6.0 Introduction

Fisheries and aquaculture have been amply studied separately from biological, environmental and economic points of view by scholars in their respective fields. These studies have brought to light important findings and suitable guidelines for practice of fisheries and aquaculture. However, it has been found that concentration on technical factors to the exclusion of broader social considerations can lead to uneven, even distorted, ventures into aquaculture. Large-scale commercial farmers and large formal organizations (corporations, parastatals, and government departments) have taken up aquaculture with a certain measure of success. Except in the case of Fisheries Departments as such, these operations have usually represented a diversification of an existing economic enterprise. By contrast, small-scale farmers have shown less interest in raising fish. Aquaculture programmes have shown limited ability to reach this group. Consequently the potential of aquaculture for improving rural nutritional and income standards has so far not been realized. Hence, it is necessary to study Fisheries and Aquaculture in the light of prevailing socio-economic conditions and cultural aspects as these have bearing on decision making by all stakeholders.
A careful study of the socioeconomic conditions of small-scale fishermen is a prerequisite for the good design and successful implementation of effective water and fishery resource utilization programmes. The main objectives of such study should be as follows:

1. To provide an overall picture and profile of the structure, activities, and standards of living of small-scale fishing communities and households as a background to their occupation of fishing.

2. To compare the standards of living of small-scale fishing households to those of other comparable socioeconomic groups (e.g., farmers), and to the national average to determine their relative positions in the national economy and establish whether government intervention to upgrade their position is needed; and

3. To identify factors that account for differences in standards of living among small-scale fishing households themselves and between them and other socioeconomic groups so that policy implications are arrived at and effective policies for assistance and development can be formulated and recommended.

4. To observe group and community behaviour, traditional and cultural activities of small scale fishing households.
6.1 Problems in doing socio-economic analysis

While the evaluation of economic performance of aquaculture projects is relatively easy, the estimation of social benefits is much more difficult. Many intangible and unquantifiable benefits are involved. The issue of the lack of a common understanding of socio-economic benefits is exacerbated by the absence of a generally accepted method for assessing them.

It is often impractical to separate out aquaculture-derived benefits in communities served by integrated rural development projects. For example, improvement in the nutritional status, employment and income may often be combined with other social development programmes and it is extremely difficult to apportion with any amount of preciseness, the contribution of aquaculture to the combined benefits derived from community activities. Even when it is possible, numerous field studies and collection of data over long periods of time may be needed. However, a net ‘increase’ in income from an additional aquaculture activity for communities at risk of poverty or marginally poor communities can be safely assessed and its role in poverty alleviation quantified. From the farmer’s perspective, socio-economic impacts of aquaculture consist of its contribution to the livelihoods of communities and should be understood in terms of direct and indirect benefits. Direct benefits include the provision of high-quality food, self-employment in case of small-scale farmers and incomes from sale of high-value produce. Indirect benefits cover the supply of aquatic products to local markets, employment opportunities for local communities and on larger farms, in seed supply networks, market chains and manufacture, repairs and other functions. Aquaculture enables the poorest of the poor, in particular the landless, to benefit from common pool resources. Indirect socio-economic benefits of aquaculture also expand to increased farm sustainability, for
example through the construction of aquaculture ponds which also serve as small-scale, on-farm reservoirs.

In order to define and measure standard of living, it is necessary to describe, in a meaningful comparative way, several of the conventional socio-economic variables: occupational structure, family size and age structure, cash and non-cash income, consumption expenditure, education, house and other consumer durables, public services, and social amenities. These variables are described and measured because they are needed to establish how well-off the fishermen are vis-a-vis each other and the rest of the country. We are then able to say whether the small-scale fishery sector as a whole, or some part of it, is among those groups of the society that need special government attention and assistance. Attempts have also been made to determine whether the fishermen's current (relative) income position, whether high or low, is a temporary feature, i.e., we should introduce some historical perspective into the picture. Moreover, even if the past confirms the present, there is no reason why the future should be the same: some consideration of the future prospects, especially in the light of growing population, expanding economy, rising unemployment elsewhere, or resource depletion in the immediate area, have also been taken into account.

The socio-economic and cultural aspects of fisheries and fishermen have been studied in this chapter with the above objectives and framework in mind. The schedule method for interacting with the fishing communities has included suitable questions and same are asked and along with other field observations made, the socio-economic analysis of fishing communities in Aurangabad district is done.

The Economic and Environmental aspects of fisheries are discussed in the earlier chapters. The detailed Socio-economic aspects as well as the cultural aspects of fisheries are considered in detail in this chapter.
6.2 Sample study

As discussed in the methodology (Chapter I), present research work is based both on primary as well as secondary data. This chapter deals with the analysis of the primary data collected by conducting field survey of inland pond and tank fishermen/fishery households in Aurangabad district. Multistage stratified random sampling method was used to capture primary data from the field and a questionnaire was canvassed to collect information by way of direct interview (schedule) method.

A brief recapitulation of the sample survey and surveyed households is made in Table 6.1. Showing a total of 504 families sampled across 119 ponds and tanks.

Table –6.1 Selection of Sample Size:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Taluka</th>
<th>Total no. of ponds and tanks</th>
<th>No. of ponds and tanks in initial sample</th>
<th>No. of ponds and tanks in final survey sample</th>
<th>No. of sampled fish farmers/fishing households</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kannad</td>
<td>234</td>
<td>23</td>
<td>17</td>
<td>62</td>
</tr>
<tr>
<td>2</td>
<td>Soygaon</td>
<td>282</td>
<td>28</td>
<td>18</td>
<td>58</td>
</tr>
<tr>
<td>3</td>
<td>Sillod</td>
<td>275</td>
<td>27</td>
<td>16</td>
<td>43</td>
</tr>
<tr>
<td>4</td>
<td>Phulambri</td>
<td>161</td>
<td>16</td>
<td>15</td>
<td>99</td>
</tr>
<tr>
<td>5</td>
<td>Aurangabad</td>
<td>310</td>
<td>31</td>
<td>24</td>
<td>75</td>
</tr>
<tr>
<td>6</td>
<td>Khultabad</td>
<td>180</td>
<td>18</td>
<td>11</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>Vaijapur</td>
<td>115</td>
<td>11</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>8</td>
<td>Gangapur</td>
<td>145</td>
<td>14</td>
<td>3</td>
<td>19</td>
</tr>
<tr>
<td>9</td>
<td>Paithan</td>
<td>165</td>
<td>16</td>
<td>12</td>
<td>80</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1867</strong></td>
<td><strong>184</strong></td>
<td><strong>119</strong></td>
<td></td>
<td><strong>504</strong></td>
</tr>
</tbody>
</table>
Table 6.2 Total Sampled Fish Farmers

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Fishery type</th>
<th>No. of sampled fishermen</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Fishery co-operative</td>
<td>504</td>
</tr>
<tr>
<td>2.</td>
<td>Individual farm pond</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>514</strong></td>
</tr>
</tbody>
</table>

Besides the government ponds and tanks, farm ponds owned by private individuals and used for fishery were also considered. Since these were rare, only 10 such suitable cases were sampled as shown in Table 6.2.

