CHAPTER V
ECONOMICS AND MARKETING OF FISH FARMING

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5.1 Introduction

In previous chapter, emphasis was given to study the fish farming in dams and tanks and also in artificial tanks constructed in saline and waterlogged soils. The basics of soil degradation, their causes, consequences, measures of soil reclamation, salient features and process of fish farming in saline and waterlogged soil are also analysed. In view of this, present chapter has divided in two parts one is the Economics of the fish farming and another is the Marketing of the fish farming. In first part an attempt is made to assess per hectare, per tone and per kg. returns of the fish. Tahsilwise availability of the fish for consumption, cost benefit ratio and the level of the profit received by the fish farmers from fish farming. Such analysis will be help to give clues regarding the perceptions of fish farmers to undergo a particular fish farming enterprises. The second part of the chapter deals with the Marketing of the fish types of the markets in the region. The data and information has collected through secondary and primary sources. The collected farm level information has been collected according to fish farming type and type of culture to analyse the variations in fish farming economy. The economics of the fish farming means the difference per hectare cost incurred for fish farming up to marketing of it and the returns received to the fish farmers in terms of money.

Farming involves two types of cost i.e. fixed costs and variable costs. Fixed costs are non recurring in nature and generally remain fixed in the particular crop season. Variable costs are of recurring type and have to be incurred in every production period. Variable costs are also known as operational costs or working costs. As fixed cost remains fixed in the short run, it is in the variable cost or operational costs that the farmers have some scope to make the economy. Now a days Farmers are becoming cost conscious of knowledge for the contribution, if the operational cost components on the total operational cost may help the farmers to reduce the operation cost and thereby enhance returns from their farms (Bora et. al 1984).

5.2 Economics of Fish Farming:

Economics of the fish farming is sub divided in to two groups for the detailed analysis. For the micro level analysis cost of production and cost benefit ratios of Fish Farming in Dams, Tanks and Reservoirs and also in Saline and Waterlogged Soils has studied as under.
5.2.1 Economics of Fish Farming in Dams, Tanks and Reservoirs:

Soil is the basic physical resource on which entire agricultural enterprises depend. The physical, chemical and biological composition of the soil determines the level of agriculture and quality of crops raised on it. Soil conditions support the distribution of fish ponds (Bond et. al. 2003). Though fish farming is not much selective about its soil requirement, its productivity and quality depends upon properties and characteristics of soil to a great extent.

A) Per Hectare and Per Tone Price Received By Farmer 1990- to 2005

For measuring the production in terms of money it needs to calculate the price. The average per tone and per hectare return shows that, per tone price and return has been fluctuated during the period under study. At the initial year it was Rs. 10,000 where as, Rs. 23,900 in 2001. The per tone price remains constant till 1992 and increased after the year of 1993-94 by 79 % (Fig 5.1a). The price of the fish decreased after 2001-02 due to competition of marine fish in the market. The demand and the production both are adversely affecting on the price fluctuation.

In year of 1994 the per tone price was increased up to Rs. 18, 800 but again decreased in next year, only because of the increased production by 30 percent. The per tone price is again increased in year of 1995-96, only because of the decreasing yield up to 33 percent. This pattern of increase and decreasing of the per tone fish price shows inverse relationship between the price and the production.

In year of 2004-05 production and the price both are also increased because of increasing demand of the fish. The trend of per hector return was increased in 2000-01 only because of higher per hectare production. In this year due to the drought like situation the fish farmers have harvested the water bodies because of scarcity of water the range of per hectare production was decreased and the rate of per hectare return is also decreased from 2001- to 2004 (Fig 5.1 a). After the 2004 the climatic situation was changed and because of favorable climatic condition region received more rainfall and sufficient water. So both the per hectare production and per hectare return raised.

B) Average Price Received For one Kg. of Fish:

The average wholesale price for one kilogram of fish is Rs. 10 at the initial year of 1990-91 where as increased up to Rs. 24 per kg. in the year 2000-01 (Fig 5.1 b). The per kilogram rate of fish is increasing from the base year up to 1994 and fluctuated up to 1999-2000. The period of 2000-01 peaks the highest price under
review and again decreased. As per the price fluctuations, per tone and per kilogram prices are directly proportionate to each other. The increasing demand of fish causes to increasing the per kilogram price and vice a Vis.

The trend line of the price shows the increasing price up to 2001-2002 and decreased in 2002-2003 only because of famine like situation and occurrence of marine fish in local market.

C) Rate Index - Price Received For One Kg. of Fish:

Price index is a measurement of economic fluctuation of the price which was calculated for understanding the price fluctuation in per tone and per kilogram price received by the enterpriser. Here an attempt has made to calculate the price index of per tone return or per kilogram price received. The per hectare production in tones has increased from initial. 2000-05 was the highest peak year for the production while lowest production is observed only at the base year.

The per tone price has also increased after initial year from Rs. 10,000 to Rs. 23,000 in 2005 due to the market fluctuations. The price index is calculated with the help of per tone price. It shows the fluctuation of the percentage of price increased and decreased.

The per tone price of the fish remains constant till 1992 and 1993. After 1993 suddenly the per tone price was increased by 79 percent and again decreased in next year by 44 percent only because of increasing per hectare yield by 30 percent than the previous year.

The per tone price was decreased up to 46 percent for twice during the period under review, once in year of 1994-95 and again in 1996-97. In year of 1995-96 the rate was increased by 84 percent this was the peak year which shows the highest price received by the fish farmers followed by the 79 percent in 1993-94, 48 percent in 2000-01 and by 41 percent in the year of 1997-98.

The analysis reveals that, the drought situation and the competition of marine fish have resulted in to decreasing the price of inland carp.

D) Upper Krishna Basin: Average per Capita Availability of Fish for Daily Consumption -1991

The per capita consumption of fish varies from state to state and within each state from region to region. In general, fish constitutes an important item of food in the diet for the people leaving in the costal regions and in eastern states of the country comprising, West- Bengal, Orisa, Assam, parts of Bihar and union territories of the
north eastern India. In other parts of the country; fish is only a supplemental food (Agarwal 1990).

The consumption of the fish depends on the availability as well as the fish eating population. In India as per the census of 1991 about 58.90 percent of the total population observed those who are eating fish where as 62.99 percent in 2001. The percentage of fish eating population in rural area is more as compared to the urban area. The percentage of fish eating population is increased with increasing population in the country.

The requirement of the fish is one of the main components of animal protein in diet computed 11 kilograms per year per person. It is revealed from the above that the per capita availability of fish of the region is 0.548 kilograms per year in 1991 which has been increased up to 1.798 kilograms in the year of 2001.

The Tahsilwise per capita availability of the fish for consumption shows that, Shirala was the leading tahsils having 3.176 kilograms fish per year and 8.70 grams per day. The Kavthemahankal, Karveer and Gaganbawada are the tahsils showing 2.186, 1.220 and 1.179 kilograms per year respectively and 3 to 6 grams only per day.

The central and eastern tahsils like Satara, Chandgad, Bhudargad, Shirol, Shahuwadi, Panhala, Hatkanangale, Miraj, Koregaon and Karad are the tahsils having low per capita availability (Fig 5.2 a). Due to the scarcity of water in far eastern tahsils where as lower production and higher population in Satara, Karad and Miraj the traditional fishing methods as well as lack of water storage facilities in Shirol and Hatkanangale the per capita availability is only below 1 gram per day. The tahsils like Mahabaleshwar and Jaoli shows zero kilograms per year where as per day availability is zero only because of hilly zone.

E) Upper Krishna Basin: Average per Capita Availability of Fish for Daily Consumption -2001

The rate of per capita availability of fish for consumption was changed after one decade. The per capita availability kilograms per year per day were increased miracally. It is also observed that the per capita availability of the fish in the region is 1.798 kilograms per year where as 4.9 grams per day.

