CHAPTER – 2

METHODOLOGY
The continuous increase in population has put a great pressure on the scarce production resources and land is one of the most important among these. Consequently there is an increase in the number of holdings along with the decrease in the average size of holding. It has put a big question mark regarding the viability of such holdings. The very smallness of size has raised doubts concerning these small and marginal holdings which may no longer be viable as far as both employment and income generation are concerned. These holdings may be, thus, characterized with low productivity resulting in high incidence of poverty and unemployment. Their production is largely consumption oriented and hence their owners have low saving capacity as well as low risk bearing capacity (Shyam, 1995). Hence, it was therefore, considered pertinent to look into the viability aspects of small and marginal farms in tribal and non-tribal areas of the state. In this chapter, the sampling design, analytical tools, concepts and definitions etc. used for arriving at results have been described.

**2.1 SAMPLING DESIGN AND COVERAGE**

Himachal Pradesh, lies in the lap of Himalayas and the altitude varies from North to South. Because of the varying altitude, the agro-climatic conditions also vary and the conditions prevailing at one particular place may be totally different from another. This has important consequences as far as the input structure and the production pattern etc. are concerned which may have important bearing on the viability of the farms. One set of input structure being used at one place and the production pattern/productivities may make the farms viable whereas the same set of the inputs etc. may
lead to unviability at other place (Vaidya, 1992). Because of this, it is envisaged to carry out the study in tribal and non-tribal areas of the state in order to bring out the differences in the status of farm viability due to location of farms. Harsher agro-climatic conditions, marginalized locations and other similar factors which generally prevail in the tribal areas, further degrade the viability status of marginal and small farms. Consequently, the state has been divided into two parts viz. tribal and non-tribal and study has been conducted in both the regions. The tribal area of the state is constituted by districts Kinnaur, Lahaul-Spiti, Bharmour and Pangi areas of district Chamba (Govt. of H.P., 2004-05). The multistage stratified random-cum-purposive sampling techniques has been used in the present study. The primary sampling unit for tribal area is tehsil and for non-tribal area it is district. The rational behind taking tehsil as primary sampling unit is that in addition to two districts being categorized as tribal areas (distt. Kinnaur and Lahaul-Spiti) the tehsil Pangi and Bharmour of district Chamba have also been notified as tribal areas. Thus, all the tribal area has been delineated into tehsils forming primary sampling unit. However, care has been taken to ensure maximum possible geographic contiguity between sampled tribal and non-tribal areas so that the results of both areas are comparable. It is logical to assume that results of Kinnaur can be compared with district Shimla and not Una which has entirely different agro-climatic conditions. On this consideration, the districts lying on South and South East border of the state having agro-climatic condition of terrain partially assembling with plain areas, were not considered for the study. From the remaining districts, district Chamba was randomly selected for the study from the non-
tribal area. The choice for tribal area was to be made from five tehsils and one sub tehsil of district Kinnaur, two tehsils and one sub tehsil of district Lahaul-Spiti and two tehsils of district Chamba. Among them Bharmour tehsil of district Chamba was randomly selected. This choice was also discussed with officials of department of Agriculture who justified it on the grounds that most of areas of Udaipur tehsil of Lahaul-Spiti and most of the area of district Kinnaur have graduated to commercial agriculture and horticulture which probably have alleviated even small holdings from clutches of poverty and majority of farms in such areas may be viable. The extent of commercialization in remaining areas is almost non-existent and farms may still be unviable.

The selected tehsils have been delineated into revenue villages. Two villages have been randomly selected and lastly a random sample of 30 marginal and small farmers was taken in probability proportion to their actual numbers. Thus, study has been based on 120 marginal and small farmers located in tribal and non-tribal areas of the state. The details of sample have been presented in Table 2.1.

2.2 DATA COLLECTION

Both primary as well as secondary sources of data have been used. The viability can best be described and understood by farm structure including land use pattern cropping and production pattern, irrigation, size of holdings, costs and consumption and gross returns. Therefore, primary data have been collected from selected farm families on mentioned aspects. The survey method has been used to collect primary data through personal interview, using a specially designed and pretested schedule.
The secondary data have been gathered from various Govt. Offices, HPU, AER Centre Shimla and from various published reports and journals and unpublished sources. The present study mainly relies on Annual Season and Crop Reports and Reports of Agricultural Census for the period 1970-71, to 1995-96, The subsequent reports have not been published and data are not available.

