CHAPTER V

PRODUCTION AND MARKETING ANALYSIS

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CHAPTER V

PRODUCTION AND MARKETING ANALYSIS

Production of Pond Fish

Pond Fish Culture

The preliminary step in pond fish culture activities is to clean the ponds. In the study area the ponds under the control of Fish Farmer Development Agencies are only seasonal ponds. The drying up of such ponds during summer months helps mineralisation, removal of excess organic matter and automatic destruction of predatory and weed fishes.*

The composite fish culture practices i.e., culturing of compatible species of fish varieties with complementary food habits popularly known as composite fish culture are adopted in the study area. The common species available are catla, rohu, mirgal, silver carp, common carp and others.

* Weed fishes – The small and uneconomical varieties are called weed fishes. They are not harmful to the stocking.
The main post stocking operation is supplementary feeding. The fast growing fish in the pond need much more food than what is available in the pond. The cultured fish varieties show a liking for mixed diet particularly carbohydrate and protein varieties, consisting of rice bran and oil cake.

The fishes also need fertilizers in an indirect way. The idea behind fertilization to increase the production of microscopic plants and microscopic animals which form the food for the cultivable fishes in fertilization is the application of super phosphate and urea fertilizers have also been used for raising the production of fishing ponds.

Organic manure like cow dung, poultry manures and pig dung are also commonly used.

The occurrence of disease in fish stock particularly in pond is unavoidable. It is observed that before releasing fingerlings in the stock pond they should be given a dip in a chemical solution, in order to avoid the occurrence of external infections. Many fish diseases are the result of poor water quality.

**Effective Pond Preparation**

Effective pond preparation prior to stocking involved some strategies for the enhancement of pond productivity. In the study area pond
owners (fish farmers) started renovating and reclaiming their derelict ponds for taking up fish culture. The pond owners with the help of hired labourers attempted to the clearance of aquatic weeds, manuring and feeding. To generate natural productivity of a pond and provide congenial conditions for normal growth of fish, ponds have to be eradicated and properly fertilized before stocking. The following table explains the involvement of fish farmers in the effective pond preparation.

TABLE No. 5.1

IN VolvEMENT OF FISH FARMERS IN THE EFFECTIVE POND PREPARATION

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Involvement</th>
<th>Number of Ponds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Drying the Pond Bottom</td>
<td>45</td>
</tr>
<tr>
<td>2.</td>
<td>Tilling and Applying Lime</td>
<td>354</td>
</tr>
<tr>
<td>3.</td>
<td>Filtering Incoming Water</td>
<td>80</td>
</tr>
<tr>
<td>4.</td>
<td>Fertilizers</td>
<td>280</td>
</tr>
<tr>
<td>5.</td>
<td>Aquatic Predators (Piscicide)</td>
<td>40</td>
</tr>
<tr>
<td>6.</td>
<td>Use of Weedicide</td>
<td>84</td>
</tr>
</tbody>
</table>

SOURCE: Survey Data.
The above table 5.1 shows that nearly 45 fish farmers reported that they dried their ponds before culture. Regarding tilling and applying lime 354 fish farmers have this practice. 80 of them are undertaking filtering of the incoming water. 280 fish farmers apply fertilizers before stocking. 40 of them use the piscicide to kill aquatic predators. This study also reveals that nearly 80 fish farmers use the weedicide to increase the space for fish culture.

From the study we can infer that in the study area filtering of the incoming water, using weedicide and drying of the pond bottom practices are very limited.

**Fish Harvesting Instruments:**

**Craft:**

**(a) Canoe**

This is a common craft used for fish harvesting in the study area. This craft is constructed with wood planks, grooved with ribs and frame. The fore part is narrow and restricted. The capacity is greater than that of catamarans. The length of the craft varies from four to five metres.

The craft and fishing gears constitute the means of production. Fishing method means the way in which the fish is harvested. While the gear is the instrument used for the harvesting of fish. The craft provides the plat
form for the fishing operations. It holds and carries the workers and fishing
gear and transports the workers from base to fishing area and back.

(b) Catamaran

It is the most traditional fish craft. In the study area it consists
of four logs, shaped and lashed together in the form of hull. Catamarans have
an average length of three to four metres.

Gears:

Gear is the instrument used for harvesting the fish in the study
area. The commonly used gears are gill nets, drag nets, cast net and hooks and
lines. Gill nets are single walled nets made of nylon fibres.

Drag nets are generally used for removing unwanted fishes from
the pond.

Cast nets and its method of operation consisting of throwing the
net fully spread over a shoal of fish thereby trapping it.

Therefore are two types of hooks and lines. One is hand lines
and other is a long lines. The hand line consist of a single vertical line, sinker
and a few baited hooks in series. The long line consist of a very long
horizontal mainline with vertical branches spaced at a uniformal intervals,
each branch bearing baited hooks.
**Fish Farmers and Casual Labours**

**Fish Farmers**

All fish farmers are not equally skilled in the various process and stages of fishing they learn their work by experience and gradually become internalized over time. The fish farmers and wage earning labour force are still below poverty line. In the study area the fish farmers are the pond owners. Given the vagaries of monsoon and fluctuations in fish harvest their income is uncertain since most of them do not save.

The fish farmers constitute the most neglected class in the fisheries sector. Their income is very low and employment irregular. Since they are less skilled they have no alternative employment opportunity. Socially a large number of fish farmers belong to Backward community and hence are an oppressed class they are not well organized and therefore cannot fight for their rights. The fish farmers fall into the clutches of unscrupulous moneylenders from which they are seldom able to extricate themselves.

The work and the leisure patterns in the study area, the alteration of activity and complete idleness must be specifically seen as a future of male work. The fish farmers never mind fully employed throughout the year. They normally taking up agricultural work, it tiles of seasonal unemployment.
Casual Labour

The workers psyche is conditioned by their relationship with nature. They learn their work by experience. The wage earning labour force who are still very poor. Socially a large number of workers belong to backward communities and hence are an oppressed class. They are not well organised and cannot fight for their rights. The workers in the pond fishery are treated as equivalent of casual labourers in other occupations. They are hired as and when the need arises, as a day-to-day basis and paid accordingly. For them the problem of unemployment is quite serious, hence they go from village to village in search of employment.

Pattern of Financing:

Finance constitutes one of the prerequisites for the successful operation of any business endeavour. Fishing industry cannot be exception to this general rule. Finance is required not only for the purchase of fishing craft and gear but also for the purposes connected with payment of lease amount, purchase of fingerlings, purchase of pesticides and fertilizers so the demand for credit is on the increase. In fishing investment means the money spent for the purchases of the above items. Fishing needs continuous financing for smooth operation. The continuous flow of finance into fishing activities is essential to maintain and improve fish production. They also require money to
keep them alive during the half seasons. An attempt is being made to analyze the various patterns of finance. In this connection one should note that finance comprises the aggregate amount obtained by a unit through its internal financing and external financing.

a) Internal Financing:

It comprises own capital, savings and dowry components. The own capital consists of properly, land, craft, gear and other assets. Past saving is yet another component being a residual item which determines the fish farmers livelihood and future level of living. Dowry is another constituent of internal financing. The practice of giving dowry is very common among the fish farmers’ community. The following table explain the pattern of internal financing.
TABLE No. 5.2

DISTRIBUTION SHOWING PATTERN OF INTERNAL FINANCING

(Amount in Rs.)

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Taluk</th>
<th>Own Capital (Amount in Rs.)</th>
<th>Family Property (Amount in Rs.)</th>
<th>Marriage Gift (Amount in Rs.)</th>
<th>Total Capital (Amount in Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Agasteeswaram</td>
<td>1760000 (40.01)</td>
<td>1375000 (31.26)</td>
<td>1264000 (28.73)</td>
<td>4399000 (100)</td>
</tr>
<tr>
<td>2.</td>
<td>Kalkulam</td>
<td>3200000 (46.84)</td>
<td>2243200 (32.84)</td>
<td>1388000 (20.32)</td>
<td>6831200 (100)</td>
</tr>
<tr>
<td>3.</td>
<td>Thovalai</td>
<td>1048000 (50.75)</td>
<td>485200 (23.49)</td>
<td>532000 (25.76)</td>
<td>2065200 (100)</td>
</tr>
<tr>
<td>4.</td>
<td>Vilavancode</td>
<td>2200000 (49.86)</td>
<td>1528300 (34.64)</td>
<td>684000 (15.50)</td>
<td>4412300 (100)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>8208000 (46.35)</td>
<td>5631700 (31.80)</td>
<td>3868000 (21.85)</td>
<td>17707700 (100)</td>
</tr>
</tbody>
</table>

SOURCE: Survey Data.
(Figures in parenthesis are the percentages).

The above table 5.2 reveals that the analysis of the various sources of internal financing of the fish farmers reveals that the percentage of own capital comprises 46.35 percent, family property 31.80 percent, and marriage gifts and others 21.85 percent.
b. External Financing

Most of the fish farmers live in indigent conditions due to uncertain earnings. Despite the many social and economic achievements of planning and the growth of credit institutions in the country, institutionalised lending to the fishery sector has been far too inadequate to cope with the increasing demands. The fish farmers require considerable amount of capital for initial investment. Besides, they also require money for occasions such as festivals, ceremonies and illness in the family. These requirements lead them to high indebtedness. The methods and practices of lending and borrowing which prevail among the different groups are briefly indicated below:

In the study area they borrow from the following sources:

i. Commercial Banks

ii. Co-operative Societies

iii. Pawn-Brokers

iv. Money Lenders and

v. Friends and Relatives.

i. Commercial Banks

The entry of Commercial Banks in the fishing sector has been a recent one. They have primarily been concerned with the provision of credit. After the nationalization of banks (1969), the commercial banks, have started
advancing liberal loans to fisheries. More branches of banks have opened in fishing villages. The Reserve Bank of India by a special order instructed nationalised banks to treat fishing on par with agriculture and to give liberal loans at the minimum rate of interest even without proper securities.¹

Commercial Banks help and promote rural credit financial institutions. The area approach to rural lending by commercial banks though unconventional, is aimed at improving the productivity of rural credit. The essence of this new approach is the compactness of the operation of lending, aimed at making credit easier for clients and close monitoring of the end use of funds at the grass root level.

