CHAPTER I
INTRODUCTION

1.1 INTRODUCTION

Dairying is an important allied activity and generates remunerative employment and provides income to the people living in rural areas. It forms one of the components of the backbone of Indian economy. There are also many secondary and tertiary business activities related to livestock which play a crucial role in rural economy and livelihood. Cattle provide draught power and milk for human consumption. Milk production is predominantly the domain of smallholder in a mixed farming system. Landless and marginal farmers rear milch animals to utilize their surplus labour. The best aspect of the milk is that milk is a complete food. In addition to it milk is the best source of preventing and curing of many diseases. Dairying is making a significant contribution to the national economy and socio-economic development of rural people.

The status of Dairy farmers is very important and related to their life. Dairy farmers who produce milk have just one or two cattle or buffalo. Most of Dairy farmers are small or marginal farmers or landless labourers. They belong to economically weak and socially backward class and are mostly illiterate.

In India the need for promotion of dairy industry the caused by low per capital, availability of milk and prevalence of large scale unemployment. Various dairy development programmes were started to ensure supply of adequate quantity of milk at reasonable price to urban consumers and to provide viable subsidiary occupation to unemployment rural poor so as to raise their income earning capacity.

In the agrarian economy of India, amongst other agro-allied activity dairying has been considered as one of the most important sources of subsidiary occupation.
Generally the marginal, small farmers and even the landless also prefer dairying as one of the suitable employment opportunity in rural India.

1.2 ROLE OF DAIRYING IN RURAL DEVELOPMENT

Milk has been recognized as the most complete single food available in nature for the maintenance of health and promotion of growth of the mammal. It is not known exactly when in the history of the world man decided to utilize milk of other animal for his own benefits. Around 1500 to 2000 BC the Aryans were the first to domestic cattle, use them for tilling their land and obtain milk to be consumed as food. Again Aryans who priced the milk of a cow more than its meat forbade its slaughter, created legends about it and even worshipped it. Hindus even to this day consider cow as sacred. To this day the same practice is religiously followed by Hindus all over India.

1.3 NEED OF DAIRY INCOME CONTRIBUTION TO FAMILY

Livestock production is equally important to both landowning and landless families. Milk and milk products play a vital role in the country’s agricultural economy. Dairying provides sustenance to millions of farmers, particularly the rural poor. Dairy development fits most appropriately in the development programmes to increase rural employment, and to promote equitable distribution of income with social justice. In small farm situation, milk and milk products directly help in increasing crop production by making liquid cash available to the farmers for the purchase of essential inputs.

Poor households need the economic and labour resources of all their members. Men’s incomes are not sufficient for the survival of the household. Development programmes, which increase only men’s income, are not successful in alleviating
poverty and malnutrition and women’s lack of access to healthcare, education and information. In India, as in many developing countries, gender is linked with poverty. Poor household are forced to adopt short and inequitable allocation of resources. While scarce resources are allocated to men tie consuming risks and responsibilities are more often allocated to women.

1.4 CONTRIBUTION OF DAIRY SECTOR TO THE NATIONAL INCOME

India represents one of the World’s largest and fastest growing markets for milk and milk products due to increasing disposable incomes. In 2011 besides 121.50 million tonnes of milk, the livestock contributed 31.5 billion eggs, 46.5 million Kgs of wool, 4.49 million tons of Meat and 5.65 million tons of fish. Over the years. The contribution of the livestock sector to the agriculture GDP has increased from 17 to 29 per cent people in principal/subsidiary status, accounting for around five per cent of the total workforce.

