIS OF PRAWN FARMING IN ORISSA STATE

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Introduction

Based on the experimental success of prawn culture in confined water ponds in Chilka lake periphery, Government of Orissa formulated a massive prawn farming project to rehabilitate about 3,000 poorest families in the coastal rural area. The programme was initially introduced in 1982 -' 83 and the actual pond excavation work was started in 1983 - ' 84 in Puri and Ganjam districts. According to this scheme, the selected beneficiaries whose annual income is not more than Rs. 12,000/- would be provided each with a pond of 0.2 ha of water area for prawn culture. The state government provides 100 per cent subsidy for the construction of the pond and also incurs the input costs for the first crop.

The state government has set up the Brackishwater Fisheries Development Agency which is fully responsible for the development of brackish water fisheries in the state. This agency provides technical assistance to the farmers right from the selection of site till harvesting as well as marketing of prawns through the entire duration of culture. The agency also provides inputs including seed, extends extension services and imparts training to prospective farmers.

All the ponds provided to the Economic Rehabilitation of the Rural Poor (ERRP) beneficiaries in Ganjam and Puri districts have been designed for confined water management. The constructed pond is given on lease for 10 years which will be further extended.

As a part of the base line study of prawn farming programme under ERRP projects, C.M.F.R. Institute has conducted a comprehensive socio- economic survey of the beneficiaries of ERRP programme in seven clusters, 5 in Puri and 2 in Ganjam districts. About 70 per cent of the total beneficiaries of the cultured ponds are covered under this survey and the results are summarised below.

Size of family

The size of the family ranges fron 5.5 in Haripur cluster to 8.2 in Kusubanti. The average size of family of all beneficiaries worked out to 6.7. Of this, workers or earning members are only 1.7 per family. The average size of the family in Panaspada is 7.7 and per

family 2 are earning members. At Kusubenti, Mudiratha and Khandualpur, each family is having 2 earning members, whereas at Jadupur Gopakuda and Haripur on an average there is only one worker in a family. The proportion of workers to non-workers in a fmily is almost 1:4. Children below the age of 14 accounted for 45 per cent of the population (Table 1).

Literacy

Percentage of literacy ranges from 21.0 per cent in Mudiratha (Puri dist.) to 71.3 per cent in Haripur. The average literacy level of the beneficiaries is comparatively higher than that of Orissa state. This may indicate that such benefits are mostly utilised by the literates in the rual areas. However, among the children below the age of 14, only 17 per cent are school going. But the percentage of school going children in different clusters show wide variation ranging from 7.6 per cent in Jodupur (Puri dist.) to 61.5 per cent in Haripur (Ganjam dist.). The literacy level of the population is also highest at Haripur which is having the smallest family size.

Occupational pattern

In all the clusters in Puri, before the introduction of the culture programme, majority of the beneficiaries were engaged in agriculture operations as wage earners whereas in Ganjam district, for most of them, fishing in Chilka lake was the major occupation. Even after taking up the prawn culture, during off - season they go for their traditional occupation. Among all the beneficiaries covered under the survey a few of them are having occupation other than agriculture labour or fishing, which include 5 fish traders in Ganjam district, one barber, 2 petty shop owners and two workers in ice factories. Since fishing and agricultural operations are seasonal and most of the beneficiaries are only wage earners without having any means of production, their average annual income ranged from Rs.1,000 to 1,200.

The percentage of workers to total population ranged from 16.4 for Gopakunda in Ganjam district to 30.4 for Madiratha in Puri district. Whereas the percentage of working population to the toal adults in different clusters ranged from 31 to 51. Percentage of working population is maximum at Mudiratha where literacy is at the lowest level. At Haripur cluster where literacy is at the highest level of about 70 per cent, the working population constituted only 38 per cent of the total adult members. The literate adults including those who are studying in colleges may be reluctant to work as agricultural labourers or to engage in fishing. Most of the adults especially those who are illiterate do engage in any of these activities.