Now under the Integrated Rural Development Programme (IRDP), loans are sanctioned through banks. Through the ‘priority window’ scheme the public sector banks are giving special attention to fish farmers.

ii. Co-operative Societies:

In the study area there are seven (Inland) Fishermen co-operatives. Most of the fish farmers are the members of these societies. All

¹ V. Ramanathan, “Tamil Nadu Fisheries Potential”, Yojana, April 1964, p.25.
² The ‘priority window’ lending is mainly intended to ensure that assistance from the banking system flows in an increasing measure to those sectors of the economy which though accounting for a significant proportion of the national product, have not received adequate support of institutional finance in the past.
the co-operatives are working under the control of the Department of Fisheries. The State Government provides five types of loans to co-operatives such as long term, medium term, short term, working capital loans and godown loans. Besides, they are also providing technical guidance, marketing and storage facilities. They enable the fish farmers community to enjoy all privileges and benefits which they cannot achieve as an individual.

iii. Pawn Brokers

The pawn brokers are generally professional money lenders, private bankers and affluent people in the area. They deal only in gold loans. Gold ornaments are pledged usually for a period between a month and a year. Repledging of these ornaments by the lender in commercial banks under the agricultural loan with a view to raise capital at a lower rate of interest is widely prevalent. On the expiry of the period of loan, the ornaments pledged are auctioned or appropriated by the lenders. When the banks close the gold loan advance as a measure of credit squeeze, pawn brokers are mostly approached by the borrowers. In the study area this is also one of the most common types of loans availed by the needy fish farmers. There are registered as well as unregistered money lenders in this trade. Fish farmers often approach pawn brokers because they need not observe the formalities.
They may get a higher amount per gram of gold pledged, the lender is nearer at hand to advance money.

iv. Money Lenders:

Among the private sources of credit, money lenders contribute a major share. Their predominance is due to a great dearth of institutionalised finance. There are two types of money lending in the study area, the professional and the occasional one. The professional money lender is one whose only occupation is lending money, the occasional money lender is one who combines fish trading with money lending as a side business. They have intimate knowledge and experience about the community so that they lend money even without any security. They generally provide the working capital and extend help in marketing of fishes. The local money lenders belong to the same community and live in the same fishing village. The easy accessibility and simple nature of transaction make them prominent. They are ready to advance loans for all purposes. Interest charges have been too harsh ranging from 25 to 50 per cent and at times even more.

v. Friends and Relatives

The poor fish farmers find it difficult to get loan since they cannot provide enough security. There is predominance of private agencies in
the provision of rural finance. Most of the fish farmers in the study area need consumption credit to meet their household expenses. It is a common feature in fishery sector i.e., diversion of productive loan to unproductive consumption purposes. Under certain circumstances the expenses are so urgently required that it will not be possible to forego or postpone and hence the fish farmers have to approach friends and relatives from whom they borrow sizable amounts.

**Magnitude of Loan:**

It is evident in the study area is that there is no pre-planning among fish farmers for raising their finances. The debt capacity of the fish farmers is restricted to economic conditions and the source of finance. In most of the credit transactions, security of either the person or the fixed assets is most important. The government schemes like subsidy scheme is implemented through bank loan. Even for obtaining these benefits fish farmers have to provide securities. The government loans are restricted only to the members of the government co-operative societies. The magnitude of the loan is assessed by taking into account the total borrowing of the fish farmers.
Forms of Security

A protection for advance to borrower is termed as security. During the course of his business a lender receives different kinds of securities. It is prudent for a lender to obtain security to insure against some untoward and unexpected development jeopardising the safety of the advances. The securities provide a sense of protection to the lender. In case of non-payment the lender is entitled to dispose them and realise his debt. The sample survey reveals that majority of the fish farmers household who really need credit cannot easily approach any agency since their assets are inadequate. Private sources of credit still cater to the needs of sizable fish farmers households. Being at the mercy of private money lenders these borrowers have been put to serious hardships owing to the practice of charging higher interest rates and other malpractices. The following table explains the sources of external financing of the fish farmers in the study area.
<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Taluk</th>
<th>Sources of External Financing</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Banks</td>
<td>Cooperative Societies</td>
<td>Money lenders</td>
<td>Relative/ Neighbours</td>
<td>Pawn brokers</td>
</tr>
<tr>
<td>1.</td>
<td>Agasteeswaram</td>
<td>1160000 (60.42)</td>
<td>405000 (21.09)</td>
<td>40000 (2.08)</td>
<td>245000 (12.76)</td>
<td>60000 (3.13)</td>
</tr>
<tr>
<td>2.</td>
<td>Kalkulam</td>
<td>1953500 (81.28)</td>
<td>105000 (4.37)</td>
<td>120000 (5.00)</td>
<td>145000 (6.03)</td>
<td>80000 (3.32)</td>
</tr>
<tr>
<td>3.</td>
<td>Thovalai</td>
<td>770000 (73.68)</td>
<td>155000 (14.84)</td>
<td>30000 (2.87)</td>
<td>60000 (5.74)</td>
<td>30000 (2.87)</td>
</tr>
<tr>
<td>4.</td>
<td>Vilavancode</td>
<td>1052500 (77.82)</td>
<td>145000 (10.72)</td>
<td>5000 (0.36)</td>
<td>60000 (4.44)</td>
<td>45000 (3.33)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4936000 (73.44)</td>
<td>810000 (12.05)</td>
<td>240000 (3.57)</td>
<td>510000 (7.59)</td>
<td>215000 (3.20)</td>
</tr>
</tbody>
</table>

SOURCE: Survey Data.
(Figures in parenthesis are the percentages).
The above table 5.3 reveals that on an average commercial banks are providing loans to the tune of 73.44 percent of the total requirements of the fish farmers. The co-operatives provide 12.05 percent of their credit requirements. The moneylenders 2.90 percent and pawn brokers 3.20 percent. But the friends and relatives provide 7.59 percent of the credit requirements.

Production means creation of utility. The act of creating utility is done by transforming a set of inputs into some output of goods or service. The output will be having greater utility than the inputs together. The new product or output thus created is sold in the market.

The inputs used in production may be goods either supplied by the nature and/or produced by other industries. These are called ‘intermediate inputs’ or ‘material inputs’. There will be another category of inputs used in production. This is defined as ‘factors of production’ such as land, labour and capital. Such inputs are used repeatedly in the process of production. They are used to convert the material inputs into output. Such inputs are also called primary inputs.

The aim of production is to convert basic raw materials and other produced inputs into outputs. This is done in the ‘technology box’ with
the help of men and machines including other equipments. To make men and
machine or plant operative we need fuel and power which is also a category of
inputs. From the 'technology box' we get the output in the form of the
desired products and also get some by-products from this.

The Concept of Production Function

The production function is an abstract concept. It is an
embodiment of the technology which yields maximum output from the given
set of inputs or specifies the way in which inputs co-operate together to
produce a given level of output. Symbolically it is

\[ Y = f(x_1, x_2, ..., x_n) \]

Where \( y \) = flow of output in physical terms and \( x_1, x_2, ... \) are flow of input in
physical terms. The production function assumes that a technical
maximization problem has been solved. The inputs may or may not be
substitutes for each other. The technology embodied in a production function
can be expressed in terms of four major characteristics which, taken together,
may be called as 'abstract technology'. The characteristics are:

(i) The Efficiency of Technology

This reflects the quality of the technology. As increase in
efficiency of technology increases the output for a given level of inputs and
other characteristics of the technology and vice-versa. It may be considered as a parameter in the production function showing the overall quality of the technology.

(ii) The Capital Intensity of the Technology

This is the factor intensity property of the technology. It shows the quality of capital in relation to other factors, normally labour. The capital labour ratio may be used as a measure of capital intensity of the technology.

(iii) The Elasticity of Substitution

This indicates the case with which capital input (or labor) can be substituted for labour (or capital) or any other set of inputs.

(iv) The Economics of Scale

This indicates proportionate changes in output due to equiproportionl changes in all the inputs. There may be increasing returns to scale or decreasing returns to scale or constant returns to scale.

The production function also must satisfy the following conditions.

(i) The marginal products of the factors must be positive.

\[ \frac{\partial y}{\partial x_i} \geq 0, \quad i = 1,2,\ldots n \]
(ii) For some ranges of factors, their marginal products must be eventually declining with increase in the quantities of factors:

\[ \frac{\partial^2 y}{\partial x_i^2} < 0, \quad i = 1, 2, \ldots, n \]

(iii) The marginal product of one factor increases with increase in the quantities of other factor,

\[ \frac{\partial^2 q}{\partial x_i \partial x_j} > 0, \quad i = 1, 2, \ldots, n; \quad j = 1, 2, \ldots, n; \quad i \neq j \]

(iv) The production function should not specify a priori the degree of returns to scale. It is to be determined empirically.

**The production function**

\[ y = a x_1^{b_1} x_2^{b_2} \ldots \ldots \ldots x_n^{b_n} \]

\[ \frac{\partial y}{\partial x_1} = a b_1 x_1^{b_1-1} x_2^{b_2} \ldots \ldots \ldots x_n^{b_n} \]

\[ = \frac{a b_1 x_1^{b_1-1} x_2^{b_2} \ldots \ldots \ldots x_n^{b_n}}{x_1} \]

\[ = \frac{b_1 y}{x_1} \]

\[ = b_1 \left( \frac{y}{x_1} \right) = b_1 (AVP) \]

Thus the MVP = AVP multiplied by the partial regression co-efficient
Types of Production Functions

(i) Linear Production Function

It is of the form

\[ y = b_0 + b_1x_1 + b_2x_2 + \ldots \]

Here \( b_1, b_2, \ldots \) are the marginal physical products of \( x_1, x_2, \ldots \)

(ii) Input-output model

\[ y = \min \left( \frac{x_1}{c_1}, \frac{x_2}{c_2} \right) \]

\( x_1 \) & \( x_2 \) are fixed quantities of inputs. \( X_1 \) & \( X_2 \) and \( c_1, c_2 \) are the amounts of input \( x_1 \) & \( x_2 \) respectively needed per unit of output. The two inputs are perfect substitutes.

(iii) The Cobb-Douglas Production Function

\[ y = A x_1^{\alpha_1} x_2^{\alpha_2} \ldots x_n^{\alpha_n} \]

Where \( y \) is the output, \( x_1, x_2, \ldots \) are the inputs/time. \( A \) is a constant. \( \alpha_1, \alpha_2, \ldots \) are output elasticities of the inputs. If \( \sum \alpha_i > 1 \) then it will show increasing returns to scale, \( \sum \alpha_i = 1 \) then constant returns to scale and if \( \sum \alpha_i < 1 \) then decreasing returns to scale. The elasticity of substitution will be unity.
(iv) The CES Production Function

\[ y = A \left[ \alpha x_1^{-\beta} + (1-\alpha) x_2^{-\beta} \right]^{-1/\beta} \]

\( A \) is the efficiency parameter. \( \alpha \) is called distribution parameter and \( \beta \) is the substitution parameter. This function gives constant returns to scale.

(v) Translog Production Function

\[ \log y = b_0 + b_1 \log x_1 + b_2 \log x_2 + \ldots + c_{12} \log x_1 \log x_2 + \ldots \]

\[ c_{13} \log x_1 \log x_3 + \ldots \]

This function permits for interaction effects of the inputs.

In the present study the scatter diagram exhibited linear trend in the logarithm of the variables and hence we resorted to the use of Cobb-Douglas production function as the best suited for this study.

Production Function Analysis

Production of pond fish might be influenced by number of internal factors such as area of the pond, lease amount, price of fingerlings, labour charges for maintaining and giving feed in time, the feed cost and external factors like rainfall, humidity, sunshine, topography and soil conditions. It is very difficult to state as to what extent the internal factors and external factors influence the yield individually and in aggregate. The
external factors are not exactly measurable and can be assumed to have a minimum influence on it. With this assumption, the economists try to estimate the input-output relationships through production functions of various mathematical form with the help of those variables which can be under our control at the same time are amenable for quantification.