1.5 CATTLE PRODUCTIVITY

There is a wide variation in milk productivity per animal among different countries. Against the world average of 2038 Kg per lactation, the highest of over 9000 Kg per lactation is found in Israel, followed by USA 7038 Kg UK 5462 Kg and Australia 4451 Kg with in India, milk yields vary widely. At one end are herds in institution farms reared under modern management, with an average yield 2000-3000 Kg. At the other end are village – reared dairy animals, their output averaging just 400-800 Kg. This deterioration from general neglect over centuries, and the consequent rise in the population of non-descriptive cows and buffaloes, chronic shortages of feed and fodder, coupled with their poor nutritive value, resulting in lower productivity as well as poor fertility of dairy animals. The productivity of our
milch animals is, in general, very poor increasing the productivity of these animals is
therefore the greatest challenge before the scientists and the researchers who can
promote sustainable integrated dairy management practices.

Agriculture and Animal Husbandry support the economy of nearly 60 percent
of the population. During 2010-11, animal husbandry contributed about 2.58 percent
of Gross State Domestic Product (GSDP) and that to the agricultural and allied
activities its contribution was 24.80 per cent. Animal husbandry comes in handy to
the rural community, majority of whom are landless, small and marginal farmers and
are also the available workforce for agriculture. Livestock sector plays a pivotal role
in creating sustainable, gainful employment opportunities and supplementing income
of small farmers and landless labourers. Moreover, it provides the much needed
balanced nutritious food and improves the household’s food security. Tamil Nadu
contributes 18.27 per cent of egg, 8.78 per cent of meat and 5.61 per cent of milk
production and stands second in egg and fifth in meat and eighth in milk production
of the country.

1.6 ORIGIN OF DAIRY CO-OPERATION IN INDIA

It is generally believed that the Kaira District co-operative milk producer’s
union limited, properly known as Amul (Anand Milk Union Limited) is the first dairy
co-operative in India. Origin of dairy co-operatives perhaps started with the formation
of madras-co-operative milk supply union in 1926 almost 20 years before the first
dairy co-operative society was registered in the Anand taluk of the then Kaira district
in Gujarat. There were similar other milk supply union operating in Coimbatore,
Allahabad and Lucknow much before the Kaira District co-operative milk producers’
union Limited was registered at Poona on December 14, 1946 by the registrar of Co-operative Societies of the Bombay Presidency\(^1\).

The Major differences in the functioning and the structure of the other co-operative milk supply unions and that of the Kaira districts cooperative milk producers union were:

a) The nature of membership

b) The assurance given to milk producer members that all their milk would be purchased even in flush season.

c) The character of the Gujarat farmer running his village milk society and

d) The character of the leaders running the co-operative. Setting up milk producers’ co-operative in Kaira or for the matter in other parts of India were necessity born out the harassment that the milk producers received on the hands of middlemen and traders.

Table 1.1
Tamil Nadu Livestock Population during the Inter Census Periods

<table>
<thead>
<tr>
<th>Species</th>
<th>17th Census Population</th>
<th>18th Census Population</th>
<th>per cent increase/decrease over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>91.41</td>
<td>111.89</td>
<td>22</td>
</tr>
<tr>
<td>Buffalo</td>
<td>16.58</td>
<td>20.09</td>
<td>21</td>
</tr>
<tr>
<td>Sheep</td>
<td>55.94</td>
<td>79.91</td>
<td>43</td>
</tr>
<tr>
<td>Goat</td>
<td>81.77</td>
<td>92.75</td>
<td>13</td>
</tr>
<tr>
<td>Horses and Ponies</td>
<td>0.25</td>
<td>0.06</td>
<td>-76</td>
</tr>
<tr>
<td>Donkeys</td>
<td>0.26</td>
<td>0.05</td>
<td>-81</td>
</tr>
<tr>
<td>Pigs</td>
<td>3.21</td>
<td>2.84</td>
<td>-12</td>
</tr>
<tr>
<td>Dogs</td>
<td>27.16</td>
<td>18.40</td>
<td>-32</td>
</tr>
<tr>
<td>Rabbits</td>
<td>0.67</td>
<td>0.14</td>
<td>-79</td>
</tr>
</tbody>
</table>

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The total livestock population of the State is 307.59 lakh (2007), accounting to 5.81 per cent of the country’s livestock population of 5296.98 lakh. Among the livestock, the sheep population in the State has registered the maximum growth. Population of cattle and buffaloes has also increased around 21-22 per cent.