2.3 Classification of Sampled Households

Physical measure is easy to demarcate, but it does not correspond to the economic concept of viability because the income from identical piece of land would vary from place to place and village to village owing to consolidation, irrigation and infrastructure (Rao, 1994). The farmers were classified into two different categories i.e. marginal and small farmers. This classification is same as the standard classification having the farmers owning less than one hectare of land termed as marginal farmers and the farmers having 1 to 2 hectares of land as small farmers. The area-wise details of sample on the basis of this classification has been presented in Table 2.1. It may be seen from the Table that in the over all sample about 79.17 percent of the total sample is made of that of marginal farmers where as the rest 20.83 percent is that of small farmers, the percentage being vary close to the state figures in this respect. While in the tribal area, the sample was constituted by that 80.00 percent marginal farmers 20 percent small farmers. These figures were almost same for non-tribal area i.e. 78.33 percent farmers were found in marginal category whereas 21.67 percent were in the category of small farmers.
Table 2.1
Size Classification of Sample Farmers

<table>
<thead>
<tr>
<th>District</th>
<th>Tehsil</th>
<th>Village</th>
<th>Marginal</th>
<th>Small</th>
<th>Total Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(In Numbers)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TRIBAL AREAS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chamba</td>
<td>Bharmour</td>
<td>Kuleth</td>
<td>24</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Balmui</td>
<td>24</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sub-Total (A)</td>
<td>48</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(80.00)</td>
<td>(20.00)</td>
<td>(100.00)</td>
</tr>
<tr>
<td><strong>NON TRIBALS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chamba</td>
<td>Chamba</td>
<td>Mehla</td>
<td>23</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mangla</td>
<td>24</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sub-Total (B)</td>
<td>47</td>
<td>13</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(78.33)</td>
<td>(21.67)</td>
<td>(100.00)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grand Total (A + B)</td>
<td>95</td>
<td>25</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(79.17)</td>
<td>(20.83)</td>
<td>(100.00)</td>
</tr>
</tbody>
</table>

**Note:** Figures in parenthesis denote percentages to total.

**Source:** Own Survey

2.4 ANALYSIS OF DATA

In general to make the analysis simple and more understandable, simple tabular analysis has been used to evaluate the data along-with the concept of cost in order to fulfill the specific objectives. However in some places where need arose, sophisticated statistical tools have also been used. The following tools have been used. This section also provides details of cost concepts used, procedures for evaluating cost of cultivation and treatment of various other items.

2.4.1 Compound Growth Rates (CGR)

The changes in number and area of operational holdings have been analysed with the help of working out the Compound Growth Rates (Acharya, 1988). Compound Growth Rates of various items were estimated by the least square technique of fitting the exponential function of the form:
\[ Y = ab^x \]

And C.G.R = \((b - 1) \times 100\)

\[ b = \text{Antilog} (\log b) \]

where \( \log b = \frac{\sum x \log y - \sum \frac{x}{n} \sum y}{\sum x^2 - \left(\frac{\sum x}{n}\right)^2} \)

\( y \) = variable under consideration such as number, area of operational holdings etc.

\( x \) = time variable

\( a \) = constant

\( n \) = number of observations

### 2.4.2 Crop Diversification

Intensification of crop diversification is necessary to food security and to provide balanced diet through nutritive products to the poor people. Level of crop diversification varies from place to place depending on climatic and socio-economic environment prevailing in the region. Agriculture is said to be diversified if the area is allocated to different crops instead of concentrating under a single crop. Under this study crop diversification have been studied by using the Herfindhal and Entropy indices (Singhal, 1998 & Sharma, 2005). The Herfindhal index has been computed using the following method.

\[ \text{Herfindhal Index} = \sum_{i=1}^{n} P_i^2 \]

Where \( P_i = \frac{A_i}{\sum A_i} \)

Where \( P_i \) is the proportion of the crop in hectare and \( A_i \) is the actual area under \( i \) th crop.

