1.1 INTRODUCTION

India is one of the countries, which have largest livestock population in the world. World milk production has increased from 590 million tonnes in the year 2001 to an estimated average of 791 million tonnes in December 2015. The average growth of world milk production is 2 per cent every year. Most of the increase comes from developing countries, in particular Argentina, China and India. India ranks first in world milk production and ranks Second in Cow milk Production next to USA.\textsuperscript{1} The milk production of India has grown to 140 million tonnes in 2013–2014 from a paltry 55.6 million tones in 1991–1992. And the per capita consumption of milk too has shown substantial improvement with 301 grams per day approximately (2013–2014) as against 178 grams per day in 1991–1992. Even at 301 gram per day approximately, it is still low compared to the world average of 279.4 grams per day but slightly higher than the average of developing countries. The production in India has grown six times since
independence and it is growing at 4 per cent per annum.\(^2\) Per capita availability of milk in India is 301 grams per day approximately in 2013 - 20014.\(^3\)

Milk production in Tamil Nadu state occupies 10\(^{th}\) place in India. Milk production is 7129 (000 tonnes) during 2013–2014.\(^4\) District-wise milk production in Tamil Nadu is found to be the highest in the districts of Salem (7.94%), Vellore (6.66%), and Coimbatore (6.06%). Per capita availability of milk by Tamilnadu is 279 grams per day in 2013 – 2014.

Among 30 districts of Tamil Nadu State, Virudhunagar District holds 15\(^{th}\) place in milk production with 254.7 (000 tonnes) during 2013 – 2014.\(^5\)

In India, the unorganized sector which handles 80 per cent of milk production while co-operatives and private sector handle the remaining 20 per cent. The economic survey 2010–2011 finds the poor productivity and no satisfactory marketing system. The demand for milk in 2012–2022 is estimated at 172.20 million tonnes (planning commission estimates), but the India Dairy Plan on NDDB projects the demand at 180 million tonnes. The statistics shows that the demand grows by 6 million tonnes per year while the production grows by 3.5 million tonnes per year. The demand may further go up with the accent in the economy, population and health awareness. To achieve the set goals, a growth rate of 5.5 per cent is necessary during the next decade. Poor achievements will lead to imports which may lead to rise in the global price of milk. There is a need for a focussed and righteous attention together with proper investment to this sector to achieve the targets.\(^6\)
Therefore, the study of milk marketing chains with reference to Virudhunagar District is necessary to have a better understanding of marketing chains as well as for increasing the production area for remedial action.

1.2 STATEMENT OF THE PROBLEM

Marketing channels are the keys for improving production and distribution. Surplus production can not enter the market due to inefficient knowledge about the marketing chains. Apart from this, poor productivity and not–so–satisfactory marketing system, non availability and non affordability of feed and fodder, improper veterinary infrastructure, deficiencies in prevention of diseases, inadequate research capacity, lack of transport and limited access to formal credit mechanisms to farmers as some of the major impediments to the growth of the sector.

Producers have no idea and efficient knowledge about the marketing chains of milk in Virudhunagar District. Due to poor marketing and transport facilities, there is a wide price gap between terminal and primary markets.

This study is to contribute information to fill the gap by investigating the milk marketing chains and factors affecting milk market in Virudhunagar District of Tamil Nadu State.

1.3 REVIEW OF RELATED LITERATURE

Studies on marketing, as made in the past, related not only to milk industry but other industries also. A review of such studies is bound to be useful in the identification
and formulation of problems, in suggesting methodology to be used, in analysis of data and in employment of statistical tools.

### 1.3.1 Studies on Characteristics of the Milk Producers

L. Singh and J. Chattaraj (1989) in their research article titled, “Import of Dairy Co-operatives on Production” have suggested that consumption and marketed surplus of milk determined the effect of dairy co-operatives on milk production, consumption and marketed surplus of milk.

S. Dexheimer and M. Ellen (1990) in their research work titled, “Specialty Products on the Move; Value-added Dairy Products Boost Profit Margins and Please Palates” have explained that the value-added often means that a healthy dairy product has been made healthier. In some cases, it can mean that a product has been made more convenient to prepare or consume.

Miriam Sharma and Urmila Vanjani (1993) in their research work with caption, “When more Means Less: Assessing the Impact of Dairy 'Development' on the Lives and Health of Women in Rural Rajasthan (India)” have opined that due to the success of cooperative dairy schemes in other parts of India (Operation Flood based on the Amul model), the Rajasthan government is attempting a similar scheme. It is hoped that a part of the milk obtained will go to the village dairy cooperative. The major aims of this program are to: encourage production of more milk for the cooperative dairies; encourage modern techniques of animal care; put control of the income from milk-selling in the hands of the women who care for the animals by permitting them to own the animals and
hence contribute to their 'independence' and 'development;' and to encourage self-sufficiency for the weaker sections by providing loans to the poor. Data were collected during fieldwork in a village in Alwar District, Rajasthan and specifically from observation and participation in the two-week dairy 'camp' there. Eighteen women were selected on poverty criteria to participate in the program. The general situation of these women is analyzed within the context of a critical discussion of the dairy movement in India, in general, and the intended effects on the lives of the village women, in particular, with special attention to the impact on their workload, nutritional intake and, ultimately, overall health. Concluding remarks are addressed to the broad issues of government development programs.

Manob Kanti Bandyopadhyay (1996) in their research work on “Dairy Co-operation and Rural Development with Special Reference to Comparative Study between the Kaira District Co-operative Milk Producers’ Union Limited and the Himalayan Co-operative Milk Producers’ Union Limited” have pointed out that, rearing of cattle is also an additional source of income of the villagers in our country. Maximum population of cows and buffaloes of the world are seen in India. This amount is too inadequate to meet the country’s demand. The supply of milk in some parts of India is higher than the local demand. On the other hand, supply of milk in the rest of the country as well as urban areas is much lower than the demand. In 1965, National Dairy Development Board (N.D.D.B) was set up with the object of meeting the increasing
demand of milk specially in urban areas as well as developing the rural economy through the enhancement of the milk production in the country.

Gautam Kakaty and Moromi Gogoi\(^{11}\)(2001) in their research study on “Employment and Income Opportunity in Dairy Enterprises of Assam - A Case Study” have discussed that animal husbandry plays an important role in India. It is closely interlinked with the socio-economic matrix of rural society. The development of livestock sector has been receiving significant priority in India in the last two to three decades. Dairy sector contributes significantly in generating employment opportunities and supplementing the income of small and marginal farmers providing them with food security.

H.G.Hegde\(^{12}\)(2001) in his article titled, “WTO Challenges for Indian Dairy Farmers”(2001) has pointed out that there is very little breathing time for Indian farmers to face the challenge of importing milk and milk products under WTO. Our farmers are not prepared to solve them well on time. It is necessary to reduce the cost of milk production by increasing the productivity of our animals. There is also a need to reduce the cost of handling of milk and processing by reducing intermediary agencies and by adding value to the produce. The quality of the milk should be of international standard which can be improved through screening of the livestock against major diseases and maintaining clean surroundings in the dairy farm. Finally, a policy can be evolved for producing low fat milk for general consumption while the high fat buffalo milk can be supplied to a selected category of customers interested in high butter fat.
S. Mather\(^{13}\)(2001) in his research article with caption, “That Changing Lifestyles, Especially among the Urban Population” has observed “That changing lifestyles, especially among the urban population”, necessitates production of large quantities of prepared or ready to use food product containing dairy ingredients. With the increasing purchasing power of the urban middle class, value–added products occupy a key position in the dairy products range.

Rawal and Vikas\(^{14}\)(2001) in their article entitled, “Participation of the Rural Poor in Dairy Co-operatives: A Case Study from Gujarat” have analysed that on a comparison of caste, education and land, the results points out that a larger proportion of households belonging to the backward caste, being less educated and holding lower size of land are not able to participate in dairying. A recent study of two dairy co-operatives in Gujarat argue that inequality in land ownership, caste, illiteracy and undemocratic functioning of co-operatives are the barriers to entry. Illiteracy might not be a factor in Kerala but land ownership is a major factor, as among the lower size class of land owners, smaller proportion seem to be keeping cattle.

Triveni Dutt\(^{15}\)(2001) in his research study on “Improving Milk Production in Cattle and Buffaloes - Vision and Challenges” has opined that the Cattle and buffalo production is an integral form of rural economy and contributes substantially to the family income. Milk production in 1998-99 was estimated to be 74.7 million tonnes, which is less than 10 per cent of world production. Around 54 per cent of this total milk comes from buffaloes, 42 per cent from cows and 4 per cent from goats. Large
increase in milk production has been due to increase in numbers and change in composition of cattle population mainly due to increase in number of crossbreds.

Isabelle Schluep Campo and John Beghin\textsuperscript{16}(2005) in their study on “Dairy Food Consumption, Production, and Policy in Japan” have explored and investigated Japanese dairy markets. Using historical data and econometric estimates of Japanese dairy demand, economic, cultural, and demographic forces that have been shaping consumption patterns. Then researcher has summarized the characteristics of Japanese milk production and dairy processing and policies affecting them. The paper concludes with policy recommendations of how to reform the Japanese dairy sector.

Jacques Somda, Mulumba Kamuanga and Eric Tollens\textsuperscript{17}(2005) in their research article entitled, “Characteristics and Economic Viability of Milk Production in the Smallholder Farming Systems in the Gambia” have suggested that the domestic milk production has been for a long time obstructed by many factors including lack of interest from decision makers, distorted economic policy and biotechnical constraints. Many developing countries have been attempting to develop the domestic milk production sector from last 20 years. This study focuses on the characteristic of smallholder milk producers in Gambia. Data were collected from 90 smallholder farm households to characterise milk producers and evaluate the profitability and viability status of this activity. Based on current typology of farms and gross margin analyses at farm level, the study identified two resource-based types of smallholder farms. The current milk production system is surely viable. Constraints to increased productivity include lack of improved technology at farm level and weak institutional support. Despite the low
viability status, it is shown that milk production generates reliable incomes, which could be a departure for most farmers to intensify farming systems, particularly in areas where no loan schemes exist for purchasing agricultural inputs.

M. Jeyachandra Reddy, Y.V.R. Reddy and Y.S. Ramakrishna (2005) in their research article entitled, “A Comparative Study of Cost of Milk Production under Different Agro-climate Regions in Semi-Arid Regions” have analysed the economics of milk production in three areas namely, Chittoor District in Andhra Pradesh, Erode District in Tamil Nadu and Kolar District in Karnataka. It is involving aspects related to existing cost structure of milk production, profitability of dairy cows in the three states under the changed socio economic political scenario. They also suggest methods to improve the viability and profitability of these enterprises. The data were collected by survey method during the year 2003. Seventy five farmers were selected at each location giving due importance in the selection of all categories of households. The number of dairy cows studied were 108 in Chittoor, 178 in Erode and 84 in Kolar districts. The net cost of maintenance of a cow per day work out to ₹.38.99, ₹.49.36 and ₹.48.88 in Andhra Pradesh, Tamil Nadu and Karnataka respectively. The cost per litre of milk work out to ₹.5.48, ₹.7.20 and ₹.5.84 in the same order. Feed cost was the major component in gross cost which account for 63.88 per cent in Andhra Pradesh. 72.14 per cent in Tamil Nadu and 71.62 per cent in Karnataka. The net profitability varies from 43 per cent in Tamil Nadu. 70 per cent in Andhra Pradesh and 83 per cent in Karnataka. The differences among the three studied locations are due to variation in breed, feeding pattern, maintenance of animals and the like. The study has further brought out the fact that
higher fat content provides higher price as milk is priced based on fat and solid-Net-Fat (SNF) content by dairies. Hence proper scientific breeding procedure is to be followed to improve fat content in the milk as well as milk production per animal. Besides scientific breeding, feeding, treatment and veterinary care and management would not only increase milk production and fat content in addition to reduction in cost, but also increase the income of farmers. Thus dairy farming is considered an instrument for socio-economic change in rural areas.

V. Ramakrishnappa. and R. Jagannatha Rao\(^1\) (2006) in their article entitled, “Emerging Microfinance Issues in Dairy Development: A Case Study from Karnataka, India” have opined that the dairy industry is an established sector in rural India. It has a vital role in generating additional income and employment. In India, Karnataka state has achieved a positive and significant dairy development and contributes towards milk production, marketing, and processing of various dairy products. The microfinance programmes extended in dairy sector are helpful to take up dairy as main occupation among economically backward communities in the state. The study has found that the microfinance scheme has positive impact on income and employment generation, and has improved the natural resource management options.

Hasan Cicek et.al.\(^2\) (2007) in their research work on “Effect of some Technical and Socio-economic Factors on Milk Production Costs in Dairy Enterprises in Western Turkey” have examined that the cost in dairy enterprises may be affected by the technical and socio-economic factors. In this context, 77 dairy enterprises running in Western Turkey were examined by its annual production records (2005-2006). Multiple regression
model is used to analyze the data. Results show that the parameters such as education of the producers, scale of the enterprise, feed consumption, feed procuring and litter size have significant effect \((P < 0.05)\) on the average milk costs. On the other hand, marketing, main occupation and age of the producer were found to be statistically insignificant \((P > 0.05)\). In conclusion, there is a felt need for decreasing the cost of the production as well as increasing the profitability of the enterprises by controlling the technical and socio-economic factors.

P.R. Waghmare and D.N. Hedgire\(^1\)(2007) in their research work with caption, “Econometric Analysis of Integrated Dairy Development Programme in Parbhani District” have opined that Milk production in India during 1950-51 was 17 million tonnes which has reached to 78 million tonnes in 1997-98. Presently India ranks first in the world in milk production. The Operation Flood Programme was instrumental in dairy development activities. These programmes are useful in upgrading the standard of living of farmers.

S. Islam, A. Goswami and D. Mazumdar\(^2\)(2008) in their research article entitled, “Comparative Profitability of Cross Breed and Indigenous Cattle in West Bengal” have taken up the study in Tehatta-II block of Nadia district in West Bengal. As per judgement sampling, fifty dairy farmers were selected from each gram panchayats. Mostly unorganized dairy farmers in milk production are found in the study area. As compared to indigenous cows, the crossbreed cow gives higher yield, more economical and increase the gainful income of dairy farmers around the year of employment. Eight districts of Marathwada region are involved in the milk pocketing to such an extent that it has
become a household work of every family. The animals maintained by joint family were not properly cared for while they were cared for properly by single family.

Mandeep Singh and A.S. Joshi\textsuperscript{23}(2008) in their article entitled, “Economic Analysis of Crop Production and Dairy Farming on Marginal and Small Farms in Punjab” have reported that the economic analysis of dairy farming has been taken up for marginal and small farmers in Punjab for the year 2003-04. In Punjab a majority of farmers suffer to meet their basic needs from their agriculture income alone. Income from off-farm sources is another important factor contributing towards meeting the domestic expenditure. Dairy farms is an allied enterprise for earning income of marginal and small farmers in Punjab. The study suggests that the technical efficiency of crops and dairy farming should be improved to provide more income to farmers.

S. Radha Krishnan, S. Nigam and Shantanu Kumar\textsuperscript{24}(2008) in their research article entitled, “Contribution of livestock in Indian Scenario” have opined that the developing countries has a rapid growth in human population, per capita income and increasing as well as in the demand for food and animal origin in developing countries. Even though India possesses the largest livestock population in the world, productivity of Indian livestock is low compared to many developing countries.

M. Dhanabalan\textsuperscript{25}(2009) in his article titled, “Productive Efficiency of Milk Production in Tamil Nadu” has opined that real economic improvement of our country depends upon the rural development. Indian dairy sector acts a major role in improving the overall rural economic conditions. Equitable development is needed to maintain the ecological balance, agriculture and allied sectors. From first five year plan onwards,
planners have given priority to allied sector for the rural economic development. Dairy farming is described as a small industry, but it provides a gainful employment opportunities which comprises of about six per cent of the national income.

A.E.N. De Alwis et al.\textsuperscript{26} (2009) in their research article entitled, “Analysis of Factors Affecting Fresh Milk Consumption among the Mid-Country Consumers” have discussed that in addition to gender, ethnic group, household composition and size of young children in the household, other demographic variables such as income and educational level have been found to significantly influence milk consumption. The household’s monthly income and level of education play a more important role in milk consumption.

A. Radam, M.R. Yacob, T. Siew Bee, and J. Selamat\textsuperscript{27}(2010) in their research article entitled, “Consumers’ Perceptions, Attitudes and Willingness to Pay towards Food Products with “No Added Msg Labelling” have explained that the consumers’ behaviour, preferences and attitudes toward consumption of dairy products substantially differ between rural and urban. By determining the effect of personal and environmental factors on children’s intention to consume milk, it shows that attitudes toward sensory properties has the highest effect while in the urban area the highest effect belongs to the availability of milk at home. It is found that urban households consume much more dairy products than those in rural area.

S. Raipur Dugdh Sangh\textsuperscript{28}(2011), the Governor of Chattisgarh, in his speech on “Increase Milk Production in Chattisgarh” has emphasised the need for increasing the
milk production in the state. Chattisgarh's average milk consumption is around 114 gm per day, while in the whole country, it is around 290 gm. This is far below American and European countries, where average consumption is around 600 gm per day. People of these countries enjoy longevity and healthy life because of milk consumption. Milk production has now reached around 42,000 liters per day. He said that work was in progress to raise production to around 65,000 liters per day.

Bonaventure and Wendy J. Umberger\textsuperscript{29}(2012) in their conference paper titled, “Factors Influencing Malaysian Consumers’ Consumption of Dairy Products” have found that consumers who perceive dairy products as a good source of nutrients have higher consumption level of dairy products than other consumers. Aside from the socio-economic and demographic factors, consumers’ health consciousness has been found to significantly affect the household’s consumption of dairy products.

O. Ebru and Y, Neslihan\textsuperscript{30}(2013) in their research work with caption “The Factors Affecting Milk Consumption Preferences of the Consumers Edirne Kesan Township Sample” have explained that the consumers with higher income were more likely to purchase milk & milk products and respondents who had completed higher level of education were more likely to consume dairy products.

Phuong V. Nguyen., M. Mergenthaler and Cuong H. Tra\textsuperscript{31} (2013) in their symposium paper on “Effects of Socio-economic and Demographic Variables on Vietnamese Households’ Expenditure for Dairy Products” have discussed that the gender and presence of young children in the household significantly influence decisions on milk
purchases. Female-headed households were found to be significant in affecting dairy products’ expenditure. They were also generally more health-conscious than men. Additionally, the households with greater presence of young children less than 12 years of age were generally less concerned about price and more interested in purchasing safe milk products.

1.3.2 Studies on Cost and Productivity of Milk Production

Emerson M. Babb\(^3\) (1981) in their research article titled, “Analysis of Regional Milk Prices and Production Costs” have analyzed the relationship between milk prices and production costs as sources of change in the level and geographic distribution of United States milk production. Milk prices and direct and total costs of production from 1974 to 1980 were estimated as a function of distance from the upper Midwest by ordinary least-squares regression. Milk prices and costs increased with distance of production areas from the upper Midwest, but the increases were less than transportation costs. The cost and price changes during 1974 to 1980 provided a strong incentive for increased milk production in all regions. Changes in milk prices and cost of production did not encourage production expansion in higher cost regions relative to expansion in the upper Midwest.

Pradeep Kumar and J.N. Gupta\(^3\) (1988) in their article entitled, “Comparative Cost of Milk Production from Different Species of Milch Animals: A Case Study of Muzaffar Nagar District (Uttar Pradesh)” have found that there is a relative share of difference in
the cost in the maintenance of buffalo, local cow and cross breed cow. The cost of feed comprising of green fodder, dry fodder and concentrates constituted 65.46 per cent of the total cost. Labour cost amounts to 28 per cent in the total maintenance cost in buffalo, 30 per cent in local cows and 19 per cent in cross–breed cows. 90 per cent of the maintenance cost was accounted for feed and labour. The cost of milk production per litre from buffalo, local cow and cross breed cow is at ₹.2.34, ₹.1.89 and ₹.1.83 respectively. Among the different groups of households the per litre cost of milk production through buffalos is computed at ₹.2.63, ₹.2.48, ₹.2.24, ₹.2.13 and ₹.2.19.

N.K. Verma, Singh, and Des Raj (1997) in their research work with caption, “Variations in the Quality of Market Milk and its Impact on the Efficiency of Milk Marketing System” have conducted a study in Karnal town of Haryana to ascertain deterioration in milk quality during marketing and to estimate real margins in milk trade. It was reported that in the lean seasons, milk supplied to consumers by producers directly was of better quality at an average price of ₹.5.68/- per litre than that was sold to Halwai and vendor at ₹.4.75/- and ₹.4.04/- per litre respectively. Raju (1992) on “consumer’s perceptions about milk marketed by Vijaya cooperative Dairy in Hyderabad” reveals that Vijaya dairy milk has powdery smell which used to easily get curdled compared to vendor milk and buffalo farm milk. Consumers judge the quality of milk fat content, colour and taste and thickness, freshness, hygiene, curd formation and flavour of the raw milk. A majority of consumers, irrespective of all income groups, consider thickness, taste and curd formation to be most important factors in judging the quality of milk.
K. Rajendran. and R. Prabakaran\textsuperscript{35}(1998) in their research article titled, “Present Scenario of Milk Production in India” have analysed the present scenario of milk production in India. Also, the focus should be shifted from quantity to quality in the daily diet by enhancing the intake of animal proteins, the major source of which are milk, eggs and meat. The nutritional demand has to be bridged rapidly and the milk, egg and meat provide affordable alternative sources of protein. Recently, the annual rate of the growth in milk production has been encouraging which has gone up from 4.5 percent in the seventies to 5.7 percent in the eighties. India ranks as the World’s second largest milk producer after USA. By then, India’s milk output is expected to range between 84 million tonnes at the minimum and 88 million tonnes at the maximum. India’s per capita consumption of milk does not commensurate with its ranking as world second largest milk producer. However, the present per capita availability of 214 grms/ day(78 kgs/year) is much higher than the average of 26.27 kg/year for the developing countries in Asia/Pacific region. Milk is India’s second most important agricultural commodity in terms of value of its output, ranking after paddy, but much above wheat.

Prashant Khare Sharma and Singh\textsuperscript{36}(2003) in their research work on “Marketing Analysis of Milk Production in Bhopal District of Mathyapradesh” have explained that milk collection is higher in healthy season (from September to February) and lower in unhealthy season (from March to August). In spite of more production in the month of July and August, the producer members of the society were not in a position to transport their product due to lack of all weather roads. As the distance of the milk producer’s cooperative society increases form the dairy plant, the volume of milk collection decreases.
The milk collection was higher in those societies, which are well connected to the dairy plant. The variable cost is the main component of cost of milk production and the maximum cost incurred in the purchase of feed and fodder and in labour management. Low price of milk was the most important problem in the collection of milk, followed by lack of cold storage, delay in payment, inadequate water for animals, lack of all weather roads, small quantity of marketable surplus of milk, improper treatment, lack of cross breed animals and uncertainty of electricity. Hence, efforts should be made to solve all these constraints.

Bhowmilk\textsuperscript{37}(2006) in his project work titled, “Economics of Milk Production and Analysis of Technological Change in Dairying in South Tripura” has opined that the Cost and returns from milk production were estimated separately for local and crossbred cattle. The gross cost of maintenance is worked out as the sum of fixed and variable costs items. The net cost is arrived at by deducing the value of dung from gross cost per milch cattle per day and further divided by the average milk yield per day of the respective breed. The net return is calculated by deducting gross cost from gross return.

A.K. Chauhan, Raj Vir Singh and B.B. Raina\textsuperscript{38}(2006) in their article on “A Study on the Economics of Milk Processing in a Dairy Plant in Haryana” have conducted the study in an ISO-9002 dairy plant situated in the north-eastern part of Haryana. It has been observed that all the products, except the double-toned milk are being produced above the recommended breakeven level. A comparison of unit manufacturing cost with unit price received by the plant for different products has revealed that ice-cream manufacturing has been the most profitable proposition among
different dairy products, and standardized milk has provided the maximum profit margin among the milk pouches manufactured during the study period, 2000-01. The double-toned milk has revealed a loss. Therefore, the study has suggested that the quantity of double-toned milk production should be raised at least equal to the recommended break-even level to avoid losses, if there is a market demand for this product or the resources of this product could be shifted to some other profitable products.

M. Srikanth Reddy and N. Vasudev (2006) in their article titled, “An Economic Analysis of Production Consumption and Marketed Surplus of Milk in Karimnagar District of Andhra Pradesh – A Case Study” have made an attempt to quantify the level of consumption, production, and marketed surplus of milk in Karimnagar District of Andhra Pradesh. The winter has positive effect on milk production. It is interesting to note that marketed surplus was more in summer (ranging from 58.5% to 60%) compared to that in rainy season (50% to 56%). On an average marketed surplus during the year ranged between 55 per cent in the case of small farmers to 57.2 per cent in the case of medium farmers. But in all the categories of farmers, the consumption of milk was above recommended level, that is 250 gm / day/person. With the disposal of marketed surplus of milk through different agencies like the co-operatives, milk vendors emerge as major procurement agencies (more than 70%) in all categories of farmers. A majority of the small and medium farmers prefer milk vendors while large farmers preferred milk co-operatives to sell their surplus milk. The large family size, education level of family has influenced the consumption pattern of milk. These factors lead to consume more, resulting in less of marketed surplus.
M. Guwahati\textsuperscript{40}(2007) in his research work with caption, “Milk Products Strike Hits Consumers Hard” has explained that the price of milk in the market varies from ₹.11 to 14 per litre but the milk producers want it to be ₹ 20 per litre. The situation is becoming difficult as they have to be extra cautious about the arrival of the milkman and reach early to queue-up for milk.

R. Joshi\textsuperscript{41}(2007) in his article entitled, “Found that Barely 1000 out of the 5000 Cities and Towns” has analysed the milk distribution network of the organized sector. The effective milk market is largely confined to urban areas, inhabited by over 25 percent of the country population having a household income of ₹5000. The urban population is expected to touch 360 million a growth of about 2.5 percent.

A. Rhone, R. Ward, A. De Vries and M.A. Elzo\textsuperscript{42}(2008) in their article titled, “Comparison of Two Milk Pricing Systems and their Effect on Milk Price and Milk Revenue of Dairy Farms in the Central Region of Thailand” have analysed and investigated the determinates of milk pricing system, farm location, farm size, and month and year that affect farm milk price (FMP), farm milk revenue (FMR) and loss in FMR of dairy farms in the Central region of Thailand. A total of 58,575 milk price and 813,636 milk yield records from 1034 farms were collected from November of 2004 to June of 2006 in the districts of Muaklek, Pak Chong, Wang Muang, and Kaeng Khoi. A fixed linear model was used to analyze milk price of farms. Two pricing systems were defined as 1. Farm size (small, medium, and large) was based on the number of cows milked per day. Results showed that FMP were lower (P < 0.05) in pricing system 1 than in pricing
system 2. Most small farms had higher \((P < 0.05)\) milk prices than medium and large farms across in both pricing systems. Large farms lost more milk revenue due to deductions from bacterial score and BTSCC than small and medium farms.

V. Saravanakumar and V.K. Jain\(^{43}\)(2008) in their research work on “Technical Efficiency of Dairy Farms in Tamil Nadu” have conducted a study ‘Technical Efficiency of Dairy Farms in Tamil Nadu” which is carried out to evaluate dairy farm households in terms of efficiency of milk production using random field production methods. The data for the study comprised of fixed investments on dairy farms, quantity and price of feeds and fodders fed to individual animals, labour utilization pattern, veterinary and miscellaneous expenses, quantity of milk produced and price realized etc. collected from 160 sample households across flush and lean season for the year 2002-03. The coefficients for the value of green fodder and concentrate were found to be statistically significant with implying their greater and significant role in cow milk production. The technical efficiency of crossbred cow farms ranged from 72.30 to 97.90 per cent with an average of 82.10 percent. The study indicated that there existed a scope to increase milk production of an average farm to 16.32 per cent for cows and 14.04 per cent for buffaloes without incurring any extra expenditure on these farms.

Mathialagan, D.C Chandrasekaran and A. Manivannan\(^{44}\)(2009) in their article entitled, “Effect of Feeding Supplements of SNF Content in Milk” have explained the objective of training the farmers on feeding technologies for improving the SNF content of milk in milch animals and to assess its impact at the field level. About 159 women dairy farmers cum self help group members belonging to ten different villages of
Namakkal district were selected for the study. A benchmark survey was conducted for all the women dairy farmers on cost effective feeding practices for dairy cattle, feeding of chopped fodder on the animals and supplementing diet with minerals. The results indicate that 46.37 per cent of cow milk samples had less than 8.0 per cent of SNF content. When the SNF content falls below 8.0 per cent, the payment for the milk will be calculated based on the fat content of the milk as per the price policy of milk co-operative societies. In such cases, the farmers would get a lower price of ₹6.50/- per litre instead of ₹8.75/litre of milk.

1.3.3 Studies on Chains of Marketing

Raju⁴⁵ (1992) in his project report titled, “Market Survey of Liquid Milk in Hyderabad” has opined that the general practice of milk vendors in Hyderabad, that they finance the producers for purchasing milch animals and other personal needs and thereby bind the producer to sell milk to them round the year.

Pawar and Sawant⁴⁶ (1995) in their research article titled, “Comparative Efficiency of Alternative Milk Marketing Agencies in Western Maharashtra” have examined the marketing efficiency of three channels - private, cooperative and government - in Western Maharashtra. Their results suggest that private dairies paid somewhat higher prices to the producers and still managed to supply milk to the consumer at competing prices. This is due to higher efficiency in procurement, processing, transportation and distribution.
Deepak Shah\(^4\)(1997) in his article entitled, “Co-operative Dairying in Maharashtra Lessons to be Learned” has viewed that though milk production in Maharashtra over last decade has increased by leaps and bounds, only 25 per cent of the milk co-operatives are economically viable in the state. Differential price structure and mismanagement of co-operatives has led to poor procurement of milk resulting in vast regional imbalances in terms of milk production. For the smooth functioning of the milk co-operatives, it is not enough to give remunerative prices to the producers, but the co-operatives themselves should take over the onerous task of ensuring necessary inputs so as to improve productivity and overall genetic stock of milch animals.

Ray and Sunil\(^{48}\)(2000) in their study on “Dairy Industry in Rajasthan: Problems and Prospects” have conducted a study in Jaipur city have reported that local milkmen supply fresh raw milk at the doorsteps or to the vendor who in turn supplies it to households. The prices varied from ₹.13-20 per litre for cow’s milk depending on adulteration of milk with water and the category of customer. The price generally realized by small farmers from the local vendor is about ₹.10-12 per litre, whereas they got only about Rs.9-10 from the cooperatives. Some middlemen also deployed daily wage workers to collect milk by using bicycles, jeep or camel cart to collect milk from the doorstep and take it to different selling points in nearby major cities.

D. Shah\(^{49}\)(2000) in his research article on “An Enquiry into Producer Members’ Perception towards Working of Milk Co-operatives in Maharashtra” has opined that the predominance of middlemen in this area is mainly due to the non-existence of co-operative infrastructure. Generally, the middlemen advanced money to needy milk
producers and procured milk at a low price round the year. It was reported that 75 per cent of the marketed surplus of small producer’s production was cornered by them. Similar observations were reported in a study conducted in Jalgaon and Kolhapur districts of Maharashtra.

Kurup\textsuperscript{50}(2003) in his research work with caption, “Livestock sector in Orissa” has viewed that the price realized by farmers from informal sector was \textcurrency{9.5} to \textcurrency{10} per litre, whereas cooperatives paid between \textcurrency{8.00} and \textcurrency{8.50}. Further, the middlemen who bought from them made instant cash payments whereas it took 12-15 days to realize payments from the cooperative system.

Samajdar, Tanmay and Chander Mahesh\textsuperscript{51}(2003) in their research article entitled, “Milk Production by Forest Dwellers: A Case of Vangujjars of Uttarakhand” have discussed that the livestock husbandry of the Vangujjars of Uttarakhand also observed that even though they possess sound experience about various aspects of animal husbandry, they are vulnerable to and open for exploitation by the middlemen to whom they sell milk despite the existence of cooperatives in that area. They are often riddled with debt and stand marginalized. The study recommended that the cooperatives should come forward to find out the reasons for Vangujjars’ apathy towards cooperatives and involve them as society members.

Fengxia Dong\textsuperscript{52}(2006) in his paper on “Outlook for Asian Dairy Markets: The Role of Demographics, Income, and Prices” has presented a 10-year outlook for major Asian dairy markets (China, India, Indonesia, Japan, South Korea, Malaysia, the Philippines, Thailand, and Vietnam) based on a world dairy model. Using the world dairy
model, the paper also analyzes the impact of alternative assumptions of higher income levels and technology development in Asia on Asian dairy consumptions and world dairy prices. The outlook projects that Asian dairy consumption will continue to grow strongly in the next decade. The consumption decomposition suggests that the growth would be mostly driven by income and population growth and, as a result, would raise world dairy prices. The simulation results show that technology improvement in Asian countries would dampen world dairy prices and meanwhile boost domestic dairy consumption.

Senthi Kumar, Selva Kumar, Prabhu and Meganather (2007) in their research work on “Upsurge in Milk Production has thrown up Unprecedented Challenges in the Milk and milk Products Marketing” have observed that the “Upsurge in milk production has thrown up unprecedented challenges in the milk & milk products marketing” changes in demographic pattern, education, lifestyle, cultural orientation, changes in consumer behaviour and other such factors influence the demand for milk and milk products.

India Post (2008) in the article titled, “Milk Production Reaches 111 Million Tonnes by 2010” has opined that the demand for value added milk products, such as cheese, dahi (Indian yoghurt) and probiotic drinks is increasing at a double digit rate. India seems to be self-sufficient in meeting its requirement for milk and milk products. However, given that demand is growing faster than supply, there could be serious issues with respect to self-sufficiency in the near future. Any increase in milk production is dependent on the farm gate price received by the producer. Farm gate prices have increased by more than 50 per cent in the last three years. Focused efforts would be
required on two fronts increasing farm size (currently the average number of animals per producer is three to four), and increasing productivity of milk producing animals. Global milk production, approx. 655 million tones in 2006/07, is estimated to be growing at 1.6 percent per annum. India ranks second in terms of milk production after the EU-27 and accounts for 15 per cent of global production. Annual milk production in India was at 100.9 million tones in 2006-07 and was growing at 4 per cent per annum. The market for liquid milk, as well as value-added dairy products, is still largely dominated by the unorganized sector. India has an insignificant share of the global dairy trade, less than 1 per cent, despite being a leading producer of milk.

G.S. Kamat (2008) in his research with caption, “Dimensions of Dairy Marketing” has emphasised on the market-oriented dairy development. In his opinion it can alone ensure success of dairy units whether they are in public, private or co-operative sector. There is a great need to institutionalise milk trade from the stage of production to marketing.

N. Rangasamy and J.P. Dhaka (2008) in their article titled, “Marketing Efficiency of Dairy Products for Co-operative and Private Dairy Plants in Tamil Nadu - A Comparative Analysis” have analysed the marketing of milk and milk products by dairy plants of co-operative and private sectors in Tamil Nadu and compared. The study is based on the data collected for toned milk, standardized milk, full cream milk, flavoured milk, butter and ghee from the selected co-operative and private dairy plants of the Coimbatore District for the financial year 2001-2002. All the dairy products earn
more marketing margins in the private sector than in co-operative dairy plant, except for toned milk. The marketing efficiency of cooperative dairy plant for all dairy products has been observed relatively less than that of private dairy plant, except for toned milk. The study has suggested the development of co-operative dairy industry in a sustainable manner, and the co-operative dairy plants should formulate long-term vision and strategy. The study has observed that value addition in dairy products should be done without compromising the quality and consumer-oriented market research and development should be accorded greater attention.

I. Syed Intikhab Ali Karachi\textsuperscript{57}(2008) in his article titled, “City Government to Crackdown on Milk Producers for Price-Hike” has explained that if the milk producers and wholesalers instead of only the retailers, continue selling milk at exorbitant prices, informed sources in the City Government say that all preparation had been made for cracking down against the milk sellers who do not follow the set prices of ₹.34 per litre. If they continue the milk selling at ₹.40 and ₹.42 per litre, they would face the stern action.

1.3.4 Studies on Constraints in Milk Production and Marketing

Robert W. Blake\textsuperscript{58}(1979) in his article on “Research Needs to Supply Milk Protein in the Human Diet” has opined that the emergence of government action to define a national policy on food and nutrition implies increased emphasis on programs for food production and marketing. Optimal policy will rely upon information from targeted basic and applied research. Dairy cattle are discussed in the context of their comparative
advantage among livestock species for providing high quality protein in the human diet. Research needs are suggested to supply economical milk protein by improving biomass efficiency, economic efficiency, milk pricing, and aggregate analyses of systems of dairy production.

Gautam Kakaty and Moromi Gogoi\(^{59}\)(2001) in their research article entitled, “Employment and Income Opportunity in Dairy Enterprises of Assam - A Case Study” have studied that animal husbandry plays a pivotal role in the agrarian economy of India. it is closely interlinked with the socioeconomic matrix of rural society.

David A. Hennessy and Jutta Roosen\(^{60}\)(2003) in their research work with caption, “Cost-Based Model of Seasonal Production, with Application to Milk Policy” have opined that the milk production is seasonal in many European countries. While quantity seasonality poses capacity management problems for dairy processors, a European Union policy goal is to reduce price seasonality. After developing a model of endogenous seasonality, there are the effects of three E.U. policies on production decisions. These are private storage subsidies, production removals, and production quotas. When cost functions are seasonal in a specified way, then arbitrage opportunities interact with storage subsidies to reduce both price and consumption seasonality. But production seasonality increases because storage subsidies promote temporal market integration. Conditions are identified under which product market interventions increase quantity seasonality.

Kurup\(^{61}\)(2003) in his article entitled, “Livestock Sector in Orissa” has viewed that the price realized by farmers from informal sector was ₹9.5 to ₹10 per litre, whereas
cooperatives paid between ₹8.00 and ₹8.50. Further, the middlemen who bought from them made instant cash payments whereas it took 12-15 days to realize payments from the cooperative system.

Bhupendra V. Singh, Guru Prasad Singh and Bhartendu Kr. Chaturvedi (2004) in their article entitled, “Marketing Manners of Producing Units – A Case Study of the Purvanchal Region of Uttar Pradesh, India” have analysed various aspects of marketing that includes types of marketing, order getting cost, product differentiations and differentiations cost, type of advertisement and cost and method of physical distribution and cost. It is found that there are miles to go in the direction of marketing. People are generally not aware of the fact that marketing can add to the performance.

Sukhpal Singh (2004) in his article on “Liquid Milk Business in India after Delicensing: A Case Study of Ahmedabad Milk Market” has pointed out that Indian dairy industry has witnessed many policy and market changes in the last decade both in the domestic as well as the international markets. The paper examines the profile of organized private sector in liquid milk business, its growth, performance, business and marketing strategies and prospects, with special reference to the Gujarat state and the Ahmedabad milk market, besides assessing the impact of policy changes in the recent years. It is primarily based on the secondary data and the interviews with the cooperative and private dairy unit owners and managers in Ahmedabad city mainly focused on liquid milk as Ahmedabad is one of the most competitive milk markets in the country with more than 25 brands of liquid milk being marketed in the city. The nature and dynamics of the
Ahmedabad milk market are analysed and marketing strategies of various types of players are examined. The policy of delicensing and its impact on milk marketing in India is also addressed. The paper concludes by discussing important steps for achieving competitiveness in the domestic and international markets.

Bhowmilk\textsuperscript{64}(2006) in his study on “Economics of Milk Production and Analysis of Technological Change in Dairying in South Tripura” has opined that the cost and returns from milk production were estimated separately for local and crossbred cattle. The gross cost of maintenance is worked out as the sum of fixed and variable costs items.

Edward V. Jesse, Normal F. Olson and Vijay P. Sharma\textsuperscript{65}(2006) in their paper on “The Dairy Sector in India: A Country Study” have opined that in the third in-depth country study, the Babcock Institute study team discusses India’s dairy sector. India is an interesting case study because it has the world’s second largest population making it the world’s largest milk producing country. The country’s main system of dairy productions involves a smallholder production system in which most of the milk produced is consumed on the farm or distributed through informal channels.

Frank H. Fuller, Jikun Huang, and Scott Rozelle\textsuperscript{66}(2006) in their research article titled, “Got Molk? The Rapid Rise of China's Dairy Sector and Its Future Prospects” have pointed out that with the rapid growth in China’s dairy industry, a number of recent papers have addressed either the supply or the demand trends for dairy products in China. The goal of this paper is to sketch a more comprehensive picture of China’s dairy sector and to assess the nature of the sectors development in the coming decades. Drawing upon several empirical studies, they examine the trends in dairy product consumption to create
a composite picture of the factors underlining the recent growth. The research empirically investigates the sources of production, gains in milk supply and assess the relative importance of expanding herd size, changes in the nature of production, technological change, and improvements in efficiency to the overall growth of milk production.

T.R. Rajarajan\textsuperscript{67}(2006) in his research work on “Trade Liberalization and Terms of Trade in Dairy Products in India” has opined that the combined effects of both domestic reforms and WTO commitments in the last decade have changed the environment in which the Indian dairy industry will operate in future. A term of trade is a significant indicator of gains from trade and efficiency of domestic industry. In average terms, the terms of trade of Indian dairy products have declined in the post-liberalization period compared to pre-liberalization years. The year-wise trend is unstable with wide fluctuations in post-liberalization years. The real effects of trade liberalization will unfold only when the WTO provisions are properly implemented.

Yue Yaguchi and Kei Kajisa\textsuperscript{68}(2006) in their research work on “Production Systems in South India from 1971 to 2002” have pointed out that it was widely believed that not only a Green Revolution in a crop sector but also a White Revolution in a dairy sector has generated the great momentum of agricultural development in India since the late 1960s. However, owing to the dominance of sector-specific analyses, the importance of the interaction between these two sectors has been neglected in the existing literature. The interaction is important in that the dairy sector provides manure to crop production while the crop sector supplies fodder to the dairy. Using household data collected in Tamil Nadu, it is inferred that in India for three decades from 1971, the increase of fodder
production as a by-product of Green Revolution in 1970s has enabled subsequent White Revolution in 1980s and the by-product of the White Revolution has increased manure availability, which in helps in enhancing the recent revival of organic farming system for sustainable agricultural development.

Senthi Kumar, Selva Kumar, Prabhu and Meganather\(^{69}(2007)\) in their research work with caption, “Upsurge in Milk Production has Thrown up Unprecedented Challenges in the Milk and Milk Products Marketing” have observed that the changes in demographic pattern, education, lifestyle, cultural orientation, changes in consumer behavior and other such factors influence the demand for milk and milk products.

P.R. Waghmare and D.N. Hedgire\(^{70}(2007)\) in their article entitled, “Econometric Analysis of Integrated Dairy Development Programme in Parbhani District” have opined that milk productions in India during 1950-51 was 17 million tones which has reached 78 millions tonnes in 1997-1998. Presently India ranks first in the world milk production, the Operation Flood Programme is instrumental in dairy development activities. These programmes are useful in upgrading the standard of living of farmer.

Kedija Hussen, Mohammed Yousuf and Berhanu Gebremedhin\(^{71}(2008)\) in their paper on “Cow and Camel Milk Production and Marketing in Agro-pastoral and Mixed Crop-livestock Systems in Ethiopia” presented at the Conference on International Research on food Security, Natural Resource management and Rural Development held at University of Hohenheim has identified the major constraints for the development of market-oriented dairy production and formulated recommendations for further development interventions.
R. Sairam\(^2\) (2008) in his article titled, “Aavin Products in Short Supply What they Say' Madurai Matters” has discussed that the shortage in supply of popular Aavin products such as butter, ghee and milk peda exists for the last six months. Even flavoured milk is not available in adequate quantity. There is a lot of demand for these products, the vendor says, adding that every day a lot of customers return home disappointed after making an enquiry for these products. When the supply is good, these products disappear from the shelves quickly.

M.G. Shisode, M.V. Dhumal, and M.F. Siddiqui\(^3\) (2009) in their article on “Evaluation of Constraints Faced by Farmers in Adoption of Dairy Cattle and Management Practices” have opined that the constraints expressed by the dairy cattle owners of Rajarambapu Patil Sahakari and Dudh Sangh Ltd. Islampur as regards the reproduction, nutrition, management, health, economic and milk distribution were studied. Some remedial measures like trainings, exhibitions, brain storming sessions, poster presentations, radio talks and programmes on Door-darshan can be taken up to create awareness in dairy farmers and to impart knowledge to them to undertake new animal and management practices to increase the milk yield.

R. Balaji\(^4\) (2010) in his article entitled, “Private Dairies Sulk as Aavin Dips its Hand in their Milk” has examined the private dairy industry representatives who do not want to be named and stated the authorities are asking the private dairy companies to part with about 20 per cent of the milk they procure from farmers to the Tamil Nadu
Cooperative Milk Producers Federation. The move is to augment supply to Aavin, the cooperative, Milk brand, in line with plans to grow the business.

B. Braganza\textsuperscript{75}(2012) in his article entitled, “Government Schemes Boost Milk Production” has concluded that the five major schemes by the new government are responsible for the change under the Kamadhenu scheme. The government gives a subsidy for the purchase of crossbred animals or improved she-buffaloes, wherein 75 per cent of the cost of the animal (limited to 40,000 value of the animal) is given to the farmer immediately on purchase of the animal.

D.G. Rangappa and N. Rangaswamy\textsuperscript{76}(2012) in their article titled, “Milk Production, Sales and Employment Generation in Kolar Mother” have stated that the dairying at present provides jobs to many rural households and utilize the idle agricultural income. The annual employment has provided income to landless, marginal and rural poor farmers.

Shenoy Karun\textsuperscript{77}(2012) in his article entitled, “Milk Powder Worth ₹240 crore Sold in State” has suggested that the milk powder market is divided between branded products and unbranded players. Amul, Nestle, Britannia, Aavin and Nandini are the major brands other than unbranded products that come from Hyderabad, and Thambaram and Erode in Tamil Nadu. North Kerala consumes 60 per cent - 70 per cent of the total powder sold in Kerala, observed Divin Davis, a former employee with one of the major brands. Families are increasingly buying milk powder and even using them during celebrations such as marriage. During the Onam season, there is a sudden spurt in
consumption—almost a 20 per cent increase. The consumption of powder goes up whenever there is a shortage of milk.

DC. Pramila Krishnan(2013) in her research article titled, “Staff Shortage Strikes Aavin Milk Delivery” has stated that State president S.A. Ponnusamy of the ‘milk dealers’ welfare association’ told DC, “Aavin receive the milk packets from the chilling units and supply them to retailers and milk booths. Due to the shortage of manpower in various milk societies that procure milk from the farmers, there is delay in our getting our milk packets from the Aavin dairies. They added that several households in Tondairpet, Ennore and Tiruvottriuyur got their milk packets only after 8 am during the last one month.

1.4 OBJECTIVES OF THE STUDY

Milk is an essential product. In recent period price of milk is increased drastically, to meet the production and marketing expenses by the various chains. This has put new pressures and realities on cost analysis by the milk marketing chains. The research study has been undertaken with the following objectives:

1. To study the profile of “The dairy sector”
2. To study the socio-economic and demographic factors of milk producers and vendors in the study area
3. To analyze the socio-economic and demographic factors influencing the production and supply/marketed of milk in milk market.
4. To study and evaluate the existing milk market structure.
5. To study and analyze the milk marketing chains.

6. To find out the cost, price spread and marketing margin of various milk marketing chains.

7. To measure the performance of milk market actors

8. To measure the efficiency of various milk marketing chains in the study area. and

9. To offer suitable suggestions.

1.5 SCOPE OF THE STUDY

“Milk Marketing Chains – A Study with reference to Virudhunagar District” is an attempt to analyze the cost, price spread, marketing margin and the factors affecting milk marketing. Taluk-wise and channel-wise marketing efficiency is dealt with. This study covers Virudhunagar District only.

1.6 PERIOD OF STUDY

The study covers a period of one year. The primary data is collected for the period of 12 months from 1st January 2014 – 31st December 2014.
1.7 RESEARCH METHODOLOGY

It includes sample design, sample size, sample area, tools for analysis and source of data.

1.7.1 Collection of Data

Data has been collected by the researcher in each taluk of Virudhunagar District. The sources of data are collected through primary data and secondary data.

Primary data has been collected through a structured questionnaire. It has been distributed to the producers, vendors, private agencies, cooperative milk producers society and milk producers union.

Secondary data has been collected from various sources like books, journals, articles, unpublished dissertations, thesis, websites and from companies in-house journals and records and so on.

1.7.2 Framework Analysis

The primary data collected through structured questionnaire from the respondents have been sorted, classified and tabulated in a format, amenable for analysis.

The questionnaire is divided in to 5 categories namely 1. Milk Producer, 2. Milk Vendor, 3. Private Milk Agencies, 4. Milk Producers Cooperative milk society and 5. Milk producers union. The data were further analyzed by applying various statistical tools and Statistical Package for Social Sciences (SPSS).
Socio-economic and demographic factors of respondents are analyzed with the help of Statistical tools such as Mean and Percentages.

Multiple Regression model in SPSS Package is used to analyse the socio-economic and demographic factors which influence the Milk Producers and Milk Vendors in the milk production, milk supply or marketed of milk in the study area.

1. To check the linear relationship between milk production/supply between socio-economic factors of milk producers/milk vendors SPSS SCATTER PLOT is used.

2. Model Summary Table - R – Square is used to test the validity of data.

3. ANOVA – Table is used to check the goodness of fit for the data.

4. In order to test the hypothesis Co-efficient Table is used.

5. S-C-P model is used to measure the milk market efficiency of various milk marketing chains by finding out Total Gross Marketing Margin, Gross Marketing Margin and Net Marketing Margin (TGMM, GMM and NMM).

1.7.3 Sample Size

The researcher has collected primary data from 526 respondents. Out of 526, 105 respondents are milk producers and 421 respondents are milk vendors.

1.7.4 Proportional Random Sampling
Proportional random sampling method is used to select the sample respondents from Aruppukottai, Kariapatti, Rajapalayam, Sattur, Sivakasi, Srivilliputhur, Tiruchuli and Virudhunagar taluks of Virudhunagar District in Tamilnadu State. This sample of 526 milk farms represent 10 per cent of the total population. It comprises 315, 126 and 84 of small, medium and large milk farms respectively. It is in the proportion of 60 per cent, 24 per cent and 16 per cent, which is in the same proportion of total population of 5255 in the study area. Since the population size of 5255 is too large, only 10 per cent from total population is taken as sample. The probability random selection process is used to select sample in the cluster population.

Table 1.1 shows the total population and proportionate sample of milk farms both Taluk-wise and Size-wise in the study area.
### TABLE 1.1
Total Population and Sample Distribution of the Milk Farms
(Producers and Vendors)

<table>
<thead>
<tr>
<th>Name of the Taluks</th>
<th>Total Production and Size of Milk Farms</th>
<th>Total</th>
<th>Proportionate Sample Size of Milk Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small Farm</td>
<td>Medium Farm</td>
<td>Large Farm</td>
</tr>
<tr>
<td>Aruppukottai</td>
<td>403</td>
<td>161</td>
<td>108</td>
</tr>
<tr>
<td>Kariapatti</td>
<td>136</td>
<td>54</td>
<td>36</td>
</tr>
<tr>
<td>Rajapalayam</td>
<td>539</td>
<td>216</td>
<td>144</td>
</tr>
<tr>
<td>Sattur</td>
<td>251</td>
<td>100</td>
<td>67</td>
</tr>
<tr>
<td>Sivakasi</td>
<td>664</td>
<td>264</td>
<td>179</td>
</tr>
<tr>
<td>Srivilliputhur</td>
<td>723</td>
<td>289</td>
<td>193</td>
</tr>
<tr>
<td>Tiruchulii</td>
<td>144</td>
<td>61</td>
<td>39</td>
</tr>
<tr>
<td>Virudhunagar</td>
<td>294</td>
<td>116</td>
<td>74</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3154</td>
<td>1261</td>
<td>840</td>
</tr>
<tr>
<td><strong>Proportion</strong></td>
<td>(60%)</td>
<td>(24%)</td>
<td>(16%)</td>
</tr>
</tbody>
</table>

Source: Calculated from 18th Livestock Census

Table 1.1 is based on the size of the milk farms, it is categorized into small, medium and large. Farms with 1 – 5 cows, 6 – 10 cows and above 10 cows are small, medium and large respectively. Total population consist of 3154 small farms, 1261 medium farms and 840 large farms which is in the proportion of 60 per cent, 24 per cent and 16 per cent respectively. Hence, the same proportion of 60 per cent, 24 per cent and 16 per cent small, medium and large milk farms representing sample of 315, 127 and 84 respectively are considered as sample.

### 1.8 AREA OF THE STUDY
Virudhunagar District from the State of Tamil Nadu is chosen for the area of the study. Previously the district was called as Kamarajar District. The district started functioning on 15\textsuperscript{th} March 1985. Later, the Government of Tamil Nadu changed the name of Kamaraj District into Virudhunagar District on 1\textsuperscript{st} July 1997. Now, the district is functioning with Virudhunagar town as its headquarter.

Virudhunagar District has two revenue divisions. One is Sivakasi Revenue division which comprises of Srivilliputtur, Rajapalayam, Sattur and Sivakasi taluks. The second is Arupukottai revenue division, which consists of Arupukottai, Kariapatti, Virudhunagar and Tiruchuli taluk. This district has 11 community development blocks namely, Rajapalayam, Sivakasi, Virudhunagar, Sattur, Arupukottai, Vembakottai, Srivilliputtur, Watrap, Tiruchuli, Narikudi and Kariapatti. It has six municipalities such as Arupukottai, Virudhunagar, Sattur, Sivakasi, Srivilliputtur and Rajapalayam, 600 revenue villages, 464 village panchayats, 11 panchayat unions and 10 town panchayats. It covers Sivakasi and Tenkasi parliamentary constituency and six assembly constituencies.\textsuperscript{79}
1.9 HYPOTHESES OF THE STUDY

In order to analyse the influence of socio-economic factors of producers and vendors in quantity of milk production (or) marketed/supply in milk market of the study area, the following hypotheses are:

1. The socio-economic factors does not influence the quantity of milk production.
2. The socio-economic factors does not influence the quantity of milk marketed /supply.

Here the socio-economic factors denotes gender, marital status, age, family size, educational level, experience in this field, source of working capital and credit acceptance. It is used to analyse the influence of milk producers and vendors in the milk market.

1.10 OPERATIONAL DEFINITION OF CONCEPTS
1.10.1 Approaches to Measure Market Efficiency:

1.10.1.1 Market Structure

It is described in terms of buyers and sellers in market concentration, barriers to entry or exit and degree of market transparency.

1.10.1.2 Market Conduct

It refers to producers’ behaviour and vendors’ behaviour including the pricing strategy and investment decisions.

1.10.1.3 Market Performance

It describes the market outcomes, usually in relation of market efficiency.

1.10.1.1 Market Structure

The milk market structure of the study area involving the milk marketing agents like producers, vendors/traders, private agencies and co-operatives with influence of competition. Market Concentration, Degree of market transparency and Barriers to entry and so on are some of structural characteristics, considered in the market structure.

The concept of market structure is central to both economics and marketing. Both disciplines are concerned with strategic decision making. In decision-making analysis, market structure has an important role through its impact on the decision-making environment. The extent and characteristics of competition in the market affect choice behaviour among the actors [Baumol, 1961; Yadav, 1995].

1.10.1.1.1 Market Concentration
Market Concentration refers to the number and relative size distribution of sellers and assumption about the behaviour and performance related to degree of transparency of sellers and buyers.

Market Concentration is measured, by the percentage of milk marketed as general commodity in Virudhunagar District. Concentration within an industry refers to the degree to which a small number of farms provide a major portion of total production.

In economics, market concentration is a function of the number of firms and their respective shares of the total production in a market.

The most common measure of concentration is the milk marketing chains concentration ratio, which is defined as the percentage of the milk output sold by the chains.\(^\text{81}\)

Degree of market concentration analysis is carried out for all milk market actors, because actors were found to procure and sale of milk to different marketing chains in the study area. As there were large number of milk producing farms mainly engaged in raw milk production and supply, there is not much of variance in the prices of milk sold by producers, vendors and co-operatives to the consumers in the study area.

1.10.1.1.2 Degree of Market Transparency

The extent of market transparency is measured with the parameters of adequate knowledge, changes in the market and reliability of market information of the vendors for making better decisions related to milk market. The existence of a large number of buyers
and sellers does not guarantee competition and efficiency of the market unless the vendors have a proper knowledge of market. In the degree of transparent market, vendors have adequate information about their competitors regarding their source of supply and buying prices for better decisions.

1.10.1.1.3 Barriers to Entry or Exit

Market liberalisation enhance the chances for development of rural business. Yet, entry barriers in poor areas are still high because there is a lack of knowledge of entry by small scale producers and vendors, uncertainties due to the concentration and market dominance by powerful business groups. There is a wide gap between those who know control and those who do not.

In particular managerial know-how, working capital, experience, educational level and legal policy constraints were used in analysing barriers to milk market entry and exit.

1.10.1.2 Milk Market Conduct

1.10.1.2.1 Producer’s behaviour

1.10.1.2.1.1 Elements to Consider by Milk Producer in Milk Sales

The most important element considered in the milk market is price decision. The price of milk is an important factor that influences the milk producer to make decision, to whom to sell. The price decision of milk producer will be based on the price of milk in the market, nearness to milk market and secure demand for milk. The price of the milk is slightly deviated, but not much more deviation in each and every taluk in
Virudhunagar District. During seasonality demand, the price change is possible, it depends upon the need and bargaining capacity of milk producers.

1.10.1.2.1.2 Production, Consumption and Disposal of Milk in the Study Areas

Milk Market Producers, those who are producing raw milk in farms are called as Milk Producers. Milk producers produce milk and utilize milk for their home consumption, use some quantity of milk for producing other dairy products and sell rest of milk in the market intermediaries for cash.
1.10.1.2.2 Vendors Behaviour
1.10.1.2.2.1 Vendors Buying and Selling Price Strategies

Survey reveals that vendors are selling raw milk directly to ultimate consumers. In the study area survey identified from the milk marketing concentration ratio that, bulk quantity of raw milk is marketed through vendors. Vendors are making price decisions based on feed cost, demand for milk and the like.

1.10.1.2.2.2 Factors Considered in Price Setting

While setting the prices some of factors have been influencing the price setting strategy of vendors. They are distance to milk market, quality of milk, market price and demand and supply.

1.10.1.3. Milk Market Performance

Milk market performance, is measured in terms of quantity of milk marketed and efficiency allocation of milk. On some occasions, advancement toward better conditions, policies or methods are also considered in milk market. In general, market efficiency is calculated for measuring the efficiency level of chains, it shows the result of technical efficiency and operational efficiency.

Technical efficiency is measured in terms of input and output ratios by comparing differences between input – output ratios of chains. Milk allocation level and pricing efficiency is referred in operational efficiency. It also considers the level of marginal product outputs and its factor cost for production, marketing, maximizing profit level of output.
1.10.1.3.1 Methods of Evaluating Marketing Performance

Organizations use various methods to evaluate marketing key performance indicators (KPIs) or metrics. Marketing Performance Measurement, Marketing Performance Management, Marketing Return on Investment (ROI), Return on Marketing Investment (ROMI), and Accountable Marketing are all metrics that companies use to connect marketing performance to the financial performance of the organization.

While evaluating marketing performance, chains should measure marketing outcomes from the consumers' points of view, include all marketing activities, measure across a continuous time period, and meet statistical and technical criteria required of all measurement systems.\(^82\)

1.10.1.3.2. Marketing Margin

A margin is the difference between two values or sums of money. Marketing involves an attempt to inform potential buyers of its product or service, drawing attention to it in such a way that consumers are willing to purchase it. A marketing margin applies to a chain that procures milk with the intent to resell it.\(^83\)

Procure a product to act as an intermediaries to sell the product at a higher price than that at which they are procured. In such situations, the marketing margin of a milk is the difference between what each chain procurement price milk for the product and what it charges for the milk.\(^84\)

1.10.1.3.3. Marketing Cost
The total cost is associated with delivering goods or services to customers. The marketing cost may include expenses associated with transferring title of goods to a customer, storing goods in warehouses pending delivery, promoting the goods or services being sold, or the distribution of the milk to points of sale. This includes handling cost, transportation cost, production loss, storage cost, processing cost, capital cost, commission and other unofficial payments. The result of this market cost investigation is compared with the perfectly competitive market conditions to measure the marketing efficiency of milk marketing chains.

1.10.1.3.4 Milk Marketing Chains

1. Producer → Consumer

2. Producer → Vendor → Consumer

3. Producer → Private agencies → Consumer

4. Producer → Cooperative Milk Producers’ Society → Consumer

5. Producer → Cooperative Milk Producers’ Society → Milk Producers’ Union → Consumer

1. Producer → Consumer

It is the shortest chain and no middlemen involve in this chain. Milk produced by the producer is directly sold to the ultimate consumer. In this chain, raw milk is sold immediately to neighbourhood consumer. Low quantity of milk is sold through this chain as compared to other chains.
2. Producer → Vendor → Consumer

In this chain, the vendors who produce milk in their farms and also collect milk from other producers and sell the milk directly to the ultimate consumers. Single middleman is involved in this chain. Mostly this type of chain is commonly found in Virudhunagar District.

3. Producer → Private agencies → Consumer

Private agencies are having their own farms in villages and also procure milk directly from producers. This chain is one of the important chains that they sell milk through their shops or through their outlets.

4. Producer → Cooperative Milk Producers’ Society → Consumer

Cooperative Milk Societies is one of the most important chain in Virudhunagar District. Milk Societies procure milk from their members and they are called as pouring members in the society. Milk societies procure milk from its pouring members and sell milk to consumers.

5. Producer → Cooperative Milk Producers’ Union → Consumer

Milk Producers union procures milk from their members who are called as pouring members. They also procure milk from cooperative milk producers society and sell to consumers. Excess milk is stored in chilling unit.

1.11 LIMITATIONS OF THE STUDY
1. The findings of the study are purely based on the information collected from the milk market respondents in each taluk and each chain of Virudhunagar District and may be biased.

2. The study covers cow milk marketing only.

1.12 CHAPTERISATION

The present study “Milk Marketing Chains – A Study with reference to Virudhunagar District” has been organized in six chapters.

The **First** chapter “Introduction and Design of the Study” comprises Introduction, Statement of Problem, Scope of the Study, review of literature, objectives of the study, Period of the Study, Methodology followed, Limitations of the study and the chapter scheme.

The **Second** Chapter “The dairy sector – An over view”, covers the historical profile of the dairy marketing structure.

**Third** Chapter deals with the socio–economic and demographic factors of milk producers.

**Fourth** Chapter analyzes the socio–economic and demographic factors of milk vendors.

**Fifth** Chapter is “Performance of milk marketing actors and the Efficiency of milk marketing chains” It evaluates the performance of milk marketing actors in various chains and measure the efficiency of various milk marketing chains.
Sixth and Final Chapter is the Summary of findings and suggestions. It offers suitable suggestions to improve the milk marketing chains in the study area.

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CHAPTER I

INTRODUCTION AND DESIGN OF THE STUDY