CHAPTER III

THEORETICAL FRAMEWORK AND CONCEPTUAL FOUNDATION

3.1.0 ECONOMIC THEORIES AND CONCEPT
3.2.0 QUANTITATIVE TECHNIQUE
3.3.0 FARM MANAGEMENT STUDY
3.4.0 COST OF CULTIVATION/PRODUCTION
3.5.0 MEASURES OF COMPARISON
Chapter III

Theoretical Framework and Conceptual Foundation

Introduction

This chapter deals with theoretical framework, which based on theories, principles and arguments of past studies. Theoretical frame is one of reliable base of any course of research. The subject Economics has developed with various theories developed by several well-known economists. Therefore, research work must be within the theoretical framework. Agriculture economics is one of the branch of economics, which apply basic economic theories. Therefore, researcher considered the some economic theories. Then it is important to clarify the concept those used in present course of study based on the survey.

Theoretical Framework

Following theories and models given in context with agricultural economics.

3.1.0 Economic Theories and Concept

3.1.1 Law of variable proportion

‘The Law of Variable Proportion’ which is a new name given to old classical concept of ‘Law of Diminishing Returns’ a played a vital role in modern economic theory. When the farmer expands output by employing more and more labour it alerts the proportion between fixed and the variable inputs. Various economists have defined the law as follows.
'As more and more of some point input “i” is employed, all other input quantities being eventually a point will yield diminishing marginal contributions to total product’”¹.

“If equal increments of one input are added, the inputs of other services being held constant beyond a certain point the resulting increments of products will diminish.”².

“As proportion of one factor in a combination of factors is increased, after a point, first marginal and then the average product of that factor will diminish.”³

This economic theory can apply in farm management study to help analyzing the factor-product relationship.

3.1.2 Return to scale and farm size

When there is, need to expand production or scale of its operation by using more of all input i.e. more labour, more equipment and more land. In this case, farm management can apply the theory, ‘Return to scale’. When all inputs increased in unchanged proportions and scale of production expanded.

‘If scale economies are small or non-existent, small farms might be used with little sacrifice in attaining a more nearly equal distribution of farm wealth, political stability within agricultural and similar ends.’⁴

In studying the scale relationships, it can be considered a production function of the nature where all resources are variable.

\[ Y=f(X_1, X_2, X_3, X_4\ldots, X_n) \]

Pure scale relationships exist only when the same proportion increases all resources, which go into production. i.e., if input \( X_1 \) is doubled all other inputs must be doubled. In case of proportionality relationships production function of the type

\[ Y=f\left(\frac{X_1}{X_2}, X_3, X_4\ldots, X_n\right) \]
In case of increasing of all resources in the same proportion, it can be finding that some cost advantages or scale economies do exist over small ranges chiefly because of standardization of tasks and a specialization division of labour.

3.1.3 ISO-Quant

In agriculture production process, uses of different types of resources are requiring. For instance, seed, manure, fertilizer, insecticides and pesticides, land, labour, machinery etc. In production process, factors of production generally substitute for each other. In case of human labour, if there is shortage of hired labour family labour can used as a substitute. This substitution not only takes place within similar factors but also even within dissimilar factors as well i.e. machine is a substitute for labour. Some factors can be useless unless some other factors are not present. For example, neither tractors nor bullocks could be use until the land and labour input. Therefore, farmer has to make choice among alternative combinations He will certainly like to look at for combination of inputs that maximize his returns, depends upon two things i) technical possibilities of production and ii) the prices of the factor used for the production of particular product. For this solution economist has developed following laws:

i) Fixed proportion combination
ii) Constant rate of substitutions
iii) Varying rate of substitution
iv) Marginal rate of substitution

3.1.4 Cost and Revenue concept

For the cost and revenue analysis, economist developed the following concepts.

**Explicit cost and implicit cost**

Cost of production refers to individual farmer and includes explicit cost, which means actual money expenses directly incurred in raising a farm commodity plus the
monetary estimates of implicit cost. Implicit costs are the money value of those inputs, which supplied by the farmer himself. In the implicit cost, we may include money value of managerial services of farmer interest on his invested capital and rent on his own land. A farmer would earn economic profit only if he is earning revenue in excess of the total accounting and implicit cost.