1.7 DAIRY DEVELOPMENT IN TAMIL NADU

India is one of the largest milk and milk products producing countries in the world. The country’s milk production increased from around 20 million tonnes in 1960s to 121.50 million tonnes in 2011. The per capita availability (281g/day in 2010-11) is almost equal to the requirement of 280 g/day. The State was placed between eighth to ninth position in the country in overall milk production in the last 10 years. Considerable reduction in buffalo’s population, less increase in productivity of crossbred animals, existence of longer dry period and relatively larger share of milk from indigenous animals in some districts could be the reasons for lesser increase in milk production during the last 10 years in the State. Maintenance of pedigree records for crossbred animals, adoption of oestrus synchronization techniques and administering smart mineral mixtures to cattle, value added health conscious dairy products are the few strategies that can be employed successfully to tackle the above issues. In procurement of milk through cooperatives, the State stood between third and fourth position in the last 10 years. Tamil Nadu stood fourth in milk sales through co-operatives.

Milk production in Tamil Nadu during 2011-12 was around 68.34 lakh metric tonnes (L.MT) While 12 per cent of the milk is consumed in the villages by milk producers, 49 per cent of milk is handled by the unorganized sector. The remaining 39 per cent of milk is handled in the organized sector. The share of cooperatives in the organized sector is 24 lakh liters per day (LLPD) to 29 LLPD. The Dairy
Development Programmes are implemented in Tamil Nadu through a network of milk cooperatives organized on ‘Anand Pattern’ model. The institutional framework has a three tier structure viz., societies at village level, unions at district level and federation of units at the apex (State) level.

The main objective of milk cooperatives is to procure milk at a reasonable price and make it available to the consumers throughout the year at nominal cost. The dairy cooperatives are keen to meet the growing liquid milk demand in the State and keep the prices under control.

In the recent years, private dairy operators play a key role in the dairy sector. They actually take care of the farm level production management to increase the productivity of animal, land, water and labour by scientific and partial mechanization. The inputs like selection of animal, shelter, fodder, veterinary services, procurement of milk, training to farmers and financial tie ups with banks are provided by the private dairy operators.

1.8 STATEMENT OF THE PROBLEM

The bulk of Indian rural population consists of small and marginal farmers and the landless agricultural labourers who mainly depend on agriculture for their livelihood. Therefore, some economical viable and feasible programmes are required to be formulated and complemented to bring about desirable improvements in the socio-economic status of the rural poor. Dairy Development is the main subsidiary occupation directly related to agriculture. The Governments of different states have laid emphasis on dairy development to generate the additional income through government milk scheme. Co-operative dairy development was cultivated on priority basis and it was spread in different states of our country.
Milk and milk products are a major source of cheap and nutritious food to millions of people in India and it is the only acceptable source of animal protein for a large vegetarian segment of Indian population. Dairying provides livelihood to millions of small and marginal farmers. It also provides the main source of income next to agriculture.

Dairy industry is of crucial importance to India. It generates regular income not only to the rural but also to the urban and semi urban population. Especially to womenfolk by providing self employment opportunity and thereby improving their life. In a tropical country like India, agriculture may fail some times, due to monsoon failure but dairying never fails and it gives regular and steady income\(^2\).

Through changes in government policy, the number of privately owned plants has increased substantially. The effect of these charges upon the performance of this sector has not been carefully assessed yet. Milk is a perishable commodity and a seasonal production. It cannot be stored in its raw form. Hence processing and product transformation are crucial sector in this industry. An attempt has been made in the present study to identify the living and working condition of dairy farmers in Tirunelveli District.