The index is defined as the sum of squares of all 'n' proportions and is a measure of concentration. For increasing diversification,
Herfindhal is decreasing and vice-versa. It is bounded by ‘0’ (complete diversification) and 1 (complete specialization). On the other hand Entropy index has been calculated with the help of following formula:

\[
\text{Entropy Index} = \sum_{i=1}^{n} P_i \log \left( \frac{1}{P_i} \right)
\]

It is an inverse measure of concentration having logarithmic character. For increasing diversification EI is increasing. It is also lies between zero and one.

2.4.3 Cost Concepts

The standard cost concepts have been used in the study to work out the cost of cultivation of important crops. Normally two costs concepts are used in classifying costs (i) to take only paid out costs and (ii) to take the cost of the all inputs, fixed as well as variable. However it would be more realistic to measure net income per farm on the basis of paid out cost. Because these are the costs which involve current cash payments to outsiders for which farmers are more interested. Under owner-farming situation the concept of paid out cost is the relevant concept where the farmer contributes land and other resources (Ghosh, 1992). On the second consideration the cost of cultivation has been categorized as cost A, cost B, and cost C, as detailed below.

These costs included following items.

**Cost A**

(i) Wages of hired human labour
(ii) Value of hired bullock labour
(iii) Value of owned bullock labour
(iv) Value of seeds (farm produced and purchased).
(v) Value of manure, fertilizers and plant protection chemicals.
(vi) Expenditure on irrigation
(vii) Depreciation of implements, machinery, farm buildings and
    hiring charges of implements.
(viii) Land revenue, cess and other taxes
(ix) Interest on working capital

**Cost A**

\[ \text{Cost } A_1 = \text{rent paid for leased in land.} \]

**Cost B**

\[ \text{Cost } A_2 + \text{rental value of owned land (net of land revenue) and} \]
\[ \text{interest on owned fixed capital excluding land.} \]

**Cost C**

\[ \text{Cost } B + \text{imputed value of family labour.} \]

### 2.4.4 Economics of Orchard

Apple is the only fruit crop found on the sampled farms despite
long period. The production of apple depends upon many factors,
such as age of tree, variety, root stock, climatic conditions, cultural
practices, pests and diseases etc. The plants generally come into
bearing at the age of 7 years, and farmers generally take cereal crop
alongwith apple plants till the canopy spreads out which happens at
about the age of 3 years but in some cases it was observed that
farmers do get intercrop upto 4 years. Thus, during the first 4 years,
there is investment on the upbringing of the apple trees with no
returns from them, but cereals grown as an inter-crop do give some
income. During fifth to seventh years nothing else can be grown
alongwith apple trees and hence there are no returns from that land.
Apple plants generally start bearing fruits at the age of eight years
and the level of bearing keeps on increasing uptill the age of about 15
years. When it plateaus and declines in productivity starts at the age
of about 20 years.

The initial cost of apple worked out with the help of cost
involved in digging and filling of pits, value of manure and fertilizer,
cost of apple plants etc. and other costs included on FYM,
insecticides, pesticides cost of nursery etc. (Sikka and Swarup, 1985).

The cost of marketing of apples includes cost on picking, grading, packing, transportation and communication etc. All such costs have been included in working out the income from the orchards.

2.4.5 Measures of Farm Income

1. **Farm Business Income**: It includes total gross returns minus Cost A2.

2. **Family Income**: It includes farm and non-farm income.

2.4.6 Procedures for the Evaluation of Farm Assets

1. **Owned and Self-cultivated land**: own land and self cultivated land evaluated at rates prevalent in the villages taking into account the differences in the type of soils. Distance from village, source of irrigation etc.

2. **Farm buildings (Cattle Sheds, Storage Sheds etc)**: Evaluated at prices prevailing in the villages.

3. **Implements and Other Farm Machinery**: Evaluated at prevalent market prices.

