RESEARCH METHODOLOGY
CHAPTER: III
RESEARCH METHODOLOGY

This chapter deals with the plan of investigation and the source of data. It is intended to describe clearly the methodology adopted to accomplish the objectives of study. The chapter has been therefore, designed to explain the sampling design, source of data and the method of data collection and the techniques of analysis adopted to accomplish each of the objective defined for the present study. Agriculture production is primarily dependent upon soil and climate conditions of the area, such as soil type, temperature and rainfall. As these factors are beyond the control of farmers, he has to adjust the crops and farming practices to fight these natural factors. In addition to these the economic factors like marketing, arrangements of transport facilities, availability of sufficient and timely credit at concessional interest rate also determine the crops to be grown by the farmer. Therefore, methodology of present study consist sampling design, analytical techniques, terms and concepts used in the study as follows.

3.1 SAMPLING DESIGN

Multi stage sampling design was adopted for selection of district, taluka, villages, and farmers.

3.1.1 Selection of District

In the first stage, the Parbhani district was purposively selected for present study because in Parbhani district oilseeds as well as cereals are grown on wider area.

3.1.2 Selection of tehsils

At the second stage Gangakhed and Palam tehsils were purposively selected from Parbhani district.

3.1.3 Selection of villages

At the third stage 6 villages from each of tehsil were selected purposively. The selected villages were Dharasur, Isad, Mahatpuri,
Maradasgaon, Naiad, and Pimpri (Zola) from Gangakhed tehsils and Palam, Chatori, Farkanda, Kerwadi, Pethpimplagaon and Sirpur from Palam tehsils.

3.1.4 Selection of farmers

In the fourth stage, the list of farmers was obtained from revenue records of selected villages. From each village 15 farmers were selected. Who were grown soybean in *Kharip* and *rabi* Jowar in *rabi* season in their cropping pattern were selected in three categories i.e. small, medium, and large farmers. 180 farmers were selected on the basis of proportion of the farmers under each village and categorized. Farmers having 20 per cent or more cropped area under oil seed and cereals have been considered. These farmers were classified under three categories viz. below 1 hectare, 1-2 hectare, and 2 hectare and above. Thus, 180 farmers growing soybean crop and *rabi* Jowar crop were selected randomly from 12 villages of Gangakhed and Palam blocks respectively. From each of the village five farmers were randomly selected in each strata. Thus, there were equal distribution 15 farmers in each village. In this way, from 12 villages 180 farmers cultivating soybean (*Kharip*) and *rabi* Jowar (*rabi*) crops were selected as 60 small, 60 medium and 60 large farmers for the present study data pertained for the year 2010-11. Data were collected from them with the help of pre tested scheduled by personal interview method.

The above type of stratified random sampling is known as disproportionate stratified random sampling in which different strata are having equal sample size. This type of stratified random sampling method has greater advantage over proportionate random sampling method is regard to inter strata comparison because in which arithmetic mean calculated on the basis of equal sample size and in analysis of variance sources of variation are also more as compared to proportionate random sampling.

3.1.5 Selection of market and market intermediaries

The study was conducted at Gangakhed and Palam market which is the only secondary market in the study area. All the market functionaries were selected randomly for the sake of easiness to present study. From this area different middlemen were selected randomly for the study of marketing.
3.1.6 Collection of data

The required primary data on physical input, cost, returns, marketing channels, marketing costs, were collected through pre-scheduled questioner from the respondents with the help of interview method.

3.2 ANALYTICAL TECHNIQUES

Data were analyzed by employee technique like frequency and percentage, growth analysis, co-relation and regression analysis, tabular analysis, standard deviation, co-efficient of variation analysis were used for the present study.

3.2.1 Growth analysis

The growth in area, production and productivity were studied both linear and compound growth rate were estimated. However, finally the compound growth rate was used for the study.

The growth rate was estimated by using exponential trend model.

\[ Y = a \cdot b^t \]

Where,

- \( Y \) = estimated area / production / productivity
- \( a \) = intercept
- \( b \) = regression coefficient
- \( t \) = time variable

From the estimated function the compound growth rate was worked out by \( \text{CGR} = (b-1) \times 100 \)

Where,

\( \text{CGR} \) = compound growth rate

3.2.2 Coefficient of variation

Coefficient of variation (C.V.) used to measure the comparative variations of socio-economic characteristics. Standard deviation does not give proper idea about variation. To know the dispersion the standard deviation and coefficient of variation were estimated with the following formula.
Standard deviation measures the dispersion between the observations.

\[ S.D. = \sqrt{\frac{\sum(x-\bar{x})^2}{N-1}} \]

Coefficient of variation is the ratio of standard deviation to mean expressed in terms of percentage.

\[ C.V. = \frac{S.D.}{MEAN} \times 100 \]

3.2.3 Tabular analysis

Tabular analysis comprised of arithmetic mean, percentage and ratio this method was used to determined the cost, returns, and profitability per hectare for soybean and rabi jowar crop.