The Tahsilwise availability of fish for consumption shows that, the Radhanagari tahsil is leading and noted about 24.08 kilograms per year and 65.98 grams per day followed by Chandgad of 7.894 kilograms per year and 21.63 grams per day. The Tasgaon, Satara, Koregaon, Ajara, Kagal, Gadhinglaj, Karad,
Hatkanangale, Panhala, Karveer, Walwa, Miraj, Shirol, Mahabaleshwar, Jaoli and Palus are having very low per capita availability due to the scarcity of the rainfall in eastern where as lack of water storage facility, traditional fishing practices and higher population in central part(Fig 5.2 b).

The tahsils like Bhudargad and Gaganbawada are sharing 6.632 and 4.516 kilograms per year and 5 to 10 grams per day availability of fish only because of hilly area, lower population where as higher per hectare production of fish. The tahsils those who are having low per capita availability of fish for consumption needs to pay more attention to managing the fish production and increasing production as per increasing population by providing modern fishing knowledge to the fishermen, providing infrastructural facilities to the members of fishing co-operative societies.

F) Tahsilwise per Hectare Returns:

The production and per tone return is directly affecting on the per hectare returns of the fish farming. The average per hectare return for the period of 1990 to 95 shows that, the western tahsils (Fig 5.3a) have very poor returns. Although these tahsils belong to Sahyadri ranges having highest peaks and largest water bodies and also having highest rainfall, the fish farming in them is very poor. The traditional bound fishing and mismanagement causes to lower per hectare production. Similarly the fishing co-operative societies have no manure to feed the ponds. The large water bodies are unsuitable for the artificially feeding and manure so the fishermen have to depend upon the natural fertility of the pond.

Besides that, the large water bodies like Shivsagar of Patan and ‘Lakxmi Talav’ of Radhanagari are declared as a wild life senturies hence these areas are strictly prohibited for fishing and causing low per hectare production and per hectare returns. The Ajara, Shahuwadi and Panhala are the leading and shows up to 40,000 per hectare return followed by Walwa and Shirol of 20 to 40 thousand per hectare it is only because of small water bodies which are suitable for artificial feeding and manure.

The south eastern tahsils like Kagal, Karveer, and Gadchinglaj where as Karad and Koregaon of the north eastern show return up to Rs.10000 to Rs. 20000 Per hectare followed by Khatav, Tasgaon, Kavthemahankal, Miraj, Shirol, Gaganbawada which are covering only Rs. 5000 to 10000 only because of the lower production in the west and scarcity of the water in eastern part.
The scenario has been changed during the period of 1995–2000. The per hectare production has increased up to 4 to 6 tones during this period. The Ajara, Shahuwadi and Panhala Show highest returns up to 50,000 where as Karad and Miraj tahsils shows return of Rs. 25,000 to 50,000 followed by Gadhinglaj. The western tahsils along with Khanapur and Kavthemahankal of eastern part have lowest per hectare return of the fish farming. On the contrary the tahsils like Karad, Shirol, Kagal and Gadhinglaj Show Rs. 25,000 to 50,000 per tone of fish followed by Koregaon and Hatkanangale tahsils of 1 to 2 tones per hectare and Rs. 5,000 to 15,000 per hectare (Fig 5.3 b).

During the period of 2001 to 2005, per tone return has increased but per hectare production is decreased. Increase in demand of the fish has caused rise in price and obviously per tone per hectare production. The Shirol and Panhala are leading in per hectare returns up to Rs. 40,000 followed by Karad, Walwa, Hatkanangale, Kagal, Gadhinglaj and Gaganbawada of Rs. 20,000 to 40,000 per hectare (Fig 5.3 c).

The remaining tahsils are having lowest per hectare production but receiving highest return due to rise in demand.

G) Tahsilwise per Tone Returns:

In region the average price is fluctuated with time period. During the initial year in 1991 to 1995 the Walwa, Khanapur, Tasgaon, Miraj and Kavthemahankal are leading for having highest price of Rs. 11,000 per tone (Fig 5.4 a). Because of the lowest production these tahsils are belongs to drought prone area of the region so they have scarcity of water so the production of the fish has limited. As per the marketing rule lower the production and higher demand causes to higher price. Besides that, Jaoli tahsil having less price of about Rs.10,000 only because of lowest demand and lack of marketing facility in surrounding and western part of the region. Remaining tahsils received Rs 10,000 to 11,000 per tone because they are having demand for fish in diet.

During the period of 1996 to 2000 the tahsils like Walwa, Tasgaon, Miraj, and Kagal shows highest return. These eastern tahsils having scarcity of water where as Walwa has problem of water storage facility and causes to decreasing the production. The decreasing production and increasing demand directly causes to increasing the price. The tahsils like Shahuwadi, Karveer, Gaganbawada, Radhanagari and Ajara having lowest price for fish (Fig 5.4 b) it’s only because of highest production. The
Shirala, Hatkanangale and Khanapur are the tahsils received Rs. 17,000 to 19,000 per tone. The remaining northern tahsils of Satara district and Kavthemahankal of Sangli where as Panhala, Shirol, Bhudargad, Gadhinglaj and Chandgad are having water storage facility and helps to higher production. These tahsils are having fewer prices of about Rs. 15,000 to 17,000 per tone.

This whole pattern of per tone return was changed during the period of 2001 to 2005. The Shirol and all tahsils of Satara district excluding Patan recorded highest price of up to Rs 25,000 per tone where as only Kadegaon and Palus are having very low price of Rs. 10,000. The tahsils of Kolhapur district excluding Ajara have got Rs. 20,000 to Rs. 25,000 per tone (Fig 5.4 c). The northern part of the region is a hilly tract of Sahyadri ranges has lowest production of the fish is only one tone per hectare.

5.2.2 Cost Benefit Analysis of Fish Farming in Dams and Tanks:

A) Cost of Production:

The profit is the motive behind all activities of farmers whether they adopt commercial system of farming or traditional farming (Singh 1993). Cost of production of fish has been measured with the help of the survey data. The capital should be emphasized in such a way that cost does not become fixed until they have been incurred. However, after costs have been incurred, they do not vary with changes in output and can have no bearing upon decisions regarding an increase or decrease in the production. In the short run, some costs are fixed some are changing. After a long time however, all costs become variable and costs which were fixed in the short run influences the decision to stop production or to alter the level of output. Variable costs are the costs of adding the variable inputs. These costs will be incurred only if production is carried on and the amount of these costs will depend on the kind and quality of inputs used. Fixed cost plus variable cost is equal to total cost of production.

Where a particular cost item will be considered as a variable cost depends upon whether the input concerned is fixed or variable. For the problem under consideration, the cost is irrelevant for a particular decision, therefore, it depends upon the nature of the decision. The importance of recording the costs by the cultivators is essential for the material, labour, machine or product. As far as fish farming is concerned the cost on material represents the purchase of Fish Seeds, Manures, Fertilizers, Supported food material and other material. The cost incurred on machine represents the cost of Engine pump, Inlet and outlet of water system. The
cost incurred on labour charges includes the payments made on processes fish farming and harvesting of fish.

It is very difficult to ascertain the cost of production, as all the cultivators do not maintain records. However, surprisingly, few of the respondents in the area under study have kept the records of fish farming, including, cost of fish seeds, price of fertilizers, manure, supported food material, yield and return etc. The illiterate population of respondents is only 5 per cent and 95 percent of the respondents have provided the required data through questionnaire cum interview method.

B) Fixed Cost of Production:

Fixed cost is often perceived as non variable costs, also known as cost of establishment. It is the cost which remains unaffected by changes in the volume of output. These are the expenses, which must be met irrespective of the quality of production. These are the costs of providing the conditions for production. This cost provides physical or human capacity, which assists but is not included in actual production. Since this cost remains the same up to a certain level of volume, naturally it becomes less in amount per unit as production increases.