In order to draw inferences on total production and also on the marginal productivity of the different inputs involved in the production of pond fish, we resorted to fitting the Cobb-Douglas type of production function, since we are also interested in the returns to scale. During the investigation it was observed that there was difference between taluks in all the activities. Hence it was decided to analyse the performance taluk-wise. The details regarding the number of fish culture ponds taluk wise is presented below:
# TABLE No. 5.4

## TALUK-WISE NUMBER OF FISH CULTURE PONDS

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Taluk</th>
<th>Number of Ponds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Agasteeswaram</td>
<td>88</td>
</tr>
<tr>
<td>2.</td>
<td>Kalkulam</td>
<td>140</td>
</tr>
<tr>
<td>3.</td>
<td>Thovalai</td>
<td>52</td>
</tr>
<tr>
<td>4.</td>
<td>Vilavancode</td>
<td>92</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
<td><strong>372</strong></td>
</tr>
</tbody>
</table>

**SOURCE:** Survey Data.

The variables used in the study are presented below:

(i) **Area of the pond** ($x_1$)

This refers to the total area utilised by the respondent for his pond.

(ii) **Lease amount per hectare** ($x_2$)

This refers to the amount which the respondent pays as its rent per hectare per year during this period.

(iii) **Price of Fingerlings** ($x_3$)

It is the total amount which the respondent is spending on his
basic material. This also includes its transportation cost from the pond to the farm and also the incidental expenditure on it.

(iv) Total Labour Charges \((x_4)\)

This includes the wages paid for putting inputs for the fingerlings till harvest, wages to remove the algae from the pond at regular intervals, charges for cleaning the entry and exit of pond water through outlets and also the charges paid for the watchman to protect the fishes from illegal fishing.

(v) Feed Cost \((x_5)\)

This includes the cost of fish fodder used until each harvest. It is the expenditure on the oil cake, lime, cowdung, ammonium sulphate and super phosphate used during one period.

(vi) Maintenance Cost \((x_6)\)

This includes the cost of repairing nets and repairs undertaken for the maintenance of the pond.

(vii) Harvesting Cost \((x_7)\)

It is the total amount of the labour charges paid at different instances in making the harvest during one season.
(viii) Total Harvest per annum (y)

It is the total quantity of fish harvested during one season in the same period.

**Average Value of Productivity (AVP)**

The average value of productivity of each resource is computed as the mean value of the output of the entire sample divided by the mean inputs of the resources for each input separately. The resultant average include the value of the product returns of all inputs and not the return attributable to a single resource. The average value productivities are presented for arithmetic mean levels of output and input.

**Marginal Value Productivity (MVP)**

The marginal value productivity indicates approximately the returns which might be expected on an average from the addition of one unit of the productive input while the remaining input levels are held constant. The partial regression co-efficients are the elasticities of production of different resources. These indicate the efficiency of utilisation of the different resources. The marginal value productivity from the Cobb-Douglas function is derived as follows:
MVP = P (AVP)

= regression co-efficient \times AVP

Production Analysis for Agasteeswaram Taluk

In order to obtain OLS estimation, logarithm of the total production was regressed linearly on the logarithm of the seven independent variables viz; total area of the pond \((x_1)\), lease amount per hectare \((x_2)\), price of fingerlings \((x_3)\), total labour charges \((x_4)\), feed cost \((x_5)\), maintenance cost \((x_6)\) and the harvesting cost \((x_7)\). The mathematical form of the estimated production function is:

\[ y = 1.027 x_1^{0.648} x_2^{-0.110 \text{ NS}} x_3^{0.213} x_4^{-0.134 \text{ NS}} x_5^{0.188} x_6^{0.102 \text{ NS}} x_7^{0.263 \text{ NS}} \]

\[ R^2 = 0.707^{**} \]

The regression co-efficients their standard errors and their level of significance are presented below in Table 5.2.
TABLE No. 5.5

CO-EFFICIENTS OF COBB-DOUGLAS PRODUCTION FUNCTION FOR POND FISH PRODUCTION IN AGASTEESWARAM TALUK WITH STANDARD ERROR AND STATISTICAL INFERENCE

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Variables</th>
<th>b&lt;sub&gt;values&lt;/sub&gt;</th>
<th>S.E&lt;sub&gt;b&lt;/sub&gt;</th>
<th>T</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Area of the Pond</td>
<td>x&lt;sub&gt;1&lt;/sub&gt;</td>
<td>0.648</td>
<td>0.323</td>
<td>2.0061</td>
<td>.05</td>
</tr>
<tr>
<td>2.</td>
<td>Lease amount</td>
<td>x&lt;sub&gt;2&lt;/sub&gt;</td>
<td>-0.110</td>
<td>0.280</td>
<td>-0.3928</td>
<td>NS</td>
</tr>
<tr>
<td>3.</td>
<td>Price of fingerlings</td>
<td>x&lt;sub&gt;3&lt;/sub&gt;</td>
<td>0.213</td>
<td>0.101</td>
<td>2.1089</td>
<td>.05</td>
</tr>
<tr>
<td>4.</td>
<td>Labour charges</td>
<td>x&lt;sub&gt;4&lt;/sub&gt;</td>
<td>-0.134</td>
<td>0.216</td>
<td>-0.6203</td>
<td>NS</td>
</tr>
<tr>
<td>5.</td>
<td>Feed cost</td>
<td>x&lt;sub&gt;5&lt;/sub&gt;</td>
<td>0.188</td>
<td>0.064</td>
<td>2.9375</td>
<td>.05</td>
</tr>
<tr>
<td>6.</td>
<td>Pond maintenance cost</td>
<td>x&lt;sub&gt;6&lt;/sub&gt;</td>
<td>0.102</td>
<td>0.147</td>
<td>0.6938</td>
<td>NS</td>
</tr>
<tr>
<td>7.</td>
<td>Harvesting cost</td>
<td>x&lt;sub&gt;7&lt;/sub&gt;</td>
<td>0.263</td>
<td>0.217</td>
<td>1.2119</td>
<td>NS</td>
</tr>
</tbody>
</table>

Regression constant : 1.027

\[ R^2 = 0.707** \]
\[ N = 88 \]

* Significant at five per cent level of probability

** Significant at one per cent level of probability

NS - Not Significant
\[ R^2 = 0.707 \] which is significant at one per cent level of probability indicating the fact that 70.7 per cent of the variations in the production of the fish cultivated in the ponds of Agasteeswaram taluk is being explained by the seven choice variables viz; area of the pond, lease amount, cost of fingerlings, total labour charges, feed cost, pond maintenance amount and harvesting cost.

The significance of the co-efficients indicate that an additional one per cent increase in the area of the pond \textit{ceteris paribus} would result in an increase of 0.648 per cent in the production of fish. This shows that area is still productive. This might be due to the fact that as the area increases the cost may become economical and production might give more economic returns, since increase in the area might not increase maintenance cost proportionately and also the feed cost and labour charges.

Regression co-efficient for the lease amount is negative and not significant. This might be due to the fact that the lease amount is almost fixed.

The regression co-efficient for the price of fingerlings is positive and significant at five per cent level of probability. This implies that a unit increase in the percentage of the fingerlings cost \textit{ceteris paribus} would result in an increase of 0.213 per cent in the output. This does not mean that the
increase in the price of the fingerlings brings more harvest. In the survey it was observed that the high yielding varieties cost more. Thus the inference in this is that when farmers resort to high quality of fingerlings they might get more quantity of fish.

The regression co-efficient for the total labour charges though negative is not significant. That is labour is not productive. This might be due to the fact that these sectors have been already using the labour forces at the optimum level.

Average value of productivity and marginal value of productivity are presented below:
TABLE No. 5.6

TABLE SHOWING AVERAGE VALUE OF PRODUCTIVITY
AND MARGINAL VALUE OF PRODUCTIVITY
IN AGASTEESWARAM TALUK

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables</th>
<th>Kalkulam Taluk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AVP</td>
</tr>
<tr>
<td>1.</td>
<td>$x_1$</td>
<td>1339.29</td>
</tr>
<tr>
<td>2.</td>
<td>$x_2$</td>
<td>6.37</td>
</tr>
<tr>
<td>3.</td>
<td>$x_3$</td>
<td>0.94</td>
</tr>
<tr>
<td>4.</td>
<td>$x_4$</td>
<td>2.19</td>
</tr>
<tr>
<td>5.</td>
<td>$x_5$</td>
<td>0.22</td>
</tr>
<tr>
<td>6.</td>
<td>$x_6$</td>
<td>5.85</td>
</tr>
<tr>
<td>7.</td>
<td>$x_7$</td>
<td>0.87</td>
</tr>
</tbody>
</table>

The average value of productivity is highest for the variable area of the pond which is in conformation with the result obtained from the production function analysis. It is the least for the variable feed cost. This is also in conformation with the results obtained from in the production analysis. The same trend is exhibited in marginal value of productivity also.
Production Analysis for Kalkulam Taluk

The Cobb Douglas type of production function estimated using total harvest \((y)\) as the dependent variable, the area of the pond \((x_1)\), lease amount per hectare \((x_2)\), price of fingerlings \((x_3)\), labour charges \((x_4)\), feed cost \((x_5)\), pond maintenance cost \((x_6)\) and the harvest cost \((x_7)\) as a set of input variables in the mathematical form is

\[
y = 0.982 x_1^{0.716} x_2^{-0.323} NS x_3^{0.346} x_4^{-0.384} NS x_5^{0.317} x_6^{-0.243} NS x_7^{0.285} NS
\]

\[
R^2 = 0.772^{**}
\]

The details regarding the variables their standard error and the level of significance are presented in Table 5.7.
TABLE No. 5.7

CO-EFFICIENTS OF COBB-DUGLAS PRODUCTION FUNCTION
FOR POND FISH PRODUCTION IN KALKULAM TALUK WITH
STANDARD ERROR AND STATISTICAL INFERRENCE

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Variables</th>
<th>$b_{\text{values}}$</th>
<th>S.E.</th>
<th>T</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Area of the Pond</td>
<td>$x_1$</td>
<td>0.716</td>
<td>0.347</td>
<td>2.0634</td>
<td>.05</td>
</tr>
<tr>
<td>2.</td>
<td>Lease amount</td>
<td>$x_2$</td>
<td>-0.323</td>
<td>0.246</td>
<td>-1.3130</td>
<td>NS</td>
</tr>
<tr>
<td>3.</td>
<td>Price of fingerlings</td>
<td>$x_3$</td>
<td>0.346</td>
<td>0.175</td>
<td>1.9771</td>
<td>0.5</td>
</tr>
<tr>
<td>4.</td>
<td>Labour charges</td>
<td>$x_4$</td>
<td>-0.384</td>
<td>0.295</td>
<td>1.3016</td>
<td>NS</td>
</tr>
<tr>
<td>5.</td>
<td>Feed cost</td>
<td>$x_5$</td>
<td>0.317</td>
<td>0.143</td>
<td>2.2167</td>
<td>.05</td>
</tr>
<tr>
<td>6.</td>
<td>Pond maintenance cost</td>
<td>$x_6$</td>
<td>0.243</td>
<td>0.198</td>
<td>1.2272</td>
<td>NS</td>
</tr>
<tr>
<td>7.</td>
<td>Harvesting cost</td>
<td>$x_7$</td>
<td>0.285</td>
<td>0.613</td>
<td>0.4649</td>
<td>NS</td>
</tr>
</tbody>
</table>

Regression constant : 0.982

$R^2 = 0.772$**

N = 140

Table 5.7 reveals that $R^2 = 0.772$ which is significant at one per cent level of probability indicating that 77.2 per cent of the variations in the pond fish production in Kalkulam taluk is being explained by the seven choice variables viz; area of the pond ($x_1$), lease amount per hectare ($x_2$), price of
fingerlings ($x_3$), labour charges ($x_4$) feed cost ($x_5$), pond maintenance cost ($x_6$) and the harvest cost ($x_7$) are selected for this study.