4. **Livestock**: The value of livestock also evaluated at prevailing market prices. The actual number of different types of livestock has been converted into SAU for facilitate comparison. The standard conversion ratio used are as following:
   
i) A cow or buffalo above three years of age = One (SAU).
   
ii) A young stock of one to three years of age = 0.5 (SAU).
   
iii) A young stock of less than one year of age = 0.25 (SAU).

iv) A camel above three years of age = two (SAU).

v) A camel below three years of age = One (SAU).

vi) A sheep or goat = 0.20 (SAU).

\[ \text{SAU} = \ldots \]
2.4.7 Cropping Intensity

Means the index of intensive cultivation and is expressed as a ratio of gross cropped area to net area sown (Govt. of H.P., 1999-2000). It is conveniently expressed as percentage and is calculated as under:

\[ CI = \frac{\text{Gross Cropped Area}}{\text{Net Area Sown}} \times 100 \]

2.4.8 Productivity

It is per hectare production (kg.) of a crop. In mathematical terms it can be found out by the following formula:

\[ \text{Productivity} = \frac{\text{Total production of crop A}}{\text{Area Under Cultivation for crop A per ha.}} \]

2.4.9 Dependency Ratio

Dependency ratios shows non-workers over the workers defined as being between the age group of 18-60 years in a family. The following formula has been used to calculate the dependency ratio:

\[ \text{Dependency Ratio} = \frac{\text{Total Number of Dependents}}{\text{Total Number of Workers}} \times 100 \]

2.4.10 Depreciation

It has been calculated by straight line method i.e. 2 percent of Pucca building and 5 percent of Kutcha buildings per year. Regarding implements the per year depreciation has been calculated as under:

\[ \text{Depreciation} = \frac{\text{Original value of Implement} - \text{Junk value}}{\text{Life of the implement}} \]

Minor charges on repair of implements and machinery during the year have also been added to the depreciation value.
2.5 Concepts and Definitions

The definitions of categories, costs, other variables etc. (Govt. of H.P., 1990-91, 2000-01, 2001, Sikka, 1987) used in the present study have been presented in this section.

2.5.1 Marginal Farmers

Marginal farmers are those whose holdings at present level of productivity, are too small to provide adequate standard of living and whose per-capita income can not be brought up to a minimum required level without combining additional enterprises. Such farmers have total land holding of less than one hectare and;

2.5.2 Small farmers

Small farmers are those whose holdings at present level of productivity provide a standard of living at the bare margin of subsistence but where further farm productivity increase could definitely provide an adequate standard of living. These farmers are classified as those who are having holdings between 1 to 2 hectares respectively.

2.5.3 Economically Viable Farms

Economically viable farms may be defined as those which can provide an income required for the minimum maintenance of the farm family (Rao, 1994). Fundamentally the viability of farm may be defined in terms of net returns from the crop and other enterprise currently figuring in the present cropping pattern. The positive net return over the variable cost may indicate the viable status of farm. The true viability of farm has been considered to be there only when the income generated from the farming activities is able to meet out the existing consumption expenditure of the farming families. It is dependent on the level of income needed to satisfying the minimum
requirements of consumption items. The economic viability of small and marginal farmers has been measured on the basis of agricultural production, employment and income from various sources. In the present study at the first stage viability of farm has been worked out on the basis of paid out cost, as the imputed costs are not incurred from the pockets of farmers as such. In the second stage it is measured over B and C costs whereas in the last stage, viability has been measured over the consumption expenditure of the farming families.

2.5.4 Human Labour

The human labour input has been recorded in terms of hours of labour actually put in by the family labour along with casual labour for carrying out various farm operations in the different crops.

2.5.5 Family Labour

It is the labour in which actual work carried out by family members for crop production. Labour charges have been equated with the prevailing rate of wages paid to the hired labour.

2.5.6 Hired/Casual Labour

This type of labour includes hired / casual labour employed for crop production. Labour charges worked out on both cash and kind basis.

2.5.7 Bullock Labour

Due to hilly terrain and peculiar conditions the farm mechanization is almost not-existent in the sampled area. The bullocks in absence of farm mechanization, is the only drought power available for sampled farms. Actual hiring charges have been considered and own bullocks charged at the same market rate.
2.5.8 Seed, Manure, fertilizer and Plant Protection Chemicals

The purchased seeds, manure, fertilizers chemicals and other inputs have been accounted at the actual prices paid for the inputs. Home produced seed, manures and other inputs have been valued at the current prevailing prices in the village.

2.5.9 Land Revenue and Other Cesses

Land revenue and other taxes actually paid by the farmers have been considered.

2.5.10 Land Rent

The rental value of owned land has been accounted on the basis of prevailing rent of land.