Rental lease of pond, cultural practices, layout, manures, and fish seeds and its stocking, nets and farm implements, farm house cum packing shed, irrigation scheme inlet filter chamber out let system etc. are the heads of expenditure. Generally this period is of about 09 to 12 months.

C) Average Cost of Production and Returns per Hectare from Dams and Tank Area in Eastern Part:

In present chapter emphasis is given to analyse the average cost of production and returns from one hectare area of dams and tank. For detailed analysis the region is sub divided in to physiographical suitable three zones like eastern plateau zone, central plain and western hilly zone.

While studding the economics of the fish farming various items such as economic rent or lease of the land or dam for contract, cost of fish seeds including transportation, cost of fertilizers and food materials, transportation charges for marketing and cost of harvesting are considered as a cost of production.

Where as on the return side due to weight of harvested carp, present market price and about 10 per cent market price fluctuation is considered for calculating the cost benefit ratio.
1. Cost of Lease:

All the fishing co-operative societies of the region are allowed to take dams and tanks on a lease period of 3 to 5 years contract for fish farming purpose. The tanks and dams constructed by the irrigation department Govt. of Maharashtra and village tanks are allotted for fish farming on lease basis for limited period for Rs. 215 per hectare per year. This rate decreases with increasing in area (Table 5.1).

2. Transportation of the Fish Seed:

In Upper Krishna Basin major carp fish culture is practiced. The process of breeding is not available near by as the carp require certain environment for breeding. The fish seeds of the major carps are brought from the ‘Dhom’ hatchery. Some of the fishing co-operative societies bring fish seeds from the fish stocking center of Kolhapur and Siddhewadi. Some of the fishing co-operative societies bring the fish seeds from Hyderabad. The per hectare cost of seeds is about Rs. 350 per year including transportation charges.

3. Feeding and Manuring:

For the proper growth of the fish stocked, proper and timely feeding is essential. The maximum large size of dams and tanks for stocking of fish seeds is generally affecting on feeding and manuring. The large water bodies has some limitation for feeding and manuring so the members of fishing co-operative societies are depending upon natural fertility of the ponds. The feed includes the residue of ground nuts, soybean, husk of the wheat and rice, lime, phosphate, cow dung manure; dry cow dung etc. Due to the dependency on a natural fertility of the pond, the fishermen has used limited feeding and manuring and expended only Rs. 1500 per hectare per year.

4. Transportation and Marketing:

Fish marketing in India at many places is controlled by middle men or powerful rings of businessmen, as results the fishermen get very low price for there produce even when the consumers pay high price. The co-operative marketing has not made much headway, although it is being introduced recently.

For the supply of fish adequate transport and storage facilities are needed. None of the fishing co-operative society of the region has it’s own storage facility. The middle men are the major purchaser of the fish hence the transportation facility is the responsibility of the fish contractor or the middle man. The miscellanies
transportation charges are expended where needed by the co-operative fishing society which is only Rs. 500 per hectare per year.

Table 5.1
Upper Krishna Basin: Average Cost of Production and Returns per Hectare from Dams and Tank Area in Eastern Part

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Cost Components</th>
<th>Expenditure in Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cost of Lease, Contract</td>
<td>215</td>
</tr>
<tr>
<td>2.</td>
<td>Cost of Fish Seeds Including Transportation Charges</td>
<td>350</td>
</tr>
<tr>
<td>3.</td>
<td>Cost of Fertilizers Including Organic and Inorganic with Food Material</td>
<td>1500</td>
</tr>
<tr>
<td>4.</td>
<td>Transportation Charges for Marketing of the Products</td>
<td>500</td>
</tr>
<tr>
<td>5.</td>
<td>Cost of harvesting Diesel, Packing and Maintenance of Tools etc.</td>
<td>500</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td><strong>3065</strong></td>
</tr>
</tbody>
</table>

Cost Benefit Ratio Table -B

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Cost Components</th>
<th>Expenditure in Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Total Production of major Carps In Rupees 200 x @ Rs.50</td>
<td>10000</td>
</tr>
<tr>
<td>2.</td>
<td>Probable Price Fluctuation (About 10%)</td>
<td>1000</td>
</tr>
<tr>
<td>3.</td>
<td>Share of Co-operative Fishing Society (About 5%)</td>
<td>500</td>
</tr>
<tr>
<td>4.</td>
<td>Net Returns (Output) (1-2+3)</td>
<td>8500</td>
</tr>
<tr>
<td>5.</td>
<td>Total Cost of Production Expended (Input) From Table -A</td>
<td>3065</td>
</tr>
<tr>
<td>6.</td>
<td>Net Profit (4-5)</td>
<td>5435</td>
</tr>
<tr>
<td>7.</td>
<td>Input-Output Ratio</td>
<td>1:2.77</td>
</tr>
<tr>
<td>8.</td>
<td>Production Cost For One Kilogram of Fish in Rs.</td>
<td>15.32</td>
</tr>
</tbody>
</table>

Source: Based on Field Survey

5. Return from Fish Production:

The culture of fish in ponds have very well developed and contributing to the fish production in the country. The fresh water resource comprises the water bodies of different sizes. However the large water bodies like dams and tanks are not suitable
for intensive fish culture. The fish in dams and tanks under study, mixed culture is in practice. The major carp group of fish like Catala, Rohu, and Mrigal are raised in the dams and tanks. About 8 to 9 months period is required for the full growth of these fishes. The per hectare production of fish of major carp in eastern part is 200 Kg. of different size and weight. The market rate of the major carp depends upon the weight of the fish and it ranges between Rs. 40 to 50 per kilogram.

The Catala, locally sold variety of fish is harvested after 7 to 8 months. The weight of the total catch is about 200 Kg. The total return from marketing the produce comes to about Rs 10,000. However the market price of the fish changes from time to time and place to place. So such fluctuation in a price is considered about 10 percent which comes Rs. 1000 where as the share of co-operative fishing society is 5 per cent which is about Rs. 500.

Hence Rs. 10,000 total return minus Rs. 1500 =8500 as a gross returns, minus Rs. 3065 as total cost of production, which to Rs. 5435 as a net profit. Based fact the calculated cost benefit ratio is 1:2.77 it indicates that, the fish farming in dams and tanks is economically viable and profitable. The production cost for producing one kilogram of the fish in western part of the region is expended only Rs. 15.32 which medium expenditure for production of one kilogram of the fish in the region.

D) Average Cost of Production and Returns per Hectare from Dams and Tank Area in Central Part

The central part of the region is physiographical plain and drains river Krishna and their tributaries. The water bodies and village tanks are distributed on a lease period for the fish farming by fishery department only to the fishing co-operative society. The Economics of the fish farming in the central part of the region is as under.

1. Cost of Lease:

   In central part of the region the water bodies are distributed on a lease period only to the fishing co-operative society. The lease rate for the contract has been increased up to Rs. 380 per hectare per year. (Table 5.2).

2. Transportation of Fish Seeds:

   In central part of region the fishermen of fishing co-operative societies purchase the fish seeds from the fish seed center of Kolhapur. Some of the fishermen have brought the fish seeds from the private fish farm of Anandrao Jadhav of Karveer
and Hatkanangale. The per hectare cost of seeds is Rs. 2000 per hectare per year including transportation charges.

3. Feeding and Manuring:

The fishing co-operative societies members utilise the fertilizers and manure and food material but not in required sufficient quantity. The fishermen’s of the central part of the region also depend upon the natural fertility of the pond. The rate of the feeding and manuring has increased than the rate of eastern part it is about Rs. 2500 per hectare per year.

In central part of the region the feeding material used is same to the eastern part of the region.

4. Transportation and Marketing:

In the central part of the region the marketing system of the fish is related to the middleman and fish contractors. So the fishing co-operative societies are spending minor charges for transportation and marketing which is about Rs. 500 only.

5. Return from Fish Production:

The fish farming in the central part of the region is traditional in nature. The fisherman of the central part belongs to the fishermen community like Bhoi and Bagadi. Their concentration in the villages located along to the river banks.