Table 6.3 Area available per member in fishing co-operatives of Aurangabad District

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Fisheries co-operative society</th>
<th>Village</th>
<th>Block</th>
<th>No. of Members</th>
<th>No. of ponds</th>
<th>Total area (ha)</th>
<th>Area per member (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bhoi Samaj</td>
<td>Pimpriraja</td>
<td>A'bad</td>
<td>66</td>
<td>3</td>
<td>520</td>
<td>7.88</td>
</tr>
<tr>
<td>2</td>
<td>Matsya Kanya</td>
<td>Kacchi Ghati</td>
<td>A'bad</td>
<td>26</td>
<td>3</td>
<td>105</td>
<td>4.04</td>
</tr>
<tr>
<td>3</td>
<td>Sambhaji Nagar</td>
<td>Begumpura</td>
<td>A'bad</td>
<td>55</td>
<td>9</td>
<td>132</td>
<td>2.40</td>
</tr>
<tr>
<td>4</td>
<td>Bhatke Vimukt</td>
<td>Daulatabad</td>
<td>A'bad</td>
<td>24</td>
<td>9</td>
<td>150</td>
<td>6.25</td>
</tr>
<tr>
<td>5</td>
<td>Sri Ganesh</td>
<td>Bidkin</td>
<td>Paithan</td>
<td>26</td>
<td>7</td>
<td>88</td>
<td>3.38</td>
</tr>
<tr>
<td>6</td>
<td>Adool</td>
<td>Adool</td>
<td>Paithan</td>
<td>26</td>
<td>4</td>
<td>123</td>
<td>4.73</td>
</tr>
<tr>
<td>7</td>
<td>Godavari</td>
<td>Paithan</td>
<td>Paithan</td>
<td>228</td>
<td>1</td>
<td>2000*</td>
<td>8.78</td>
</tr>
<tr>
<td>8</td>
<td>Lokshair Annabhau Sathe</td>
<td>Palgavan</td>
<td>Vaijapur/ga</td>
<td>25</td>
<td>3</td>
<td>105</td>
<td>4.20</td>
</tr>
<tr>
<td>9</td>
<td>Gangotri Matsya</td>
<td>Valuj</td>
<td>Vaijapur</td>
<td>35</td>
<td>2</td>
<td>100</td>
<td>2.86</td>
</tr>
<tr>
<td>10</td>
<td>Shamiyababa</td>
<td>Pirbavda</td>
<td>Phulambri</td>
<td>43</td>
<td>4</td>
<td>76</td>
<td>1.77</td>
</tr>
<tr>
<td>11</td>
<td>Girija Matsya</td>
<td>Phulambri</td>
<td>Phulambri</td>
<td>243</td>
<td>4</td>
<td>99</td>
<td>0.41</td>
</tr>
<tr>
<td>12</td>
<td>Mahatma Phule</td>
<td>Phulambri</td>
<td>Phulambri</td>
<td>51</td>
<td>1</td>
<td>108</td>
<td>2.12</td>
</tr>
<tr>
<td>13</td>
<td>Shravan Baba</td>
<td>Aland</td>
<td>Phulambri</td>
<td>58</td>
<td>6</td>
<td>33</td>
<td>0.57</td>
</tr>
<tr>
<td>14</td>
<td>Jaibhole Matsya</td>
<td>Varkheli Tanda</td>
<td>Soygaon</td>
<td>41</td>
<td>8</td>
<td>104</td>
<td>2.54</td>
</tr>
<tr>
<td>15</td>
<td>Marathwada Adivasi</td>
<td>Shindol</td>
<td>Soygaon</td>
<td>41</td>
<td>5</td>
<td>165</td>
<td>4.02</td>
</tr>
</tbody>
</table>
### Table 6.3

<table>
<thead>
<tr>
<th>No.</th>
<th>Village</th>
<th>District</th>
<th>Area Available (sq km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Sangha Shakti</td>
<td>Nimbayati Tanda</td>
<td>1.58</td>
</tr>
<tr>
<td>17</td>
<td>Jaidurga</td>
<td>Bhakt</td>
<td>2.48</td>
</tr>
<tr>
<td>18</td>
<td>Jailaxmi</td>
<td>Rahimabad</td>
<td>1.41</td>
</tr>
<tr>
<td>19</td>
<td>Rajtara</td>
<td>Ghatnadra</td>
<td>2.58</td>
</tr>
<tr>
<td>20</td>
<td>Eklavya</td>
<td>Verul</td>
<td>0.55</td>
</tr>
<tr>
<td>21</td>
<td>Magasvargiya</td>
<td>Yesgaon Vadod</td>
<td>2.92</td>
</tr>
<tr>
<td>22</td>
<td>Devgiri</td>
<td>Kagjipura</td>
<td>1.21</td>
</tr>
<tr>
<td>23</td>
<td>Bhoi Samaj</td>
<td>Kannad</td>
<td>4.51</td>
</tr>
<tr>
<td>24</td>
<td>Adivasi</td>
<td>Vaispur</td>
<td>1.38</td>
</tr>
<tr>
<td>25</td>
<td>Magasvargiya</td>
<td>Umbarkherda</td>
<td>12.61</td>
</tr>
<tr>
<td>26</td>
<td>Late Bhausamrat</td>
<td>Ritthimohadi</td>
<td>1.28</td>
</tr>
</tbody>
</table>

Area available for fishing is only considered Table 6.3 shown the area of fishing available per member of a fishery co-operative. This is a per day mathematical derivation not necessarily reflecting the actual fishery utilization because all members of a fishery co-operative do not always actually do the fishing. Details are discussed later on in this chapter.

### 6.3 Fishermen population and group formation based on field survey in Aurangabad District

It is estimated that there are about 50,000 inland water fishermen who are often concurrently farmers, and about 3000 fishermen out of these are the traditional artisanal fishermen. They do fishing in about 540 villages and around 2000 ponds, tanks, rivers, lakes or reservoirs, all put together. In addition, there are another 2000
private farm ponds, each not more than 30 X 30 X 3 cubic meters in size, where the owner may or may not fish.

Those who catch and appropriate fish may be grouped into four:

a. traditional caste fishermen,

b. non-traditional fishermen,

c. Government tank/pond lease-holders.

d. the public who catch fish for subsistence purposes.

These types can be explained as follows.