TABLE 1. *Clusterwise socio-economic parameters*

	Puri district					Ganjam district	
Name of the cluster	Panaspada	Jadupur	Kusubenti	Mudiratha	Khandualpur	Haripur	Gopakuda
No. of beneficiary families surveyed	31	20	47	27	134	29	33
Population	239	142	384	181	822	160	214
Males	65	37	100	56	229	41	53
Females	61	39	103	51	230	41	63
Children	113	66	181	74	363	78	98
No. of workers	63	32	94	55	230	31	35
No. of literates	64	35	113	38	279	114	101
No. of school going children	28	5	51	16	45	48	30
Percentage of workers to total population	26.4	22.5	24.5	30.4	28.0	29.0	16.4
Percentage of workers to total number of adults	50	42	46.3	51.4	50	37.8	30.2
Percentage of literacy	26.8	24.6	29.4	21.0	34.0	71.3	47.0
Percentage of school going children to total children	25	7.6	28.2	21.6	12.4	61.5	30.6
Size of family	7.7	7.1	8.2	6.7	6	5.5	6.5
Main occupation	A. L	A. L	A.L	A.L	A.L	F	F
Type of house	T. H	T. H	T. H	T. H	T. H	T. H	T. H

A. L. : Agricultural labour, F : Fishing, T. H : Tatched hut.

After the introduction of ERRP programme all the adults in the families including women, not otherwise employed, and all children who do not go to school are participating in the activities of prawn farming. Women and children are mostly engaged in feed preparation. Because of this, some of the parents, especially those who are not literate are not interested in sending their children to the school.

Social problems

Before introducing any new developmental programmes in rural sector its socio - economic impact should be critically studied. The prawn farming programme in Chilka periphery with its vast potential paves the way for a structural change in the social set up of the economically backward communities of this area. Most of the people who are now engaged in prawn farming were earlier occupied either in fishing or paddy cultivation for their livelihood. Majority of them are not having either own land for paddy cultivation or own fishing equipments.

With the introduction of prawn farming by Orissa government through Economic Rehabilitation of Rural Poor programme in 1983, a number of agricultural labourers get opportunity to enter into prawn farming in their own ponds provided by Orissa Government on a long term lease basis. For a landless labourer, opportunity to put all his efforts for his own enterprise will help to increase his labour productivity to a large extent. As it has been already seen from the field study, these new entrepreneurs face managerial problems because of lack of experience and conventional approach to prawn farming as a business. Prawn culture being a new industry or an old one being transformed by the application of new technology, many technical, institutional, economic and social problems as well as opportunities will arise.

Since most of the ponds are constructed in remote areas where there are no adequate transport and communication facilities, despite a good demand for prawns especially *P.monodon*, disposal of prawn is not an easy task for the farmers. The price they get at the farm level do not have any linkage to the price of the processed product.

Since most of the clusters under ERRP project are located in remote villages of Chilka periphery, communication facilities have to be further developed. Only government or any public agency can invest such overhead capital.

During the culture period the farmers have to stay at the cluster where their ponds are located. They construct small huts on the embankment of the pond and stay there with their family. The children usually engage in feed preparation as well as feeding also. This has created problem of dislocation of the family because most of these farmers belong to distant villages. Moreover, school going children have to abandon their studies which will naturally increase the number of drop outs from the school.

Economics of prawn farming

To study the economics of prawn farming, cost and earning data have been obtained from 9 centres in Puri and 6 clusters of fish ponds in Ganjam district. Detailed information on clusterwise average cost and earnings in prawn farming per pond per crop is given in Table 2 for Puri district in Table 3 for Ganjam district.