The fishermen of the central part of the region are not feeding and manuring properly as per requirement.

In the region the fishes are harvested between 8 to 10 months or achieving the weight of above 1Kg, of an individual fish. The per hectare production of the fish is 350 Kg of different size and weight. The market price of the fish depends on the weight and size of the fish and it ranges between Rs. 40 to 50.

The total return from marketing the produce comes to about Rs. 17,500. However, the marketing price of the fish changes from time to time. The fish eating population is increasing with increasing population so the increasing demand causes to increasing price per kg. of the fish. So such fluctuations in prices are considered about 10 per cent which comes Rs. 1750. The share of the co-operative society is 5 per cent. This is about Rs. 875 per hectare. Hence Rs. 17,500 minus Rs. 1750 and Rs. 875 = 14,875/- as a gross return minus Rs. 6,155 as a total cost of the production, which comes to Rs. 8,720 as a net profit.
Table 5.2
Upper Krishna Basin: Average Cost of Production and Returns per Hectare from Dams and Tank Area in Central Part

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Cost Components</th>
<th>Expenditure in Rs.</th>
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<tbody>
<tr>
<td></td>
<td><strong>Cost of Production Table -A</strong></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Cost of Lease , Contract</td>
<td>380</td>
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<td>2.</td>
<td>Cost of Fish Seeds Including Transportation Charges</td>
<td>2000</td>
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<tr>
<td>3.</td>
<td>Cost of Fertilizers Including Organic and Inorganic with Food Material</td>
<td>2500</td>
</tr>
<tr>
<td>4.</td>
<td>Transportation Charges for Marketing of the Products</td>
<td>500</td>
</tr>
<tr>
<td>5.</td>
<td>Cost of harvesting including Diesel, Packing and Menaínence of Tools etc.</td>
<td>775</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td><strong>6155</strong></td>
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<td></td>
<td><strong>Cost Benefit Ratio Table -B</strong></td>
<td></td>
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<tr>
<td>1.</td>
<td>Total Production of major Carps In Rupees 350 x @Rs. 50</td>
<td>17500</td>
</tr>
<tr>
<td>2.</td>
<td>Probable Price Fluctuation (About 10 %)</td>
<td>1750</td>
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<td>3.</td>
<td>Share of Co- operative Fishing Society (About 5 %)</td>
<td>875</td>
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<td>4.</td>
<td>Net Returns (Output) (1-2+3)</td>
<td>14875</td>
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<td>5.</td>
<td>Total Cost of Production Expended (Input) From Table -A</td>
<td>6155</td>
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<tr>
<td>6.</td>
<td>Net Profit (4-5)</td>
<td>8720</td>
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<td>7.</td>
<td>Input- Output Ratio</td>
<td>1:2.42</td>
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<tr>
<td>8.</td>
<td>Production Cost For One Kilogram of Fish in Rs.</td>
<td>17.58</td>
</tr>
</tbody>
</table>

Source: Based on Field Survey

So the calculated cost benefit ratio is 1:2.42 which shows the fish farming in the central part of the region is viable and profitable but per hectare production is less. The production cost for producing one kilogram of the fish in western part of the region is expended only Rs. 17.58 which is highest expenditure in the region than the eastern and western part.
E) Average Cost of Production and Returns per Hectare Dams and Tank Area in Western Part

Geographically the western part of the region is hilly tract suitable for constructing the water storage. The larger water bodies of the region have enough water throughout the year but the traditional practicing causes to lower per hectare production, and limits to intensive fish culture. The viability of fish farming is analysed by following factors.

1. Cost of Lease:

The water bodies of the region are larger than the central and eastern part so obliviously due to the larger water bodies and due to the inaccessibility, the rate of the lease are lower than the central part but greater than the eastern part (Table 5.3).

2. Transportation of the Fish Seeds:

In the western part of the region most of the fishing co-operative societies use the fish seeds of Dhom hatchery. Some fishermen use to bring it from Hydrabad. The per hectare cost of fish seeds is about Rs. 1655 per hectare per year including transportation charges.

3. Feeding and Manuring:

The fishermen, the members of co-operative fishing society are using the fertilizers, manures and food materials but not in required sufficient quantity. The innovative fishermen are using more fertilizers and manures than the central and eastern part. The rate of feeding and manuring is more than the other part of the region. In western part of the region fishermen are spending Rs. 3500 per hectare per year.

4. Transportation and Marketing:

Through the western ghat development programme bicycles are provided to the fisherman for transportation of the harvested fish from production center up to the market or the consumer. Due to the low density and less local demand of fish for consumption. It needs to send the fish to other markets in the region. The western part of the region requires about Rs. 500 for the transportation of harvested fish up to market place of the region.

5. Return from Fish Production:

The fishermen of the western part of the region are also not feeding and manuring properly and cultured major carp group of varieties of fish.
In the region the fishes are harvested between 8 to 10 months or observing the weight of above 1 kg. of an individual fish. The per hectare production of the fish is 450 Kg. of different size and weight, the market price of the fish depends the weight and size of the fish and it ranges between Rs. 40 to 50

**Table 5.3**

**Upper Krishna Basin: Average Cost of Production and Returns per Hectare from Dams and Tank Area in Western Part**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Cost Components</th>
<th>Expenditure in Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cost of Lease, Contract</td>
<td>260/-</td>
</tr>
<tr>
<td>2.</td>
<td>Cost of Fish Seeds Including Transportation Charges</td>
<td>1655/-</td>
</tr>
<tr>
<td>3.</td>
<td>Cost of Fertilizers Including Organic and Inorganic with Food Material</td>
<td>3500/-</td>
</tr>
<tr>
<td>4.</td>
<td>Transportation Charges for Marketing of the Products</td>
<td>500/-</td>
</tr>
<tr>
<td>5.</td>
<td>Cost of harvesting Diesel, Packing and Maintainence of Tools etc.</td>
<td>750/-</td>
</tr>
<tr>
<td></td>
<td><strong>Grand Total</strong></td>
<td>6665/-</td>
</tr>
</tbody>
</table>

**Cost Benefit Ratio Table -B**

| Sr. No. | Expenditure                                                                 | Expenditure in Rs. |
|---------|                                                                            |--------------------|
| 1.      | Total Production of major Carps In Rupees 450 x @ Rs.50                    | 2250/-             |
| 2.      | Probable Price Fluctuation (About 10 %)                                    | 2500/-             |
| 3.      | Share of Co-operative Fishing Society (About 5 %)                          | 1250/-             |
| 4.      | Net Returns (Output) (1-2+3)                                               | 18750/-            |
| 5.      | Total Cost of Production Expended (Input) From Table -A                    | 6665/-             |
| 6.      | Net Profit (4-5)                                                           | 12085/-            |
| 7.      | Input- Output Ratio                                                        | 1:2.81/-           |
| 8.      | Production Cost For One Kilogram of Fish in Rs.                             | 14.81/-            |

*Source: Based on Field Survey*

The total return from marketing the produce comes to about Rs. 22,500. The fluctuations in prices are about 10 per cent which comes Rs. 2250. The share of the co-operative society is about Rs. 1250 per hectare. Hence Rs. 22,500 minus Rs 2,250
and Rs. 1250 = 18,750 as a gross return minus Rs. 6,665 as a total cost of the production, which comes to Rs. 12,085 as a net profit.

So the calculated cost benefit ratio is 1:2.81 which shows the fish farming in the central part of the region is viable and profitable but per hectare production is less. The production cost for producing one kilogram of the fish in western part of the region is about Rs. 14.81.