Professional fishers: Fishers who rely entirely on fishing for their income. They mainly fish in open waters, especially in rivers, and tend to belong to communities that have fished for generations. These are the traditional caste fishermen and comprise around 40% of the interviewees encountered during the field survey.

Part-time or seasonal fishers: When there are few other employment opportunities and fish are moving and easy to catch in larger quantities (i.e. at the beginning of the flood and during the drawdown period), people take up fishing and tend to focus on areas that are drying and on migration corridors such as canals connecting agricultural fields with permanent water-bodies. 30% of such non-traditional fishermen were found to constitute the fisherman’s community during the survey.

Subsistence or occasional fishers: Members of most rural households own a net or rod or even fish by hand. They fish mainly for food, however all fishers will sell surplus catch, especially large fish which fetch a higher price. At least 20% of the fishermen encountered during the field survey are found to belong to this category.
**Investors:** Wealthier people who do not normally fish themselves. The investors usually hold lease or fishing rights to a particular water-body and employ fishers or hire them as labourers. Other investors procure expensive types of fishing gear (e.g. seine nets) which they rent to groups of fishers against a share of the catch. The above three categories of fishermen described may be found to be employed by such investors in lease-hold water-bodies.

**Women:** Women do not normally fish; it is almost exclusively men who are engaged in fishing, even at the subsistence level. Fish are generally only traded by women at the village market place. However, women (especially elderly widows) can sometimes be seen using hook and line near their home. They are also seen to be engaged in activities of feeding as well as cleaning of the fish. Less than ten percent of the interviewees were found to be women. Gender profile of Figure 6.1 shows a diagrammatic representation of fishermen types as seen in Aurangabad district.

![Gender profile of sampled fish-farmers](image)

**Figure 6.1 Gender profile of sampled fish-farmers in surveyed fish ponds of Aurangabad District**
6.4 Occupational profile of fish farmers

Figure 6.2 gives a pictorial representation of the occupational profile of sampled fish farmers in Aurangabad district. It is revealed from this diagram that 39 percent of fishermen work full time in the fisheries and this is their sole occupation. Apart from the category of fishermen for whom fishing or fish-farm management is their sole occupation, a good 37 percent of fish-farmers were occupationally agricultural farmers as well and owned land. Another 19 percent, mostly fish-farm labour or fish catchers, combined the occupation of fishing with daily wages work elsewhere, say at the farms of big landholders in the village or even as wage labourers for government’s employment programmes. Another 5 percent combined fishing with miscellaneous work. The latter could range from helping at the local kirana store to running their own shop or business in the urban and rural areas, allied to fisheries or even otherwise. This lot was found to comprise of the relatively economically better-off people.

Figure 6.2 Occupational Profiles of Sampled Fish-Farmers in Aurangabad District
While some full-time fishers effectively work as labourers in fishing teams and are clearly poor, living day-to-day on their wage or share of the catch, many full-time fishers are not necessarily poor, some own higher value gears or lead fishing teams and may also have fish trading interests. Also the type of fishers who depend on the resource differs between water-body types.

6.5 The socio-economic profile of fish farmers

6.5.1 Education

Figure 6.3 shows diagrammatically the educational profile of fishermen and fish farmers interviewed in the survey. Almost 40 percent of the fish farmers were found to be illiterate. In the literate category, more than half had studied till the secondary or higher secondary level. Around 7 percent had completed their school education and another 3 percent were graduates. 14 percent farmers reported having received education only till the primary level.

![Educational profile of fish-farmers in sampled fish ponds of Aurangabad district](image_url)

Figure 6.3 Educational Profile of Fish- Farers in Sampled Fish Ponds of Aurangabad District
The illiterate in the group were the primarily labour or actual fishing persons. However, they were not found to belong to any specific caste of traditional fishermen or otherwise and represented a broad cross-section of the labour class as well as small farmers class in the village. Amongst the educated, the education had been received in almost all the cases in the Zilla Parishad run primary and secondary schools in the village. Those who had studied further, had however, been educated in private educational institutions. These farmers were also found to belong to the decision-making and office-bearers’ group in the fishing co-operatives. A large number of these high-educated fish farmers were not traditional fishermen, but had taken to aquaculture with a reasonable understanding of its scope and profitability. These persons also showed better entrepreneurial abilities. Amongst the secondary level educated farmers, we also found farmers whose traditional occupation was fishing and they subsequently grouped themselves into a co-operative around some big water tanks and reservoirs. They were able to obtain lease rights to the water body and some of these members are second generation fishers in that water body. Such fish farmers displayed better education, improved social and economic status as compared to others in the same community, better education for the next generation and even better management techniques were observed to be followed by this category in the fish farm management. All this was directly seen translating into better yields and economic betterment of these communities.

6.5.2 Family Size and Structure

A family size of between 5-7 members was found to be the most prevalent family size amongst the fish farmers and fishermen interviewed during the field survey. This was found to confirm to the general family structure of non-fishing families in the village. The fishing couple or the fisherman may live with elderly
parent(s) and has two or more school going children. The general age profile of fishing folk interviewed was found to most commonly fall in the range of 30-40. The next bigger groups were 5-7 years on either side of this range. Thus, for a fish farmer who is typically 40 years old, a family size of 5-6 persons may be the norm. The family will typically have the farmer’s wife, usually an elderly parent and 2-3, grown-up children. In some cases, one of the married sons or daughters may stay on with the family with their spouse and help with the fishing activity. Figures 6.4 and 6.5 represent the age profile and family size profile of fish farmers as found in the field survey.

![Figure 6.4 Age profile of sampled fish-farmers in surveyed fish-ponds of Aurangabad district.](image-url)

*Figure 6.4 Age profile of sampled fish-farmers in surveyed fish-ponds of Aurangabad district.*
Figure 6.5 Family size of sampled fish-farmers in surveyed fish-ponds of Aurangabad district.

6.5.3 House and Land

Around 35 percent of sampled fish farmers did not have a house of their own at the time of survey. These were the fish farm labour and fishermen who were mostly employed by fish farm owners and the fishing water body lease-rights holders. This category was found to be landless as well. Some of these were tribal fishermen and almost all of these fishermen corresponded to the uneducated and illiterate interviewees. Their socio-economic status can be clearly said to be the lowest from amongst the sampled fish farmers in Aurangabad district. They usually reside in temporary structures at the site of ponds and fish farms. Some live in temporary structures on the farm land where that find work as agricultural labour and several families were also found to be living as encroachers on government or private land. From amongst the 65 percent who have a house, only 28 percent have a pucca house, with the rest of 37 percent owning only a kuccha house. 60 percent of the fish farmers
own farm land having an average size of 4 ha, indicating that fishery is taken up as an option to diversify agricultural income. The most common land holding size was found to be between 2-4 ha amongst the landed. A total of 4 fishermen reported having a land holding of more than 10 ha. The land holding in all the cases was found to be agricultural land, with jowar and cotton as the main cultivated crops. Some fish farmers were observed to even plant some seasonal fruit crops like melons or cucumbers that can be harvested within 3-4 months. At the start of summer month in March or April, as the water level reduces, leaving open land in the dried-up tank or reservoir basin, the crop is planted. Figures 6.6 and 6.7 show the housing and land holding profile of sampled fish farmers in Aurangabad district.