The regression co-efficients presented in the Table 5.4 indicates that the regression co-efficient for the total area of the pond is 0.716 which is significant at five per cent level of probability. This shows that a one per cent increase in the total area of the pond *ceteris paribus* would result in an increase of 0.716 per cent in the output that is the variable total area of the pond has a positive effect on the production of the pond fish. This might be due to the fact that in the sampling area the resources are not optimally used. Might be that by increasing the area the inputs like maintenance cost, harvesting cost, labour charges, might not increase proportionately.

Regarding the variable lease amount per hectare the regression co-efficient is negative but not significant. This might be due to the fact that the standard deviation of this variable estimated for the per hectare value is very low that is in the entire area the value might move only in fixed proportion.

The regression co-efficient for the price of fingerlings is 0.346 which is positive and significant at five per cent level of probability indicating its positive effect on the output. A one per cent increase in the price of fingerlings *ceteris paribus* would result in an increase of 0.346 per cent in the
output. Regarding the price it is observed during the survey that the farmers used different varieties of fingerlings in the ponds and the price is not uniform for all the varieties. This result is an indication that higher value of fingerlings might bring more weighted output than those with lower price.

The regression co-efficient for the labour charges is negative and not significant. This might probably be due to the over utilisation of this resource. This along with the significance of the area indicates that additional area will be more profitable.

Feed cost is the most vital variable for the production of pond fish. The regression co-efficient for the feed cost is 0.317 which is positive and significant at five per cent level of probability indicating it’s positive effect on the pond fish production. The value of the co-efficient indicate that a one per cent increase in the feed cost *ceteris paribus* would result in an increase of 0.317 per cent in the output. This is natural since proper nourishment yields good health.

The regression co-efficient for the maintenance cost is positive but not significant indicating its nil effect on the output. This might be due to the non-variability of this variable in this area as indicated by its standard deviation.
The regression co-efficient for the harvesting cost is also positive and not significant indicating its nil effect on the production. This is again due to the non-variability of this cost.

Average value of productivity and marginal value of productivity in Kalkulam taluk are presented below.

**TABLE No. 5.8**

**TABLE SHOWING AVERAGE VALUE OF PRODUCTIVITY AND MARGINAL VALUE OF PRODUCTIVITY IN KALKULAM TALUK**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables</th>
<th>Kalkulam Taluk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AVP</td>
</tr>
<tr>
<td>1.</td>
<td>$x_1$</td>
<td>1375.51</td>
</tr>
<tr>
<td>2.</td>
<td>$x_2$</td>
<td>6.46</td>
</tr>
<tr>
<td>3.</td>
<td>$x_3$</td>
<td>0.91</td>
</tr>
<tr>
<td>4.</td>
<td>$x_4$</td>
<td>1.95</td>
</tr>
<tr>
<td>5.</td>
<td>$x_5$</td>
<td>0.25</td>
</tr>
<tr>
<td>6.</td>
<td>$x_6$</td>
<td>2.51</td>
</tr>
<tr>
<td>7.</td>
<td>$x_7$</td>
<td>0.81</td>
</tr>
</tbody>
</table>
The average value of productivity is highest for the variable area of the pond which is in conformation with the result obtained from the production function analysis. It is the least for the variable lease amount. This is also in conformation with the results obtained from in the production analysis. The same trend is exhibited in marginal value of productivity also.

**Production Analysis for Thovalai Taluk**

In order to discuss the behaviour of the different inputs which are supposed to be responsible for the production of pond fish in Thovalai taluk, the Cobb Douglas type of production function was fitted for the total catch \( (y) \) with area of the pond \( (x_1) \), lease amount \( (x_2) \), price of fingerlings \( (x_3) \), labour charges \( (x_4) \), feed cost \( (x_5) \), pond maintenance cost \( (x_6) \) and the harvesting cost \( (x_7) \) as a set of regressors. The mathematical form of the estimated function along with \( R^2 \) and the standard error for the respective regressors is

\[
y = 2.013 x_1^{0.513} x_2^{-0.191 \text{ NS}} x_3^{0.313} x_4^{-0.115 \text{ NS}} x_5^{0.227} x_6^{0.197 \text{ NS}} x_7^{0.140 \text{ NS}}
\]

\[
R^2 = 0.727^{**}
\]

The details regarding the b-values their standard errors and the statistical inferences are presented in Table 5.9.
## TABLE No. 5.9

**CO-EFFICIENTS OF COBB-DOUGLAS PRODUCTION FUNCTION FOR POND FISH PRODUCTION IN THOVALAI TALUK WITH STANDARD ERROR AND STATISTICAL INFERENCE**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Variables</th>
<th>$b_{values}$</th>
<th>S.E$_b$</th>
<th>T</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Area of the Pond</td>
<td>$x_1$</td>
<td>0.513</td>
<td>0.249</td>
<td>2.0602</td>
<td>.05</td>
</tr>
<tr>
<td>2.</td>
<td>Lease amount</td>
<td>$x_2$</td>
<td>-0.191</td>
<td>0.217</td>
<td>-0.8801</td>
<td>NS</td>
</tr>
<tr>
<td>3.</td>
<td>Price of fingerlings</td>
<td>$x_3$</td>
<td>0.313</td>
<td>0.103</td>
<td>3.0388</td>
<td>0.1</td>
</tr>
<tr>
<td>4.</td>
<td>Labour charges</td>
<td>$x_4$</td>
<td>-0.115</td>
<td>0.123</td>
<td>-0.9349</td>
<td>NS</td>
</tr>
<tr>
<td>5.</td>
<td>Feed cost</td>
<td>$x_5$</td>
<td>0.227</td>
<td>0.109</td>
<td>2.0825</td>
<td>.05</td>
</tr>
<tr>
<td>6.</td>
<td>Pond maintenance cost</td>
<td>$x_6$</td>
<td>0.197</td>
<td>0.157</td>
<td>1.2547</td>
<td>NS</td>
</tr>
<tr>
<td>7.</td>
<td>Harvesting cost</td>
<td>$x_7$</td>
<td>0.140</td>
<td>0.128</td>
<td>1.0937</td>
<td>NS</td>
</tr>
</tbody>
</table>

Regression constant: 2.013

$$R^2 = 0.727**$$

$N = 52$

The co-efficient of multiple determination $R^2 = 0.727$ which is significant at one per cent level of probability indicating the fact that 72.7 per cent on the variations in the total catch is being explained by the seven explanatory variables included in the study.
The regression co-efficient for the area is positive and significant at five per cent level of probability. This implies that the total area has a positive impact on the total harvest. Moreover a one per cent increase in the area \textit{cetaris paribus} would result in an increase of 0.513 per cent increase in the output. The reasons stated for the earlier equations are valid here also.

The regression co-efficient for the lease amount per hectare is negative but not significant as in the other cases. That is the farm has already availed this resource at optimum level.

The regression co-efficient for the variable price of fingerlings is positive and significant at one per cent level of probability implicating its positive effect on the total production. A one per cent increase in the price of the fingerlings \textit{cetaris paribus} would increase the total harvest by 0.313 per cent. The implication is that the high yielding varieties are more productive.

The regression co-efficient for the total labour charges is negative but not significant. This shows that labour charges are ineffective that is these farms are already using it at the optimum level.

The regression co-efficient for the feed cost is positive and significant at five per cent level of probability indicating its positive effect on
the total harvest. Again a one per cent increase in the feed cost *ceteris paribus* might produce a 0.227 per cent increase on the output.

The regression co-efficient for maintenance cost and harvesting cost are both not significant. As in the case of all the previous production functions this implies that these farms had been using these resources at optimum levels.

Average value of productivity and marginal value of productivity in Thovalai taluk are presented below.

**TABLE No. 5.10**

**TABLE SHOWING AVERAGE VALUE OF PRODUCTIVITY AND MARGINAL VALUE OF PRODUCTIVITY IN THOVALAI TALUK**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables</th>
<th>Thovalai Taluk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AVP</td>
</tr>
<tr>
<td>1</td>
<td>$x_1$</td>
<td>127147</td>
</tr>
<tr>
<td>2</td>
<td>$x_2$</td>
<td>5.47</td>
</tr>
<tr>
<td>3</td>
<td>$x_3$</td>
<td>0.75</td>
</tr>
<tr>
<td>4</td>
<td>$x_4$</td>
<td>1.69</td>
</tr>
<tr>
<td>5</td>
<td>$x_5$</td>
<td>0.16</td>
</tr>
<tr>
<td>6</td>
<td>$x_6$</td>
<td>1.69</td>
</tr>
<tr>
<td>7</td>
<td>$x_7$</td>
<td>0.90</td>
</tr>
</tbody>
</table>
The average value of productivity is highest for the variable area of the pond which is in conformation with the result obtained from the production function analysis. It is the least for the variable feed cost. This is also in conformation with the results obtained from in the production analysis. The same trend is exhibited in marginal value of productivity also.

Production Analysis for Vilavancode Taluk

To estimate the Cobb-Douglas type of production function for pond fishes in Vilavancode taluk independent variables used are area of the pond ($x_1$), lease amount per hectare ($x_2$), price of fingerlings ($x_3$), labour charges ($x_4$), feed cost ($x_5$), pond maintenance cost ($x_6$) and the harvest cost ($x_7$) and the dependent variable is total harvest ($y$). The mathematical form of the estimated production function is

$$y = 1.143 x_1^{0.693*} x_2^{-0.274 \text{ NS}} x_3^{0.297*} x_4^{-0.199 \text{ NS}} x_5^{0.228*} x_6^{0.181 \text{ NS}} x_7^{0.094 \text{ NS}}$$

$$R^2 = 0.815^{**}$$

The details regarding the variables their standard error and the level of significance are presented in Table 5.11.
TABLE No. 5.11

CO-EFFICIENTS OF COBB-DOUGLAS PRODUCTION FUNCTION
FOR POND FISH PRODUCTION IN VILAVANCODE TALUK WITH
STANDARD ERROR AND STATISTICAL INFERENCE

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Variables</th>
<th>$b_{values}$</th>
<th>S.E</th>
<th>T</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Area of the Pond</td>
<td>$x_1$</td>
<td>0.693</td>
<td>0.231</td>
<td>3.0000</td>
<td>0.1 (**)</td>
</tr>
<tr>
<td>2.</td>
<td>Lease amount</td>
<td>$X_2$</td>
<td>-0.274</td>
<td>0.283</td>
<td>-0.9681</td>
<td>NS</td>
</tr>
<tr>
<td>3.</td>
<td>Price of fingerlings</td>
<td>$x_3$</td>
<td>0.297</td>
<td>0.150</td>
<td>1.9800</td>
<td>0.5 (*)</td>
</tr>
<tr>
<td>4.</td>
<td>Labour charges</td>
<td>$x_4$</td>
<td>-0.199</td>
<td>0.217</td>
<td>-0.9170</td>
<td>NS</td>
</tr>
<tr>
<td>5.</td>
<td>Feed cost</td>
<td>$x_5$</td>
<td>0.228</td>
<td>0.108</td>
<td>2.1111</td>
<td>0.5</td>
</tr>
<tr>
<td>6.</td>
<td>Pond maintenance cost</td>
<td>$x_6$</td>
<td>0.181</td>
<td>0.199</td>
<td>0.9095</td>
<td>NS</td>
</tr>
<tr>
<td>7.</td>
<td>Harvesting cost</td>
<td>$x_7$</td>
<td>0.094</td>
<td>0.113</td>
<td>0.8318</td>
<td>NS</td>
</tr>
</tbody>
</table>

Regression constant: 1.143

$R^2 = 0.815**$

$N = 92$

The table 5.11 reveals that the explanatory power of the function is 0.815 and is significant at one per cent level of probability. This indicates that 81.5 per cent of the variations in the pond fish production is being explained by the seven independent variables used in the study.
The regression co-efficients presented in the table 5.5 indicates that the regression co-efficient for the total area of the pond is 0.693 which is positive and significant at one per cent level of probability indicating its positive impact on the pond fish production. Moreover a one per cent increase in the total area of the pond \textit{cetaris paribus} would result in an increase of 0.693 percentage on the output. The reason already stated for earlier function hold good here also.

