RESEARCH DESIGN AND METHODOLOGY
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This research study on the women farmers in sustainable agricultural practices: Impact on family economy is conducted during the years 2006-2009 in the selected villages of three districts of Northern Transition Zone VIII viz., Belgaum, Dharwan, and Haveri. A systemic research design is presented in this chapter. This chapter consists of the description of the study area, sampling design, procedure involved, analytical tools and techniques employed for the research under the following headings.

3.1 Locale of the study

3.2 Sample of the study

3.3 Data collection tool and process

3.4 Quantification of the data

3.5 Development of the module on sustainable agricultural practices

3.6 Statistical analysis of the data

3.1 LOCALE OF THE STUDY

Karnataka is the eighth largest state in India with an area of 1,91,791 sq km. It is situated between 11.5° and 19.0° North latitude and between 74.0° and 78.0° East longitude in the southern plateau. According to 2001 census, Karnataka has a total population of 52.8 million comprising of 26.86 million males and 25.95 million females, with an overall literacy rate of 67.04 percent. Rural population is about 3.48 million and urban population accounts for 17.92 million. The population density of the state is 275.5 per sq km. The average annual rainfall of the state if about 1139 mm from both Southwest and Northeast monsoons. The mean temperature ranges from 10.0° C to 44.0°C.
per sq km. The average annual rainfall of the state is about 1139 mm from both Southwest and Northeast monsoons. The mean temperature ranges from 10.0° C to 44.0° C.

The Northern Transitional Zone is a narrow strip from Chikkodi taluk in Belguam district in the north up to Hirekerur taluk of Haveri district in south, with a total geographical area of 12.11 lakh hectares, with a cultivable area of 9.45 lakh hectares, with irrigated area of 0.82 lakh hectares. The zone lies in between the northern dry zone in the east and hilly zone in the west, occupying 6.36 per cent of the total geographical area of the state. The zone lies between 14°13' to 16°41' N latitude and 72 °32' to 75 °38' E longitude, with the altitude ranging from 557.4 to 769.9 m.

The soils of Northern Transitional Zone are broadly classified into the following types, viz., red sandy, red sandy loam, and red loam, mixed red and black, deep black and lateritic soils. The important soil problems in Northern Transitional Zone are: soil erosion, low fertility status, deficiency of micronutrients and crust formation in red soils.

This zone receives rainfall from both southwest and northeast monsoons and hence has well distributed rainfall from June to November with less coefficient of variation. The soils are varied in the zone facilitating growing of varied crops in both Kharif and Rabi season. The average maximum temperature of the zone is 30.89°C, with a highest of 36.69°C during April and lowest of 26.35°C during August. The minimum temperature ranges from 14.01°C to 22.12°C, with an average minimum temperature of 18.61°C. The relative humidity of the zone varies from 85.36 per cent to 51.59 per cent, with an average relative humidity of 68.49 per cent.

The total geographic area of this zone is 12.11 lakh hectares of which 9.45 lakh hectares are cultivated area (78.03%). Only 4.13 per cent of the area is put to non-
agricultural use. The pastures and grazing lands occupy 2.23 per cent. The land put under irrigated cultivation under all the sources like canals, tanks, wells, tube wells and other sources is only 0.82 hectares (6.77%).

The rainfall in this zone is well distributed from May to November and has a varied soil type facilitating the different cropping pattern in the zone. The cropping patterns for the rainfed situation are summarized below.

Among the major crops grown, cereals are cultivated on 3.59 lakh hectares, pulses occupy 0.9 lakh hectares whereas, oilseeds cover 2.15 lakh and commercial crops to the extent of 2.15 lakh ha. Among cereals, sorghum occupies 195168 ha, followed by paddy at 65494 hectares Green gram (26635 ha), tur (10503 ha) and horse gram (19629 ha) are important under pulses. In oil seeds, ground nut occupies the largest area (176935 ha) cultivated in both kharif and summer season. Sunflower occupies 19386 hectares and safflower grown under Rabi season covers 6583 ha. Cotton is important commercial crop grown on an area of 15,7996 ha, whereas, tobacco occupies 2,2068 hectares The plantation and spice crops is spread over 93021 ha, whereas, fruit crops occupy 6095 ha. Vegetables and flowers occupy 34037 ha and 701 ha, respectively. (A Report on NARP 1996)