![Housing Status](image)

**Figure 6.6 Housing status of fish-farmers in sampled fish ponds of Aurangabad district.**
Figure 6.7 Land holding status of fish-farmers in sampled fish ponds of Aurangabad district.

6.5.4 Family Income

The average annual gross income of the sampled households engaged in inland fisheries in Aurangabad district shows wide variation, ranging from Rs. 18,000 to Rs. 16,00,000 per annum. The household income was derived from both fishing and non-fishing activities. Non-fishing activities include farming of grains, fruits, vegetables and other crops, small business, and daily wage worker in village and outside. Figure 6.8 gives the Income status of sampled fishery households of Aurangabad district.
6.5.5 Social status

Fishing in Maharashtra / Aurangabad district was an occupation undertaken primarily by members of particular Hindu (Bhois or Kolis) or Muslim castes. Given the low social status associated with fishing, these communities traditionally occupied the lower rungs of the social hierarchy in rural communities. Even in Muslim society, where caste is not recognized, groups involved traditionally in fisheries are accorded a generally low social status.

Significant changes have taken place in the social groups involved in fisheries with many fishermen migrating to coastal areas over the last 40 years, increased population pressure. While a core of full-time professional caste fisher-folk are still to be found in some villages of Aurangabad district (usually the villages with large and old capture and culture fishery resources), their traditional field of activity is increasingly opening up to a wider range of rural people who have become more and
more involved in fisheries. These newer entrants to fisheries may be attracted by the profitability of certain fisheries activities, at least on the seasonal basis, or they may be driven into fisheries through their exclusion from other labour markets or areas of income earning activity.

With an increase in the number of government-owned water-bodies available for lease and also the profitability of small quarter-acre size private farm-ponds seen here and there in Aurangabad district, people from the higher rung of society are also taking to fishing as it is becoming a lucrative profession. Rich, influential people of higher caste, who are often seen instrumental in spearheading formation of the newer fisheries co-operative societies of late, often have access to credit and market contacts which are required for profitable aquaculture. The traditional fishermen or ‘Kolis’ are then relegated as the ‘labour-providing’ members of the fisheries co-operative society.

6.5.6 Cultural aspects of fishermen

The inland fishermen in Aurangabad district are of two types. The first type is that of the traditional fishermen, who have been practicing fisheries as a traditional occupation since several generations. These are the ‘kolis’ or ‘bhois.’ Even though their hamlets in the village may be separate at times, their cultural aspects, apart from fish being an essential part of their diet and the women necessarily engaged in fish selling and preservation activities, have become integrated into the overall cultural aspects of the village they live in. Thus, while the fishermen in coastal areas often show distinct festivals and celebrations, the inland fishermen in Aurangabad district more or less celebrate the same festivals as the other communities in the village. In case of Hindus, Diwali, Dassera and Holi are the main festivals, while Ramzan and Id are the main festivals of Muslims. Any distinctions in the way marriages or events such as childbirth etc are celebrated were also not noticed during the field studies.
The other type of fishermen being the new entrants into fisheries, mainly for income diversification, continue to follow their original customs and festivals and do not show any special customs or practices.

6.6 Institutional Arrangements

Institutional arrangements can be studied from two angles.

i. In terms of water body or fishery type.

ii. Resource ownership type

6.6.1 Water body or fishery type

1. Tanks and ponds constructed by the irrigation department, held mostly under license for a period of five years by fisheries co-operative societies.

2. Village ponds owned by the local village body – these are leased out to individuals on competitive leasing basis.

3. Village ponds or irrigation department ponds held by individuals who pay rent for fishing on annual basis.

4. Individually owned private ponds or farm ponds.

Semi-intensive culture is seen in almost all the cases. The ponds and tanks mostly get water from rain-fed canals and streams. Who will be responsible for the maintenance of the pond or the water body is often not resolved. Usually, either agency of the irrigation sector (minor or ZP or state-level) that has constructed the pond or tank is also responsible for regular maintenance. Lines are not clearly drawn. Sometimes a formal ‘handing-over’ of the water body is necessary, post work-completion for a particular govt. agency or local-self body to allocate funds for such maintenance.
work. Such formal process having not being completed in a majority of cases, maintenance is the most crucial but often the most neglected part of making water resource available for the development of a sustainable fishery. It can be proposed that the local body under whose jurisdiction the water body falls take care of the maintenance of the pond or tank and ensure availability of minimum water so that fishing can be practiced. This has been found to be the case in parts of Haryana, where the maintenance of local ponds vests with the village panchayat and this ensures its active co-operation to the local fishery.

6.6.2 Resource Ownerships Types:

Composition/ socio-economic profile of a fisheries’ co-operative society

On the institutional side, and in response to the weaknesses of competitive leasing, there has been a focus on “community-based management” in recent years. This has been affected through the formation of local organizations of people who are awarded use rights on the condition that they adopt improved management practices. On the technical side, and considering the declining capture fisheries and experience gained in aquaculture, the emphasis of the Department of Fisheries has been on giving long-term lease rights in these fisheries to boost production.

These community based organizations vary – some have a strict membership of fishers who hold exclusive fishing rights, others comprise representatives of the wider community of people who use a water body and associated floodplains (for example, including some farmers and wealthier people as well as professional fishers and landless subsistence fishers). Because stocking involves annual investments in fingerlings, it is usual for the community organizations involved to be either
membership-based and raise funds from the members who have rights to fish, or to charge fishing fees to cover the costs of stocking.

A fisheries co-operative society is comprised of people living in the village(s) in which a water tank or pond is located. A majority of ponds and tanks have the fishing rights leased out to fish-farmers from the local village, most commonly organized into a co-operative society for the purpose of bidding for the fishing and aquaculture license. Number of members in a co-operative society can vary from 20 to 250. However, the number of active members may vary from place to place. As per stipulations of the fisheries department, at least 10 active fishermen need to be in a society, with a minimum of 26 members. At least 10 active fishermen per society were found to be the case in the field studies as well.