5.2.3 Economics of Fish Farming in Saline and Waterlogged Soils:

Besides the culture fishery in dams and tanks and capture fishery in river water, fish farming in private ponds is also practiced in the region. In Upper Krishna basin due to the irrigation facilities mono-cropping of the sugarcane is practiced traditionally along to the rivers. This mono-cropping of sugarcane area was over fascinated by excess use of chemical fertilizers, over use of irrigation water and mono-cropping causes land to become saline and waterlogged. Such saline and waterlogged lands do not respond well for crops to be grown so the innovative farmers of the region constructed fish tanks in such a saline and waterlogged soils and practiced fish farming intensively thereby getting more and more production from such soil. Hence an attempt has made to study the economics of such fish farming by considering various inputs and return from it has been analysed as bellow.

5.2.4 Cost Benefit Analysis:

A) Average Cost of Production and Returns From One Hectare of Fish Tank in Saline and Waterlogged Area

1. Land Development Cost:

In view of practicing fish farming, the farmers have selected the saline and waterlogged soil, which was highly degraded soil which was kept fellow by farmers and was not responding for the germination of any grain, this soil having pH value of 8.5 and E.C. more than 5.65 was quite suitable for tank construction. As water infiltration capacity of the soil was zero.

It was necessary to level it before construction of the fish tank. The fish farmers spend Rs. 50,000 to 60,000 per hectare for construction of the tank on the land.

2. Transportation of the Fish Seeds:

The process of breeding is only available at Dhom hatchery but the hatchery is unable to fulfill prawn seeds demand as per requirement in the region. The farmers of
the region are use to bring the prawn seeds from Ratnagiri, some from Hydrabad and some from the Kerla state.

For Mix culture the prawns and the major carps are cultured together. The two tanks are constructed in one hectare of area in which about 20,000 of prawn seeds and 6000 of major carps are cultured together. The required cost is about Rs. 22,900 including transportation for prawns and Rs. 2000 for major carps (Table 5.4 A).

3. Feeding and Manuring:

The feeding material and the feeding schedule of the prawn and major carps are different. The prawn is carnivores where as major a carp belongs to herbivores. The maximum limit of the stocking of the prawn and fish is generally limited by food supply and manuring. The food material for the prawn and major carps is residue of ground nut, soybean, husk of wheat, or rice, where as the animal flesh and west is utilised for better growth of prawn. The flower of ‘Nachani’ is specially used by the farmers for the better growth of prawn. The super phosphate, cow dung and dry cow dung are also used as a manures for manuring the ponds where as lime is utilised for maintaining the pH of the water and urea for maintaining the water temperature. The expenditure for feeding in saline and waterlogged soils is about Rs.32, 500 per hectare and for manuring the ponds is Rs.16, 400/-. 

4. Labour Charges:

For proper management of the fish farm requires the full time service at the fish farm for performing the fish farming activity like feeding and manuring. The manually labours are also required at the time of harvesting. The total expenditure for the residential labour for one year is expended Rs. 24,000 per year where as Rs. 1000 for additional labours for harvesting of the fish.

5. Cost of Harvesting:

The additional labours are required at the time of harvesting. Besides the labour charges the diesel for engine for draining the pond water packing charges ice, mentainence of nets and fishing tools required about Rs. 7900 per hectare per year. However, decreases with increasing area under fish farming,
Table 5.4 -A

Upper Krishna Basin: Average Cost of Production from One Hectare of Fish Tank in Saline and Waterlogged Area

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Cost Components</th>
<th>Expenditure in Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Deprecation Cost of Development, Including Construction of Tank, Inlet Outlet System</td>
<td>10,840/-</td>
</tr>
<tr>
<td>2.</td>
<td>Cost of Seeds Including Transportation Charges</td>
<td>Prawn (Micro Brachium Rozenburgi) 20,000 Prawn Seeds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Major Carps (Catala, Rohu &amp; Mrigal) 6,000 Major Carps</td>
</tr>
<tr>
<td>3.</td>
<td>Supported Food Material including cellulose, Ground Nut Cake, Forage and Animal Waste for Prawn and major carps</td>
<td>32,500/-</td>
</tr>
<tr>
<td>4.</td>
<td>Cost of Fertilizers Including Organic and Inorganic</td>
<td>16,400/-</td>
</tr>
<tr>
<td>5.</td>
<td>Labour Cost for Residential Labour for One Year</td>
<td>24,000/-</td>
</tr>
<tr>
<td>6.</td>
<td>Water and Electricity Charges</td>
<td>7,000/-</td>
</tr>
<tr>
<td>7.</td>
<td>Cost of harvesting Including Labour, Diesel, Packing and maintenance of Tools</td>
<td>7,900/-</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td><strong>1,23,540/-</strong></td>
</tr>
</tbody>
</table>

Source: Based on Field Survey

B) Average Returns from One Hectare of Fish Tank in Saline and Waterlogged Area

The fresh water resources comprises the water bodies of different sizes and highly restricted for the intensive fish farming where as the small water bodies like small tanks constructed in saline and waterlogged areas are quite suitable for intensive fish farming.

In mixed fish farming process the prawn and major carps are raised simultaneously in the tank. About 8 to 9 months period is required for full growth of these fishes. The per hectare production of the prawn is about 1110 kg. of the different sizes and weight. The market rate of the prawn depends upon the weight of the prawn (Table 5.4 B) it ranges from Rs 135 to 300 per Kg.
### Table 5.4-B

Upper Krishna Basin: Average Returns from One Hectare of Fish Tank in Saline and Waterlogged Area

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Species of Fish</th>
<th>Average Weight Per Fish</th>
<th>Net Production in Kg.</th>
<th>Returns Per Kg. in Rs.</th>
<th>Total Returns in Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prawn (Micro Brachium Rozenburgi)</td>
<td>Grade I Above 100 grams 355</td>
<td>300/-</td>
<td>106500/-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grade II 75 to 100 grams 500</td>
<td>210/-</td>
<td>105000/-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grade III 50 to 75 grams 255</td>
<td>135/-</td>
<td>34400/-</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Major Carps (Catala, Rohu &amp; Mrigal)</td>
<td>1 Kg. to 3 Kg. 2300</td>
<td>39/-</td>
<td>89700/-</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Grand Total</td>
<td></td>
<td></td>
<td>335600/-</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Probable Price Fluctuation (About 10 %)</td>
<td></td>
<td></td>
<td>35000/-</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Net Returns (Output) (3-4)</td>
<td></td>
<td></td>
<td>300600/-</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Total Cost of Production Expended (Input) From Table - 5.4 A</td>
<td></td>
<td>123540/-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Net Profit (5-6)</td>
<td></td>
<td></td>
<td>177060/-</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Input- Output Ratio</td>
<td></td>
<td></td>
<td>1:2.43</td>
<td></td>
</tr>
</tbody>
</table>

Source: Based on Field Survey

The Catala, a locally sold variety of fish is also harvested during 7 to 9 months. The average weight of the total catch is about 2300 kg. The total return from marketing the produce comes to about Rs. 89,700. Such fluctuation in price is considered about 10 percent which comes Rs. 35,000 per hectare.

Hence Rs. 3,35,600 total return minus Rs. 35000= Rs. 300600 as gross return minus Rs. 1,23,540 as a total cost of production expended for inputs from table 5.4 a which comes to Rs. 1,77,060 as net return from the mix culture of prawn and major carp.
So the total net return from the per hectare of the fish tank in saline and waterlogged soils comes to about Rs. 1,77,060. The cost benefit ratio of 1:2.43 shows fish farming in such saline and waterlogged soil is viable and profitable.

C) Cost of Production and Returns From One Hectare of Fish Tank in Saline and Waterlogged Area, a Case Study of Mix Culture

Fish farming in saline and waterlogged soil shows that, this practice fish farming is more intensively than the fish farming done in dams and tanks. The case study of fish farming is selected for studying viability of fish farming in saline and waterlogged soils. The present attempt is made to analyse economics and the cost benefit ratio from one hectare of the fish tank in saline and water logged area as a mixed culture with the help of following heads.

