CHAPTER III

METHODOLOGY OF THE STUDY
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3.1. Introduction

Spices are strongly flavoured or aromatic vegetable products usually dried and used for seasoning and preserving foodstuff. In general, they consist of volatile and non volatile oils, protein, fibre, starch, mineral catter, tannis and the like. The flavoring, preservative and antiseptic properties of certain spices are due to the presence of volatile oils. Spices play a very important part in the human dietary and although they are not classified as food because they contain little of nutritive value, they give an agreeable flavour and aroma to food and add greatly to the pleasure of eating. When the aromatic or fragrant vegetable products used to flavour food or beverages are from plants of tropical origin, it is considered a spice¹.

The total consumption of spices in both developing and industrialized countries is influenced by the size of population, income, the state of economy and culinary and social habits². On the other hand, per capital consumption of all spices as a whole and for individual spices varies widely from one area to another area within individual countries. In the developing countries, spices are consumed chiefly in the household sector whereas in the industrialized countries, large amount of spiced are absorbed by the industrial sector, mainly in food processing. Among the industrialized countries, the industrial and the retail sector are the main users of spices. Spices are used in most segments of the food processing industries of industrialized countries particularly in the processing of meat, fish, vegetable products, bakery goods and other prepared and convenient foods. In most cases, the meat industry is by far the largest user of a wide range of spices. The consumption of spices in non food industries such as the pharmaceutical and perfumery sectors is not in general appreciable and is unlikely to have significant effect on overall demand. From the variety of uses of spices in various sectors of the economy of any country, it can be assumed of a perpetual demand for spices in the world.

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India produces more than thirty-five spices, of which more than twenty are exported. Among various items of spices exported from India, pepper commands prime importance in terms of earning larger amounts of foreign exchange for the country. Pepper comes from the dried berry called a peppercorn of woody, climbing vine. Its botanical name is *piper nigrum* L. - no relation to the rod peppers, which give us sweet red and green peppers and the hot, red peppers. A native of East Indies, pepper is now cultivated in the tropics of both eastern and western hemispheres. While it does grow wild, most of our pepper today comes from cultivated plants. Production ranges from plantation scale to home garden, depending on the area growing it. The vines, which have a large ovate leaves are trained to climb support trees or stout poles of 12 feet or so in height. Since several cuttings are planted around each support, the vines eventually resemble tall, very thick bushes. It takes three to seven years before a vine comes into full production. The pepper berries grow in spike-like clusters of roughly four to six inches in length (varying according to type) and bearing 50 or more berries. As they ripen they turn from green to yellow and then to red.

**3.2. Statement of the problem**

The fame of Indian spices is perhaps older than the recorded history. India is well known the world over as the “Home of Spices”. Spices constituted an important group of agricultural commodities. Some are also used in pharmaceutical, perfumery, cosmetics and several other industries. Besides, they play quite a significant role in our national economy and also in the national economies of various spices producing exporting and importing countries of the world. Before independence, India was holding a virtual monopoly position in the cultivation, production and export in pepper.
Spices had a major role in influencing the course of history and civilization all over the world. Since time immemorial, Indian spices added flavour and taste to human food besides being used in cosmetics, perfumery and medicine. India is a leading producer of spices in the world and had a monopoly in spices trade for centuries. At present, spices are cultivated in India in about 20.3 lakh tonnes annually. It contributes to about 20% of the world’s production and about 30% of its trade.

India is the centre of origin for black pepper, which is called as the "King of Spices". Increasing productivity of black pepper can be developed through high yielding high quality varieties resistant to pests, diseases and drought are the priority area. Black pepper is a perennial climbing vine grown for its berries extensively used as spice and medicine. India is a leading producer, consumer and exporter of black pepper in the world. It is a plant of humid tropics requiring adequate rainfall and humidity. The hot and humid climate of sub mountainous Western Ghats is ideal for its cultivation. The white pepper of commerce is either prepared from freshly harvested berries or dried black pepper using special techniques such as retting, steaming and decortications. The recovery of white pepper from ripe pepper berries is about 25%.