Practically, in at least half of the ponds surveyed, the actual numbers of members actively involved in the aquaculture and management of the fish-farm was found to be not more than 8-10. This was found to be true across societies of all sizes. The co-operative society elects a chairman and a secretary, and a few office-bearers in case of bigger societies who usually handle the liaison work, bidding, obtaining license etc. Quite often, they are the ones to invest in the lease amount from personal accounts. The membership fee is usually seen to be Rs.100 per member. The office-bearers are seen to be actual fishermen in only 5 societies out of the 26 we came across during the field studies. Very often, the decisions relating to management of the fish-tank, actual investments into inputs of fish seed, feed, fertilizer etc are made by the chairman alone or by the body of office-bearers. The 8-10 members of the cooperative body who are actual fishermen are by and large illiterate, often come from low-income, usually marginal or landless families, with partial or seasonal unemployment. They were hardly observed to play any role in decision-making. In
other words, they constitute the actual field labour – force for the co-operative body. They usually have a share of Rs.10 per kg of fish caught by them in the harvest season and a collection of this share represents their income from the aquaculture activity. The chairman or office–bearers, on the other hand are observed to divide the profits amongst themselves from sales of the fish by the society to a private businessman or trading agent. In 2 or 3 cases, the chairman of the society was himself the agent supplying fish to export houses or specific markets in Mumbai on contract.

Rest of the members are often for name-sake, to fulfill the legal requirement of a minimum number of members required in order to constitute a fisheries co-operative society. Quite often they were not even found aware of the yield of the water body, when surveyed during this study.

In 9 of the 26 societies studied, every single member of the society was found to be a fisherman and the profits from total sales were equally shared by all the members. These societies appear to have been constituted by actual fishermen, identified as ‘bhoi’ community in their villages. Fishing is regarded as their traditional occupation and by constituting a co-operative society, they have successfully managed to expand their base for natural resource utilization. The almost egalitarian socio-economic backgrounds of the society members have also ensured fair distribution of responsibility and profits in these co-operative societies.

The co-operative societies have a predominantly male membership, with women constituting less than 5% of the total strength of most societies. It is seen that at least 3-4 women are usually members of a fisheries co-operative society. The job of selling fish in the local village market is usually performed by them. In some cases where the number of women members is more, the job of giving feed to the fish was
also seen to be handled by these women. Quite often, the women’s husbands are also members of the same society.

In several of the societies, the present office-bearers of the society either hold an office-post in the local village’s political body or have held such a position in the past. Very often, the society formation and obtainment of the license or lease—rights have emanated from their political and economic clout, past or present. Competitiveness to obtain lease-rights or license to fish in the bigger irrigation projects is often seen in such co-operative societies. The yields of these tanks too show an above average trend.

An analysis of book-keeping of these societies, however, shows a poor record-keeping habit. Little transaction record—most of the economic transactions were reported to have been carried out orally—is maintained. Even the audit reports are sketchy at best. As a co-operative, even if a vehicle or office-room is found on record, it’s informal use for work other than the society’s work is often seen by the more influential members of the group.

6.6.3 Competition for resource use— from common property to limited access

In ponds that have yielded high yields over the past several years, the competition for obtaining license has increased tremendously. This is particularly seen for ponds ranging around 20-30ha in size. This size specificity could be attributed to this being the most manageable size by a group of 20 or so people, and by close observation possible from within the group. Further labour costs (for seasonal hired labour or for guarding) are minimized and the stakeholders take personal interest in keeping the society working smoothly.
6.7 Institutional Analysis

The local level institutional analysis was carried out using Venn Diagram tool to identify major stakeholders in the community affecting the fisheries resource there. This was done to explore social networks within the village, the relationships between the villagers and external organizations/institutions, and the extent to and way in which different individuals (institutions and organizations) influence the livelihoods of the villagers (fishers). Figure 6.9 shows the relationships observed through an Institutional or Venn Diagram.

Figure 6.9 Venn Diagram for Sampled Fisheries in Aurangabad District

![Venn Diagram](image)

The strength of relationship among actors (or “influence” of the institutions) is ranked as high, medium or least (and 1= strongest relationship). Venn diagram provides an overview of the institutions located in the village and helps to identify the
institutions playing critical roles for the community livelihoods. It also illustrates local level relationship between different groups, institutions, and individuals, type and intensity of interactions between the villagers and the organizations/institutions, as reflected by the distance or size of the arrow connecting the circle. The size of the circle in the diagram reflects perceptions of the villagers (fishers) about importance of these institutions to them and kind of their relationships (degree of associations) with the institutions.

The major findings of the institutional analysis are summarized below.

• Fish traders (1). Fishers gave highest priority and strength of the relationship to fish traders. In general, the fishers have got good relationship with fish traders. In addition to purchasing fish, the fish traders also provide credit to the fishers in a time of need. Usually, the spouses of the fisher sale fishes to the traders, and the fishing communities almost daily interact with the traders. Hence, they ranked fish traders as a most important local organization (ranked by 1).

• Local political functionaries (1): In order to actually reap the benefit of leased ponds and tanks and avoid local disputes, the local political functionaries who often wield money and muscle power have to be kept in good humour. Thus, they are rated as important as the traders.

• Sellers (fishing materials/equipments and fuel) (2): After fish traders, the fishing communities have got the next closest relationship with the sellers/suppliers of the fishing and household commodities. This is logical, as the fishers often need to buy fishing and household materials from the sellers.
• Chairman of the fisheries co-operative society(3): Fishing households are also in close contact with the chairman of the local fisheries co-operative and fisheries leaders there.

• Fisheries extension officers (3): The fisheries extension officers also occasionally visit the village and assess the aquaculture practice or offer guidance.

6.7.1 Ranking of problems felt by the fishers

The problem ranking method was adopted to identify, compare, and prioritize major problems that are faced by the majority of the fishing households in the community. The results show that there were fine major problems faced by the small-scale fishers. The main problem was nature’s vagaries predominantly in the form of unpredictable water availability that largely determined the potential for stocking and subsequent culture. This was followed by recent increased price of fish seed and fish food, fishing gears, then increasing practices of illegal fishing (bomb, electrocution) and poaching leading to decrease in fish catch. The interviewed group also reported that the fish tanks were becoming shallower in the recent past (especially it is becoming shallower quickly after the main season rain compared to the situation in the past), due to increased silt accumulation. Figure 6.10 shows the problem ranking in a pictorial form.
Figure 6.10 Problem ranking of fisherman in Aurangabad District

Water availability to maintain a minimum level of water in the ponds for the fish to survive during the lean months is a major problem, even if there has been a good monsoon initially. The problem is more common in smaller and shallower ponds which have been stocked, so the fish farmers have more stakes to maintain a minimum level of water in the ponds for the fish to survive in the lean season. As the stocking density increases, the stakes to maintain the minimum 3 feet depth of water and the minimum water spread area for the growth of fish becomes high. With
depleting water level, the growth of fish slows down and mortality increases. Thus, some farmers were also seen to be resorting to pumping in groundwater into the culture ponds and tanks to maintain the level of water during summer and to ensure fish survival till the time of harvest.