**Revenue concept**

The revenue of farm together with its costs determines profit reaped by the farmer. After having some knowledge of cost concept, it is necessary now to study the concept of revenue since farmers profit will be equal to the difference between its total revenue and cost. The term revenue refers to the receipts obtained by the farmer from the sale of certain quantities of farm products as various prices. The revenue concepts relates to total revenue, average revenue and marginal revenue.

**Total Revenue**

It refers to total amount of money that the farmer receives from the sale of his yields i.e. the gross revenue. It calculates as below.

\[ TR = Q \times P \]

\[ Q= \text{Total yield} \]
\[ P= \text{Unit price} \]

Total revenue is obviously equal to the quantity sold multiplied by the selling price of the commodity.

**Average Revenue**

It is calculated by dividing total revenue by the number of units sold.

\[ AR= \frac{TR}{q}=qxp/q=p. \]
3.1.5 The survivor technique

For the cost analysis, George Stigler\(^8\) has been developed survivor technique. It is based on the Darwinian doctrine of the survival of the fittest. The method implies that the firms with lowest costs will survive through time. In implying the survivor technique firms or plants in industry classified into group in the market, output is calculated over time. The criterion for the classification of firms into groups is usually the number of employs or the capacity of firms.

Stigler concluded that the small and the large firms are inefficient (have high cost)

Its validity rest on following assumption

a) The unit pursues the same objectives

b) Price of factors and technology remaining same

c) Firm operate in very competitive market

3.2.0 Quantitative Technique

3.2.1 Production function

Total yield or output varies with the quantities of inputs used in the production process. Farm manager has to decide the amount of production and amount and kinds of inputs to be used in production process. Production function can be expressed as follows.

Linear function\(^9\)

Statistical cost studies consist in the application of regression analysis to time series or cross section data. Time series data include observation on different magnitudes (output, cost prices etc.) of a firm over a time. Cross section data give information on the input, cost, output and other relevant magnitude of a group of firms at a given point of time. We may estimate a short-run cost and long run cost functions either from time series data of a single firm over a period during which it has been utilizing different level
of output. Once the data is collected and appropriately processed the researcher can be fit a linear function to the cost output observations. Following is the formula.

\[ C = b_1 x_1 + u \]  
Where \( C \) = Total variable cost  
\( x \) = Output (physical)  
\( U \) = random variable

**Cobb-Douglas production function**\(^{10}\)

The Cobb-Douglas production is based on empirical study of the American manufacturing industry undertaken by *Paul H. Douglas and C.D. Cobb* (1928). It is a linear homogeneous production function of the first degree. It takes into account only two input factor labour and capital, for the entire output of the manufacturing industry. The Cobb-Douglas function assumes that the logarithm of the total output of the economy is a linear function of the logarithm of the labour force and capital stock. It can be expressed as follows.

\[ \log Q = K + P \log L + q \log C \]

**3.3.0 Farm Management Study**

**3.3.1 Human labour**

*Schultz T.P\(^II\)* concluded in his contribution ‘Women’s Role in Agricultural Household’ that, farm production and the family consumption decisions implied that hired family labour were equivalent and all families had access to well functioning labour markets to bring their labour demands into balance with their family supplies.

He had tested assumption and concluded this restrictive assumption continued in a variety of context and it is somewhat surprising that it has not been resoundingly rejected at yet, based on studies of Indonesia, India and Philippines. He studied the literature of Sing (1986) Pitt and Vosellwieg (1986) Seavay (1987) Benjamin (1992) Muluccio (1997)
Desilva (1997). According to these literatures, he concluded that families with relative shortage or excess of family labour for farms production needs do not exhibit distractively different own farm input proportions. Even for family female labour in India, where it might be expected that off-farm labour involve social stigma and monitoring costs.

3.3.2 Transformation of agriculture

Prof. Theodore. W. Schultz has given significant contribution on the subject of the transformation of traditional agriculture. According to Schultz, it will be necessary to resolve the following unsettled questions.

1. Can low-income communities increase agricultural production substantially by an efficient allocation of the agricultural factors of production presently at their disposal?

2. Which agricultural factors of production are primarily responsible for large differences among countries in the success of the agricultural sector in contributing to economic growth?

3. Under what condition does it pay to invest in agriculture?

As the first question is concerned, the general belief held is that agriculture in less developed countries is inefficient in using the factors at the disposal of a farm. Prof Schultz contradicts this hypothesis, his study supports the proposition “that differences in land are least important, differences in the quality of material capital are the great importance and differences in the capabilities of farm people are most important in explaining the differences in the amount and the rate of increase of production.