3.2.4 Analysis of marketing aspects

It consists of marketable surplus, marketed surplus, different marketing channels, marketing margin, marketing cost, and price spread.

**Marketable surplus:** the marketable surplus is that quantity of the produce which can be made available to the nonfarm population of the country in other words the marketable surplus is the residual left with the producer/farmer after meeting his requirements for family consumption farm needs, for seeds and feed for cattle, payment to labours in kind. This may be expressed as

\[ MS = P - (C + D + F) \]

Where,

* MS = marketable surplus
* P = Production
* C = consumption by family members
* D = damage
* F = Feed for cattle

**Marketed surplus:** is that quantity of the produce which the producer/farmer actually sales in the market, irrespective of his requirements for family consumption, farm feeds and other payment. The marketed surplus may be more, less or equal to the marketable surplus.
Marketing channels: it consist various agencies which perform the different marketing function in sequence to move the produce from the place of production to ultimate consumer. Three main marketing channels were found for marketing of farm products in the study area.

Channel-I (producer - village trader - wholesaler)
Channel-II (producer - wholesaler - processor)
Channel-III (producer - processor)

Market intermediaries

Market intermediaries are those who are specialized in performing various marketing functions involved in purchase and sale of produce from producer to final consumer.

Village trader or village merchant

Village trader or village merchant may be defined as a person who purchases the farm produce in the village directly from the farmers for the purpose of subsequent selling in the regulated market.

Commission agent or arhatia

Commission agent is a person operating in the wholesale market who acts as the representative of either a seller or a buyer. He is usually granted broad powers by those who consign goods or who order the purchase. A commission agent normally takes over the physical handling of the produce, arranges for its sale, collects the price from the buyer, deducts his expenses and commission, and remits the balance to the seller.

Wholesaler

Wholesalers are the one who buy and sell goods in large quantities from the farmers or from other wholesalers. Products sales in the same market or in other markets. They are sale to processor but not to ultimate consumer.

Processor

Processor carry on their business either on their own or custom basis. Some processors employ agents to buy for them in the producing areas, store the produce and process it throughout the year on continues basis.
Retailers are one who buy goods from wholesaler and sell them to consumer in small quantities. Acts as producers personal representative to consumers and is closest to consumer. Itinerant trader and village merchant act as retailer.

3.2.5. Marketing cost

It is the actual expenses required in bringing goods and services from the point of production to the point of consumption. Marketing cost may be computed as follows.

\[ C = CF + C_{m_1} + C_{m_2} + C_{m_3} + \ldots + C_{mn} \]

Where,
- \( C \) = total cost of marketing of the commodity
- \( CF \) = cost paid by producer from the time the produce leaves the farm till he sells it.
- \( C_{m_1} \) = cost incurred by the 1\textsuperscript{st} middlemen in the process of buying and selling the product
- \( C_{mn} \) = cost incurred by \( n \)\textsuperscript{th} middlemen

3.2.6. Gross margin

\[ M = S_i - P_i \]

Where,
- \( M \) = Gross margin
- \( S_i \) = sale value of produce for 1\textsuperscript{st} middlemen
- \( P_i \) = purchase value for 1\textsuperscript{st} middlemen

3.2.7. Producer price

\[ P_f = P_a - C_f \]

Where,
- \( P_f \) = net price receive for the farmers
- \( P_a \) = wholesale price
- \( C_f \) = marketing cost incurred by the farmer
3.2.8. **Producer's share in consumer rupee:** is very helpful in deciding the appropriate strategic for reducing the marketing cost in the present study. The producer's share in consumer price is the actual price received by the producer. It is the price received by the farmer expressed as a percentage of the retail price, i.e., price paid by the consumer. If price is the retail price, the producer's share in consumer's rupee (Ps) is expressed as follows.

\[
Ps = \frac{\text{Net price received by producer}}{\text{Price paid by consumer}} \times 100
\]

3.2.9. **Price spread of the produce:** shows the difference between net price received by the producer in the assembling market and price paid by the ultimate consumer to produce in the retail market. It includes all the market charges incurred by producer, wholesaler, and retailer as well as profit margin at wholesaler and retailer.

3.2.10 **Constraints analysis**

The problem faced by the farmers in production and marketing of farm products were identified and the views of farmers were analyzed and presented separately with the help of frequency and percentage method.