Capital is the main problem and the most important hindrance for intensifying culture fishery, as in the lack of soft loan facilities for overcoming this obstacle.

Fish farmers tackle poaching in various ways. Members of the fisheries co-operative society living close the farm site keep a watch themselves or hire a night watchman in some cases, particularly as the fish grows to a marketable size. In the case of larger ponds though, the watchmen and hired labour for security purpose is a more common feature as a single person is unable to guard the pond. Interestingly, when a majority of influential and politically-connected individuals were seen to be fish farmers or members of the fisheries co-operative society, the problem of poaching or stealing was found to be minimal or non-existent. In cases where richer individuals had stakes in the co-operative society, they were often seen to be ‘maintaining good relations’ with the members of the local village body and the village politicians, by regularly giving them some gifts and presents, in cash or kind, to ensure their support in keeping poaching and harm from conflicting interests at bay. The chairman of fisheries co-operative society were also found to be hosting an occasional ‘goodwill meal’ for the villagers and the local police to stay in their good books and avoid any potential losses due to their ire or jealousy in future.

The problems like market access, labour, disease to fish and resistance from villagers got less weightage across the sampled sites.
6.7.2 Investment and Credit

The fishermen or the members of co-operative societies holding license to fish often borrow from fingerling suppliers and other money lenders at interest rates of 5 percent per month. Eventually these groups are likely to fall under the control of these financiers especially considering the risks associated with stocking (below), and would in effect be worse off than before becoming involved because by then they will have accumulated a considerable debt. It is therefore important for fisher groups involved in stocking to have access to credit on favourable rates, for example through nationalized banks. Another option is to help the groups develop their own revolving funds.

6.7.3 Risk management

The outcomes of stocking are highly variable, and because stocking requires a high investment the risks are high even if average long-term returns are good. Even when loans are provided, the poorest people are not likely to become involved because they cannot afford to take the risk involved with the investment. It is crucial that results are positive even in the short term because the beneficiaries have accrued a debt which may be very significant compared with their individual incomes, and which needs to be paid off.

It has been studied in Bangladesh\textsuperscript{2} that even if fisher communities gain access to a water body and have access to credit from an NGO for stocking, they may lose control owing to disputes over the lease or they may be forced to pay for the fishing rights even in situations where they lack the power to exercise these rights or they may have to pay retrospectively so that they can maintain access rights in the future.
When the water body has a high lease cost it is impossible for fishers to raise enough money to pay for both the lease and the stocking (on the other hand it is only possible to raise sufficient money to pay for the lease if fish are stocked and only if the attempt is successful). Fishers then have to rely on wealthy investors or money lenders who will demand repayment at high interest rates. Before any stocking the resulting cash flow for the fisher community should be worked out realistically after considering all the costs, likely returns and risks. This should be discussed widely with all stakeholders to see if costs and risks are acceptable.

A further issue is that the initial investments of the projects in stocking tend to attract interest from those with an intention to profit from the process. Inevitably only some people are directly involved in purchasing fingerlings and other financial matters, and this brings opportunities for funds to be diverted from the intended purpose at different stages of the process. For example, it has been common, when projects started informing that they expect to support stocking of water-bodies, for local influential people to seek to involve themselves in the community organizations in the expectation of profiting from this. Accusations of exploitative collusions may arise concerning each party involved in handling funds associated with such programmes. This was seen in case of some larger tanks studied during the present study.

Another interesting observation related to the source of supply of fish seed was made during the field studies. The economic conditions of a majority of fish farmers being poor, they often do not have enough cash on hand to purchase seed from government hatchery. The lack of institutional credit in fisheries sector worsens this situation. Under this circumstance, the farmers find it attractive and convenient to purchase seed from door-to-door sellers from the neighbouring state of Andhra
Pradesh, and in some cases even from West Bengal. These businessmen sell specified quantity of fish seed for a token amount, with the fishermen pledging a certain percentage of produce to the businessmen as repayment of loan. At the time of harvest, the agents of these traders or lenders come and take the produce, to be sold in markets. Thus, the fish farmer is left with only a certain portion of produce. Illiteracy and poverty in at least thirty percent of the sampled fishermen was observed to cast them into a net of such economic transaction, which worsens if production plummets owing to vagaries of nature or other factors. This practice also does little to improve the fishermen’s socio-economic status.

Very low level of profit margin of the fishing effort during the close season suggests a need of alternate livelihood diversification activities for small-scale fishing communities, particularly for the period of 4 to 5 months of close season. Seasonal impacts of closed seasons and restrictions on fishing can be mitigated through livelihoods components such as processing and cottage industries that are part of the work to improve fishery management.
6.8 Role and Involvement of Women in Fisheries and Aquaculture

Women play an important role both as workers in the fisheries sector and in ensuring household food security. Generally, they possess an in-depth understanding and knowledge of the natural environment and its resources. Millions of women around the world, especially in developing countries, work in the fisheries sector. Women participate as entrepreneurs and by providing labour before, during and after the catch in both artisanal and commercial fisheries. Their labour often consists of making and mending nets, baskets and pots, and baiting hooks. In fishing, women are rarely engaged in commercial offshore and deep-sea waters, but more commonly involved in fishing from small boats and canoes in coastal or inland waters – harvesting bivalves, molluscs and pearls, collecting seaweed and setting nets or traps. Women also play an important role in aquaculture, where they attend to fish ponds, feed and harvest fish, and collect prawn larvae and fish fingerlings. However, their most important role in both artisanal and industrial fisheries is at the processing and marketing stages. In some countries, women have become important entrepreneurs in fish processing; in fact, most fish processing is performed by women, either in their own cottage-level industries or as wage labourers in the large-scale processing industry. However, statistics of this work are not available and therefore cannot be quoted.

In Aquaculture development programs in Bangladesh, studies show that women working on homestead aquaculture achieve higher fish yields per unit of water area than male operators in the same areas. Women are successfully producing table-fish at rates of over 5 tons/ha/year. They are also rarely delinquent on their loan repayments. Family owned pond water resources tend to be near the homestead, providing the opportunity for women to undertake aquaculture while still carrying on
with normal household activities. Women’s involvement also frees family men to pursue other avenues of income generation.

In the present study, women are men participating both as formally registered members of the co-operative society as well as informally if their husbands are members of the fisheries co-operative. In that role, they play an important role in cleaning of pond, feeding the fish and selling the produce in local fish market.