1.9 SCOPE OF THE STUDY

This study will be helpful to know about the socio-economic conditions of the dairy farmers, especially in the areas of income, employment, and profit through the dairy farming activities. This study analyses the production and marketing of milk through dairy cooperative and vendors also. This study is especially focused on benefit of dairy farmers, knowledge about the Dairy activities, problem faced by the

beneficiaries, suggestion of dairy farming for good performance for better economic status.

This study is mainly confined to the role played by the Dairy farming in Tirunelveli District. The performance of milk production and socioeconomic status of dairy farmers are also analysed.

1.10 OBJECTIVES OF THE STUDY

The specific objectives of the present study are

1) To study the general feature of dairy sector in Tirunelveli Districts

2) To estimate the standard of living of dairy farmers

3) To examine the factors influencing milk production and income from dairy farming

4) To examine the knowledge of good marketing and strategy of dairy farmers

5) To find out the problems faced by the dairy farmers

6) To suggest a few measures for the betterment of socio economic status of dairy farmers

1.11 OPERATIONAL DEFINITION OF THE CONCEPTS

1.12 HYPOTHESES OF THE STUDY

H₀ - There is no significant difference in problems encountered by different age group of dairy farmers in Tirunelveli district.

H₀ - There is no significant difference in problems encountered by different gender group of dairy farmers in Tirunelveli district.

H₀ - There is no significant difference in problems encountered by different educational qualification of dairy farmers in Tirunelveli district.
H₀ - There is no significant difference in problems encountered by different community of dairy farmers in Tirunelveli district.

H₀ - There is no significant difference in problems encountered by different marital status of dairy farmers in Tirunelveli district.

H₀ - There is no significant difference in problems encountered by different family size of dairy farmers in Tirunelveli district.

H₀ - There is no significant difference in problems encountered by different family type of dairy farmers in Tirunelveli district.

H₀ - There is no significant difference in problems encountered by different occupation of dairy farmers in Tirunelveli district.

1.13 METHODOLOGY OF THE STUDY AND SOURCES OF DATA

The study is a descriptive one based on survey method employing both primary and secondary data.

1.14 SOURCES OF DATA

One pre tested interview schedule was designed. The schedule has four parts. The first part contains questions related to socio-economic profile, the second part related to cattle particulars. Third part contains questions on the impact of dairying on Dairy Farmers and the fourth part identifies the problems faced by the dairy farmers.

Data were collected from both primary and secondary sources.

The present study is an empirical one based on survey method. The Primary data were collected from the sample respondents through a pre-tested and a well-structured interview schedule. Data relating to various factors like social condition and economical condition, production, marketing etc., in Tirunelveli District.

Secondary sources for the milk co-operative society, Deputy Registrar of dairy and Joint Director of Animal Husbandry in Tirunelveli District, were also used.
1.15 SAMPLING DESIGN

The present investigation has adopted multistage sampling methods for the selection of dairy units under different categories of management and the respondents.

Number of blocks in Tirunelveli District

Stage – I
Selection of Blocks based on the different types of dairy manage moved

Stage – II
Selection of Village based on different types of dairy Management
Total No of Dairy farmers 250 550 350

Stage – III
Selection of Respondents 25per cent 63 137 88

Total Number of Respondents 288
Table 1.2
Sample Frame and Sample size of the study

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Name of Block</th>
<th>Name of the Village</th>
<th>Total No of Milk Producers</th>
<th>Sample Size in Percentage</th>
<th>Sample respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Manur</td>
<td>Rajapathy</td>
<td>250</td>
<td>25</td>
<td>63</td>
</tr>
<tr>
<td>2.</td>
<td>Cheranmahadevi</td>
<td>Melacheval</td>
<td>550</td>
<td>25</td>
<td>137</td>
</tr>
<tr>
<td>3.</td>
<td>Radhapuram</td>
<td>IllayanainarKulam</td>
<td>350</td>
<td>25</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>288</td>
</tr>
</tbody>
</table>

Source: Primary Data

Twenty five percent each of the total milk producer members of the three blocks. The respondent was selected by simple random sampling method.