The regression co-efficient for the lease amount per hectare is negative and not significant. This means that as it is in the present condition the effect of lease is nil.

The regression co-efficient for the price of fingerlings is 0.297 this is positive and significant at five per cent level of probability indicating its positive effect on the total production. A one per cent increase in the price of the fingerlings \textit{cetaris paribus} would result in an increase of 0.297 per cent in the output. The logic discussed for the earlier production functions will hold good in this situation also.

The regression co-efficient for the total labour charges is negative but not significant. This might be due to the fact that these farms had been utilising this resource at the optimum level so that any more increase will turn out to be non productive.
The regression co-efficient for the feed cost is positive and significant at five per cent level of probability. Since the sign is positive this resource will have positive influence on the total harvest. That is a one per cent increase in the feed cost *cetaris paribus* would result in an increase of 0.228 per cent in the output. Here also the discussions presented for the earlier functions will hold good.

The regression co-efficients for the maintenance cost and harvest cost are positive and not significant. It indicates their nil effect on the production. Might be that these resources are already used in the optimal levels.

Average value of productivity and marginal value of productivity in Vilavancode taluk are presented below.
TABLE No. 5.12

TABLE SHOWING AVERAGE VALUE OF PRODUCTIVITY AND MARGINAL VALUE OF PRODUCTIVITY IN VILAVANCE TALUK

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables</th>
<th>Vilavancode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AVP</td>
</tr>
<tr>
<td>1.</td>
<td>$x_1$</td>
<td>165.03</td>
</tr>
<tr>
<td>2.</td>
<td>$x_2$</td>
<td>6.63</td>
</tr>
<tr>
<td>3.</td>
<td>$x_3$</td>
<td>0.84</td>
</tr>
<tr>
<td>4.</td>
<td>$x_4$</td>
<td>2.20</td>
</tr>
<tr>
<td>5.</td>
<td>$x_5$</td>
<td>0.28</td>
</tr>
<tr>
<td>6.</td>
<td>$x_6$</td>
<td>3.42</td>
</tr>
<tr>
<td>7.</td>
<td>$x_7$</td>
<td>0.83</td>
</tr>
</tbody>
</table>

The average value of productivity is highest for the variable area of the pond which is in conformation with the result obtained from the production function analysis. It is the least for the variable feed cost. This is
also in conformation with the results obtained from in the production analysis. The same trend is exhibited in marginal value of productivity also.

**Production Constraints**

The major constraint in the fish culture is the production constraint. The production constraint relates to inadequacy of seeds, untimely supply of seeds, costliness of seeds, costliness of fertilizers, inadequacy of credit, untimely availability of credit, costliness of credit and cost illness of labour. This is analysed in the following table.
TABLE No. 5.13

DISTRIBUTION SHOWING THE PROPORTION OF POND OWNERS AFFECTED BY PRODUCTION CONSTRAINTS

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Constraints</th>
<th>Proportion of Fish Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Inadequacy of seed</td>
<td>49</td>
</tr>
<tr>
<td>2.</td>
<td>Untimely supply of seed</td>
<td>54</td>
</tr>
<tr>
<td>3.</td>
<td>Costliness of seed</td>
<td>35</td>
</tr>
<tr>
<td>4.</td>
<td>Costliness of fertilizers</td>
<td>40</td>
</tr>
<tr>
<td>5.</td>
<td>Inadequacy of Credit</td>
<td>31</td>
</tr>
<tr>
<td>6.</td>
<td>Untimely availability of Credit</td>
<td>28</td>
</tr>
<tr>
<td>7.</td>
<td>Costliness of Credit</td>
<td>30</td>
</tr>
<tr>
<td>8.</td>
<td>Costliness of labour</td>
<td>58</td>
</tr>
</tbody>
</table>

SOURCE: Survey data.

The above table 5.13 reveals that 58 fish farmers reported that costliness of labour is the main constraint and 54 pond owners reported that untimely supply of seed and only 28 pond owners reported that the untimely availability of credit.

From the study we can infer that the major constraints in the study area are the costliness of labour, untimely supply of seed and inadequacy of seed.
The costliness of labour was expressed as a constraint by the pond owners who were not able to undertake the operations particularly harvesting from themselves. The untimely supply of seed depends on the seeds of species.

**Profit Function Analysis**

In pond fishing a farmer has to spend money on leasing the land, purchase of base materials, labour utilised, feeding material, maintenance charges, if to be marketed at a distance place the transportation cost, harvest charges and protection measures. Hence the profit will be decided by the expenditure on these items. Hence the researcher wanted to establish the relationship between the profit and these expenditure items. Here the profit is conceptualised as a function of lease amount \( (x_1) \), price of fingerlings \( (x_2) \), labour charges \( (x_3) \), fish fodder \( (x_4) \), oil cake \( (x_5) \), cow dung \( (x_7) \), ammonium sulphate \( (x_8) \), super phosphate \( (x_9) \), pond maintenance amount \( (x_{10}) \), repairing net \( (x_{11}) \), transportation cost \( (x_{12}) \), marketing cost \( (x_{13}) \), harvesting cost \( (x_{14}) \), fish protection \( (x_{15}) \) and fish loss \( (x_{16}) \).

Since the number of independent variable is fourteen, all the variables might not contribute significantly towards profit. Again there might be variations among the variables between farms. To accommodate all these step wise regression analysis was preferred, so that variables which do not
contribute much can be isolated from the equation. With this the estimated equations for the four taluks are,

(i) **Profit Functions in Agasteeswaram taluk**

The estimated profit function is

\[ y = 13650.722 + 21.069x_3** - 7.650**x_4 - 1.851^{NS}x_8 + 12.925*x_{15} - 6.812*x_{16}. \]

\[ R^2 = 0.628** \]

The \( R^2 \) is significant at one per cent level of probability. This implies that 62.8 per cent of the variations in the profit is being explained by the five independent variables selected in the regression. The regression co-efficient for labour charges \( (x_3) \) is positive and significant at one per cent level of probability. This implies that a unit increase in the labour charges *ceteris paribus* would result in an increase of 21.069 units in profit. Here by labour charge we mean the labour employed for giving feed for this fish and also to protect the fish from enemies and hence the labour is most profitable, that is these farms still under utilise this labour.

The regression co-efficient for the fish fodder is negative and significant at one per cent level of probability i.e. a unit increase in the expenditure on the fish fodder *ceteris paribus* would result in a decrease of
7.65 units in the profit i.e. these farms might be using this fodder at the toxic level for the fish. Thus for increasing the profit the ration in the fish fodder must be reduced to the prescribed (recommended) level.

The regression co-efficient for ammonium sulphate is negative but not significant. This implies that the expenditure on this input has already reached the optimum and any more increase will be non profitable to these farms.

The regression co-efficient for fish protection is positive and significant at five per cent level of probability. This implies that a unit increase in the expenditure on fish protection _ceteris paribus_ would result in an increase of 12.925 units in the profit i.e. next to labour the fish protection seems to be still profit making. Thus these farms are not yet utilising the fish protection measures properly. This when combined with the labour indicates that if more labour is utilized for protection and feeding it will be highly rewarding.

The regression co-efficient for fish loss is negative and significant at five per cent level of probability. Here also the loss might be due to the shortage of labour and non-use of protection measures.
(ii) **Profit Function in Kalkulam Taluk**

The estimated profit function is

\[ y = 16989.376 - 11.729x_{10} + 17.602x_{15} \]

\[ R^2 = 0.708** \]

The co-efficient of multiple determination is 0.708 that is 70.8 per cent of the variations in the profit is being accounted by the two variables viz. pond maintenance cost and fish protection cost.

The regression co-efficient for the pond maintenance cost is negative and significant at one per cent level of probability. That is a unit increase in the maintenance cost *ceteris paribus* would result in a decrease of 11.729 units in the profit. That is unnecessary expenditure on the maintenance should be kept under control.

The regression co-efficient for the fish protection cost is positive and significant at five per cent level of probability. That is a unit increase in the fish protection cost *ceteris paribus* would result in a increase of 17.602 units in the profit. That is these farms are still not utilising proper protection measures. Hence any more increase in it will add to profitability.

(iii) **Profit Function in Thovalai Taluk**

The estimated profit function is
\[ y = 30739.239^{**} + 16.599^{**} (x_3) - 43.304^{**} x_6 - 7.295 x_{10}. \]

\[ R^2 = 0.642^{**} \]

The \( R^2 \) is 0.642 which is significant at one per cent level of probability indicating the fact that 64.24 per cent of the variations in the profit is being accounted by the three variables included in the equation. The regression co-efficient for the fingerlings is positive and significant at one per cent level of probability. That is a unit increase in the cost of the fingerlings \( cetaris paribus \) would result in an increase of 16.599 units in the profit i.e. the farmers if they resort to getting quality fingerlings by paying more than what they do now, the profit will get increased.

The regression co-efficient for the oil cake is negative and significant at one per cent level of probability. That is a unit increase in the oilcake \( cetaris paribus \) would result in a decrease of 43.04 units in the profit. That is these farms are already utilising the resource oilcake much beyond the optimal level. Hence these farms should hereafter either decrease or keep this resource at the existing level if they need higher profits.

The regression co-efficient for the super phosphate is negative and significant at five per cent level of probability. That is a unit increase in the input cost of super phosphate \( cetaris paribus \) would result in a decrease of 7.295 units in the profit. That is super phosphate is being used beyond the
optimum level. Thus the Thovalai taluk farms need reduction of super phosphate and oil cake to increase their profitability.

(iv) Profit Function in Vilavancode Taluk

The estimated profit function is

\[ y = 3312.772 + 7.352** x_2 - 6.695** x_4 + 8.138x_8* - 18.932** x_{12} - 13.471x_{14}^{NS} \]

\[ R^2 = 0.743** \]

The explanatory power of the function is 0.743 which is significant at one per cent level of probability. This indicate that the selected five explanatory variables together could explain 74.3 per cent of the variations in the profit in Vilavancode taluk. The significant of the co-efficient indicate that a unit increase in the price of the fingerlings \textit{ceteris paribus} would increase the total profit by 7.352 unit i.e. the higher quality fingerlings could bring better profit.

The regression co-efficient for the fish fodder is negative and significant at one per cent level of probability. That is a unit increase in the fish fodder \textit{ceteris paribus} would result in the decrease of 6.695 units in the profit. As in the case of Thovalai taluk, in Vilavancode also the fish fodder is in excess. Here also farmers should either stop at the existing mean level or cut down the ration on fish fodder for pond fish.
The regression co-efficient for the ammonium sulphate is positive and significant at five per cent level of probability. That is a unit increase in the value of ammonium sulphate \textit{cetar is paribus} would result in an increase of 8.132 units in profit. That is these farms are now utilising ammonium sulphate much below the optimum level needed for higher profit. That is increase in the dose of ammonium sulphate is needed for better profitability.