Cost of production

Under ERRP programme, inputs such as seed, feed and fertiliser have been provided free of cost to the prawn farmers for the first crop . However, the cost of seed per pond per crop worked out to the range of Rs. 278 at Khandualpur to Rs.477 at Nairi and Gobapadar in Puri dist. This variation in the cost of seed in different clusters is mainly because of the variation in the size of stock and the distance to the collection point. The average cost per 1000 seeds worked out to about Rs.200. The average cost of feed per pond ranged from Rs.146 at Jadupur cluster to Rs.442 at Janikuda. The items used as feed and fertiliser are mostly groundnut oil cake, SSP, Urea, raw cow dung and lime. These are the only operational inputs used other than labour. No hired labour was engaged in any pond. The entire farming activities have been carried out by family labour. On the basis of the survey conducted in Puri and Ganjam districts the total labour requirement for raising one crop has been estimated to about 120 mandays. With an opportunity cost of Rs. 10 per manday, the labour cost per pond per crop worked out to Rs. 1,200/-.

In Puri district the total operational costs per pond (of 0.2 ha) per crop ranged from Rs. 518 at Jadupur to Rs. 860 at janikuda. If the imputed value of family labour is also included this range will be from Rs. 1,718 tp Rs. 2,060.

The average stock size per pond of 0.2 ha in Puri district worked out to 2,311 and Ganjam district 2,831. However, the average cost of seed per pond in Puri district came about Rs. 374 as against Rs. 301 in Ganjam district. The seed cost in Ganjam district was lower than that in Puri district because of less transportation cost.

TABLE 2. *Clusterwise average costs and earnings in prawn farming per crop per pond of 0.2 ha during 1983 - '84 and 1984 - '85 in Puri district, Orissa state*

Name of the cluster	Year of crop	Duration of crop (in days)	No. stocked	Cost of seed (Rs)	Cost of feed and fertiliser (Rs)	Total costs (Rs)	No. Harvested	Survival rate (%)	Quantity* harvested (kg)	Gross** revenue (Rs)	Farm surplus (Rs)
1. Khandualpur	1983-1984	97	1632	278	353	631	1223	75	28 (26)	1996 (71)	1365
2. Khandualpur	1984-1985	134	2362	343	248	591	1122	48	29 (27)	1963 (68)	1372
3. Kusubenti	"	112	2154	277	326	603	1305	61	39 (24)	2686 (69)	2083
4. Mudirath	1983-1984	88	1742	346	384	730	1454	84	36 (26)	2655 (74)	1925
5. Janikuda	"	80	2092	418	442	860	1737	83	52 (28)	3851 (74)	2991
6. Gobapadar	"	125	2500	477	339	816	1353	54	33 (29)	2880 (69)	1464
7. Nairi	"	126	2500	477	339	816	1414	57	32 (31)	2055 (64)	1239
8. Jadupur	1984 -1985	58	1868	372	146	518	1000	54	31 (25)	2174 (70)	1656
9. Gorapur	1983-1984	160	2000	400	361	761	1735	87	42 (31)	2699 (64)	1938
10. Panaspada	"	130	1706	279	270	549	1415	83	36 (27)	2404 (66)	1855

1. *Figures in brackets indicate break-even production.
2. **Figures in brackets indicate value realised per kg of prawn.
3. No hired labour was engaged in any pond.
4. Opportunity cost of family labour is not included in the total costs.
5. For the calculation of break-even production, imputed value of family labour has also been taken into account.

TABLE 3. *Cluster - wise average costs and earnings in prawn farming per crop per pond of 0.2 ha during 1983-'84 and 1984-'85 in Ganjam district*