1. Land Development Cost:

The selected saline and waterlogged soils is highly degraded soil and kept fallow by the farmer. This soil was having the pH value of about 8.5 which was quite suitable for construction of tank. The two fish tanks were constructed in one hectare of land for practicing fish farming intensively.

The selected farmers for case study spend Rs. 50,000 per hectare for the development including construction of the tank with inlet and outlet system. The 10 percent depreciation cost of Rs. 5000 has been considered for five year (Table 5.5 A)

2. Feeding and Manuring:

The supported food material like Cellulose, Groundnut cake, Forage and the inorganic and organic fertilizers are also used for increasing productivity of the pond. The farmers spend Rs. 35,000 for feeding material and only Rs. 2,325 for manuring the ponds.

3. Labour Charges:

Including permenant servent and seassional labour employed the farmers spend about Rs. 25,000 per year. Besides the residential labour, Mr. Mulla and his partners are taking regular observations regarding the water quality and giving suggestions to the labours for managing the fish farm intensively.
Table 5.5- A
Upper Krishna Basin: Cost of Production from One Hectare of Fish Tank in Saline and Waterlogged Area, a Case Study of Mix Culture

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Cost Components</th>
<th>Expenditure in Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Deprecation Cost of Development, Including Construction of Tank, Inlet Outlet System</td>
<td>5000/-</td>
</tr>
<tr>
<td>2.</td>
<td>Cost of Seeds Including Transportation Charges</td>
<td>15000/-</td>
</tr>
<tr>
<td></td>
<td>Prawn(Micro Brachium Rozenburgi)20,000 x @75 paisa</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Major Carps (Catala, Rohu &amp; Mrigal) 6,000 x @ 200 per ‘000’ Major Carps</td>
<td>1200/-</td>
</tr>
<tr>
<td>3.</td>
<td>Supported Food Material including cellulose, Ground Nut Cake, Forage and Animal Waste for Prawn and major carps</td>
<td>35000/-</td>
</tr>
<tr>
<td>4.</td>
<td>Cost of Fertilizers Including Organic and Inorganic</td>
<td>2325</td>
</tr>
<tr>
<td>5.</td>
<td>Labour Cost for Residential Labour for One Year</td>
<td>25000/-</td>
</tr>
<tr>
<td>6.</td>
<td>Water and Electricity Charges</td>
<td>6000/-</td>
</tr>
<tr>
<td>7.</td>
<td>Cost of harvesting Including Labour, Diesel, Packing and maintenance of Tools</td>
<td>3000/-</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td><strong>108525/-</strong></td>
</tr>
</tbody>
</table>

Source: Based on Field Survey Based on Personal interview of C. A. Mulla of Nandani Road of Hakanangale Tahsil

4. Cost of Harvesting:

The additional labours are also supplied as per requirement at the time of harvesting for packing and preserving process. The additional labours and the maintenance of the fishing tools together costs about Rs. 3000 per hectare per year as a harvesting cost.

5. Return from Fish Production:

The mixed culture of prawn along with major carps was practiced in the tank under study. The prawns and locally demanded Catala and Rohu have been raised simultaneously in the tank. About 8 to 9 months are required for the full growth of the fish. The per hectare production of prawn is about 1300 kg. per hectare of different size and weight and as 2000 kg. of major carps like Catala, Rohu and Mrigal.
Table 5.5- B
Upper Krishna Basin: Returns from One Hectare of Fish Tank in Saline and Waterlogged Area, a Case Study of Mix Culture

Source: Based on Field Survey Based on Personal interview of C. A. Mulla of Nandani Road of Hatkanangale Tahsil

The market rate of the prawn depends upon the weight of the prawn (Table 5.5 B) it ranges from Rs. 120 to 250 per kilograms. The average cost for locally demanded major carps is Rs. 50 per kg. The Catala a locally sold variety of the fish is also harvested along with the prawn after 7 to 8 months. The total return from the marketing the produce comes to Rs. 3, 93,000. However the fluctuations in price is considered about 10 percent which comes to Rs. 39,300

Hence Rs. 3,93,000 total return minus Rs. 39,300= 3,53,700 as a gross return, minus Rs. 1.08,525 as total cost of production, which comes to Rs. 2,45,175 as a net profit. Accordingly the cost benefit ratio comes to 1:3.26 it reveals the viability of the fish farming in such saline and waterlogged degraded soils as alternative land use besides traditional cropping system (Pawar 2005).
D) Cost of Production and Returns from One Hectare of Fish Tank in Saline and Waterlogged Area, a Case Study of Prawn Culture

The monoculture of prawn is cultured more intensively than the mixed culture. But in Upper Krishna Basin, the prawn is not practiced properly and successfully in region everywhere. However, Shri. Abhijit Chavan Sarkar of Kasbe Digraj developed 05 hectare of the land for fish farming purpose and practiced fish farming very intensively in saline affected soils. The detailed analysis of the prawn culture as a case study is studied under following heads

1. **Land Development Cost:**
   
The selected saline and waterlogged area is developed for intensive fish farming. The total cost for development including construction of the tank, inlet outlet system for one hectare of the land. The 10 percent of the depreciation cost is Rs. 3500 (Table 5.6 A)

2. **Transplantation of the Fish Seeds:**
   
   Monoculture of prawn required maximum 25,000 prawn seeds costing about Rs. 6000 per hectare. The Micro brachium Rozenburgi, major variety is cultured which is brought from Ratnagiri hatchery.

3. **Feeding and Manuring:**
   
   The monoculture of the prawn is successfully practiced by the Chavan Sarkar, as he is well educated and completed professional course of 3 month for practicing prawn culture.

   Besides observing the proper schedule for feeding he also used supported food material including cellulose, groundnut cake, forage for which animal waste and required total fund of about Rs. 70,000 per hectare per year. He also spent about Rs. 9000 for manuring the ponds.
Table 5.6- A
Upper Krishna Basin: Cost of Production and Returns from One Hectare of Fish
Tank in Saline and Waterlogged Area, a Case Study of Prawn Culture

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Cost Components</th>
<th>Expenditure in Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Deprecation Cost of Development, Including Construction of Tank, Inlet Outlet System</td>
<td>3500/-</td>
</tr>
<tr>
<td>2.</td>
<td>Cost of Seeds Including Transportation Charges</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prawn (Micro Brachium Rozenburgi) 25,000 Prawn Seeds</td>
<td>6000/-</td>
</tr>
<tr>
<td>3.</td>
<td>Supported Food Material including cellulose, Ground Nut Cake, Forage and Animal Waste</td>
<td>70000/-</td>
</tr>
<tr>
<td>4.</td>
<td>Cost of Fertilizers Including Organic and Inorganic</td>
<td>9000/-</td>
</tr>
<tr>
<td>5.</td>
<td>Labour Cost for Residential Labour for One Year</td>
<td>25000/-</td>
</tr>
<tr>
<td>6.</td>
<td>Water and Electricity Charges</td>
<td>7000/-</td>
</tr>
<tr>
<td>7.</td>
<td>Cost of harvesting Including Labour, Diesel, Packing and Maintainence of Tools</td>
<td>4000/-</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td><strong>1,24,500/-</strong></td>
</tr>
</tbody>
</table>

*Source: Based on Field Survey Based on Personal interview of Abhijit Chavan Sarkar, a farmer of Kasbe Digraj of Miraj Tahsil*

4. **Labour Charges:**
Under the Supervision he employed one residential labour for a year for which he paid Rs. 25000.