2.5.11 Interest on Working Capital

The interest on working capital is charged at the rate of 8 percent per annum for the period of the crops. The fixed assets like the value of implements machinery farm building and other fixed assets of farm have also been charged at the same rate because crop loans and loans for the purchase of agricultural implements and construction of cattle sheds etc. the bank charged at 8 percent per annum for loans upto Rs. 50,000.

2.5.12 Operated Area

It includes both cultivated land and uncultivated area, provided part of it is put to agricultural production during the reference period. It excludes government forest land, government waste land, village common grazing land, abadi area etc.

2.5.13 Net Area Sown

The total area sown with crops and orchards counting area sown more than once in the same year only once.
2.5.14 Total Cropped Area

It is the sum of all area sown under all crops during the year under review, treating “area sown more than once” separately for each crop.

2.5.15 Current Fallow

Cropped area which are kept fallow during the current year. For example if any seeding area is not cropped in the same year, it may be treated as current fallow.

2.5.16 Fallow Land and Other than Current Fallow

All lands which area taken up for cultivation but are temporarily out of cultivation for a period of not less than one year and not more than five years.

2.5.17 Operational Holdings

All land which is used wholly or partly for agricultural production and is operated as one technical unit by one person alone or with others without regard to the title, legal form, size or location.

2.5.18 Gross Annual Income from Live-Stock

Comprises (i) Income from sale of live-stock products (ii) Animal labour used in agriculture and transportation,(iii) Value of dung / dropping, (iv) Receipts from sale of skin, hides from dead / slaughtered animals.

2.5.19 Annual Expenditure on Live-Stock

Current annual expenditure on livestock rearing includes: (i) Value of fodder and feed fed to animals, (ii) Veterinary expenses, (iii) Labour used in tending and grazing of live-stock etc.
2.5.20 Main Workers

Main workers are those workers who work for the major part of the year i.e. those who are engaged in any economically productive activity for more than six months or 183 days or more during the year.

2.5.21 Marginal Workers

Marginal workers are those who are engaged in any economically productivity but did not work for a major part of the year i.e. those who worked for less than 183 days or six months have been counted as marginal workers.

2.5.22 Non workers

Non-Workers are those who are not engaged in any economically productive activity.

2.5.23 Cultivators

A person is classified as cultivators if he or she is engaged in cultivation on the land in his /her possession irrespective of government land or any other kind of land.

2.5.24 Household

Household is group of family members normally living together and taking food from common kitchen constituted a household for the purpose of the present study (Govt. of H.P., 1975).

2.5.25 Consumption Expenditure

Consumption implies utilizaton of goods and services to satisfy the human desire and wants. The pattern of consumption varies from place to place and person to person and may be influenced by the socio-economic and psychological consideration. But for the purpose of general studies consumption expenditure implies all expenditure incurred by a household exclusively towards its non-productive domestic consumption, thus excluding all the expenditure.
towards the enterprise activities of the household transfer payments in kind like loans, advance, charities, gifts and other payments, in kind are not considered in consumption out of transfer receipts in kind or fee collection for determining total consumption.

2.5.26 Apple Bearing Tree

A tree of bearing age was defined as a tree which has attained the specified age irrespective of the fact whether it bore fruit or not, during a particular year. This age was taken to be seven years after planting.

2.5.27 Apple Non – Bearing Tree

A non-bearing tree was defined as a tree which has not reached the bearing age.

2.5.28 Orchard

An area of land having at least ten apple trees and owned by a person defined as an orchard irrespective of the fact that whether this area was geographical contiguity or scattered.

2.5.29 Maintenance Cost

The costs subsequently incurred on its maintenance year after year are denoted as operational costs or maintenance costs.

2.5.30 Other Category of Holdings

Such type of holdings included, semi medium, medium and large farms.

2.6 Reference Period

The study pertains to agricultural year 2004-05.
2.7 LIMITATIONS OF THE STUDY

Despite the best efforts the study suffers from following limitations:

1. Limited geographic coverage due to limited resources available with the individual researcher. Ideally, the study should have been carried out at more comprehensive level in more than one district covering different agro-climatic regions of the state.

2. The data may have suffered because of memory bias of farmers.

3. The study is based on a small sample size which should have been larger, but again it is beyond the means of individual researcher.