Name of the cluster	Year of crop	Duration of crop (in days)	No. stocked	Cost of seed (Rs)	Cost of feed and fertiliser (Rs)	Total costs (Rs)	No. Harvested	Survival rate (%)	Quantity* harvested (kg)	Gross** revenue (Rs)	Farm surplus (Rs)
1. Binchanappalli	1983-1984	90-105	2542	305	406	711	1031	41	17 (36)	905 (53)	194
2. Binchanappalli	1984-1985	120-140	2250	243	347	590	710	32	18 (25)	1289 (71)	699
3. Gopakuda	1983-1984	96-104	2606	367	515	882	1168	45	25 (33)	1578 (63)	696
4. Gopakuda	1984-1985	N. A.	2586	342	453	795	1149	44	29 (29)	1969 (68)	1174
5. Sonapur-Khariapada	1983-1984	113-123	3000	270	404	674	817	27	20 (36)	1032 (52)	358
6. Sonapur-Khariapada	1984-1985	N. A.	3460	346	161	507	2256	65	37 (59)	1070 (29)	563
7. Sonapur-Bhagamara	1983-1984	103-113	3000	270	404	674	964	32	21 (41)	967 (46)	293
8. Sonapur-Bhagamara	1984-1985	N. A.	4400	440	178	618	1855	42	32 (51)	1138 (36)	520
9. Katuru-Baghanara	1984-1985	N. A.	3000	300	223	523	2100	70	25.5 (27)	1630 (64)	1107
10. Haripur	1984-1985	N. A.	4300	430	486	916	1963	46	44 (34)	2749 (52)	1824

1. *Figures in brackets indicate break-even production.
2. **Figures in brackets indicate value realised per kg of prawn.
3. No hired labour was engaged in any pond.
4. Opportunity cost of family labour is not included in the total costs.
5. For the calculation of break-even production, imputed value of family labour has also been taken into account.

The average cost incurred on feed and fertiliser for one crop wroked to Rs. 321 in Puri and 325 in Ganjam district. The total operational costs per pond (0.2 ha) excluding labour charges worked out to Rs. 695 in Puri and Rs. 626 in Ganjam districts.

Regarding fixed costs, the average initial investment for the construction of a pond including land value came about Rs. 7,000/-. Annual cost on equipments like traps and sheds came about Rs. 200 per pond.

Unit cost

Detailed cluster wise information on the expenditure to produce one kg of prawn is given in Table 4. The clusterwise break up of average cost of inputs required to produce one kg of prawn and its value realised is given in Table 3. It is seen that in Puri district the value realised per kg of prawn is higher than cost for all clusters, whereas in Ganjam district it is lower for all culusters except Hairpur. To estimate the total cost per kg of prawn imputed, value of the family labour, also has been taken into consideration which contributes the major portion of the total cost.

The cost of production per kg of prawn is maximum in Binchanapally cluster (Ganjam district) and minimum in Janicuda cluster (Puri district). The higher level of unit cost in Ganjam district is mainly because of low level of productivity as compared to Puri district. So also the price realised in Ganjam district in case of many clusters is much lower than those in Puri district.

TABLE 4. *Clusterwise average levels of imputs used to produce one kg of prawns*

Name of cluster	Seed used (Nos)	Value (Rs)	Feed & fertiliser's (Rs	Labour* value (Rs)	Total operational cost (Rs)	Value realised per kg (Rs)
Puri District						
1. Khandalpur19 83-1984	58	10.00	12.50	43.00	65.5	71.00
2. Khandalpur 1984-1985	81	12.00	8.69	42.00	62.69	68.00
3. Mudiratha	48	9.66	10.67	33.00	53.33	74.00
4. Kusubenti 1984-1985	56	7.16	8.43	31.00	46.49	69.00
5. Janicuda	40	7.89	8.50	23.00	39.39	74.00
6. Gabapada	75	14.28	10.15	36.00	60.43	69.00
7. Nairi	80	12.70	13.28	38.00	63.98	64.00
8. Jadupur	61	12.23	3.75	39.00	54.98	70.00
9. Corapur	55	11.00	9.15	24.00	54.15	64.00
10. Panaspada	50	8.00	5.69	34.00	47.69	66.00
Ganjam District						
1. Binchinappalli 1983-1984	150	18.00	24.00	71.00	113.00	53.00
2. Binchinappalli 1984-1985	125	13.50	19.00	67.00	99.50	71.00
3. Gopukuda 1983-1984	104	14.50	20.50	48.00	83.00	63.00
4. Gopukuda 1984-1985	89	12.00	15.50	41.00	68.50	68.00
5. Khariapada 1983-1984	150	13.50	20.00	60.00	93.50	52.00
6. Khariapada 1984-1985	94	9.00	4.50	32.00	45.50	29.00
7. Baghamara (Sonapur) 1983-1984	143	13.00	19.00	57.00	89.00	46.00
8. Baghamara (Sonapur) 1984-1985	138	13.75	5.50	38.00	61.25	36.00
9. Katurn 1984-1985	118	12.00	9.00	47.00	68.00	64.00
10. Haripur 1984-1985	97	10.00	11.00	27.00	48.00	62.00