All parts of the vine are vulnerable to the disease and expression of symptoms depends upon the infected part of the plant. The incidence of the disease was positively correlated with total rainfall, high humidity, low ambient, and soil temperatures. Integrated management strategy techniques were developed for screening the disease. The 'pollu' beetle is the most destructive insect pest causing over 30% crop loss in endemic areas in plains. The adults damage tender leaves and spikes and the grubs bore into berries. The top shoot borer, which damages tender terminal shoots, is a serious pest in younger plantations. Leaf gall thrips and scale insects were identified as important pests at higher
altitudes. The role of natural enemies in the suppression of insect pests and propagation techniques for their utilization in the field are being studied.

Pepper is popular all over the world, which is used mainly as a food ingredient and as a preservative. Besides, almost all the traditional systems of medicine - Ayurvedic, Homoeopathy, Unnani and Aromatherapy as well as Chinese and African Systems - regularly use pepper in various forms, both as a preventive and cure for an astonishing number of ailments with remarkable success. Pepper is an effective cure for malaria and functions as a mosquito repellent. Pepper could help in relief of cold and cough, reduce fever, function as an analgesic or antiepileptic, help in digestion, serve as an antidote for food poisoning and relieve headaches. The king of spices also has some cosmetic value and if applied as recommended it could help control baldness and hair loss.

Kanyakumari is a land of agriculture where nearly 60% of the workers are agricultural labourers. The main crops grown in this district are paddy, coconut, tapioca, rubber, cashew, banana, areca nut etc., and the main spices cultivated are cardamom, cloves, ginger and pepper. As per records, pepper is cultivated in an area of 74 ha whereas the private people which find no place in the records and the same is estimated to be 2500 ha occupy most of the areas. Pepper has been harvested in this district during the period from May to July. The district gives good scope for the farmers to develop the crops. To develop the schemes under horticulture and plantation, seven farms are situated in the district at various places. It should be noted that out of the seven farms, one is exclusively meant for pepper under the name pepper farm at Pechiparai. Since there is wide scope for the cultivation and marketing of pepper in Kanyakumari District, this study has been attempted to evaluate the production and marketing scope and the difficulties involved in it.
3.3. Objectives of the Study

- To evaluate the significance of pepper in agriculture
- To bring out the export potentiality of Pepper as the foreign exchange earner.
- To study the problems and prospects of pepper cultivators in Kanyakumari District
- To analyze the marketability of pepper in Kanyakumari District
- To give suggestions on the basis of the study

3.4. Hypotheses of the Study

1. There is no significant difference between the problems of pepper cultivation and the constraints of getting pepper yield.
2. There is no significant difference between age and income from pepper cultivation
3. There is no significant difference between qualification and income from pepper cultivation
4. There is no significant difference between Occupation and income from pepper cultivation
5. There is no significant difference between Area and income from pepper cultivation
6. There is no significant difference between Irrigation and income from pepper cultivation
7. There is no significant difference between Mode of sales and income from pepper cultivation
8. There is no significant difference between Intercropping and income from pepper cultivation
9. There is no significant difference between Yield and income from pepper cultivation
10. There is no significant difference between Satisfaction and income from pepper cultivation
11. There is no significant difference between Government support and income from pepper cultivation
12. There is no significant difference between Experience and income from pepper cultivation
13. There is no significant difference between Market extension and income from pepper cultivation
14. There is no significant difference between Problems of pepper marketing and the constraints of pepper marketing
15. There is no significant difference between among the indices of price, sales and profit
16. There is no significant difference between income and consumption pattern of pepper
17. There is no significant difference between age and consumption pattern of pepper
18. There is no significant difference between occupation and consumption pattern of pepper
19. There is no significant difference between education and consumption pattern of pepper
20. There is no significant difference between Pepper quality and consumption pattern of pepper
21. There is no significant difference between Medicinal usage and consumption pattern of pepper
22. There is no significant difference between food habit and consumption pattern of pepper
3.5. **Scope of the study**

The study relates to the production and marketing of pepper in Kanyakumari District covers the entire district. Three questionnaires have been prepared and administered among the farmers who are involved in pepper cultivation and marketing and to the consumers. The study has good scope for pepper cultivation and marketing. Both primary and secondary data have been collected and used for the purpose of the study.