Among the 19 blocks in Tirunelveli District, Three blocks has been selected for the study. The blocks are Manur, Cheranmahadevi, and Radhapuram.

Among the three blocks, Manur block has a highest milk production and procurement in Tirunelveli District.

Cheranmahadevi with the highest number of women producers in Tirunelveli District and Radhapuram block with the largest cattle and buffalo population (18 census) in Tirunelveli District.

Table 1.3
Profile of the selected Block

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Particulars</th>
<th>Manur</th>
<th>Cheranmahadevi</th>
<th>Radhapuram</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Geographical Area (in KM)</td>
<td>493.43</td>
<td>197.93</td>
<td>446.14</td>
</tr>
<tr>
<td>2.</td>
<td>Revenue village</td>
<td>46</td>
<td>51</td>
<td>39</td>
</tr>
<tr>
<td>3.</td>
<td>Total population</td>
<td>510147</td>
<td>123848</td>
<td>116576</td>
</tr>
<tr>
<td>4.</td>
<td>Literacy rate (per cent)</td>
<td>83.18</td>
<td>71.61</td>
<td>71.63</td>
</tr>
<tr>
<td>5.</td>
<td>Cattle production</td>
<td>35383</td>
<td>47861</td>
<td>56225</td>
</tr>
<tr>
<td>6.</td>
<td>Milk production (in litres)</td>
<td>2299440</td>
<td>663480</td>
<td>684672</td>
</tr>
</tbody>
</table>

Source: District Statistical Hand Book Tirunelveli 2010 – 2011
1.16 METHODOLOGY

The collected data had been processed with the help of appropriate statistical tools. The statistical tools were selected on the basis of the objectives of the study and also the nature of data included for the analysis. The details of statistical tools and its relevance of application are summarized below:

1.16.1 Percentage

In order to analyse the socio economic profile of sample respondent, the simple percentage analysis was adopted

1.16.2 T Test

‘t’ test is used to study the significant differences among two groups of samples with respect to a variable. It is also used to test the significance of a correlation co-efficient calculated among two variables. Theoretical work on t-distribution was done by W.S. Gosset in the early 1900. The “t-statistic” is defined as:

\[ t = \frac{x - \mu}{s} \times \sqrt{n} \]

Where, \( S = \sqrt{\frac{\sum(x - x')^2}{n-1}} \)

The t-distribution is derived mathematically under the assumption of a normal distribution as:

\[ f(t) = C \left(1 + \frac{t^2}{v}\right)^{-\frac{v+1}{2}} \]

Where, \( t = \frac{(X-\mu)}{S} \sqrt{n} \)

\( C = a\) constant required to make the area under the curve equal to unity.
\( v = n-1\), the number of degrees of freedom.

To test the significance of the correlation coefficient the following formula is used:

\[ t = \frac{r}{\sqrt{1-r^2}} \times \sqrt{n} - 2 \]

Where, \( t \) is based on (n-2) degrees of freedom.
If the calculated value of \( t \) exceeds \( t_{0.05} \) for \((n-2)\), d.f., the value of \( r \) is significant at 5% per cent level. If \( t < t_{0.05} \) the data are consistent with the hypothesis of an uncorrelated population.

### 1.16.3 ANOVA

ANOVA test is used by the researcher to find the significant differences existing among the three or more sample groups in relation to a variable. The total variance in a set of data is divided into variation within groups and variation between groups.

The ANOVA technique is based on the concept of sum of squared deviations from a mean. Corresponding to the total variance and its two components, we have

- the total sum of squares (SS),
- between groups sum of squares (SS\(_b\)),
- within groups of squares (SS\(_w\)).