3.3 **TERMS AND CONCEPTS USED**

3.3.1 **Cost concept**

In the present study, the cost of cultivation of selected crops, i.e., Soybean and Rabi Jowar was worked out fewer than three heads using the accepted cost concepts. The cost concepts such as Cost-A, Cost-B, and Cost-C were used. Cost-A includes items namely hired human labour, bullock labour, machine labour, seed, fertilizer, manure, plant protection, interest on working capital, and depreciation of asset. Cost-B comprised of the Cost-A plus rental value of land and interest on fixed capital. Cost-C includes the Cost-B plus family labour cost.
3.3.2 Measurement and evaluation of cost items

Inputs are the factors of production which refer to those expenses of cultivation that are incurred in the form of cash and kind (Appendix-II). The items considered are as under.

**Hired human labour:** hired human labour was measured in man day. One man day consists with 8 hours. Labour cost evaluated at the rate of ₹200 per day for male and ₹100 per day for female. The female labour was converted into man days to multiply to number of female with 0.50.

**Bullock labour:** hired bullock labour charges were considered for 8 hours in a day. Family bullock labour charges accounted equal to the charges paid to the hired bullock labour. For the present study, hired bullock charges were charged at the rate of ₹400 per day for one pair of bullocks.

**Machine labour:** in case of hired machine labour the prevailing rate of machine labour in the village was considered. Mostly, machine labour is to be hired and charges on account of owned machine labour were accounted on the basis of charges paid to the hired machine labour. Machine charges for present study were ₹500 per hour.

**Seed:** the actual cost paid and expenditure incurred on procurement were taken into account for the purchased seeds and cost of own farm produced seeds considered as the prevailing of prices in the locality at the time of sowing of the crops. The rate of seed of soybean was ₹40 per kg. The rate of rabi jowar seed was ₹30 per kg.

**Fertilizer:** fertilizer in the form of urea, diammonium phosphate (DAP) 18:18:10, 15:15:15 was used and quantity of nitrogen, phosphorus, and potash were calculated in order to determine the actual expenditure on nitrogen, phosphorus, and potash. The rate of prevailing in the market for nitrogen, phosphorus, and potash as ₹13.73/Kg, ₹38.74/Kg, and ₹12.88/Kg respectively.

**Manure:** manure produced on own farm was evaluated at the rate of prevailed in village. The cost of purchased manure was according to the price paid by
cultivators. One cart load of manure was considered as four quintals and prevailing price was ₹105/q.

**Plant protection:** this includes the actual cost incurred on purchase of insecticides, pesticides, fungicides, and their procurement. For present study plant protection was ₹400 per liter.

**Incidental expenditure:** it includes minor repairs, refreshing charge and other expenditure for cultivator of the crop.

**Interest on working capital:** it was calculated by charging interest at the rate of 10.5 per cent on items of expenditure as hired human labour, bullock labour, machine labour, seed, fertilizers, manure, plant protection and incidental expenditure.

**Depreciation of assets:** depreciation is the decrease in the value of asset through wear and tear. Straight line method was used for calculating depreciation. The uniform rate of 10 per cent on the present value at the beginning of the year of farm implements and machinery was taken and only proportionate charges were taken for the crop on hectare basis.

**Rental value of land:** rental value of owned land was estimated at 1/6th of the value of gross produce i.e. value of main produce plus value of by produce.

**Interest on fixed capital:** it was calculated by charging interest at the rate of 10 per cent of investment on commonly used assets like wooden implement, iron implements, equipments which distributed on cropped area.

### 3.3.3 Income concepts

**Farm business income:** it is calculated by gross returns minus Cost-A

**Family labour income:** it is calculated by gross return minus Cost-B

**Net profit:** it is calculated by gross returns minus Cost-C

**Output-input ratio:** it is calculated by gross return divided by Cost-C

**Per quintal cost of production:** it is calculated by Cost-C minus by produce value divided by main produce quantity
Items of cost

Cost-A

It is the actual paid out cost by the cultivators in the form of cash and kind. It approximates the actual expenditure incurred by the farmers. Thus, the cost includes the expenditure on.

I. Hired human labour
II. Bullock labour
III. Machine labour
IV. Cost of seed
V. Cost of manures and fertilizers
VI. Plant protection measures
VII. Irrigation charges
VIII. Depreciation on assets
IX. Land revenue and other taxes
X. Incidental expenditure
XI. Interest on working capital, and

Cost-B

Cost B includes cost-A plus the imputed costs of rental value of land and interest on fixed capital.

Cost-C

It includes cost-B plus imputed value of family labour. Thus cost-C means the total cost of cultivation.