* Imputed value of family labour required to produce one kg of prawn at the rate of Rs 10/- per labour day.

Production trend

The average quantity of prawns produced in a pond of 0.2 ha in different clusters in Puri district raising one crop in 1983 - '84 and 1984 - '85 varied from 28 kg in Khandualpur cluster to 52 kg in Janikuda. Stocking rate also was lowest at Khandualpur (1,632 for 0.2 ha pond) whereas at Janikuda it was 2,072 and the maximum of 2,500 was at Gobapada and Nairi. The survival rate ranged from 54% in Gobapada and Jadupur to 87% in Gorapur.

In Ganjam district average production per pond ranged from 17 kg in Bimchanapalli to 44 kg in Haripur cluster. Stocking rate varied from 2,542 in Binchanappalli to 4,400 in Baghamara (Sonapur). However, survival rate with the minimum of 41% at Binchanappalli and maximum 46% at Haripur do not show much variation.

The average production per crop per pond worked out at 36 kg in Puri district and 27 kg in Ganjam district. The low level of average production in Ganjam district can be attributed to the floods in certain clusters and poor management.

Since the prawn farming is still at an experimental stage and the production data given in the Table - 1 are pertaining to Ist or 2nd crop raised under ERRP, the level of production can be definitely improved by efficient utilisation of available inputs and better pond management. In Ganjam district without taking family labour into account average net income for one crop per pond for different clusters ranged from Rs. 194 in Binchanapalli (1983 -' 84 crop) to Rs. 2,740 in Haripur cluster. However, the imputed value of family labour also is included in the cost of prawn production, in Ganjam district only. Haripur cluster (1984 - '85 crop) recorded a net profit over the operational costs. InTable 1 and 2 break-even production levels are given in brackets under column which indicate that in Ganjam district except in Haripur cluster production levels should be considerably increased if the prawn farming is to be carried out with the hired labour. However, in Puri district average production levels in all the clusters and more than the corresponding break-even production levels. In the calculation of break-even output imputed value of family labour also have been taken into account.

Marketing problems

From Table 1 and 2 it is seen that the price realised is very low in some clusters especially in Ganjam district. It is mainly because of the defective marketing system and lack of infrastructure facilities. Many clusters do not have proper road facilities. Since the harvesting is done by traps and continue for 10 to 15 days the quantity harvested daily at each cluster will be not sufficient for truck loads. Moreover most of the clusters are not accessible for trucks. Hence the agents of the processing units collect the prawn from the farmer by cycle loads.The fish farmers do not have sufficient knowledge of price structure. In Ganjam district price factor is the major one which affects the revenue of the farmers. By improving the marketing efficiency, the average revenue per crop could be raised by 25 to 60 per cent.

Farm income

Gross income received for one crop from a pond of 0.2 ha in different clusters in Ganjam district ranged from Rs. 905 (Binchanappalli) to Rs. 2,740 (Haripur cluster). The low level of gross revenue in Binchanappalli and Sonapur cluster could be attributed to the low level of production mainly due to the damage to the crop by flood and lower level of value realised per kg of prawn. Whereas in Puri district the average gross revenue ranged from Rs. 1,963 (Khandualpur cluster) to Rs. 3,851 (Janikuda). Average gross income per crop per pond in Puri district worked out to Rs. 2,530 and Ganjam district Rs. 1,432.