The total sum of squares (SS\(_1\)) is equal to a sum of within and between groups sum of squares.

\[
SS_1 = SS_b + SS_w
\]

**SS\(_b\)** is by calculating the difference between each sample mean and the total mean. The squared difference is multiplied by the sample size in the concerned category and these quantities. The formula is

\[
SS_b = \sum [(x-x_1)^2 \times n]
\]

Where,  
\( X \) = any sample mean 
\( X_1 \) = the total mean 
\( n \) = the number of scores in any sample 
\( SS_b \) = the between groups sum of squares
Mean Square

The value of the sums of squares tends to become larger as variation increases and also as sample size increases. The mean square (or variance) is obtained by dividing $SS_b$ or $SS_w$ by the appropriate degrees of freedom.

\[
MS_b = \frac{SS_b}{df_b} \\
MS_w = \frac{SS_w}{df_w}
\]

Where,

- $MS_b$ = the between-groups mean squares
- $MS_w$ = the within-group mean squares
- $df$ = the degrees of freedom
- $df_b = k-1$
- $df_w = n_1-k$

Where,

- $k$ = the number of samples (groups)
- $n$ = the total number of scores in all samples combined.

1.16.4 Chi-Square test

The chi-Square ($\chi^2$) test is a statistical tool used to examine differences between nominal or categorical variables. This test compares the observed data with expected data according to a specific hypothesis. Mostly a null hypothesis will be framed and that will be tested with the help of the chi-square test. In this research work, several null hypotheses have been framed and this test has been applied. The formula used for chi-square test is given below.

\[
\chi^2 = \sum \frac{(O-E)^2}{E}
\]

Where

- $O$ = The observed frequencies
- $E$ = The expected frequencies
- $\sum$ = The ‘sum of’
When the calculated value of the chi-square test is higher than the calculated value of the chi-square test is higher than the table value at 5 per cent significance level, then the hypothesis is rejected and the decision is made accordingly.

1.16.5 Factor Analysis

To analyze the factors influencing to take up dairy farming, the Factor Analysis method has been applied.

The factor analysis model in matrix notation is given by

\[ X = Af + e \]

Where,

\[ X = (x_1, x_2, x_3, \ldots, x_p) \]

\[ F = (f_1, f_2, f_3, \ldots, f_m) \]

\[ E = (e_1, e_2, e_3, \ldots, e_p) \]

\[ M = \text{Number of factors} \]

And the relevant matrix is

\[
A = \begin{pmatrix}
a_{11}, & a_{12}, & \ldots, & \ldots, & \ldots, & a_{1m} \\
a_{21}, & a_{22}, & \ldots, & \ldots, & \ldots, & a_{2m} \\
\ldots, & \ldots, & \ldots, & \ldots, & \ldots, & \ldots, \\
\ldots, & \ldots, & \ldots, & \ldots, & \ldots, & \ldots, \\
a_{p1}, & a_{p2}, & \ldots, & \ldots, & \ldots, & a_{pm}
\end{pmatrix}
\]

Where \( a_{ij} \) is the factor loading which give net correlation between the variables \( x_i \) and factor \( f_j \) (where \( i = 1, 2, \ldots, p \) and \( j = 1, 2, 3, \ldots, m \)). It is assumed that the error variables (e) are distributed independently of f and p and e as a multivariate normal distribution.
1.16.6 Mann-Whitney U Test

Mann-Whitney U test is the non-parametric equivalent of the independent samples t-test. A Mann-Whitney's U test is also known as Wilcoxon Rank sum test and non-parametric version of t test. Mann-Whitney's U test compares the medians of the two groups, not the means.

A case in point is the Mann-Whitney U-test (Also known as the Mann-Whitney-Wilcoxon (MWW) or Wilcoxon Rank-Sum Test). Unlike its parametric counterpart, the t-test for two samples, this test does not assume that the difference between the samples is normally distributed, or that the variances of the two populations are equal. Thus when the validity of the assumptions of t-test are questionable, the Mann-Whitney U-Test comes into play and hence has wider applicability.

The Mann-Whitney U test is used to test whether two independent samples of observations are drawn from the same or identical distributions. An advantage with this test is that the two samples under consideration may not necessarily have the same number of observations.

This test is based on the idea that the particular pattern exhibited when 'm' number of X random variables and 'n' number of Y random variables are arranged together in increasing order of magnitude provides information about the relationship between their parent populations.

The Mann-Whitney U test criterion is based on the magnitude of the Y's in relation to the X's, i.e. the position of Y's in the combined ordered sequence. A sample pattern of arrangement where most of the Y's are greater than most of the X's or vice versa would be evidence against random mixing. This would tend to discredit the null hypothesis of identical distribution.
The test has two important assumptions. First the two samples under consideration are random, and are independent of each other and Second the observations are numeric or ordinal (arranged in ranks).

In order to calculate the U statistics, the combined set of data is first arranged in ascending order with tied scores receiving a rank equal to the average position of those scores in the ordered sequence.

The Mann-Whitney U test statistic is then calculated using \( U = n_1 n_2 + \frac{n_1 (n_1 + 1)}{2} - T \), where \( n_1 \) and \( n_2 \) are the sizes of the first and second samples respectively.

Next compare the value of calculated U with the value given in the Tables of Critical Values for the Mann-Whitney U-test, where the critical values are provided for given \( n_1 \) and \( n_2 \), and accordingly accept or reject the null hypothesis. Even though the distribution of U is known, the normal distribution provides a good approximation in case of large samples.

1.16.7 Kruskal-Wallis Test

The Kruskal–Wallis one-way analysis of variance by ranks (named after William Kruskal and W. Allen Wallis) is a non-parametric method for testing whether samples originate from the same distribution or not. It is used for comparing more than two samples that are independent, or not related. The parametric equivalent of the Kruskal-Wallis test is the one-way analysis of variance (ANOVA). When the Kruskal-Wallis test leads to significant results, then at least one of the samples is different from the other samples. The test does not identify where the differences occur or how many differences actually occur. It is an extension of the Mann-Whitney U-test to test to 3 or more groups. The Mann-Whitney U Test helps to analyze the specific sample pairs for significant differences.
Since it is a non-parametric method, the Kruskal–Wallis test does not assume a normal distribution of the residuals, unlike the analogous one-way analysis of variance. However, the test does assume an identically shaped and scaled distribution for each group, except for any difference in medians.

Kruskal–Wallis Test is also used when the examined groups are of unequal size (different number of participants).

1.17 OPERATIONAL DEFINITION OF THE CONCEPTS USED IN THE STUDY

**Age at calving**
It refers to the age of animal at which the first calf is born.

**Animal husbandry**
A branch of veterinary science, which deals with livestock management, production and breeding.

**Artificial Insemination (A1)**
Artificial placement of semen in the females genital tract with a view to cause impregnation.

**Balanced ration**
A term applied to diet, ration, or feed having all known required nutrients in proper amount and proportion based upon recommendations of recognized authorities in the field of animal nutrition.

**Bovine**
The term pertains to cattle, the genus Bos relating to cow and buffalo.

**Breed**
A group of animals having common origin and processing certain distinguishing characters not common to other animals of the same species.