5. **Water and Electricity Charges:**
Whole of the area under fish culture of 10 hectare is irrigated by the lift irrigation scheme installed on river Krishna. The electricity is made available at the farm which supplied by ‘Mahavitaran’. The total expenditure for water and electricity for one hectare is Rs. 7,000 per hectare per year

6. **Cost of Harvesting:**
The additional skilled labours are also required for harvesting of the prawn in the farm. It needs to drain water from the tank water. The Labour force, the diesel for engine, packing, preserving and maintainence of pond required Rs. 4000 per hectare as a harvesting cost.
Table 5.6- B
Upper Krishna Basin: Returns from One Hectare of Fish Tank in Saline and Waterlogged Area, a Case Study of Prawn Culture

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Species of Fish</th>
<th>Average Weight Per Fish</th>
<th>Net Production in Kg.</th>
<th>Returns Per Kg. in Rs.</th>
<th>Total Returns in Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prawn (Micro Brachium Rozenburgi)</td>
<td>Grade I: Above 100 grams</td>
<td>265</td>
<td>350</td>
<td>92750/-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grade II: 75 to 100 grams</td>
<td>600</td>
<td>250</td>
<td>1,50,000/-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grade III: 50 to 75 grams</td>
<td>350</td>
<td>210</td>
<td>73500/-</td>
</tr>
<tr>
<td>2</td>
<td>Grand Total</td>
<td></td>
<td></td>
<td></td>
<td>3,16,250</td>
</tr>
<tr>
<td>3</td>
<td>Probable Price Fluctuation (About 10 %)</td>
<td></td>
<td></td>
<td></td>
<td>3,1,625</td>
</tr>
<tr>
<td>4</td>
<td>Net Returns (Output)(2-3)</td>
<td></td>
<td></td>
<td></td>
<td>2,84,625</td>
</tr>
<tr>
<td>5</td>
<td>Total Cost of Production Incurred (Input) From Table -A</td>
<td></td>
<td></td>
<td></td>
<td>1,24,500</td>
</tr>
<tr>
<td>6</td>
<td>Net Profit (4-5)</td>
<td></td>
<td></td>
<td></td>
<td>1,60,125</td>
</tr>
<tr>
<td>7</td>
<td>Input- Output Ratio</td>
<td></td>
<td></td>
<td></td>
<td>1:2.30</td>
</tr>
<tr>
<td>8</td>
<td>Production Cost For One Kilogram of Fish in Rs.</td>
<td></td>
<td></td>
<td></td>
<td>102.46</td>
</tr>
</tbody>
</table>

Source: Based on Personal interview of Abhijit Chavan Sarkar a farmer of Kasbe Digraj of Miraj Tahsil

7. Return from the Fish Production:

As per the experience of Shri. Chavan Sarkar the monoculture of prawn was profitable. About 8 to 9 months were required for fully growth of prawn. The per hectare production of prawn was 1215 kg. Per hectare per year.

The prawn is separated by doing gradation on the basis of weight of the individual prawn. About 265 Kg. of the prawn is considered as a grade 1st which having the weight of above 100 grams each. The grade IIrd prawn having the weight of between 75 to 100 gm. weighted 600 kg. Whereas IIIrd grade prawn (50 to 70 gram weight each) weighted about 350 kg.

The market price of the prawn ranges between Rs. 210 to 350 per Kg. (Table 5.6 B). Prawn is an exported variety of fish which is less demanded in local markets.
The total return from the marketing the produce comes to Rs. 316250. However the fluctuations in the price are considered about 10 percent which comes to Rs. 31,625. Hence, Rs. 3,16,250 minus Rs. 31,625=2,84,625 as a gross return, minus Rs. 1,24,500 as a total cost of production which comes to Rs. 1,60,125 as net profit.

The cost benefit ratio (1: 2.30) reveals that, prawn farming as a monoculture is profitable and viable in saline and waterlogged soils.

5.3 Marketing of Fish:

Geography of marketing is concerned with the delimitation and measurement of markets and the channels of distribution through which goods move from the producer to the consumer. Distribution channels are the various outlets through which products pass to reach the ultimate consumer in the right quantities, at the right place and at the right time. Distribution channels are the networks of economic institutions through which a produce of goods is delivered and handed over to the users. Marketing of agricultural commodity invariably affects the extent and nature of cultivation. Marketing can be defined as "the performance of business activities that direct the flow of goods and services from producer to consumer at a specific time and place in the form of wishes and at the price he is willing to pay" (Kohls 1958). Marketing is the most potent factor greatly stimulating agricultural productions of an area.

The economic position of a farmer cannot be improved by producing only more unless he gets a fair price for his produce. In this, regard Thompen (1959) has argued that an effective and efficient marketing system is one which facilitates the production of those products which, when sold to consumers, will yield maximum returns after the deduction of marketing charges and farm production cost incurred by a farmer. Thus, marketing is the last stage where a farmer converts all his efforts and investments in to cash (Sharma and Sharma 1981).

Marketing activity in fact begins with the adoption of appropriate technology at the farm level and ends at the final consumption level. However, marketing methods also differ from commodity to commodity. A good organized marketing structure can do much to ensure the economic stability of a region, the maintenance of pattern of production suited to the geographical environment and the steady development of the country (Symons 1970).

In view of this, the present chapter deals with the study of marketing system and its role for development of fish farming in the study region.
5.3.1 Channels of Distribution:

Every manufacturer needs a link with the consumer to sell his produce. The set of marketing intermediaries forming the link is called the distribution channel or sometimes the traders' network. 'Channel' is a comprehensive term used to denote the group of agencies or intermediaries who help in transferring the goods from the producer to the consumer. The manufacturer's choice of selecting the type of channel and the number of dealers depend on the various criteria and methods and is a function of many factors (Jalan 1987).

5.3.1 Process of Fish Marketing:

The process of marketing is a chain like structure. Three channels are observed in fish marketing system. The channels developed in the Upper Krishna basin are modeled in fig 5.5 and analysed bellow.

a) Producer, Hawkers to Consumer:

Most of the fishermen belong to the fishermen’s community and they sell the fish direct to the consumers. This channel provides fresh fish to the customer for direct consumption in low price. Some times the hawkers purchase the fish from the retailers and sell the fish to the consumers by door to door delivery.

b) Producer Fishermen to Consumer:

There are two main branches observed for fish marketing in the region. In which fishermen and the fishing workers harvest the fish and sell to the wholesaler. Wholesale sell it to the retailers. Further the retailers sell the fishes to the stall venders and also to the consumers.

c) Producer, Fish Contractor to Consumer:

The channel of the fish marketing in the region is observed fish contractor to consumer. The fish contractors purchase the fish from the fish producers it may be fishermen or fish growers and sell the fish to the commission agents and wholesaler cum retailer. The retailers supply the fish to the consumers. Some time the hawkers purchase the fish from the producers and also from the retailers and sell to the consumers.
5.3.2 Retail Marketing:

Retail marketing system of the fish is practiced in the central and western part of the region. The fishermen belongs to the fishermen’s community are engaged in retail marketing. These fishermen are fishing in river water and also in dams and tanks. Almost all the fishermen in Upper Krishna Basin prefer the retail marketing system where they directly sell fish to the customer. The fishermen belong to the fishermen’s community sell the fish early in the morning or in the evening. After selling the fish they attend again fishing activity in the afternoon and early in the morning. Fishermen who have saved their time in selling would get more time for fishing. There are two ways through which retail marketing is organized.

1. Stall Venders:

In the study region the market centers located at certain points. The availability of the market places both in rural and urban areas is having equal importance. In the region urban centers have a daily market. But in rural areas market is available on weekly market day. In weakly market centers some of the specific spots are allotted for the fish. The customers are also well aware for availability of the fish which ensures the sale and thus the fishermen are benefited. By this method fishermen save their time because the customers come to the stall.

2. Hawkers:

The hawker fishermen have to attend the costumers at their resident. Some times the fishermen of the region have to take round through roads of villages and gullies of the cities and calling attention of the people for selling the fish. This system of the selling requires more patience and energy. This system is time consuming and difficult to manage. Due to the physical mobality the fishermen have to tolerate a lot of physical and psychological troubles.

5.3.3 Wholesale Marketing:

The wholesale marketing system of the fish selling is practiced every where in the region. Fishermen belonging to the fishermen’s community having good economic condition are involved in wholesale marketing channels. The farmers performing fishing activity in saline and waterlogged soils prefer the wholesale marketing.