The regression co-efficient for the transportation cost is negative and significant at one per cent level of probability. That is a unit increase in the expenditure on transport \textit{cetar is paribus} would reduce the profit by 18.932 units. This might be either due to the fact that to reach market it has to be transported to longer distance or might be that the transportation cost is higher in Vilavancode taluk.

The regression co-efficient for the harvesting cost is negative and non-significant showing its nil effect on the profit.

**Marketing of Pond Fish:**

**Market**

The concept of market include both place and region in which buyers and sellers are in free intercourse with each other. It is also an
expression of the aggregate forces or condition within with buyers and sellers make decisions resulting in the transfer of goods and services consequent to the aggregate demand of the potential buyers of a commodity or service.

There are two types of markets viz; primary and terminal markets. Primary market is one, where transaction at wholesale level takes place directly between the producer and wholesaler. Terminal market is one which received a significant portion of its supplies from the primary market which might be a major urban consuming centre in the region.

In this study we define the market as one which covers the entire gamut of organisations through which the commodity is transferred from the primary producer to the ultimate consumer and the price is determined.

Marketing

Marketing refers to the performance of business activities that direct the flow of goods and services from the primary producer to the ultimate consumer or user. It is also described as the process of discovering and transacting consumer needs and wants into product and service. In this marketing is defined as all business activities that directs the flow of goods and service from the primary producer to the ultimate consumer.
Market Structure

It is defined as the characteristics of the organisation of a market which seem to influence strategically the nature of competition and pricing within the market. It is also defined as those features of the organisation of a market which influenced the nature of competition and pricing in the market and affected the conduct of business firms. It is also refers to the various market channels, intermediaries and traders involved in moving the produce from producer to the consumer.

Here market structure include the different market channels, intermediaries who are engaged in the trade channel, the buyer concentration, extent of product differentiation and the case of entry and exit of new firms.

Marketing Channel

Marketing channel is the path through which produce travels from farm to ultimate consumer or receiver. Here marketing channel refers to the collection of agencies and movements associated with the exchange of goods and services from the primary producer to the ultimate consumer.

Marketing Cost

Marketing costs is the sum of actual costs incurred by each agency involved in the marketing channel for performing their function.
These included transportation, loading and unloading, weighing, cleaning, packing charges, market fees, commission, tax, processing costs and wastage.

**Marketing Margin**

This included all costs of assembling, grading, packing, transportation, handling, processing, storage, wholesale trading and retailing in the whole process of marketing.

**Price Spread**

It is a broad spectrum which discloses the proportions of various components of marketing costs of producer and intermediaries. It explain the variance between the price paid by the consumer and price received by the producer.

**Estimation of Price Spread**

In this study, price spread is estimated as the difference between the price paid by consumer and received by the producer for a given quality of the produce which is made up of marketing costs and marketing margins in the movement of the produce.

**Price Efficiency**

Marketing is a link between the producer and the consumer. It is a chain of processes that encompasses all activities of exchange conducted by
producers and middlemen in commerce in order to satisfy the consumer demand\textsuperscript{2}.

Marketing plays a vital role in the fishing industry. The process of production and marketing is interrelated in commerce\textsuperscript{3}. There is a highly unorganised fishing sector in the country in general and in Kanyakumari district in particular. The selling price of fishes and the marketing system adopted determine the living standard of a large population of inland fish farmers.

The demand for the inland fish is not the same always. The demand for the inland fish increases when there is a decrease in the supply of marine fish. The people of this district prefer marine fish to inland fish.

Fish is a perishable commodity and it has to be stored and transported to various destinations. The inland fishing takes place throughout the district and there are wide fluctuations in the quantity and quality of production. All types of species do not have equal demand at the market. To make the matter worse, the fish farmers need middlemen to sell their catches in the market. As a result the fish farmers have to share their hard-earned money with the middlemen.

Analysis of marketing involves three major approaches. They are the commodity approach, the institutional approach and the functional approach. Marketing practices of a few peculiar commodities come under commodity approach. The institutional approach deals with the middlemen who perform the marketing functions. The functional approach deals with the activity by which the commodity and the consumers are brought together.

Assembling

Assembling is the first step in fish marketing and it involves collecting fishes from various places before distributing to the consumers. A great many producers are scattered over the length and breadth of the Kanyakumari district and it is not an easy task. It also involves some preliminary processing and packing for easy transportation to prevent the fishes from being spoilt during transit.

Unlike in marine fishing, in inland fishing the fish farmers play a significant role in selling his catches. The fish farmers resort to the help of middlemen sometimes when their service is absolutely essential and the catches are comparatively more. In such cases marketing is done mainly by auctioning on a commission basis at which assemblers and retailers bid. So it

is right to say that the assembler cum wholesaler, commission agent and the retailers are engaged in the assembling function.

**Mode of Selling**

Generally fishes are heaped according to their variety before they are auctioned. The fishes are displayed on the banks of the rivers or ponds and the buyer can inspect and review the market situation fairly before offering the highest rate that he can afford to pay. The buyer who offers the highest rate will be the successful bidder. The auction is open to all the buyers and so there is no chance to monopolise price settlement. We see both direct sale by the producer and the presence of a middleman between the producer and the buyer. It is not the same throughout the year and this trend is changeable from season to season and from place to place. Direct sale is done either by the fisherman himself or his wife through head load. The fish is carried to different villages and there is a bargaining between the seller and the consumer. Cycle vendors are also in the scene who carry the fish to the towns to demand competitive price. Now a days cycles are being replaced by motorcycles, as it is the need of the hour. These vendors are able to cover more areas within a short period of time if they have motorcycles. Also they can supply fresh fish, which will fetch them attractive prices. The consumers are good at identifying the fresh fish from the stale fish and according to the
condition of the fish the price is fixed. Only the unsold fishes are disposed in salted and dried form which happens very rarely.

**Pricing**

The price of the fish in the market is subject to wide fluctuations. The demand plays a pivotal role in fixing the prices. If the demand is more, the price is higher or if the supply is less, the price is higher. The variety of fish, the size and other factors like demand and supply determine the price. Sometimes there may be fluctuations of the price on the same day itself. Bargaining is the sine-qua-non in the fixation of prices.

**Auctioneer**

An auctioneer is a person who auctions and he gets one to four per cent commission on the value of the fish auctioned. He knows the market conditions of the day of auction. He is a mediator between the fish farmers and fish traders. He closes the auction in favour of the highest bidder. The higher the bidding is, the more he gets as commission. The selling price is directly proportional to the commission. Also he is responsible for collecting the amount from the buyer and paying the fish farmers.

**Role of Institutions in Marketing**

Despite the fish farmers’s hard work they are not able to make
both ends meet because they are being exploited by the middlemen due to lack of proper education, lack of market consciousness and lack of infrastructure to preserve the catches. These fish farmers have weak bargaining power and they do not realize their rightful income. The intermediaries swallow a sizable portion of the consumer's price. What they need at this stage is institutions to market their catches and offer loan facilities so as to enable them to improve their economic conditions.

Storage and Processing

Storage facilities maintain a balance between supply and demand in the market. It enables the fish farmers to wait until the wind blows in their favour. Being a perishable commodity, fish has to be stored only in the cold storage to keep it fresh and to avoid spoilage. As it requires huge investment, the fish farmers are not able to install this facility. The irregular income due to seasonal use and high cost of service is the barrier, which comes in the way of installing the cold storage facility. That is to say, it is not cost-effective in this area.

Transportation

As fishing is done even in remote areas, the transportation of fish to the marketing centres is rather difficult. Normally the fresh
unprocessed fish is to be transported to the market as early as possible as it is perishable. Gone are the days when the fish farmers were denied to carry fish in the bus. Now there are specially designed buses available which carry both the fish and the passengers.

Channels of Distribution

Bridging the gap between the original producer and the consumer is the key function of marketing. In the study area, fish marketing is handicapped due to the lack of infrastructure. The channel is a path which facilitates the transfer of goods from the producer to the consumer\(^6\). It bridges the gap between them by resolving geographical distance and time difference in supply and demand. The channel always includes the producer, consumer and the intermediaries who promote sales\(^7\).

Local Marketing

In local marketing, fishes pass through several hands before they reach the consumers. The fresh fishes are auctioned, the retailers bid and purchase directly and sell them to the consumers.

---


Fish Farmer

↓

Middlemen

(Auctioneer)

↓

Small Fish Merchants

(Retailer)

↓

Consumer.

**Interior Marketing**

In this kind of marketing, the fishes pass through three to four hands to reach the consumer. The fishes are auctioned and the wholesalers procure them. They dispose them off to the retailers who distribute them to the consumers.
Outstation Marketing

In the case of outstation marketing, the fishes pass through four to five hands before they reach the consumers. The fishes are auctioned through auctioneers. They are bought by wholesale fish merchant. They sell it to the commission agents of the outstation market. From them the wholesale fish merchants buy and sell them to the retailers. They in turn sell the fishes to the consumers. This is how fishes from Kanyakumari district are
sold to outstation markets in the neighbouring states and neighbouring districts.

```
Producer
(Fish farmers)

Middlemen
(Auctioneers)

Whole Sale Merchant (Production Centre)
(Assembler Cum Whole-Salers or Commission Agents)

Whole Sale Merchant (Consumption Centre)
(Commission Agents)

Small Fish Merchant
(Retailers)

Consumer.
```
Assembler Cum Wholesaler

All activities directly involved in the sale of products to those who buy for resale constitute wholesale trade and the person who does is a wholesaler. Sometimes the wholesaler has to do assembling too. In such cases, he is an assembler cum wholesaler. Fishes are assembled from nearby villages either through direct purchase or by auction and they are despatched to various consuming centres, both interior and outstation markets. Andhra Pradesh is one of the States, which consumes a large quantity of inland fish from this district.

Commission Agent

The commission agent is a middleman between wholesale merchants and fish farmers. When fish farmers are badly in need of money, he lends interest free loan to them. Normally the commission agent charges four to eight per cent commission for his service and if he lends money, then the rate of commission will be higher. It is not true in all cases and it may vary depending upon the understanding between the commission agent and fish farmers.

Retailers

The retailer is the last rung in the ladder between the producer and the consumer. On the retailer is the last ring in the chain linking both consumers and producers. The retailer belongs to two categories namely cycle vendors and head load vendors. In the study area, the researcher finds that the head load vendors are mostly women. They go from door to door in the nearby village and they have to sweat a lot because when the retailer goes to the consumer, usually the consumer has more bargaining power. But at the same time the cycle vendors go to the nearby markets and wait for the consumer and here the situation is entirely different and the retailer has more bargaining power because the consumer comes to him. We must understand one thing that business is done not in letters but in spirit. So there is always a flexible approach by both the retailer and customer. Moreover, the fish is a perishable commodity and so very often the retailer has to yield to pressure and he conducts his business according to the trend in the market. He must be a very good surveyor of the market and a telepathist or mind reader and he must be able to read the mind of his consumers and accordingly he must take the right decision at the right time to promote his sales. The retailer must have the first hand information about the taste and buying power of his customers.
Price Spread of Fish

The term Price-spread is defined as the margin between the actual cost of production and the retail price of consumer goods\(^9\). In other words, it is the difference between the purchase rate and selling rate. Price spreads are fairly near to marketing costs incurred and profits earned by various intermediaries.