**Breeding**
The science and art of bringing improvement in animals through the selection and proper mating system.

**Calving Interval**
It refers to the period from one calving to the next. Twelve to thirteen months in considered an efficient interval.
<table>
<thead>
<tr>
<th><strong>Cattle</strong></th>
<th>A collection of live domestic animal kept as Property or for use by an individual specially bovine animal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concentrate</strong></td>
<td>It is a feed low in fibre (about 20 per cent) and high (over 60 per cent) in Total Digestible Nutrients (TDN)</td>
</tr>
<tr>
<td><strong>Crossbreed</strong></td>
<td>It refers to offspring’s produced from cross-Breeding</td>
</tr>
<tr>
<td><strong>Crossbreeding</strong></td>
<td>The breeding of one distinct type or breed of animal with another breed; crossing, hybridizing; breeding between two varieties of same species.</td>
</tr>
<tr>
<td><strong>Dairy</strong></td>
<td>The term refers to a farm where milk is Produced</td>
</tr>
<tr>
<td><strong>Dairying</strong></td>
<td>The business of operating a dairy, including distributing and selling milk and its products.</td>
</tr>
<tr>
<td><strong>Dehorning</strong></td>
<td>Removing horns from the cattle; it is usually done at an early age. The horn bud is removed with hot iron or strong caustic.</td>
</tr>
<tr>
<td><strong>Dry cow</strong></td>
<td>A cow, which has stopped giving milk.</td>
</tr>
<tr>
<td><strong>Dry Period</strong></td>
<td>A period between the end of one lactation and the beginning of another.</td>
</tr>
<tr>
<td><strong>Fodder</strong></td>
<td>The Stalks and leaves of dry crop plants or those of fresh plants given as feed to livestock.</td>
</tr>
<tr>
<td><strong>Fodder Crops</strong></td>
<td>Fodders are mainly obtained from straws of cereals grown for grain, and from plant residues of pulses and other legumes. Some cereals and legumes are also grown for fodder purposes.</td>
</tr>
<tr>
<td><strong>Fodder grass</strong></td>
<td>important fodder grasses cultivated in the country are napier or elephant grass, guinea grass.</td>
</tr>
<tr>
<td><strong>Forage</strong></td>
<td>Green stuff obtained from the crops raised for livestock feeding. Usually it refers to roughage and crops grown primarily for use as roughage.</td>
</tr>
</tbody>
</table>
Germ plasm  Genetic material in the form of sperm or ovum. Generally, superior term plasma, selected on the basis of genetic merit, is utilized in breeding so as to improve production. Orange preserved in dry form without anyway appreciable loss in its nutritive value Heifer female matured young cow, usually one that has not produced offspring; ready for breeding usually around two year age.

Herd  A group of cattle collectively considered as a Unit

Hereditary  Physical and productive characteristics inherited from parents.

Inseminate  To implant the male sperm into the genital tray of a female, either naturally or artificially.

Lactation period  Time between calving during which the cow produced milk.

Legumes  Plants of the family Leguminosae, which bear seeds in pods as in peas and beans. Legumes are generally rich in both protein and mineral content and make excellent fodder forage for Dairy cattle. Because of their specialized root system legumes tend to fix nitrogen and enrich the soil.

Lucerne  leguminous fodder crop perennial in nature and provides green nutritionally rich fodder throughout the year

1.18 LIMITATIONS OF THE STUDY

The study has focused on the performance of the Dairy farmers in one district with its sample drawn from three blocks. In view of the limited time and material resources of the investigation, the size of the sample had to be restricted to 288, which is expected to reflect the silent features of the problem of the Dairy farmers in the study area.

The period of the study was limited to five years 2009 – 2017. Since a longer period was not feasible for collection of Primary Data due to limitations of collection.
1.19 CHAPTER SCHEME

The present study “An Economic Study On Dairy Farming In Tirunelveli District of Tamilnadu is organized into seven chapters.

Chapter I – Introduction

Introduces the subject and deals with historical background of dairy farmers in India and various categories of dairy management, and Methodology of the study and sources of Data, scope of study, objectives, hypothesis, limitation and scheme of work.

Chapter II – Review of literature

Chapter III – Profile of the Study Area

Chapter IV – Challenges of dairy Industries

Chapter V – Socio- Economic Status of the Respondents

Chapter VI – Analysis Level of attitude and problem faced by the dairy farmers

Chapter VII – Summary of findings, Suggestions and Conclusion.