Average net income of a pond from one crop in different cluster of Puri district ranged from Rs. 1,239 (Nairi) to Rs. 2,991 (Janikuda) and in Ganjam district from Rs. 194 (Binchanappalli) to Rs. 1,824 (Haripur). The average net income for the district as a whole per crop per pond worked out Rs. 1,834 in Puri district and Rs. 743 in Ganjam district. The net income or the farm surplus is defined as the gross revenue minus the operational costs. All farm activities were carried out by family members. The imputed value of the family labour is not included in the total costs for the computation of farm surplus.

Returns to labour

Since ERRP project is mainly meant for the rehabilitation of the poorest people, beneficiaries are mostly landless agricultural labourers or fishermen who are only wage earners. For both these activities, monsoon is lean season; prawn farming, which is mainly carried out in monsoon season, provides employment to the beneficiaries during this time. All the farm activities are carried out by the family labour and no hired labour is engaged for any work. In the economic analysis of such projects for which initial investment is comparatively low, returns to labour carry much more meaning than returns to capital.

The folowing table gives the clusterwise returns to labour in Puri and Ganjam districts. In Puri district for all clusters returns to labour per man day is more than the opportunity cost of Rs.10 per man day. However, in Ganjam district except in Haripur cluster, returns to labour is less than the opportunity cost. This is because of the lower productivity of ponds in Ganjam district together with the low level of prices received by the prawn farmers. The cost of feed per 1000 seeds stocked worked out at Rs.170 in Puri district and Rs.115 in Ganjam district. Other than the lower feed intensity, poor pond management also has contributed to the low productivity in Ganjam district. It was observed that, in Ganjam district, many clusters were not having proper protection embankments and crops were damaged in many ponds.

Returns to labour (in ERRP ponds) (Rs./Man - day)

Puri Dist. (1983-'84)	
Name of the cluster :	
Khandualpur	11.38
Mudirath	16.04
Janikuda	24.94
Gobapada	12.20
Nairi	10.33
Gorapur	16.15
Panaspada	15.46
(1984-'85)	
Kusubanti	17.35
Khandualpur	11.43
Jadupur	13.80
Ganjam Dist. (1983 - '84)	
Binchinppalli	1.62
Gopakuda	5.80
Khariapada	2.98
Baghamara (Sonapur)	2.44
(1984-'85)	
Binchinappalli	5.66
Gopakuda	9.78
Khariapada	4.69
Baghamara (Sonapur)	4.33
Bahamara (Katuru)	9.23
Haripur	15.20

Policy implications

1. At the present level of average production of 25 kg of *P. monodon* for one crop in 0.2 ha pond in Ganjam district, the net farm surplus is calculated without taking into account the opportunity cost of family labour. The labour requirement for all farm activities in one pond (0.2 ha) to raise one crop is worked out at 120 man days and with an opportunity cost of Rs.10 per man day, the total labour cost would come to Rs.1,200. However, the average income realised in Ganjam district is much lower than what can be expected in a normal situation. It can be considerably increased by avoiding floods during monsoon, by better pond management and improving the marketing facilities. The average price realised per kg of prawn in Ganjam district was only Rs. 53 as against Rs. 70 in Puri district. The situation in Puri is better not only because of higher price level but also the high average production (36 kg) with a net farm income of Rs.1,885. A close observation of cost and revenue structure, mangement and environmental aspects indicated that the production as well as net farm income can be increased by increasing stock size, efficient feeding, improved marketing infrastructure and proper pond management.