6.9 Social Conflict & Promoting Responsible Practices and Attitudes

Multiple use conflicts that have been referred to earlier have had socio-cultural impacts in some areas. A major conflict has concerned the use of natural resources, such as land and water. Though productive agriculture land has often been acquired by the government for construction of tanks and reservoirs for the purpose of irrigation, the original land holders have been given compensatory land, usually in a neighboring area. Conflicts arise when these ‘displaced’ farmers are not license-holders to fish in the local pond or tank. Also, if the use of water tank for fishery restricts the quantity of water available for irrigation, conflicts of interest arise. Sometimes, seasonal or recreational activities like boating and swimming get hampered due to fishing nets, invoking the ire of local populace. Because of these and other cultural reasons, social and political opposition have occurred. A few instances were observed where profitable aquaculture projects had to be abandoned or suffered as a result of such opposition.
In many cases the decision to stock has been based exclusively on the desire to increase production. Existing uses and users have by default been considered non-existent, and it has been common practice to initiate management for intensive fish production without a baseline survey.

Inland fisheries are essentially small-scale, subsistence or artisanal in nature. It is not unusual for small-scale commercial, artisanal and subsistence fisheries to co-exist in the same area although with some degree of conflict. Major impacts on fishers usually derive from outside the fisheries sector when large scale projects involving alternative uses of water can alter the whole nature of the resource. Typical of this is the need to displace communities and re-educate fishers when riverine fisheries are converted to lacustrine ones following impoundment. The impacts on and needs of fishers should be taken into account within the general impact assessments of all such projects.

A large volume of literature shows that sustainable development of a resource takes place when a particular group of stakeholders has both control and responsibility for that resource. Further, group management on a collective basis is likely to be effective when it constitutes of people with similar needs and interests, customs, interactions. The greater the inequality in the distribution of rights and economic decision making power in the management group, other things being equal, the greater is the deviation from optimal management. Hence it sounds rational that management of a resource is likely to be closer to optimality when persons having a stake in sustainability of the resource base and belonging to a relatively equal income group, undertake the management of a fishery resource. According to Barbier (1987), Pezzy (1992), economic dimension of development is seen as an important part of an environmentally sound socio-cultural, political and institutional transformation.
Changes in the management institution coherent with a sustained exploitation of the fishery resources is viewed as a step to achieve equity in the society both in inter as well as intra-generational sense. Thus, it is a scenario to strive for aquaculture that is environmentally non-polluting, technically efficient, economically viable and ecologically sustainable.$^{10}$

6.10 Measuring Impacts on Livelihoods

The baseline survey for a fishery resource should cover the entire resource management unit in say, a watershed approach, and all relevant institutions and stakeholders must be identified and the latter’s reliance on aquatic resources for their livelihoods assessed before any intervention. Such a baseline survey is needed both for planning purposes and in order to be able to monitor the impact of fishery management activities. The baseline survey should shed light on the reliance of various stakeholders on aquatic resources in the area under management, and assess whether the relationships between different user-groups are largely cooperative or competitive, or whether any one group is dependent on another. It should further assist in identifying potential problems and conflicts and finally help measure the impact of the activities in improving people’s livelihoods. The baseline should also serve as a reference point to measure the impact of project intervention. Ideally fish catches and other indicators should be monitored for at least a year before any interventions are undertaken. However, poverty alleviation means not only an increase in income, nutritional quality of food and food security, but also improvement in social conditions including access to training, higher social status and
better housing thus a broader range of indicators is needed than may be regarded by fisheries specialists as necessary or appropriate.

Given the diversity in aquaculture and the sometimes different perceptions of “sustainability”, more balanced and informed approaches are required to address developmental and environmental issues at any given location. Commitment for collaboration, constructive dialogues among responsible partners, and participation of aqua-farmers and their communities are important when assigning responsibilities for sustainable development of aquaculture.

6.11 Prevailing Social Attitudes towards Fisheries and Aquaculture

Technical strategies, to be successful, should be combined with an appropriate socio-economic set-up to suit local conditions.

As a new occupation, poor farmers do diversify their occupational profile to aquaculture provided they perceive the value of fish as food and as a source of income, they have access to a water resource for aquaculture that has zero or very low opportunity cost where fish seed can be stocked, seed is available at a reasonable cost, and they are familiar with low-cost techniques of aquaculture commensurate with their resources. Still, it is not an activity that more than five or maybe ten percent people in the village will adopt *suo moto* unless they have some practical orientation or guidance in this regard. This is where the role and importance of extension activities comes into picture.
A large number of subsistence-level farming households around village ponds are reluctant to adopt aquaculture. They perceive aquaculture as a new technology for which investment, albeit small, might carry risk. Unless the benefits have been proven to them, they invariably ‘wait and watch’ till a neighbour with similar socio-economic condition is successful before they take it up themselves.

The villagers all have different background assumptions about how social organization is supposed to work, why people act the way they do, what is sensible action and what is not. These assumptions in return are related to different demand conditions. Each is a function of their social and cultural background. It is therefore understandable that misunderstandings should arise when a group of people within the village are seen to adopt a new activity, hitherto not fitting into the traditional socio-cultural set-up of the village. Attitudes to officials and attitudes to politicians or well-off members in the village community are also an integral part of these perceptions.

The local staff, familiar with the local situation (they will know the local culture and will be able to anticipate people's reactions) must use it to educate people in a way they are receptive to new ideas of livelihoods and occupational diversification.

The political processes set into motion by the project will affect the local balances of power. Since these are likely to change, with the inclusion of more groups in the process, the process of change should be one that is readily understandable, and can be justified in terms of generally accepted values.
6.12 Role of Extension

Given the vastness of available fishery resource and human resources in Aurangabad district and their potential, strong support services and extension network are needed to realize this potential. A stronger extension component needs to be integrated in fisheries development and aquaculture projects. The following are the major issues regarding extension:

1. Definite plans, objectives, programmes in fishery extension at both state and district levels.

2. On-line functions between the DOF Headquarters, Division, District and Block level.

3. Technically qualified extension officers, who are sensitized to the prevailing socio-economic and cultural scenario of the target groups;

4. Adequate number of field extension staff to cope with a large number of clients.

5. Instructional manuals/materials and case studies which are relevant to local conditions.

In addition, aquaculture projects can also help integrate the “workers” (e.g., teachers, clinic staff, agricultural assistants, etc.) more effectively into the work of the village. These can offer valuable technical skills: literacy and numeracy, experience with formal organizations and with urban life and attitudes, and access to technical resources and information. All of these are important aspects of the rationalization process. Their participation in the planning and carrying out of village aquaculture projects will provide additional legitimacy in the eyes of villagers, beyond the necessary approval of local leaders, and will help cross-out their tendency to
separation on income, status, and ethnic grounds. Thus, proper co-ordination of fisheries department officers and extension staff with other departments’ staff within the village and above can all go a long way in the process. Involvement of NGOs can be encouraged. The general form in which government intervention should take place can also be identified in this manner. For instance, should the government provide small-scale fishermen with credit and subsidies for fishing equipment or help them extend their fishing range to new fishing grounds or develop more non-fishing employment opportunities. To answer questions of this sort, socio-economic analysis becomes very useful.