Schultz pointed that, in several countries such as Mexico and Japan, agriculture has done several times better than that of India, not because they have superior quality
lands but they have improved skills and schooling of farm people and used better quality capital. He remarked that, all poor agricultural communities may not be traditional and may have to be excluded because these have witnessed change. The implications are-

a. That no appreciable increase in agricultural production is to be by reallocating the factors at the disposal of farmers who are bound by traditional agriculture.

b. Significant individuals will not hamper agriculture production.

c. No farm management expert shall be in a position to discover any major inefficiency in the allocation of factors.

d. No production factor remains unemployed.

3.3.3 Agriculture Ministry of Government of India and farm management study

For studying cost of cultivation/production of principal crops in India, study initiated in 1970-71 following the earlier farm management studies has reviewed time to time. First reviewed by the Special Expert Committee in 1980 and then in 1991, Ministry of Agriculture, Government of India has set-up a study group. The well-known economist Abhijit Sen and M.S. Bhatia has reviewed farm management studies that recommended the structure. That given in the volume 27, Ministry of Agriculture and Co-operation, Government of India has provided powerful research facility for the purpose of agricultural research. As a result of these reviews, the scheme underwent changes, as detailed design of scheme is currently having three stages, stratified random sampling with tahsil as the first stage, village/cluster of villages as the second stage, and holding is the third and ultimate stage.

Initially, farm management studies included four major cost concepts cost A1, Cost A2, Cost B and Cost C. After the review of the scheme by the Special Expert
Committee in 1980, Cost estimates began to generate according to the six major concepts of Cost A1, Cost A2, Cost B1, Cost B2, Cost C1 and Cost C2. After the recommendation by the Expert Committee for review of methodology of cost of production of crops, and new items of cost were included viz cost C2* and C3. The first relates to cost of human labour if evaluated at statutory minimum wages (when this is higher than actual wage rates) and the second relates to the inclusion of cost on managerial input. The cost estimates are therefore now generates according to eight major cost concepts.

**Classification of Item of cost**

Cost (out of pocket expenses) and imputed cost at owned inputs. These items of cost classified under two heads are –

A. Paid out items of cost –


3. Material Inputs
   
   i. Seed (both home grown and purchased)
   
   ii. Fertilizers and Manure (owned and purchased)
   
   iii. Pesticides, and
   
   iv. Irrigation

4. Depreciation on: i) Implements ii) Farm buildings

5. Local Revenue

6. Interest on borrowed/working capital

7. Rent paid for leased inland

B. Imputed items of cost

1. Value of family labour
2. Managerial input of the farm

3. Rent of owned land

4. Interest on own fixed capital

3.3.4 Size pattern of holding in India

According to All India Agricultural Census 1970-71, following structure had designed.

Table 3.1 Size pattern of holding in India

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Category of holding</th>
<th>Size group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Marginal</td>
<td>Less than 1 ha</td>
</tr>
<tr>
<td>2</td>
<td>Small</td>
<td>1.01 to 2.0 ha</td>
</tr>
<tr>
<td>3</td>
<td>Semi-medium</td>
<td>2.01 to 4.0 ha</td>
</tr>
<tr>
<td>4</td>
<td>Medium</td>
<td>4.0 to 10.0 ha</td>
</tr>
<tr>
<td>5</td>
<td>Large</td>
<td>10.0 Ha. and above</td>
</tr>
</tbody>
</table>

3.3.5 Farm size and efficiency

In terms of productivity

Theoretically, a sound measure of farm efficiency is, cost per unit of output, which is also farmer’s point of view. A number of studies have appeared on the relationship between productivity per unit of land and the size of the farm. The studies in the economics of farm management conducted previously and provided wealth of data for the economists and policy makers. One of the important conclusions drawn from these studies was that the output per acre declines as the size of farm increases.

Prof. Amartya Sen came to the following observation:

“By and large productivity per acre decreases with size of holding”

While suggesting the existence of an inverse relationship between farm size and productivity
E.J. Long\textsuperscript{16} observed data from research centre of farm management in India from certain selected states concluded the same. The relationship holds true in not only an underdeveloped country but also some of more advanced agricultural countries. One of the countries with the high yields per acre and a small percentage of large-scale farms is the Federal Republic of Germany. The experience of Japan and Taiwan also supports the generalization that owner-cultivated small-sized farms can be viable reasonably, efficient and capable for sustaining rapid increases in the agricultural productivity and output.