The prawn farming in 0.2 ha ponds serves the purpose of providing employment to the beneficiaries who work mostly either as agricultural labourers or as wage earners in fishery sector with scant availability of employment opportunities. If the prawn farming is to be brought under an industrial footing, the 0.2 ha ponds are not at all sufficient. However, as a scheme for rehabilitation of rural poor this pond size is sufficient to provide a subsistance level of income to the poorest of the poor who are so far deprived of any sort of ownership of means of production.

2. According to the survey conducted by the Department of Fisheries, Government of Orissa since 1979 - '80, the extent of suitable brackish water area that can be brought under productive coastal aquaculture projects is estimated to be about 203,000 ha including dense mangrove forests. To bring atleast 10,000 ha under prawn farming in the near future the seed requirement, at an average rate of 20,000/ ha, for two possible crop in a year worked out at 400 million seeds

The State Fisheries Department initiated a seed survey in 1979 - '80 and continued upto 1982 - '83. The survey revealed that the seed potential of important species of cultivable prawn mainly *P. indicus* and *P. monodon* is 130 million and another survey conducted in 1983 - '85 revealed that the availability of juveniles of these species in different estuaries and Chilka lake would be around 36 million. If a judicious method of collection of seed is adopted without affecting the capture prawn fishery of the lake, stocking materials for about 1,000 ha prawn farms in Chilka area can be collected from the lake.

These surveys indicate that the seed requirement for developing the potential area for prawn farming in Orissa state cannot be met with the collection from the wild. In this connection the immediate requirement is an assured supply of seed to farmers at the appropriate time for a reasonable price. The present practice of collecting the seeds from the wild cannot be continued indefinitely. The shortage of seed has alrady been felt

in certain areas of Puri district. Hence it is highly essential to establish hatcheries so that the collection from the Chilka lake area, which will in due course affect capture fishery of prawns, can also be avoided.

3. Another major problem, the prawn farmers are facing, is the lack of efficient feeds. At present the farmers mainly use ground nut oil cake, snail etc. as feed. The farmers themselves prepare feed and feeding intensity is decided on their own discretion. In the near future this will pose serious problem to them. Steps have to be taken to produce efficient feed and make it available to farmers at reasonable price.

4. It was observed during the survey that in some of the clusters, some ponds have been washed away and crops have been very seriously damaged due to flood. One of the reasons for the low level of productivity in Ganjam district is the absence of proper embankment to protect the farms from flood. The construction of protection embankment requires huge capital which can be done only through public investment.

5. Before undertaking major investments in prawn farming by distributing land to small farmers, issues of land tenure and water rights must be solved. The issue at hand, when land or water is leased out to private individuals is the price and duration of contracts. In the case of ERRP programme beneficiaries do not have to pay lease amount. The duration is 10 years which will be extended further. Since the government is planning to bring more area under prawn farming it is better to lease out land area on long term basis so that fermers also can have long term planning for proper maintenance of ponds.

6. Majority of the farmers interviewed, were of the opinion that the ponds are to be deepened. The depth of the ERRP pond is 2.5 metres. The water level for the 2nd crop which is harvested in March is much lower and not at all sufficient for the proper level of growth of the animal.

7. Most of the clusters do not have proper marketing infrastructure and hence the price realised per kg of prawn both at Ganjam (Rs.53) and Puri (Rs.70) was much lower than the prevailing market price of about Rs.80. The formation of a marketing co-operative society of the prawn farmers will help them to solve the marketing problems and get reasonable price for their product.

8. It was observed that inefficiency in management was responsible to certain extent, for low level of production in many clusters. Fish farming is a business and it requires business methods for efficiency in its management. Recent development in the field of techniques and methods of aquaculture and the increasing trend in fish prices have further pin- pointed the importance of the role of management in fish farming. For the efficient management of the farm, information on new technology, modern practices and prevailing price trends are to be made available to fish farmers. For sound farm planning, farmers further need information on cultivable species, proper size of the pond, availability of seeds, economic as well as technical efficiency of artificial feed production techniques, cost structure etc.