Depending on which factors are found to contribute more to the family income, the government can design its intervention policies so as to achieve the maximum effect on the small-scale fishing household's income from a given level of public expenditure.

6.13 Social net to ensure sustainability: A proposed division of labor within a society/fishermen’s group and family

During the survey cases were seen showing innovative use of the traditional division of labour, e.g., setting youths to cleaning the ponds or married women to feeding and harvesting the fish. The ponds therefore, had rather the flavour of being set over the village economy as “modern” and somewhat odd activities. There is however, potential for integrating fish-farming into the social division of labour, such that each age and gender group can be made responsible for one aspect of the work. Adult men can dig the ponds; youths can carry out everyday maintenance and guard
the fish against pests and thieves; women, traditionally responsible for the food supply, can feed and eventually harvest the fish.

If successful, this will integrate fish-farming much more fully into the economic life of the village:

- it will increase the commitment of the whole family to the activity;
- it will make it easier to rationalize production techniques by breaking them down into separately allocated tasks;
- it will require coordination, and therefore, will provide work for old people;
- it will spread the labour load more widely;
- it will allow naturally for learning by experience and informal apprenticeship.

The young people who learn it naturally will find it a personal novelty, not an unfamiliar activity. This will help lead to the incorporation of fish-farming into village culture as something to be carried forward spontaneously into the future;

- it will provide an additional source of unity and solidarity within the family and increase its adaptive-ness, hence its likelihood of survival.
6.14 Sustainable Livelihoods Approach

Most poor household potential new entrants to aquaculture will have a diverse livelihoods strategy. The main component of such a family’s household income is likely to be agriculture, but with increasing supplementation through non-farm income e.g., from seasonal activities such as part-time industrial worker or aquaculture. Thus, aquaculture needs to be an attractive option for use of limited household assets and ‘fit-in’ with the resource base. Furthermore, poor farming households may not be motivated to produce the maximum amount of fish from a culture system. Rather they may view aquaculture as a relatively small but nevertheless important benefit to their overall household survival strategy\textsuperscript{10}.

Instead of working to create a separate identity for fish-farmers, efforts should be made to render fish-farming one of the normal village activities. If a visitor should come and ask any villager, “What do you grow here?” the answer might be, “We grow mostly maize and jowar, and we keep cattle and fish”. This level of integration should be the aim of village aquaculture projects.
CONCLUSION

As evident from this study, aquaculture development has provided local employment and added to incomes, preventing to some extent the exodus of people to urban areas for work. The major conclusions made from the background of socio-economic and cultural considerations in inland fisheries as observed during the field studies are summarized below:


2. The rural folk doing fish culture hail not just from the traditional fishing groups such as the ‘bhois’ or the ‘kolis’ but are more and more mixed and have a wider caste base.

3. The lifestyle of the inland fisher-folk and fishing families has become merged into the general village lifestyle and hardly shows much distinctive features or special festivals, unlike the coastal fishing communities.

4. Within the village, the local public representatives have an influential place when it comes to the decision on fishing rights to be enjoyed by a group or a society in the local water body. The officials from the Fisheries department also occupy an important place.

5. Women contribute to the fisheries in diverse ways such as cleaning, feeding the fish, selling the harvest etc even though they may not be formal registered members of the fishing co-operative.

6. A minimum food security is assured to households engaged in the inland pond or tank fishery.
7. Fisheries when used to supplement other sources of income like the family occupation of agriculture lead to an improvement in the socio-economic parameters of the household like education of children, quality of house etc.

8. Water bodies are not specifically designed for fish culture but are used for aquaculture, exhibiting multiple use of given resource.

9. Multiple use of the water body (e.g. irrigation) interferes with fish culture (especially at the end of dry season, in the absence of tube wells). Multiple-user conflicts for water body use exist in particular, in areas of water scarcity. Prioritization of felt needs at the village level must be respected in such cases.

10. Government ownership of the water tanks makes decision-making difficult especially when investments are needed for physical improvement of ponds. This can be solved by evolving a strong and empowered decentralized decision-making system in which the village communities can have the financial clout to make and implement such decisions.

11. Prevalence of a competitive leasing-out system of water-bodies and in some cases, creation of intermediaries between first lessee and ultimate user, the fishermen.

12. Ponds may be leased out to poorly educated individuals who face the problems such as limited knowledge of aquaculture techniques, lack of quality seeds, lack of credit and high risks. The fishermen depend on traders, village moneylenders and boat owners for loans at usurious rates of interest. Loans of traders are tied up with a compulsion to sell to them, which brings down the actual profit of the fishermen. These aspects can be addressed by provision of strong institutional credit facilities, micro finance, improving extension and
training activities and facilitating market forces for provision of seed supplies etc. with proper regulation in prices, keeping the interests of small scale fish farmers in mind.

13. Lack of institutional credit facilities for investment in pond management and for procurement of various fishing inputs results in a lack of capacity of small scale fishermen to procure fishing inputs such as boats and nets from own financial resources. Strengthening of Self Help Groups and evolving an aquaculture loan policy for small scale fish farmers as a priority sector lending can be very helpful to address this problem.

14. No insurance coverage for life and fishing equipments. Private players and insurance companies, particularly the public sector undertakings, can be encouraged to come out with such insurance policies.

15. Hazards due to diseases also result in productivity losses. These can be partially and in some areas totally prevented through better management techniques.

16. Pollution resulting from increasing use of agrochemicals and discharge of industrial effluent and resulting threat to the suitability of ponds and tanks for fish culture. Environmental Impact Assessment and following of environmental guidelines in the catchment areas of fisheries in particular, should be made compulsory.

17. Problem of poisoning and theft (partially due to multiple ownership problem) needs to be addressed.
18. Lack of organized marketing facilities results in lower revenue for the fishermen. Lack of preservation facilities result in spoilage/wastage particularly at time of bumper catch. Horizontal and vertical linkages in these sectors need to be worked out, particularly with the help of Public Private Partnerships (PPPs).

19. A limited extension programme exists for motivation toward pond-fish culture. This must be improved if the income diversification aspect of small scale fisheries and encouragement of local communities to take up fishing as a new activity is to be highlighted. Exposure visits of new entrants to successful sites and their interaction with successful ‘non-traditional’ fishermen can also help in this regard.

Thus, a proper understanding of the socio-economic and cultural aspects of fish-farmers and fishermen communities can help in designing of a development policy aiming at improving the productivity from aquaculture as well as the status of fishing communities.
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