**In terms of profitability**

The small sized farms compared to large- sized farms, has found to be inefficient, in the sense that they are unaffordable. Amartya Sen while summing up the debate on the subject has concluded that: When family labour employed in agriculture seems unaffordable. “What it amounts to is that if an account is made of the cost on family farms by imputing values to the inputs, then the farming will not be profitable or in other words, there will be no surplus over costs. From this follows, that larger the size higher the profitability.

Amartya Sen\textsuperscript{17} (1962&64) summarizing the various findings on the subject and concludes: “By and large, the profitability of agriculture increases with the size of holding.” profitability being measured by the surplus or deficit of output over cost, including the imputed value of labour.

**Cropping intensity**

Ranjeet Sahu\textsuperscript{18} says that, in India, the intensity of cropping declines as farmers have a multiplicity of channels of profit making such as cultivating land with hired labour, lending money to small farmers and agricultural labourers. The big farmer leaves his land follow, which intern reduces the cropping intensity.
Researcher found that, these theories, models and arguments are important in relation to the analysis of farm managements study as milestone. Therefore, theoretical implications have given at the end of respective thesis.

**Conceptual Foundation**

The methodology for valuation of different item of cost in estimation of cost of cultivation/production discussed below.

3.4.0 **Cost of cultivation/production**

3.4.1 **Establishment cost**

This refers to per-bearing costs incurred in the establishment of flower farms and its maintenance up to bearing stage (first harvest of flowers). This included land rent and costs incurred in the establishment of flower seedlings such as cost of land preparation, cost of digging pits or trenching, cost of planting material, cost of manure, cost of chemical fertilizer, cost of plant protection, cost of labour, etc. These costs apportioned equally for every year of the life of the perennial crop.

3.4.2 **Apportioned establishment cost**

This refers to annual apportioned establishment cost, which has to be included in cost of cultivation to recover the cost incurred while establishing the farm. It worked out by considering cost of the item to its life period.

\[
\text{Cost of the item} \\
\text{Apportioned establishment cost} = \frac{\text{Cost of the item}}{\text{Life period of the item}}
\]

3.4.3 **Human labour**

Flower cultivation has remained largely a labour intensive activity. The share of human labour is quite significant. Human labour can be classified according to hired and family labour.
a. Hired labour: For field cultivation considers causal labour only. The actual wage paid to the hired labours is directly used in the computational.

b. Family labour: The flower growing require considerable amount of labour. Generally, a member of family has used largely in open field cultivation. The cost of family labour was imputed based on the number of hours they worked in the farm and the existing wage rate (for similar work paid to hired labours). It was charged normally at the actual wage rate for casual labour, which observed higher than statutory wage rate in the study area was considered.

3.4.4 Machine and bullock labour

These can be classify under two heads such as hired and owned labour.

a. Hired machine and bullock labour: In the case of hired machine and bullock labour, the prevailing rates in the village considered.

b. Owned machine and bullock labour: Charges on account of owned machine and bullock labour accounted based on charges paid to the hired machine and bullock pair at the prevailing rate in the said village was considered.

3.4.5 Seedling

The cost of seedlings considered both purchased and homegrown seed.

a. Homegrown seed: Majority farmers used homegrown seed, which charged at the prevailing market prices in the village at the time of sowing.

b. Purchased seedlings: Some farmers used purchased seedlings, which charged at the actual cost paid by the farmers.

3.4.6 Manures

The cost of farmyard manure or compost produced on the farm was evaluated based on rates prevailed in the village. The cost of manure purchased was accounted by considering to the actual price paid by the cultivators.
3.4.7 **Fertilizers**

The chemical fertilizers used with great extent in flower cultivation. The cost on account of fertilizers worked out at the actual price paid by the cultivators.

3.4.8 **Insecticides and pesticides**

Open field cultivation of flowers has been required plant protection. Insecticides and pesticides (including growth dosage) charged at the actual price paid by the cultivators.

3.4.9 **Irrigation charges**

In case of open field cultivation, the electricity charged at a flat rate based on the horsepower of the pump set, which the farmers were using. Every three months paid out the electricity bill so according to crop duration it is calculated and divided as per land proportion.