3.6 **Conceptual Definitions**

**Spices**

The term spices applies to such natural plant or vegetable products or mixtures thereof, used in whole or ground from for imparting flavour, aroma and piquancy to food and also for seasoning of foods. A spice is defined as one or other of various strongly flavored or aromatic substances of vegetable origin, obtained from tropical plants, commonly used as condiments or employed for other purpose on account of their fragrance and preservative qualities.

**Pepper**

A Green or Red pod with many seeds and are eaten as a vegetable or relish. A hot tasting seasoning made by grinding the dried berries of a tropical plant.

**Lot:** A lot shall consist of a homogeneous quantity of pepper, which has been processed in a smaller way, packed in uniform packing, stored under the same storage conditions and identified by a specific number.

**Pinheads:** Very small immature berries in black pepper

**Light berries:** Pepper berries which have no kernel and which will float in an alcohol water solution of specific gravity in the range of 0.80-0.82.
Black/Grey Berries: Berries, with or without pericarp, and are dark in colour. Those berries with or without pericarp which are light brown or cream in colour will not be considered as black.

Standard: It refers to the cutting of trees for growing pepper. "Murukku", "Kilingil", "Silver Oak" and the like are suitable trees for growing pepper.

Tieing Material: Generally, coir threads are used to tie plants with standards.

3.7. Methodology

The study is empirical in nature, which includes both primary source and secondary source. For collecting primary data, three well chalked out Interview Schedules were being prepared and administered among the respondents. The first one is for the cultivators, the second one is for the sellers and the third one is for the consumers. The respondents include 200 cultivators, 100 consumers and 100 traders from all over Kanyakumari District. The secondary source of data has been collected from various books, journals, periodicals, reports of both private and government organizations. The farmers, traders and consumers are chosen based on random sampling method.

3.8. Frame work of Analysis

For interpreting the development of pepper cultivation in terms of area, production, productivity and export potentiality, trend analysis and percentages are being used. The supportive hypothesis to locate the influencing factors on income generation out of pepper cultivation, ANOVA test is used. To analyze the marketability of pepper traders, Yule's coefficient of association has been used. To study consumer attitude towards pepper usage, Chi Square test is being applied. The major problems and suggestions are given weights and then ranked. Apart from these, Pictures, graphs and charts are used wherever necessary. To find out the significance of the chosen indices, Kruskal - Wallis and Man-Whitney tests are being used.
Break even point represents the level of activity at which the revenue from the sale of goods and services is just equivalent to the total cost incurred to produce and sell the same. If the sales volume exceeds the break even point, there will be profit and if the sales volume falls below the point, there will be loss. The formulas for the tests are given below.

**Kruskal - Wallis Test**

\[ H = \frac{12}{n(n+1)} \left( \frac{R_1^2}{n_1} + \frac{R_2^2}{n_2} + \frac{R_3^2}{n_3} \right) - 3(n+1) \]

**Man - Whitney Test**

\[ Z = \frac{U - n_1n_2/2}{\sqrt{n_1n_2(n_1 + n_2)/12}} \]

Where \( U = n_1n_2 + \frac{n_1(n_1 + 1)}{2} - R_1 \)

**Trend Analysis**

\[ Y = a + bx \]

Where \( a = \frac{\sum Y}{n} \) \( b = \frac{\sum xy}{\sum x^2} \)

**Index Numbers**

\[ \text{Index} = \frac{\text{Current Year's figure}}{\text{Previous Year's figure}} \]