As in marine fishing the share of the inland fish farmers in the final rupee paid by the consumer is meagre. It is crystal clear from this that there is a wide gap between the amount that the fish farmers get for their catches and the amount that the consumers pay for the fishes. It simply means that the fish farmers sell their fish comparatively at a low price against the higher price paid by the consumer. Unless this wide gap between the producer’s price and the consumer’s price is bridged, a healthy and satisfactory position of inland fishing in this district will remain a distant dream. If it is done, it becomes a dream come true and it is cocksure that the economic well being of the fish farmers community will be better and brighter.

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Factors Determining Price-Spread

There are so many factors that determine the producer’s share in the final rupee paid by the consumer. Factors like the quantity of production, quality of production, share of the commission agent, cost of transportation, cost of preservation, market expenses, value of commodities offered for sale and the bargaining power of the parties concerned determine price-spread. The illiterate and ignorant fish farmers cannot understand these intricacies. What they know is catching the fishes and selling them as early as possible as it is the only source of income for these people.

Price-Spread in Local Market

In the study area, one can see the middlemen taking full advantage of the ignorance of the fish farmers, as they have no idea about marketing. The middlemen’s share in the earning is comparatively higher to that of the fish farmers. There is a proportionate decrease in the return on the consumer’s rupee to the fish farmers and an increase in the price that the consumer pays. It is quite unfortunate that in the study area the investigator could see the middlemen becoming richer and richer and the fish farmers becoming poorer and poorer due to the exploitation of the middlemen.
TABLE No. 5.14

PRICE SPREAD IN THE LOCAL MARKET

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Details of Costs/ Function</th>
<th>Catla</th>
<th></th>
<th>Rohu</th>
<th></th>
<th>Mirgal</th>
<th></th>
<th>Silver Carp</th>
<th></th>
<th>Common Carp</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rs</td>
<td>%</td>
<td>Rs</td>
<td>%</td>
<td>Rs</td>
<td>%</td>
<td>Rs</td>
<td>%</td>
<td>Rs</td>
<td>%</td>
</tr>
<tr>
<td>1.</td>
<td>i) Fish farmers earnings</td>
<td>22.00</td>
<td>70.40</td>
<td>25.00</td>
<td>73.52</td>
<td>21.00</td>
<td>71.79</td>
<td>24.00</td>
<td>70.59</td>
<td>20.00</td>
<td>69.57</td>
</tr>
<tr>
<td></td>
<td>ii) Auctioneer commission</td>
<td>1.50</td>
<td>4.80</td>
<td>1.75</td>
<td>5.15</td>
<td>1.25</td>
<td>4.27</td>
<td>2.00</td>
<td>5.88</td>
<td>1.70</td>
<td>5.92</td>
</tr>
<tr>
<td>2.</td>
<td>i) Retailers purchase price</td>
<td>23.50</td>
<td>75.20</td>
<td>26.75</td>
<td>78.67</td>
<td>22.25</td>
<td>76.06</td>
<td>26.00</td>
<td>76.47</td>
<td>21.75</td>
<td>75.65</td>
</tr>
<tr>
<td></td>
<td>ii) Additional Cost (Transportation, ice, marketing, expenses)</td>
<td>2.50</td>
<td>8.00</td>
<td>2.25</td>
<td>6.62</td>
<td>2.25</td>
<td>7.69</td>
<td>2.50</td>
<td>7.35</td>
<td>2.00</td>
<td>6.96</td>
</tr>
<tr>
<td></td>
<td>iii) Wastages / Spoilages</td>
<td>2.25</td>
<td>7.20</td>
<td>2.00</td>
<td>5.88</td>
<td>2.00</td>
<td>6.85</td>
<td>2.00</td>
<td>5.88</td>
<td>2.00</td>
<td>6.96</td>
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<tr>
<td></td>
<td>iv) Market margin</td>
<td>3.00</td>
<td>9.60</td>
<td>3.00</td>
<td>8.83</td>
<td>2.75</td>
<td>9.40</td>
<td>3.50</td>
<td>10.30</td>
<td>3.00</td>
<td>10.43</td>
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<td>3.</td>
<td>Consumer price</td>
<td>31.25</td>
<td>100</td>
<td>34.00</td>
<td>100</td>
<td>29.25</td>
<td>100</td>
<td>34.00</td>
<td>100</td>
<td>28.75</td>
<td>100</td>
</tr>
</tbody>
</table>

SOURCE: Survey data
The table 5.14 reveals that fish farmer received 70.40 percent, 73.52 percent, 71.79 percent, 70.59 percent and 69.57 percent of the prices paid by the ultimate consumers. The auctioneer commission 4 to 6 percent of the sale proceeds as its commission. In transporting the fish from the production centres to the local market additional cost have to be met it amounts to 8 percents, 6.62 percent, 7.69 percent, 7.35 percent and 6.96 percent of the consumers price. The additional costs include the cost of transport, ice and market expenses of fish. The spoilage and wastage of fish is due to delay in disposal and unsold quantity. This portion should be borne by the retailer. The market margin of the retailer for the different species are 9.60 percent, 8.83 percent, 9.40 percent, 10.30 percent and 10.43 percent of the consumer price.

Price Spread in Interior Market

Rajapalayam is the one of the important distant markets inside the state for pond fish cultured in Kanyakumari district. It is situated at a distance of 150 kilometers from the district head quarters.
<table>
<thead>
<tr>
<th>Sl No</th>
<th>Details of Costs/ function</th>
<th>Catla</th>
<th>%</th>
<th>Rohu</th>
<th>%</th>
<th>Mirgal</th>
<th>%</th>
<th>Silver Carp</th>
<th>%</th>
<th>Common Carp</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>i) Fish farmers earnings</td>
<td>22.00</td>
<td>61.97</td>
<td>25.00</td>
<td>62.50</td>
<td>21.00</td>
<td>60.00</td>
<td>24.00</td>
<td>61.54</td>
<td>20.00</td>
<td>58.82</td>
</tr>
<tr>
<td></td>
<td>ii) Auctioneer commission</td>
<td>1.50</td>
<td>4.22</td>
<td>2.00</td>
<td>5.00</td>
<td>1.75</td>
<td>5.00</td>
<td>1.95</td>
<td>5.00</td>
<td>1.50</td>
<td>4.41</td>
</tr>
<tr>
<td>2.</td>
<td>i) Assembler- purchase price</td>
<td>23.50</td>
<td>66.19</td>
<td>27.00</td>
<td>67.50</td>
<td>22.75</td>
<td>65.00</td>
<td>26.00</td>
<td>66.67</td>
<td>21.50</td>
<td>63.23</td>
</tr>
<tr>
<td></td>
<td>ii) Additional Cost</td>
<td>0.60</td>
<td>1.69</td>
<td>0.50</td>
<td>1.25</td>
<td>0.25</td>
<td>0.71</td>
<td>0.60</td>
<td>1.54</td>
<td>0.25</td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td>(Transportation, ice, marketing, expenses)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>iii) Market margin</td>
<td>2.90</td>
<td>8.17</td>
<td>3.00</td>
<td>7.50</td>
<td>2.50</td>
<td>7.14</td>
<td>2.40</td>
<td>6.15</td>
<td>2.75</td>
<td>8.09</td>
</tr>
<tr>
<td>3.</td>
<td>i) Semi- wholesalers purchase price</td>
<td>27.00</td>
<td>76.06</td>
<td>30.50</td>
<td>76.25</td>
<td>25.50</td>
<td>72.86</td>
<td>29.00</td>
<td>74.36</td>
<td>24.50</td>
<td>72.06</td>
</tr>
<tr>
<td></td>
<td>ii) Market expenses</td>
<td>0.40</td>
<td>1.13</td>
<td>0.50</td>
<td>1.25</td>
<td>0.50</td>
<td>1.43</td>
<td>0.75</td>
<td>1.92</td>
<td>0.60</td>
<td>1.76</td>
</tr>
<tr>
<td></td>
<td>iii) Market margin</td>
<td>3.10</td>
<td>8.73</td>
<td>3.50</td>
<td>8.75</td>
<td>3.00</td>
<td>8.57</td>
<td>3.25</td>
<td>8.33</td>
<td>3.15</td>
<td>9.26</td>
</tr>
<tr>
<td>4.</td>
<td>i) Retailers purchase price</td>
<td>30.50</td>
<td>85.91</td>
<td>34.50</td>
<td>86.25</td>
<td>29.00</td>
<td>82.86</td>
<td>33.00</td>
<td>84.63</td>
<td>28.25</td>
<td>83.09</td>
</tr>
<tr>
<td></td>
<td>ii) cost incurred</td>
<td>0.15</td>
<td>0.42</td>
<td>0.25</td>
<td>0.62</td>
<td>0.25</td>
<td>0.11</td>
<td>0.65</td>
<td>1.67</td>
<td>0.50</td>
<td>1.47</td>
</tr>
<tr>
<td></td>
<td>ii) wastages / spoilages</td>
<td>1.35</td>
<td>3.80</td>
<td>1.50</td>
<td>3.75</td>
<td>1.75</td>
<td>5.00</td>
<td>1.60</td>
<td>4.10</td>
<td>1.75</td>
<td>5.15</td>
</tr>
<tr>
<td></td>
<td>iii) market margin</td>
<td>3.50</td>
<td>9.87</td>
<td>3.75</td>
<td>9.38</td>
<td>4.00</td>
<td>11.43</td>
<td>3.75</td>
<td>9.60</td>
<td>3.50</td>
<td>10.29</td>
</tr>
<tr>
<td>5.</td>
<td>Consumer price</td>
<td>35.50</td>
<td>100</td>
<td>40.00</td>
<td>100</td>
<td>35.00</td>
<td>100</td>
<td>39.00</td>
<td>100</td>
<td>34.00</td>
<td>100</td>
</tr>
</tbody>
</table>

SOURCE: Survey data
The table 5.15 reveals that the fish farmers received 61.97 percent, 62.50 percent, 60 percent, 61.54 percent and 58.82 percent of the prices paid by the ultimate consumer. The auctioneer charges two to five percent of the sale proceeds as its commission. In transporting from the fish producing centres to the distance market additional cost have to be met. It is observed that the share of the fish farmers in the distant market is less when compared to the share in local market. This could be attributed to the presents of two or more intermediaries - the assemblers and Semi-wholesalers. The marketing margin of the assembler on the different species account for 8.17 percent, 7.50 percent, 7.14 percent, 6.15 percent and 8.09 percent of the consumer price.

**Price spread in outstation market**

To have a consistent growth and integrated approach linking production and marketing is vital. However at present the emphasis on the marketing of fish to the out station market is the state of Karnataka. The city is famous for assembling and its consuming of inland fish. In kanyakumari district is an important source of inland fish supply. This market is more important due to high degree of retail sale of fish and the presents of all the market functionaries.
TABLE No. 5.16

PRICE SPREAD IN THE OUTSTATION MARKET (BAGALORE).