3.4.10 **Depreciation on implements and machinery**

Farm assets like implements and farm buildings machinery (plough, harrow, etc) evaluated at the prevailing market prices taking into consideration the collection of assets. Depreciation of these assets for the current year was calculated. For this purpose, present value and the remaining useful life of assets considered.

3.4.11 **Interest on working capital**

Cost of pre-culturing, manures, seedling, plantation, digging, earthing up, weeding, fertilizers, crop protection, and crop cutting (excluding post harvest activities) together considered as working cost. Farmers needed working capital to meet out the above various costs, working capital raised by famers from their own sources and supplemented by borrowings from their commercial or co-operative banks, moneylenders and relatives. Farmer has to spend working capital in installment. Hence, the cost of working capital
took into consideration half-life of the flower crop. Interest has calculated at the rate of 10 per cent per annum.

3.4.12 Interest on fixed capital

Interest on fixed capital calculated at 10 per cent per annum for flower cultivation. The rate at which financial institution lends to the farmer considered for the analysis. Interest on present value of fixed assets (excluding lands) such as farm building, implements and equipments calculated at the rate of 10per cent per annum.

3.4.13 Rental value of land

As the lands under research area are the inherited property for the respondents, they were unable to quote the exact purchase price of the land. The present market value of land is not true index of land value. Therefore, the actual rent of lease in land or expected rental value of land taken into consideration. Expected rental value based on the judgment of the respondent and researchers is noted. The location and quality of land took into account for calculating the rental value.

3.4.14 Land Revenue and Taxes

This item of cost includes land revenue and other relevant taxes and cesses, which actually paid by the cultivator. Total revenue apportioned amongst different crops according to the area covered in different seasons.

3.4.15 Managerial cost

Both review committees agreed to inclusion of management as on item of cost. Expert Committee had recommended a norm i.e. to account for management input of the farmer. It computed at 10 per cent of the total cost of cultivation.

3.4.16 Cost of Marketing

(Grading, Packing, Transportation, Commission and Miscellanies)
The actual expenditure of packing material was accounted for this item. Material required for packing was nylon bags for field cultivation. All the expenditure incurred after packing flowers for market was accounted for transportation, commission, etc. were included in this item.

3.4.17 Pricing of flowers

Present study related to cost and returns. The sample flower grower sells their yield in APMC Gultakadi, Pune. Therefore, price of flower considered the same, average price to be calculated as per APMC, Pune record (2009-10)

3.5.0 Measures of comparison

The following measures of comparison has adopted in present study for the analytical purpose.

3.5.1 Per-hectare cost of cultivation and cost of production

Factors including cost A, cost B, cost C in aggregate called cost of cultivation. Cost of production comprises of cost C plus managerial cost and marketing cost. Marketing cost includes, grading, packing, transportation and commission of commission agent and miscellanies. It defines as cost of marketing refers to the amount spent by the producer, seller and intermediaries in the sale or purchase of commodity from the time of harvest until it finally sold to the ultimate consumer.

3.5.2 Gross returns and net returns

Data pertaining to cost of production has analyzed to estimate the cost and returns of selected flower crop. The standard cost concept mentioned earlier provides different measures of returns to the cultivator. The difference between gross returns and cost C represents gross profit or loss to the cultivator. The difference between gross returns and cost of production represents net profit or loss to the cultivator.
3.5.3 Input-output ratio

Input-output ratio worked out to assess the input efficiency. It calculated in the context of each selected flower at cost A, cost B, cost C and cost of production level considered for calculations. As such, input-output ratio estimated as under-

i) Input-output ratio in context of cost A-
   Gross returns (Rs)/ha
   Input-output ratio= ---------------------------------------
   Cost A (Rs)/ha

ii) Input-output ratio in context of cost B-
   Gross returns (Rs)/ha
   Input-output ratio= ---------------------------------------
   Cost B (Rs)/ha

iii) Input-output ratio in context of cost C-
   Gross returns (Rs)/ha
   Input-output ratio= ---------------------------------------
   Cost C (Rs)/ha

iv) Input-output ratio in context of cost of production-
   Gross returns (Rs)/ha
   Input-output ratio= ---------------------------------------
   Cost of production (Rs)/ha
References


All India Agricultural Census Report (1970-71), Government of India Publication, New Delhi


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