CHAPTER I

DESIGN AND METHODOLOGY
1.1 Introduction

Agriculture is the largest and the most important sector of the Indian economy. About 68 per cent of people depend on agriculture and another 10 per cent indirectly depend on it in villages. Further, those living in towns and cities also benefit from agriculture in more than one way, through trade in agricultural products, working in agricultural processing units and agro-based industries, etc.

Agriculture plays an important role in the development of an agrarian economy like India. The contribution of agriculture to the economy consists of increasing food supply to match the growing demand, provision of raw materials for industries, generation of surplus financial resources for investment and expansion of secondary and tertiary sectors, provision of employment opportunities to labour force and earning of foreign exchange through exports.¹

Agriculture is the backbone of the Indian economy. The impulses of its prosperity or deceleration are

instantaneously transmitted and are reflected in the other sectors of the economy. In spite of concerted efforts to develop agriculture in India, it still remains the most backward sector of the economy. The rate of growth of agriculture is very low compared to that of industry and service sectors.

The significance of agriculture in Indian economy is steadily declining. The share of agriculture in the national income clearly shows that agriculture and allied activities contributed 52.2 per cent in 1960-61, 49.1 per cent in 1970-71, 38.4 per cent in 1980-81 and about 37.6 per cent in 1983-84.² By 1988-89 its share has come down to 30 per cent.³

As a result of planned efforts, Indian agriculture has been experiencing a substantial impact on science and technology since mid sixties. The introduction of New Agricultural Technology in the form of high yielding varieties, chemical fertilizers coupled with assured irrigation facilities has brought a veritable revolution in

Indian agriculture. It has increased agricultural production and productivity. But its impact was highly commodity and region biased.⁴

Increased production and productivity did not, however, lead to increased prosperity of all farmers. People living in irrigated tracks and having physical and financial resources have appropriated the gains of development and those living in dry regions have remained silent spectators of progress made elsewhere. Further, increased production has not been buttressed by remunerative prices for agricultural commodities so as to encompass the cost of production and to ensure a reasonable rate of return on investment. The terms of trade actually went against agriculture. Monsoons have become more erratic and the incidence of floods and drought is experienced simultaneously. The increase in irrigation potential has not been utilised fully. Low prices for agricultural commodities coupled with increasing wages and input costs are striking hard at the very roots of economic viability of agriculture. Farmers are compelled to undertake various non-farm activities such as small scale and cottage

industries, trade and services for supplementing their incomes. On-farm activities like horticulture, sericulture, pisciculture, poultry farming are equally powerful in redressing the sufferings of rural masses. Among on-farm subsidiary occupations, poultry farming is more popular.

1.2 **The Study**

The genesis of poultry farming in Chittoor district can be traced back to the poor performance of agriculture in the region. Agriculture has been the principal occupation and major source of livelihood to the rural people. However, its importance in the region declined in recent years due to a number of reasons. There are no assured irrigation projects to provide irrigation facilities. Wells are the main source of irrigation. If the monsoon fail in any year, majority of wells gets dried-off. This makes difficult the cultivation of wet crops. The cultivation of dry crops also becomes equally gamble in monsoon. Stagnant prices for many agricultural commodities along with rapidly increasing wages and other input costs has made cultivation of agricultural commodities unremunerative. Consequently, farmers are compelled to take other
subsidiary occupations to supplement their meagre farm income. In this context poultry farming was found to be a great boon to them. Many small and marginal farmers who are hit hard in agriculture have resorted to poultry farming.

Many factors contributed to the rapid development of poultry industry in the district. Poultry farming requires less labour and other inputs. The inputs are available readily in the district. Banks and other financial institutions are well developed in the region and they provide liberal financial assistance.

The Chittoor district is located in the southern part of Andhra Pradesh bordering Tamil Nadu and Karnataka. It is blessed with good transport system connecting number of cities and towns in Tamil Nadu, Andhra Pradesh and Karnataka. The managerial and technical guidance to the poultry farmers in the district is readily available from the rich experience of the poultry farmers in Tamil Nadu. With ten urban centres including five municipalities, Chittoor district provides good market for poultry farmers. Medical assistance to poultry farmers are provided by the local veterinary dispensaries and the
veterinary college, Tirupati. All these factors attracted the attention of small and marginal farmers and educated unemployed youth in the district towards the poultry farming.