### Cropping pattern under rain fed situation

#### Monocropping system

<table>
<thead>
<tr>
<th>Crop</th>
<th>Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>Hybrid jowar</td>
</tr>
<tr>
<td>Sunflower</td>
<td>Chilli</td>
</tr>
<tr>
<td>Maize</td>
<td>Groundnut</td>
</tr>
<tr>
<td>Tobacco</td>
<td>Paddy</td>
</tr>
</tbody>
</table>

#### Double cropping

- Paddy – Pulses  Groundnut- Rabi jowar/ Wheat/ Bengal gram
- Pulses- Rabi jowar/ Safflower/ Bengal gram  Potato- Rabi jowar/ Wheat/ Bengal gram
Maize - Safflower    Sunflower - Rabi jowar
Minor millets - Horse gram

Intercropping

Chilli + Cotton    Hybrid jowar + Tur
Chilli + Onion

3.1.1 Description of Dharwad district

The etymological significance of the term "Dharwad" is a resting place. However the district's nomenclature is shrouded in conjectures and surmises. With a 900-year-old history, once a kingdom of the Chalukyas is the focal pint of North Karnataka's academic, economic and industrial development. Occupying an expanse of 13738 sq. km and lying to the east of the Western Ghats, the twin cities of Hubli-Dharwad are strategically located 420 km north and 550 km south of the urban metropolis of Bangalore and Mumbai, respectively. Having recorded a population of 1.6 million, comprising of 8, 23, 204 males and 7,81,049 females, the inhabitants of Dharwad practice agriculture and also are engaged in industry and commerce. The district is famous for its mouth-watering milk based sweetmeats.

3.1.2 Description of Belgaum district

Belgaum District sited in the Western Ghats in Karnataka and also recognized by the nom de plume 'Venugrama' or 'Bamboo Village' and Malendu or 'Rain Country' is shrouded in history dating back to antiquity. Strategically located midway between the metropolis of Mumbai and Bangalore, Belgaum District occupies 13,444 sq. km area. The population indices are estimated to be 42,147,505 with 21, 50,090 males and 20,64,415 females. Belgaum, renown for its exquisite cotton and silk weavings has a predominantly agrarian economy, which is complemented by a multi-dimensional industrial base.
Plate 1. Map showing the study area
Belgaum is a traveler's paradise with its verdant landscape dotted with meandering rivers.

The old British Cantonment, majestic historical fort, Kamala Basti, Kapileshwar temple (South Kashi), the hills of Vaijyanath, Ramtirth in Kanarge and the aerodrome at Sambra are worth visits.

3.2.1: The three districts of Northern Karnataka Zone namely: Dharwad, Belgaum and Haveri were selected based on the following criteria:

1. The study area belongs to the Jurisdiction of agriculture University Dharwad, where the researcher is working.
2. The selected three districts have varied agro climatic regions as well as different cropping pattern.
3. The selected three districts have more women having ownership of agricultural land and also involved in farming activities either solely or supporting their husband.

sq.kms) with 74 per cent of this area is under cultivation. It has as total population of 1439116 (as per 2001 censes) with a male population of 740469 and female population of 698647. It has a rural population of 140096 (men 586935 and women 553161). District has literacy percentage of 68.08 (male 77.94 percent and female 57.60 percent). It has population density of 276. The district received on an average 752mm of rainfall spread over from June to September. The temperature varies from minimum of 16 C (November and maximum of 38 C during April and May).

3.2 SAMPLE OF THE STUDY

The sample selection was done by using multi stage random sampling procedure. The districts were purposively selected in the first stage. In the second stage the talukas and villages were selected. The attempt was made to identify the sample from the selected households in which the selection criteria for the subjects was ownership of land, and minimum five years of farming experience in the field of the women's were selected for the study. Three talukas in the third stage of sample selection. The total sample size of the study was 270 women farmers from the three districts. Three talukas were selected from each of
the three districts belonging to the Northern transitional zone (8). Equal sample selection has been made from each taluks hence mainly a total of 90 samples from each district.

Table 3.1  Distribution of sample according to Districts in Northern transitional zone (8) (n=270)

<table>
<thead>
<tr>
<th>Districts</th>
<th>No. of women farmers in selected study area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dharwad</td>
<td>90</td>
</tr>
<tr>
<td>Belgaum</td>
<td>90</td>
</tr>
<tr>
<td>Haveri</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>270</td>
</tr>
</tbody>
</table>

3.3 DATA COLLECTION TOOL AND PROCESS

Data was collected by personal interview method. The interview schedule was developed, pre-tested and used to record the data. The detailed data were collected from the selected districts from the selected sample of the households of women farmers by researcher, through personal interview. The interview schedule comprised two major parts. Part I of the schedule elicited the information on demographic characteristics of the women farmers, Part II of schedule assessed the prevailing sustainable agriculture practices followed by the women farmers. Each part of the question was explained clearly to elicit the correct and relevant information. Sufficient time was utilized with each respondent of women farmer for the purpose of data collection.
Plate 2. Sample selection for the study
The interview schedule consisted of eleven parts to elicit information as detailed below:

**Part I**

I. Demographic characteristics of the women farmers from the selected Districts  
II. Husbands' contribution in agricultural activities  
III. Annual income of the respondent's family  
IV. Involvement of women farmers in various agricultural activities in terms of man days

**Part II**

V. Prevailing sustainable agricultural practices followed by the women farmers  
   a) Farm management b) Water management c) Labour management  
VI. Sustainable agricultural practices  
VII. Impact of sustainable agricultural practices on the average annual income of women farmers in study areas  
VIII. Organizational support received by the women farmers  
XI. Technology adoption and Training programmes attended by the women farmers  
X. Constraints faced by the women farmers  
XI. Empowerment of women farmer in the development of personality

The detailed data were collected from the selected sample women farmers by the researcher through personal interview method with the help of the pre-tested interview schedules in an informal atmosphere. Each question was explained clearly to elicit the correct and relevant information. Sufficient time was utilized with each respondent for the purpose of data collection.
3.4 QUANTIFICATION OF THE DATA

Data is quantified by using the frequency and percentage methods. The data is analyzed under the following heads.

I. Demographic characteristics of women farmers in selected study area

The demographic characteristics like educational level, occupation of the husbands and wife, marital status of the respondents, family type, family size, farming experience of the women farmers and annual income of the families were analyzed. The categorization of each independent variable is done based on the review of earlier studies conducted.

1. Education of the respondent:

The respondents were classified on the basis of the number of years of formal education received by them and categorization was done under the following headings.

- Illiterates
- Can read and write
- Primary school
- Middle school
- Matriculation
- College

2. Marital status of the respondents:

The marital status of the respondents was categorized into five groups as, currently unmarried, married, separated, divorce and widow.
3. Occupation of the respondent

Based on the data collected, the families and the respondent's occupation both main and subsidiary were classified as given below-

- Agriculturist (leased land)
- Self farmer
- Agriculturist (own land)

4. Occupation of the husband

Based on the data collected, the families and the respondent's occupation both main and subsidiary were classified as given below-

- Agriculturist
- Business
- Government employee
- Others

5. Type of family

The family type is classified into three broad groups based on the data available for the study, namely- nuclear family, joint family and extended family.

The nuclear family consisted of one unit of husband, wife and their children. In joint family, more than one unit will be staying together. In the extended family, one or more dependents will be there with one family unit.

6. Age of the women farmers:

The age is measured based on the calendar years completed at the time of the interview and it is categorized as follows.
• Young - < 30 years.
• Middle - 30 to 40 years
• Elderly - >40 years

7. Family size:

Based on the number of family members residing, the family are categorized into three groups as followed in studies conducted by Karakaran (1999) and Paloti (2003). The groups are as detailed below:

<table>
<thead>
<tr>
<th>Family size</th>
<th>No. of members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small family</td>
<td>Lesser/equal to 4 members</td>
</tr>
<tr>
<td>Medium family</td>
<td>5 to 8 members</td>
</tr>
<tr>
<td>Big family</td>
<td>Greater/equal to 8 members</td>
</tr>
</tbody>
</table>

8. Farming experiences:

The farming experiences of the women farmers are classified into three broad groups based on the data available for the study. The classification are as detailed below.

• Less then 10 years
• 10 to 20 years
• More then > 20 years

II. Husbands’ contribution in agricultural activities

Participation of husbands’ in agricultural activities is measured through average mean score was calculated for each activity. Comparison between the district was observed.
III. Annual income of the respondent’s family

The total family income was be calculated based on the:

- Earnings from primary occupation
- Earnings from secondary occupation

The total income categorization was done based on the mean income of all the households by using the statistical formula \( X \pm 0.425 \times SD \).

- Low income - Below \( X - 0.425 \times SD \)
- Middle income - Between \( X + 0.425 \times SD \) and \( X - 0.425 \times SD \)
- High income - Above \( X + 0.425 \times SD \)

Where, \( X = \) mean income and \( SD = \) Standard Deviation

IV. Involvement of women farmers in various agricultural activities in terms of man days

The number of man days spent per year on each activity was calculated by using average time spent per day and average number of days the activity is performed per year.

Involvement of women farmers in various agricultural activities in terms of man days was calculated by using formula (Renuka 2007)

\[
\text{Man day} = \frac{\text{Time spent/day} \times \text{no. of days/year}}{8 \text{ hrs}}
\]

V. Prevailing sustainable agricultural practices followed by the women farmers

a) Farm management b) Water management c) Labour management

Average land holding in acres, area cultivated, soil type was calculated and compared between the districts and the ‘t’ test was applied. Soil related problem was
calculated with chi-square was used find out the association between the districts and problems of soil was compared.

VI. Adoption of sustainable agricultural practices followed by women farmers.

The opinion index was calculated based on the mean score by using the formula

\[
\text{Index} = \frac{\text{Observed score}}{\text{Expected score}} \times 100
\]

Adoption of sustainable agricultural practices by the women farmers was compared between the districts for the same activities. Chi-square test was used to find out the association between the districts was observed. Within the district, comparison between the activities was calculated with frequency and percentage.

VII. Impact of sustainable agricultural practices on annual income from various occupational sources over a period of four years

Impact of sustainable agricultural practices on annual income from various occupational sources over a period of four years was calculated in three stages based on: Ref. page no. 125 Tab. 21 and Fig. 6.

Stage 1. Pre sustainable agricultural practices stage during 2004, 2005 and 2006 years

Stage 2. Introductory to sustainable agriculture practices stage during 2007

Stage 3. Based on post sustainable agricultural practices the module was developed.

VIII. Organizational support received by the women farmers and Technology adoption and Training programmes attended by the women farmers

Frequency and percentage was calculated for organizational support and combined mean score and ‘F’ test was carried out to know the difference among the
districts was observed. Chi-square was used to the significance association between the
training and technology received by the women farmers.

3.5 DEVELOPMENT OF MODULE ON WOMEN FARMERS IN
SUSTAINABLE AGRICULTURAL PRACTICES
i. Identified the problems based on research study on women farmers in sustainable
agricultural practices. A suitable model has been developed. In this module the
strong and weak indicators in adoption of sustainable agricultural practices for each
of the districts has been mentioned.

ii. Indicators has been classified as:

a) Socio personal support

b) Sustainable agricultural practices

c) Institutional / organization support

d) Financial institutional / Banking support

iii. Indicator has been measured in five point scale and used for identifying the
problems

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Colours</th>
<th>Indicator</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red</td>
<td>Very low adoption</td>
<td>Less 20%</td>
</tr>
<tr>
<td>2</td>
<td>Orange</td>
<td>Low adoption</td>
<td>21-40%</td>
</tr>
<tr>
<td>3</td>
<td>Yellow</td>
<td>Medium adoption</td>
<td>41-60%</td>
</tr>
<tr>
<td>4</td>
<td>Light green</td>
<td>High adoption</td>
<td>61-80%</td>
</tr>
<tr>
<td>5</td>
<td>Dark green</td>
<td>Very high adoption</td>
<td>More than 80%</td>
</tr>
</tbody>
</table>
iv. Suggested recommendation for better adoption for sustainable agricultural practices by the women farmer is also been highlighted in module with necessary source of information wherever necessary.

3.6 STATISTICAL ANALYSIS OF THE DATA

Following are the statistical tools used for analyzing the data and drawing the conclusions as per the objectives of the research

* The frequency and percentage were computed for the demographic information of the women farmers from the selected districts.

* Standard deviation test were administered to ascertain the annual income groups selected sample for the study.

* 't' test were used to assess the difference among the land holding between the districts was compared

* 'F' tests is employed to the study the district wise average annual income of the families from various occupational source, and to study the involvement of women farmer in various agricultural activities in terms of man days.

* Correlation was worked out between independent variable and sustainable agricultural practices.

* Calculation of Personality Development Index for women farmers in selected districts.

* Chi-square Test was used