<table>
<thead>
<tr>
<th>SI No</th>
<th>Details of Costs/ function</th>
<th>Catla</th>
<th>Rohu</th>
<th>Mirgal</th>
<th>Silver Carp</th>
<th>Common Carp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rs</td>
<td>%</td>
<td>Rs</td>
<td>%</td>
<td>Rs</td>
</tr>
<tr>
<td>1. i) Fish farmers earnings</td>
<td>22.00</td>
<td>57.90</td>
<td>25.00</td>
<td>57.47</td>
<td>21.00</td>
<td>51.22</td>
</tr>
<tr>
<td>2. ii) Agent commission</td>
<td>1.50</td>
<td>3.95</td>
<td>2.00</td>
<td>2.30</td>
<td>1.75</td>
<td>4.27</td>
</tr>
<tr>
<td>i) Assembler - purchase price</td>
<td>23.50</td>
<td>61.84</td>
<td>27.00</td>
<td>62.07</td>
<td>22.75</td>
<td>55.49</td>
</tr>
<tr>
<td>ii) Additional Cost (Transportation, ice, marketing, expenses)</td>
<td>0.60</td>
<td>0.02</td>
<td>0.50</td>
<td>1.15</td>
<td>0.25</td>
<td>0.61</td>
</tr>
<tr>
<td>iii) Agent commission</td>
<td>1.40</td>
<td>3.68</td>
<td>1.50</td>
<td>3.45</td>
<td>2.00</td>
<td>4.88</td>
</tr>
<tr>
<td>iv) Market margin</td>
<td>3.00</td>
<td>7.89</td>
<td>3.50</td>
<td>8.05</td>
<td>3.00</td>
<td>7.32</td>
</tr>
<tr>
<td>3. i) Semi-wholesalers</td>
<td>28.50</td>
<td>75.00</td>
<td>32.50</td>
<td>74.71</td>
<td>28.00</td>
<td>68.29</td>
</tr>
<tr>
<td>i) Market expenses</td>
<td>0.50</td>
<td>1.32</td>
<td>0.50</td>
<td>1.15</td>
<td>0.70</td>
<td>1.71</td>
</tr>
<tr>
<td>iii) Market margin</td>
<td>3.50</td>
<td>9.21</td>
<td>4.00</td>
<td>9.02</td>
<td>3.80</td>
<td>9.27</td>
</tr>
<tr>
<td>4. ii) Retailers purchase price</td>
<td>32.50</td>
<td>85.53</td>
<td>37.00</td>
<td>85.06</td>
<td>32.50</td>
<td>79.27</td>
</tr>
<tr>
<td>iii) Market margin</td>
<td>0.25</td>
<td>0.66</td>
<td>0.25</td>
<td>0.57</td>
<td>0.40</td>
<td>0.98</td>
</tr>
<tr>
<td>i) Cost incurred</td>
<td>2.50</td>
<td>6.62</td>
<td>2.90</td>
<td>6.38</td>
<td>3.50</td>
<td>8.33</td>
</tr>
<tr>
<td>ii) Wastages / Spoilages</td>
<td>1.25</td>
<td>3.29</td>
<td>1.75</td>
<td>4.02</td>
<td>2.10</td>
<td>5.12</td>
</tr>
<tr>
<td>iii) Market margin</td>
<td>4.00</td>
<td>10.52</td>
<td>4.50</td>
<td>10.35</td>
<td>6.00</td>
<td>14.63</td>
</tr>
</tbody>
</table>

SOURCE: Survey data
The above table 5.16 reveals that the price details of selected species of pond fish at different levels of marketing additional cost and marketing margins.

The price paid to the fish farmer varies from 51.22 percent to 57.90 percent of the consumer price. The share of the auctioneer in consumer price almost remain the same. The assembler takes the task of transporting the fish to the marketing area.

The market expenses which include the market rent, labour charges, and other incidentials range from 0.56 percent to 1.71 percent of the consumer price. The market margin varies from 7.78 percent to 9.27 percent of the consumer price.

The retailers costs which include market expenses range from 0.57 percent to 0.98 percent of the consumer price. The marketing margin of the retailer is high and it varies from 9.53 percent to 14.63 percent of the consumer price.

The assembler is responsible for packing and transporting to the market. In this channel semi-whole salers purchase price varies from 76.06 percent, 76.25 percent, 72.86 percent, 74.36 percent and 72.06 percent of the consumer price. The purchase price of the retailer varies from 83.09 percent to 86.25 percent of the consumer price. The cost incurred by retailer is
high compared to other functionaries due to the bearing the risk of spoilage and wastage of fish.

The market expenses which include the market rent, labour charges, and other incidentals range from 0.56 percent to 1.71 percent of the consumer price. The market margin varies from 7.78 percent to 9.27 percent of the consumer price.

**Marketing Problems**

Unless or until the fish farmers receive fair prices for their catch, the poor economic conditions of them will continue forever. The fish farmers feel extremely dissatisfied and frustrated in marketing their catch. They are quite aware that they are being exploited still they are helpless. They are not able to raise their voice against the middlemen who are dominant in fish marketing and the fish farmers are just 'yes men' and they dance according to the tune of the middlemen. Though they long for a change, they are pessimistic about the change. Earlier the better. One of the important causes for the poor economic conditions of the fish farmers is that they do not receive fair prices for their catch. The fish farmers are extremely dissatisfied and frustrated in marketing their catch.
### TABLE No. 5.17
FISH FARMERS OPINION REGARDING PROBLEMS IN MARKETING

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Nature of problem</th>
<th>No of fish farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Predominance of middlemen</td>
<td>163</td>
</tr>
<tr>
<td>2.</td>
<td>Lack of infrastructure</td>
<td>74</td>
</tr>
<tr>
<td>3.</td>
<td>Variation in price</td>
<td>18</td>
</tr>
<tr>
<td>4.</td>
<td>Lack of marketing knowledge</td>
<td>44</td>
</tr>
<tr>
<td>5.</td>
<td>Lack of government support</td>
<td>76</td>
</tr>
<tr>
<td>6.</td>
<td>Lack of organized market dealings</td>
<td>92</td>
</tr>
<tr>
<td>7.</td>
<td>Others</td>
<td>12</td>
</tr>
</tbody>
</table>

The table 5.17 reveals that out of the total 372 fish farmers, 163 persons opined that the main problem is attributed to the predominant role of middlemen, 74 persons to lack of infrastructure facilities, 18 persons to lack of variation in price, 44 persons to lack of marketing knowledge, 76 persons to lack of government support, 92 persons to lack of organized market dealings and the rest 12 persons attributed them to other problems like lack of knowledge about market conditions, lack of fish based units and traditional methods of processing.
An integrated approach linking production and marketing is vital. Several problems are there in fish marketing and the study reveals that the existing system concentrates mainly to improve and expand the production of fish. These problems tend to have a retarding effect and they are,

(i) **Distress Sales**

Almost all the inland fish farmers sell their catches to the wholesalers through middlemen at the production centres and hence they get very low prices though they actually deserve more considering their hard work. As they are indebted either to the moneylenders or to the middlemen or to the wholesaler, they are forced to sell their catches only to these people and eventually they lose their bargaining power and very often the fish farmers are at the mercy of the middlemen. This is the most important reason for the distress sale and the other reason is lack of communication even with the nearest markets. The middlemen fish in troubled waters and fleece the inland fish farmers for their own personal gain and this condition lands the fish farmers in deep trouble. Lack of knowledge of the marketing practices and the presence of too many middlemen are the root cause for distress sales. The middlemen with their rosy and sugar coated words cheat the fish farmers making good use of their financial weakness. In most cases, it is the
middlemen who dictate and the fish farmers are just passive listeners and silent spectators.

(ii) Lack of Marketing Organisation

In the study area, the fish farmers are tied up with their work and they have very little time to explore possibilities to market their product. Even when they have time, they are unenthusiastic and non-chalant as they are tongue-tied. They are yet to realize and appreciate the importance of an organization for the purpose of bargaining, social uplift and marketing. They are in total darkness as far as marketing aspects are concerned. They have no knowledge and exposure to look into the marketing aspects. Another important thing that this investigator noticed is these fish farmers have no satisfaction in this occupation and they want to quit it as early as possible as they deem it a shame to be in this. For the time being they are doing this to feed their mouths. As they are doing this half-heartedly they don’t have the burning desire to improve their catches and flourish in this industry. The main reason for the frustration and depression is that they have not tasted the benefit. They work from dawn to dusk but they get very a meagre income. In order to safeguard their interests and rights, they must have an organised marketing and it must be done in no time in the welfare of these fish farmers.
(iii) Predominance of Middlemen

There is a saying "Too many cooks spoil the broth". It is true in inland fishing industry too. There are too many middlemen in between the fish farmers and the consumers. The middlemen are the decision makers and deciding authorities and the fish farmers are just puppets in their hand. The middlemen play the role of a hard taskmaster without minding or caring about the sordid condition of the poor fish farmers. The fish farmers are fed up with the indifferent attitude of the selfish middlemen still they are not able to escape from their clutches. "There is no substitute for hard work" so goes the saying. But in the study area, it has been disproved because the hardworking fish farmers get less and the easy going middlemen get more. These people are longing for a day when their faces are lit up with a beaming smile when they get what they deserve.

The middlemen who are notorious for malpractices and fraudulent activities trap the fish farmers and drive them into the point of no return. The root cause for malpractices in the market is multiplicity of commission charges, deductions, unfair weighing and undesirable mode of sale.
(iv) Lack of Transport and Link roads

Transport and communication are part and parcel of commerce and they should go hand in hand to pave way for flourishing the business. The fish farmers are in remote villages which do not have adequate transport facility and it is one of the principal obstacles that comes in the way of inland fishing industry. It checks the marketing efficiency. During the rainy season the fish farmers find it very difficult to sell their catches as they have poor link roads to the market. Lack of transport is very often responsible for a big waste of perishables.

(v) Lack of Market Information

It is quite unfortunate that the fish farmers are groping in darkness without any basic knowledge about marketing, as they have literally no contact with the outside world nor are they in touch with the trend of market price. The village merchants always offer misleading and misguiding information and the fish farmers have to rely only on this. Mostly, this oral information is without an iota of truth. It is deliberately done by the village merchants as they are money-minded and narrow-minded.

(vi) Inadequate Storage Facilities

Fish is aquatic in habit and it should be preserved properly as
soon as it is caught. So adequate storage facilities play a vital role in marketing the fish. But in the study area, the researcher finds inadequate storage facilities which put the fish farmers in a lot of hardship. A lot of wastages take place which is primarily due to spoilage in the absence of adequate cold storage facilities. The existing storage facilities are not capable of protecting the fish from dampness and other vermins. Private sectors own these storage facilities and it leads to a number of malpractices like over charging and hoarding of storage space.

(vii) Absence of Co-ordination Between Production and Marketing

The economic prosperity mainly depends upon the surplus available in the economy. Incentive for maintaining surpluses and corresponding expansion of production will be determined by the scope for profitable disposal of the increased catch. There is an impending need to develop a link between production and marketing in order to improve the economic conditions of the fish farmers.

(viii) Minimal Data Availability

Oral transactions are prevalent in the study area where minimal data is available from secondary sources. The realm of fish marketing is highly unorganised in nature and possibility of examining and recording is almost nil. No records are maintained for fish arrivals and sales. Wide
fluctuations are seen in the annual fish catch, sales, middlemen, wholesalers and retailers.

Thus the existing marketing system in operation is neither beneficial to the consumer nor the fish farmers in any way. The system is devoid of integrity and it is a sick and exploiting system. Labour power of the fish farmers is exploited to a great extent and they are subjected to a process of systematic deprivation of their right to a fair return for their produce.