**One-Way ANOVA**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares (SS)</th>
<th>Degrees of Freedom (df)</th>
<th>Mean Square (MS)</th>
<th>F ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between samples</td>
<td>SSC</td>
<td>C - 1</td>
<td>MSC = SSC/(C-1)</td>
<td>MSC/MSE</td>
</tr>
<tr>
<td>Within samples</td>
<td>SSE</td>
<td>R - 1</td>
<td>MSE = SSE/(R - 1)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>SST</td>
<td>n - 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Two-Way ANOVA

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares (SS)</th>
<th>Degrees of Freedom (v)</th>
<th>Mean Square (MS)</th>
<th>F ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between samples</td>
<td>SSC</td>
<td>C - 1</td>
<td>MSC = SSC/(C-1)</td>
<td>MSC/MSE</td>
</tr>
<tr>
<td>Between rows</td>
<td>SSR</td>
<td>R - 1</td>
<td>MSE = SSR/(R - 1)</td>
<td>MSR/MSE</td>
</tr>
<tr>
<td>Residual or error</td>
<td>SSE</td>
<td>(C-1)(R-1)</td>
<td>MSE=SSE/(C-1)(R-1)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>SST</td>
<td>n - 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SSC = Sum of Squares between Columns, SSR = Sum of Squares between rows  
SSE = Sum of Squares within samples or error, SST = Total sum of squares  
MSC = Mean Sum of Squares between samples, MSE = Mean Sum of Squares within samples

### Chi-Square Test

\[ \chi^2 = \frac{(O - E)^2}{E} \]  
Where O = Observed frequency and E = Expected frequency

\[ E = \frac{CT \times RT}{N} \]  
CT = Column total, RT = Row total

### Coefficiency of Contingency

\[ C = \sqrt{\frac{\chi^2}{N + \chi^2}} \]

### Yule's' Coefficient of Association Test

\[ Q = \frac{(AB)(\alpha\beta) - (A\beta)(\alpha B)}{(AB)(\alpha\beta) + (A\beta)(\alpha B)} \]

### Cost Benefit Analysis

\[ \text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 \]

\[ \text{Break Even Point} = \frac{\text{Fixed Cost}}{\text{Unit Contribution}} \]

\[ \text{Break Even Sales} = \frac{\text{Fixed Cost}}{\text{P/V Ratio}} \]
3.9 Limitations of the study

- As Kanyakumari District has limited area of intensive pepper cultivation, the results may not be accurate because for the study, the incomes from intercropping are omitted.

- The cost related particulars also do lack accuracy because the researcher has omitted the rental value of land due to intercropping.

- Usually, the cultivators may not have no practice of keeping records and so much of the information collected are originated from their memory and they cannot be more accurately generalized.

Chapter Scheme

- The first chapter of the study deals with the importance of Spices and their medicinal uses. It also describes the marketing conditions and exportability both at world level and in India.

- The second chapter gives a detailed summary of the review of literature about pepper, its production, marketing and export.

- The third chapter is the methodology chapter wherein the particulars like introduction, statement of the problem, scope of the study, conceptual definitions, methodology, framework of analysis, limitations of the study and the chapter scheme are narrated.

- The fourth chapter gives an overview of pepper cultivation, types of pepper and the methods to improve the cultivation.

- The fifth chapter contains the particulars of pepper export trade and highlights the role and potentiality of pepper as a foreign exchange earner.

- The sixth chapter describes the district profile and scope for the development of agriculture in the district.
• The seventh chapter is an analytical study, which critically analyze the problems and prospects of pepper cultivators in Kanyakumari District.

• The eigth chapter is the output of the analysis in connection with marketability and the consumption pattern of pepper in Kanyakumari district.

• The ninth chapter is the outcome of the study, which gives findings of the study, conclusion and suggestions.

References

4. Ibid P 614
5. Ibid P 489
6. Ibid P 486
7. Ibid P 1013
8. Ibid P 1019
10. Ibid P.807
Propagation of Pepper by Cuttings

Manual Harvesting of Pepper

Bush Pepper Plant