There has been a rapid increase in the number of poultry farms in this district and at the end of April 1991, there were 293 registered poultry units. The success achieved by the enthusiastic farmers in the initial stages acted as an impetus to the new entrants. However, in recent years the poultry farming in Chittoor district has confronted with teething problems. Feed and other inputs costs have increased more than proportionate to increase in egg and chicken prices. Original and appropriate medicine is not available in time. Mushroom growth of poultry farms in the district has led to over-supply and fall in prices. These problems are also seemed to be common to poultry farms in other districts in Andhra Pradesh.

There are no systematic studies on problems of poultry farming in Chittoor or other districts in Andhra Pradesh to analyse and understand the root causes and to suggest suitable remedial measures to save the poultry industry
from bankruptcy. The present study is a modest attempt towards this end.

1.3 **Objectives of the Study**

The following are the specific objectives of the study.

1. To study the sources and amount of capital investment in poultry farming in Chittoor district.
2. To estimate the egg and chicken yield per bird.
3. To assess the income and employment generated by poultry farming.
4. To study the channels and problems of egg/chicken marketing.
5. To analyse the variations in egg and feed prices and to examine price parity of eggs and feed over years.
6. To estimate the profits/losses earned by the poultry farmers.

1.4 **Hypotheses**

1. There is no correlation between the size of farm and the yield of egg/chicken per bird.
2. The cost of feed is not a major component of the total cost in egg/chicken production.

3. There are no seasonal fluctuations in egg/chicken prices.

4. There is no disparity between the indices of egg/chicken prices and feed prices.

5. There is no decline in the profit margin of poultry farmers over the period of time.

1.5 **Methodology**

1.5.1 **DATA BASE**

Both primary and secondary data were collected for the present study.

(i) **Primary Data**

Primary data relating to the size and structure of capital investment, employment generation, egg yield per bird in different farms, feed and egg/chicken price over years, profit margins, marketing problems of poultry products and other information needed to the study were collected through field survey.

(ii) **Secondary Data**

Secondary data was collected from Office of Assistant
Director of Poultry and Meat Development Corporation, Government of Andhra Pradesh, the poultry industry year books 1976, 1986, 1989, and 1990, Andhra Pradesh Darshini 1990 and periodicals like Poultry Guide, Poultry Adviser, Poultry Gazette, Economic and Political Weekly, Yojana, Southern Economist, etc., and the dailies like Economic Times, Times of India, Indian Express, The Hindu, Andhra Prabha and Eenadu. In addition, the unpublished M.Phil and Ph.D dissertations have also been consulted for the present study.

1.5.2 SELECTION OF POULTRY UNITS

At the end of April 1991, there were 293 registered poultry farms in Chittoor district of Andhra Pradesh. These units were registered with District Industries Centre under Small Scale Industries Act. Out of the total 293 registered units, 224 were layer units and 69 were broiler units. An attempt was made to include all the units (census study) for the present study. However, during field investigation it was found that out of 224 registered layer units only 162 units were functioning and the remaining 62 units became defunct. Similarly,
out of 69 registered broiler units in the district, only 38 units were in operation and the remaining 31 broiler units became non-functional. Accordingly, all the working (162 layer and 38 broiler) units were included for the present study. An effort was made to collect information from the defunct units regarding reasons for closure down of the units. However, a systematic study of these defunct units was not attempted, but the collected information was made use to understand the problems confronting the poultry units in Chittoor district.

Besides the registered units, there were also a number of unregistered units. However, no information is readily available about their size and location. Hence, the study is confined only to registered units in Chittoor district. Specially designed and pretested interview schedules were used to collect data from the study units.

1.5.3 TOOLS OF ANALYSIS

Various statistical and econometric tools like linear growth rate, adjustment for seasonal variations,
analysis of variance (one way) and Cobb-Douglas Cost Function were used to analyse the data and to draw inferences.

(i) **Cobb-Douglas Cost Function**

To measure the elasticities of various input costs with respect to output value, Cobb-Douglas Cost Function is used.

\[
Y = B_0 X_1 X_2 X_3 X_4 X_5 U
\]

where

- \( Y \) = Value of output
- \( B_0 \) = Intercept
- \( B_1 B_2 B_3 B_4 B_5 \) = Elasticities of output with respect to various input costs
- \( X_1 \) = Rate of interest and depreciation
- \( X_2 \) = Cost of day old chick
- \( X_3 \) = Feed cost
- \( X_4 \) = Labour charges
- \( X_5 \) = Veterinary and miscellaneous charges
- \( U \) = Error term
To test the significance of the estimated coefficients \( B_1 \), 't' test has been employed.

\[
t = \frac{B_1}{S.E(B_1)}
\]

The coefficients of determination denoted by \( R^2 \) is an index of adequacy of linear fit. Nearer the value of \( R^2 \) to unity, the more is the adequacy of the fit. To test the \( R^2 \) value, F test statistic is employed.

\[
F = \frac{R^2/1 - R^2}{n-k-1/k-2}
\]

where

\( k \) = the number of explanatory variables

\( n \) = the number of observations

(ii) **Linear Growth Rate**

To measure the growth of production of eggs and broiler chicken, the following linear growth rate formula is used.

\[
Y = a + bx
\]
where

\[ Y = \text{Output} \]

\[ a \& b \text{ are constants} \]

\[ X = \text{Time} \]

\[ G.R = \frac{\hat{b}}{\bar{y}} \times 100 \]

To test the significance of linear growth, 't' test is employed using the following formula.

\[ t = b \times \sqrt{n-2} \left\{ \frac{(x_1 - \bar{x})^2}{(y_1 - \bar{y})} \right\}^{\frac{1}{2}} \]

where

\[ b = \frac{\sum (x_1 - \bar{x})(y_1 - \bar{y})}{(x_1 - \bar{x})^2} \]

\[ \sum (y_1 - \bar{y})^2 = \sum (y_1 - \bar{y})^2 - b^2(x_1 - \bar{x})^2 \]

(iii) **Adjustment for Seasonal Variations**

If the relation among the variables in the time series is multiplicative,
i.e.,

\[ Y_t = T_t \cdot S_t \cdot C_t \cdot R_t \]

where

- \( Y_t \) = Time series observations
- \( T_t \) = Trend
- \( S_t \) = Seasonal component
- \( C_t \) = Cyclical component
- \( R_t \) = Random component

Since the time series are available for ten years on monthly basis, it is assumed that the cyclical component is not present in the series. Thus, the multiplicative model now becomes,

\[ Y_t = T_t \cdot S_t \cdot R_t \]

As a first step seasonal component is removed from time series observations by calculating moving averages as follows.

To indicate year we choose the suffix, \( i \), and for a month suffix, \( j \). The multiplicative model may be
specified as:

\[ X_{ij} = T_i \cdot S_{ij} \cdot R_{ij} \]

\[ i = 1, 2, \ldots, 10 \text{ years} \]
\[ j = 1, 2, \ldots, 12 \text{ months} \]

A twelve month moving average was computed and centered each value opposite the seventh month in the average. These averages may be denoted by \( \bar{X}_{ij} \):

\[ \bar{X}_{ij} = \frac{X_{ij}}{\bar{X}_{ij}} \times 100 \]

Calculate means for each month over different years,

\[ \bar{X}_{ij} = \frac{1}{r} \sum_{i=1}^{r} \frac{X_{ij}}{r}, \quad j = 1, 2, \ldots, 12 \]

where, \( r \) is the number of years.

The seasonally adjusted series are

\[ X^*_{ij} = \frac{X_{ij}}{\bar{X}_{ij}}, \quad j \]

Seasonally adjusted data now consists of the impact
of trend and some random fluctuations. Assuming the presence of linear trend, the seasonality adjusted data are used to estimate the trend components.

(iv) **Analysis of Variance (One Way)**

To test whether egg yield per bird has significant variation among the marginal, small, medium and large farms, the analysis of variance of one way classification is used.

The framework of the analysis of variance is:

\[ X_{ij} = U = X_j + X_{ij} \]

where

- \( X_{ij} \) = Egg yield per bird in ith farm in jth type of farm
- \( U \) = General mean egg yield per bird
- \( X_j \) = Effect due to jth type of poultry farm
- \( X_{ij} \) = Random disturbances
- \( i = 1, 2, 3, 4, \ldots \) 200
- \( j = 1, 2, 3, 4, \ldots \)

Besides, price parity indices, averages, percentages,
coefficients of variation are used for analysis and interpretation of data.

1.6 Concepts Used

1.6.1 FIXED COST

The fixed cost included the rate of interest on capital investment, depreciation on machines and equipment and death of birds. 10 per cent on the value of machines and equipment was taken to arrive at depreciation rate. The rate of interest was taken at 15 per cent per annum of the total capital investment. Birds depreciation was worked out by adding up the prices of culled birds using mortality rates and the value of 15 days chick in the case of broilers.

1.6.2 VARIABLE COST

Variable cost included the cost of chicks, feed, labour, medical and other charges. The cost of chicks included chick price at hatchery and transport charges. With regard to feed cost, to the market prices of feeds were added the transport cost of the feed.
The number of labourers employed both on temporary and permanent basis and their wages are added to get total labour cost. All the expenses incurred in connection with dewarming, debarking, vaccination, medicines and other service charges were included in the variable cost.

The miscellaneous expenditure include the cost of lighting, repair on buildings and equipment, litter, shed sanitation and insurance, if any, to this were also added packing, transporting and other marketing expenditures.

1.6.3 TOTAL COST

Total cost of egg/chicken production per layer and broiler was worked out using the following formula.

Total cost = Total fixed cost + Total variable cost.

1.6.4 TOTAL REVENUE

Total revenue is calculated by the addition of the following items.

(a) Revenue from egg/chicken sold
(b) Revenue from culled birds sold
(c) Revenue from manure and gunny bags sold
(d) Revenue from the broiler chicken sold

Net revenue of total profit is computed by subtracting total cost from total revenue.

1.6.5 PROFIT MARGIN

It is the margin per 100 egg/chicken to the farm owner after deducting transport and handling charges and the cost of purchase from the selling price.

1.6.6 PRICE PARITY INDEX

\[ \text{Feed price parity index} = \frac{\text{Feed price index}}{\text{Egg price index}} \times 100 \]

\[ \text{Feed price parity index} = \frac{\text{Feed price index}}{\text{Broiler price index}} \times 100 \]

1.7 Scope and Limitations of the Study

The present study can be construed as a micro level study which covers all the 200 working poultry units in the district out of 293 registered poultry units in Chittoor district of Andhra Pradesh. It comprehensively covers all aspects of poultry farming ranging from mere
descriptive analysis of socio-economic background of poultry farmers, size and structure of poultry farms, sources of investment to more analytical and technical aspects like the nature of cost function governing production, nature and magnitude of elasticities of various inputs and estimation of trend in the movement of feed, chicken and egg prices over years. Since the present study is based on the registered units in Chittoor district of Andhra Pradesh, the findings of the study can very well be generalised to represent the entire poultry industry in Chittoor district. The findings can also be relevant to understand the working of the poultry units in other regions with similar agro-climatic and socio-economic conditions.

One limitation of the present study is exclusion of unregistered units from its purview mainly because of lack of time and resources for the individual researcher. The survey of these units can be undertaken by a larger research body with more resources at its command.

1.8 Plan of the Study

The thesis was presented in nine chapters.
The first chapter contains a precise discussion on the present status of research in the area under study justifying the need for it. It included objectives, hypotheses, data base, data collection, statistical and econometric models employed to analyse the data, concepts used in the study and scope and limitations of the study.

In the second chapter, poultry industry in India is briefly analysed. In this chapter poultry in the world, poultry industry in India, allocation of funds to poultry development under five year plans, poultry industry in Andhra Pradesh, problems and prospects of poultry industry are discussed in detail.

In the third chapter, a brief review of literature on various aspects of development and problems of poultry industry is presented.

In the fourth chapter, the profile of Chittoor district is described paying particular attention on the aspects relevant to the present study.

In the fifth chapter, a brief description of the size and structure of poultry farming in Chittoor district is presented. The socio-economic background of poultry
farmers also found place in the chapter.

In the sixth chapter, economics of poultry farming is analysed paying special emphasis on cost, revenue and profitability of both layer and broiler units in Chittoor district.

In the seventh chapter, the results of various statistical and econometric tools used to analyse the data are presented.

In the eighth chapter, marketing of poultry products is discussed throwing light on the price fluctuations and price parity indices in poultry industry. The problems confronting the poultry industry in Chittoor district are also discussed in the chapter.

In the ninth chapter, summary and conclusions and suggestions are presented.