In this system the middlemen play an important role. The middlemen purchase all the fish stock at a time and it save the time of the fishermen. The price received by
the fishermen from the middlemen is definitely less than the price they might have
got through direct sailing.

5.3.4 Marketing of Fish in Dams and Tanks:

In Upper Krishna Basin, most of the fishermen are engaged in capture fishing
in river water. Many locally demanded varieties like Wam, Shivada, Catala, Rohu and
Mrigal are sold in local markets at tahsil level or village level. The market type is
discussed as bellow.

A) Local Markets:

In the region almost all the fishing co-operative societies prefer local markets
for sailing the fish. Being a perishable by nature, fish requires freezing and preserving
facility. However, in the region none of the fishing co-operative society is having
storage and refrigeration facility. So the fishermen prefer local markets for selling
fresh fish. 100 percent of the fishing co-operative societies and fishermen have
preferred local markets for sailing the fish (Table 5.7). The local market centers are
open at tahsil level. The weakly market centers are also available at village level
where as daily fish markets centers are situated at urban centers.

B) Regional Market:

About 45.45 percent of the fishing co-operative fishing societies and
fishermen from the central part of the region has preferred regional fish markets of
Poona and Mumbai (Table 5.7). The regional market centers at district places provide
good market. In central part of the region Kolhapur is the largest fish market followed
by Satara of Northern and Sangli and Miraj of Eastern part of the region (Plate 5.1 &
5.2).

C) National Market:

None of the fishing co-operative societies has preferred national fish market.
In Upper Krishna Basin only Major carps varieties are cultured in dams and tanks.
The locally demanded carps or the varieties are cultured in dams and tanks in the
region.

Only prawn is demanded at national market but it has strong competition with
marine prawn. Due to the high price of the prawn it is not preferred by the local
people for consumption. Besides that prawn is not cultured intensively so region has
lower production of prawn.
### Table 5.7
Upper Krishna Basin: Marketing of Fish in Dams and Tanks

<table>
<thead>
<tr>
<th>Part of the Region</th>
<th>No. of Respondent Societies</th>
<th>Percentage of Types of Market Preferred By the Fishermen’s</th>
<th>Average market price received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Local</td>
<td>Regional</td>
</tr>
<tr>
<td>Local Marketing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western</td>
<td>11</td>
<td>100</td>
<td>00</td>
</tr>
<tr>
<td>Central</td>
<td>11</td>
<td>100</td>
<td>45.45</td>
</tr>
<tr>
<td>Eastern</td>
<td>11</td>
<td>100</td>
<td>72.72</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100</td>
<td>39.39</td>
</tr>
</tbody>
</table>

Agent Charges 5 Percent to the total price received

Share Of Fishing Co-operative Society is 5 Percent to the total price received

*Source: Based on Field Survey*

#### 5.3.5 Marketing of Fish in Saline and Waterlogged Soils:

In Upper Krishna Basin the mixed culture of major carps and prawn are cultured in saline and waterlogged soils. There are various routes through which fish move from the place of production to the place of consumption or from producers to consumers. The small farmers usually sell their produce either to the village traders or in the local markets, while large-scale farmers sell their produce in the main markets where it goes into the hands of wholesalers or commission agents. In the region, most of the fish growers usually sell their produce to the middle man (Dalal). As marketing of the fish the farmers have applied various types of the markets for the fish are discussed as under.
i) Spot Marketing on Farm:

The spot marketing on farm is observed in the region. About 6 percent of the farmers are practicing such spot marketing system (Plate 5.3). In ‘Shere’ village of Karad tahsil the farmers are practicing such type of marketing. He started his pond for harvesting from 6 to 7 months from the stocking or after observing one kg. of the weight of individual fish.

Such spot marketing is suitable for practicing and for getting more benefit. Such system helps to reduce packing and preserving cost. It need not have the packing and storage facility.

Table 5.8

Upper Krishna Basin: Marketing of Fish in Saline and Waterlogged Soils

<table>
<thead>
<tr>
<th>Types of Market</th>
<th>No. of Respondents</th>
<th>Percentage to Total Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spot Marketing on farm</td>
<td>01</td>
<td>06.66</td>
</tr>
<tr>
<td>Local</td>
<td>09</td>
<td>60.00</td>
</tr>
<tr>
<td>Regional</td>
<td>02</td>
<td>13.33</td>
</tr>
<tr>
<td>Local and Regional</td>
<td>03</td>
<td>20.00</td>
</tr>
<tr>
<td>National</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>

| Average Retail Price in Rs. | Rs. 50             |
| Agent Charges              | 5 Percent to the total price received |

Source: Based on Field Survey

ii) Local Market:

The farmers practicing fish farming in saline and waterlogged soils are preferred local markets for the fish. About 60 percent of the fishermen have preferred the local markets for the fish (Table 5.8). The local markets are near to the fish production ponds. Miraj, Sangli and Satara are the major market centers in the region. These markets are near to the fish production units which reduces the transportation charges and other expenses like preservation and refrigeration. Thus fishermen save their time and again attended their duties in fishing activity as fishermen. The local markets at tahsil and District level provide good marketing environment and also customers to the major carps like Catala, Rohu and Mrigal.
iii) Regional Market:

Most of the fish growers sell their fish to the fish contractor or to the middleman. The middlemen or the fish contractors purchase the fish on the farm and use to send it in regional market like Bombay.

The varieties like Catala, Rohu and Mrigal are sold in local markets by the middlemen and remaining good quality of fish is spent to Bombay market. About 13.33 percent of the fish farmers sell their fish and prawn to the regional markets (Table 5.8). In the region about 20 percent of the farmers prepare regional and local markets for the fish.

iv) National Market:

Only prawn is demanded at national market but it has strong competition with marine prawn. Due to the highest price of the prawn it is not preferred by the local people for consumption. Besides that prawn is not cultured intensively so region has lower production of prawn. In whole of the region about Rs. 50 per kg. received for the local fish or also for major carps (Table 5.8). It also depends on the variety and size of the fish. The agent charges are taken at about 5 percent.

5.4 Conclusion:

The analysis of the economics of the fish farming reveals that, demand and the production both are adversely affecting on the price fluctuation. The pattern of the per tone fish price shows inverse relationship between the price and production. In region, average wholesale price was increased from Rs. 10 up to Rs. 25 per kilogram. It is also observed that due to the drought like situation and the occurrence of marine fish in the market are the major constraints in fish farming.

The price index shows that, the price was decreased by 18 percent in year 2004 and by 12 percent in year 2002 but due to decreasing per hectare production per hectare return was decreased and per tone price increased. The consumption and per capita availability of the fish is also increased from .548 kilograms per year up to 1.798 kilograms per year during the period of 1991 to 2001.

The tahsilwise per hectare and per tone return from fish farming has been increased during the period under study. The average cost of production and returns per hectare from dams and tanks area in the region shows that, fish farming is more beneficial in western part of the region followed by eastern and central part. It is only because western part is fascinated by large water bodies followed by eastern part of the region where as central part of the region has lack of the water storage facility.
The average cost benefit ratio of the fish farming in dams and also in saline and waterlogged soils reveals that, average cost benefit ratio is favorable. However in mixed culture (1:2.43 where as 1:3.26) is more profitable. The prawn culture of the region has 1:2.30 cost benefit ratio. The analysis reveals that, mixed culture is more beneficial than the monoculture.

The marketing of the fish reveals that, most of the fishermen mainly depend upon the local and regional markets. None of the fishing co-operative society sends their fish production to the national market. The fishermen belong to the fishermen communities sold the fish in local markets and also through hawkers to the customers by home to home delivery. The fish farmers sold their produce to the middlemen or to the fish contractors for reducing transportation, harvesting and preservation charges of the fish.
References: