1.1 INTRODUCTION

India is a country of peasants and agriculture provides sustenance to more than two-third of the Indian population\(^1\). Agriculture is the backbone of Indian economy and no planning for economic growth can be fruitful without the development of agriculture sector. This Sector in India assumes special importance in the context of the population explosion and it is required that agricultural planning should be so devised that agricultural productivity should keep pace with the growing population. Efficient agricultural management to ensure better and still better productivity may make valuable contribution to the balanced growth of Indian economy.\(^2\) It occupies a central position in the Indian economy. It contributes 29.4 per cent of GDP, employing 64 per cent of the country’s workforce. Indian agriculture is characterized by poor yields, stagnant diversification, imperfect market conditions and traditional production practices.\(^3\) There are a number of sub-fields in the agriculture sector like sericulture, floriculture, and horticulture. Among those fields, horticulture has played a dominant role in the agricultural output throughout India.

Horticulturalists are cultivating a variety of fruits in their field. Among the different fruits produced by growers the cultivation of mango is higher in terms of area as well as in output compared to other fruits. India has occupied number one position in the mango cultivation in the world.\(^4\)

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\(^2\) Ibid, p.431.


Cultivation of fruits is a very important factor contributing to the prosperity of the nation. In fact, the per capita consumption and production of fruits are often taken as an index of the standard of living of the people in a country.\(^5\)

In terms of nutrition, fruits are a very good source of several vitamins, mineral salts and dietary fibre, which are essential for good health. Fruits are health-promoting as well as pleasure-giving. Because of their low energy density and appreciable amounts of dietary fibre fruits are good for health.\(^6\)

In India, daily consumption of fruits is only 10 grams per head compared with the recommended allowance of 37 grams for balanced diet.\(^7\) The per capita consumption of fruits and vegetables in India is estimated at 40 kilograms per year.\(^8\) The per capita production of fresh fruits alone in India, as per report of food and agricultural organization, works out to 24 kilograms as compared to 40 kilograms for the whole world.\(^9\)

The world market provides a good opportunity for the development of fresh and processed fruits and vegetables industry in India. From the point of view of the domestic market also, the horticultural products provide a higher nutrition value. Their cultivation

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\(^7\) Padmanandam, Indian Horticulture, Vol.30, October – December 1995, p.3

\(^8\) Ibid., p.8

\(^9\) Ibid., p.17
generates higher employment and higher returns to farmers than cereals and other agricultural cash crops.\textsuperscript{10}

The diverse agro-climatic conditions of soil and temperature allow India to cultivate a wide range of fruits and vegetables under natural climatic conditions as against artificial condition needed in the most developed countries. For instance, in Europe, electrical cables are installed in farms to heat the soil for cultivation of some agricultural products.\textsuperscript{11}

The mango, a fruit that originated in India, has admirers all over the globe. It is found in Vedas too. Mango undoubtedly deserves to be the national fruit of India. In area of production, nutritive value and popularity, no other fruit can compare with it. Its cultivation in India dates back to 6000 years old.\textsuperscript{12}

It is the national fruit and King among the fruits in India. In India’s horticultural crops, production of mango is about 60 per cent. Mango is one of the highly eatable fruits in the country. It contains various neutering namely B, carotene, carbohydrates, vitamin “C” fibre and energy.

Mango is one of the cheapest fruits in India, which can be eaten even by the poorest of the poor. In India large numbers of agriculturists are cultivating mango trees for their livelihood. Mango cultivation is seasonal and therefore during the off-season, the growers have to search for alternative employment.

\textsuperscript{10} Vikas Singhal, Hand Book of Indian Agriculture, Vikas Publishing House Private Limited, New Delhi, 1995, p.117
\textsuperscript{11} Ibid., p.113
\textsuperscript{12} Arun Arya, Tropical Fruits, Disease and Pests, Kalyani Publishers, Ludiyana, 1993, p.2
1.2 STATEMENT OF THE PROBLEM

Agriculture employs about 70 per cent of the Indian population. The success of agriculture is highly influenced by the strategies adopted by the agriculture. It is quite obvious that the farmers have been facing a variety of problems during the time of cultivation. The major problem included production, finance, and maintenance of field. The problems faced by the mango growers are entirely different from other agriculturists.

The increase of agricultural production and the development of agri-processing industries are mainly depending on agricultural operations. The mango cultivation is one of the important segments in the horticultural operation of this country. In general, the mango growers are economically and socially weaker people and faced by various problems such as under employment, lack of financial resources and involvement of intermediaries. Since the mango cultivation is a seasonal one, it is obvious that they have been unemployed for about six months in a year.

Mango is a horticultural commodity. The mango growers are exploited by marketing intermediaries like moneylenders and pawnbrokers. Most of the farmers are illiterate and therefore they are not aware of marketing strategies to market their produce. Moreover, they are not aware of the prevailing price trend in different countries.

The mango growers are facing many problems every day. There is no well-organized marketing system and co-operation among the growers. Commission agents and middlemen are exploiting the illiterate farmers by fixing the prices below the cost of production. Generally mango prices are fixed by the middlemen, not by the growers with the result they have lost their share in the mango business.
The study area namely Tirunelveli District is very famous for Mango Cultivation. Especially the blocks around the Tirunelveli district are contributing the maximum quantity of mango to the Tirunelveli Market. Previously the entire production of mangoes had been sent to the Tirunelveli Market, which involved high amount of work cost. But at present, the mango growers themselves organize a local mango market at the production places. Though the mango cultivation is not a profitable one, many people are continuously doing the cultivation due to the non-availability of alternative occupation.

Therefore, there is very much essential to study the problems of production and marketing of mango, since large numbers of farmers are involving themselves in this field. Based on the findings, anyone can easily understand the background of the mango growers and also take an appropriate decision for the benefit of growers. They are facing a number of problems during their cultivation, operation and marketing practices. The most serious problems faced by the cultivators among other things are financial indebtedness to others, and no guarantee in mango yield. But the main reason for lower production of mango is frequent climatical changes in the area of cultivation. In this context, the present study highlights the production and marketing problems of mango growers in Tirunelveli District.

1.3 SCOPE OF THE STUDY

Tirunelveli district is one of the important districts in Tamil Nadu and agriculture forms the backbone of the district economy. It is one of the major mango producing districts of Tamil Nadu. During 2010-2011 the area under mango growers in Tirunelveli district was 5916 hectares, which was nearly 4.23 per cent of area under mango in Tamil Nadu. The production of mango during the corresponding period was 58465 tonnes, which was about 6.10 per cent of the state production. Mango is an important
commercial crop, which plays a vital role in the agricultural economy of Tirunelveli District. Besides, mango is grown under irrigated and unirrigated conditions. Several thousands of people get employment directly as well as indirectly.

In Tirunelveli district, Mango is the most popular fruit. It is equally liked by both the rich and the poor. The district has the 5th place in mango cultivation in Tamil Nadu. In this district a large number of farmers are engaging in mango cultivation. Presently in Tirunelveli district, mango is being cultivated in Alangulam, Ambasamudram, Cheranmahadevi, Kadayam, Pappakudi, Nanguneri, Kalakkadu, Palayamkottai, Radhapuram, Valliyoor, Sankarankovil, Melaneelithanallur, Kuruvikulam, Shenkottai, Vasudevanallur, Tenkasi, Kadayanallur, Keelapavoor, and Manur blocks. Hence, the researcher has selected the entire district for the study. The study is mainly conducted on behalf of mango growers. It does not include other persons who are directly or indirectly connected with mango cultivations.

1.4 OBJECTIVES OF THE STUDY

The following are the main objectives of the present study;

i) To study the socio-economic conditions of the mango growers of Tirunelveli district.

ii) To review the mango cultivation practices adopted by the mango growers

iii) To analyse the cost and returns of mango cultivation in Tirunelveli district,

iv) To analyse the production problems faced by the mango growers of Tirunelveli district

v) To analyse the marketing problems of mango cultivation of Tirunelveli district

vi) To offer suitable suggestions for the improvement of production and marketing of mangoes in Tirunelveli district.
1.5 REVIEW OF LITERATURE

The review of earlier studies on this topic and related topic is essential to have a clear view on the areas already studied. The studies related in this field are described below.

The analysis of cost and returns is an important aspect in Indian agriculture. In agricultural operations, the cost of cultivation refers to the various input costs incurred by a farmer to produce the final output. The Cost of Cultivation consists of Two Parts, namely Fixed Cost and Variable Cost.

The Fixed Cost includes depreciation, taxes, rent, interest and insurance premium. It remains constant in the short run and does not vary with the changes in output. The variable cost covers wages paid to hired labour, cost of manures and fertilizers, cost of seed, tractor fuel and livestock feed. It is one which changes with the level of production in the same direction.

Shukla has categorized Costs into Cost A1, Cost A2, Cost B and Cost C in the farm management studies in India. Cost A1 includes the cost of seeds, manures and fertilizers, plant protection, livestock expenses, hired human labour, irrigation charges, land revenue, interest on working capital, depreciation of fixed assets and other miscellaneous expenses. Cost A2 covers Cost A1 plus rental value of owned land plus interest on fixed capital minus land revenue on owned land. Cost C includes cost B plus imputed value of family labour.\(^\text{13}\)

Harison in his study, “Agricultural Modernisation and Income Distribution” revealed that the small farmers cultivated ADT 27 variety more extensively than the large

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farmers. Small farmers spent higher amount per hectare on the inputs. Chemical fertilizer was the highest input cost incurred in the small and the large farmers and it was followed by the input, seed.$^{14}$

Rajagopalan in his study, “Cost of Production of Major Crops in Tamil Nadu”, considered only Cost A (Variable) and Cost C (Fixed). The two cost items included the following:

**i) Variable Cost (Cost A)**

a) Value of human labour including family labour.

b) Value of bullock labour.

c) Value of machinery charges.

d) Value of seed

e) Value of insecticides

f) Value of manures and fertilizers

g) Cost of irrigation and

h) Interest on Working Capital

**ii) Fixed Cost (Cost C)**

Cost A plus rent (including actual rent paid by the tenant or rental value of owned land), interest on fixed capital, land revenue, cess and taxes plus depreciation value of farm implements and machinery.$^{15}$

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$^{15}$ V. Rajagopalan, Studies on Cost of Production of Major Crops in Tamilnadu, Department of Agricultural Economics, Tamilnadu Agricultural University, Coimbatore, 1978, pp.2-3.
Latha Bastine and Radhakrishnan, in their study, found that the cost of cultivation per hectare was Rs. 36,249. The returns worked out to Rs. 45,068 and the net income was Rs. 8,819. The main items of expenditure were the cost of both family and hired labour and manure per hectare of plantain cultivation. Their study showed that the contribution of family labour was 30-50 per cent of the total expenditure for labour. The contribution of family labour showed a decreasing trend as the size of the holding increased.\textsuperscript{16}

Cost of Production in general comprises four concepts namely, Cost A1, Cost A2, Cost B and Cost C. Various authors have defined these four concepts differently. The Directorate of Economics and Statistics used this concept in many of the cost of production studies and farm management studies and they are discussed below.

Cost A1- it approximates the actual expenditure incurred in cash and kind. It includes value of human labour, value of bullock labour (owned and hired), machine labour, value of seeds, manures and fertilizers, plant protection chemicals, irrigation charges, land revenue and cess water rates, interest paid on working capital and depreciation on implements, machinery and farm buildings.

Cost A2 – it comprises cost A1 plus rent paid for leased land.

Cost B – it comprises cost A2 plus rent value of owned land plus interest on fixed Capital excluding land.

Cost C – it includes cost B plus imputed value of family labour.\textsuperscript{17}


Selvan has included annual maintenance costs comprising the land revenue and other taxes incurred during the current year in the growth phase of orchard in direct cost. Annual establishment cost up to bearing stage and interest on fixed and working capital were included in the indirect cost.\textsuperscript{18}

Bhatta Charjee in his study entitled “Reflection on the Approach to studies in Farm Economics in India”, reveals national welfare and farmer’s welfare as objectives of cost schedules. The former included input-output relationship, utilization of resources and costs at aggregate farm level and the later included allocation of resources, the nature and inter-relationship of different enterprises and the relationship between input and output at individual farm level.\textsuperscript{19}

Alikhan and Rajagobalan studied the cost of production of coconut as the sum of establishment cost and operational cost. Establishment cost up to bearing stage C was spread over the life span of coconut palm, which is assumed to be 80 years. Indirect cost included annual share of establishment cost, interest on working and fixed capital and depreciation charges.\textsuperscript{20}

Hanumantha Rao examined the changes in cost and return structure of high yielding varieties versus local varieties of rice per acre and revealed the following:

1) The cost per unit was reduced and the share of profits was increased under the high yielding varieties technology.

\textsuperscript{18} V. Selvan, Problems in Production and Marketing of Country Pear in Kodaikanal, Madurai District, Report No.2, Agricultural Economics, Tamilnadu Agricultural University, 1981, p.30

\textsuperscript{19} Bhatta Charjee, “Reflection on the Approach to studies in Farm Economics in India”, Indian Society of Agricultural Economics, Bombay, 1961, pp.108-120

2) The new technology was turned out to be cost saving on three factors namely land, labour and capital. The greatest cost saving on land was followed by labour and capital.

3) The unit cost of fertilizer declined significantly

4) The capital labour ratio was raised

5) The increase in fertilizer use was positively associated with the capital labour ratio. The analysis was based on the farm management data for the year 1969-70.21

Ravichandran concluded that nearly half (48.57 per cent) of the respondents had medium level of farming experience with 12 to 18 years. This was followed by low (up to 12 years) and high (above 18 years) farming experience with 30.00 per cent and 21.43 per cent respectively.22

Jeganarayanan reported that a little more than three fourths (78.34 per cent) of the respondents were with high level of farming experience was possessed by only 13.33 per cent and 8.33 per cent of the respondents respectively.23

Chade indicated that among fruit exports mango accounts for 36.40 per cent of volume. It was 27,000 during 1992-93 32.5 and 33.4 per cent of the total exports by

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21 Hanumantha Rao, Changes in Cost and Returns with the use of High yielding Seeds, Technological Change and Distribution of Gains in Indian Agriculture, Macmillan Company of India Ltd., Delhi, 1975, pp.75-88


volume and value respectively. Even though India is the largest producer of mango the export has been quite static due to the exclusive dependence of Alphonso variety.²⁴

Pandey revealed that export of fresh mango has increased from 3,000 tonnes (Rs.2.11 crores) in 1976-77 to nearly 15,000 (Rs. 17.30 crores) in 1987-88. He also opined that the constraints in exporting fresh mango are the incidence of Spongy tissue in Alphonso and nut Weevil in Banganapalli and Deshekar. Lack of uniform size and colour also impede their export.²⁵

Jogindar and Kulwinder indicated that mango is becoming a good foreign exchange earner. Out of a total of 1000 varieties, 20 are commercial while only Deshehar and Alphonso are exported to Afghanistan, Bharain, France, Kuwait, Malaysia, Qatar, Singapore and USA.²⁶

Kumar, et al., revealed that the major processed products from fruits include beverage (30 per cent), followed by juice pulp and concentrates (21 per cent) and pickles and chutney (11 per cent). Since fruits are seasonal and perishable in nature, absence of processing is one reason for high magnitude of wastage that occurs in these commodities.²⁷

Mehta reported that majority of the respondents had knowledge on grafting techniques (87.00 per cent), the recommended size of pit (77.00 per cent), the maturity

indices of mango fruit (87.00 per cent), the reason behind harvesting matured fruits along with their stock (63.50 per cent) and the reason behind the removal of loranthus from trees (85.50 per cent).\(^{28}\)

Walke found that 47.33 per cent of the respondents had medium level of knowledge followed by high (27.33 per cent) and low (25.33 per cent) levels of knowledge on the recommended practices of banana. They further reported that 64.69, 56.67, 50.67 and 51.33 per cent of the respondents were lacking knowledge about the practices like smudging in banana farm, plant protection measures, recommended fertilizer doses and recommended varieties respectively.\(^{29}\)

Lakshmi and Vijaya reported that there was no variation among different categories of respondents in knowledge level when crop production technologies were concerned. However, more of low level knowledge on alternate land use was found among marginal farmers. Small and marginal farmers had low level of knowledge in soil conservation works and improved implements compared to the large and medium farmers.\(^{30}\)

Venugopala Reddy in his study revealed that nearly half (49.17 per cent) of the respondents were medium level adopters of recommended package of practices of mango, followed by low (42.50 per cent) and high level (19.33 per cent) adopters. He further


reported that majority of them partially adopted the plant protection measures. The practices like soil testing, use of hybrids, recommended age and type of grafts, recommended number of plants per acre, application of manures and fertilizers in the pits, water management, use of growth regulators, package and storage of fruits were not adopted by majority of the respondents.  

Shaikh indicated that almost all the mango growers were found to adopt technologies of soil requirement, spacing and filing of pits, while 50.00 per cent of the farmers had adopted the recommended dose of fertilizers and less than 25.00 per cent of the growers were adopting the technology of diseases and pest control, transplanting the seedlings in July-August and irrigation practices. Only 11.67 per cent of the growers were found to adopt the improved varieties, while none of the farmers adopted seed treatment. 

Ajayakumar reported that the constraints faced by the grape growers were diseases, poor bud burst, non-availability of labourers, micro-nutrient deficiency, rain during pollination, lack of irrigation water and weed management. The constraints faced by them in marketing of grapes were lack of regulated markets, exploitation by middlemen and low price for the produce.

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Mathaiya indicated that the foremost and predominant problems faced by majority of mango growers were high cost of inputs (78.33 per cent) more incidence of pests and diseases (73.33 per cent), inadequate irrigation facilities (69.16 per cent) inadequate extension support (65.00 per cent), high fluctuation in the market price (61.67 per cent), high labour wages (55.83 per cent) and lack of credit facilities (32.50 per cent).\(^{34}\)

Nirmaladevi revealed that low price for the produce, lack of quick transport facilities, lack of storage facilities, non-availability of regulated markets, exploitation by middlemen and non-availability of processing units were the market related constraints faced by guava cultivators.\(^{35}\)

Radha Raman Singh and G. K. Srivasta in their case study of Mukundpur Sarasai village of Vishali district emphasise that the task to be undertaken is to step up agricultural inputs and sell agricultural outputs by improving the market conditions. They conclude their study saying that the subsistence farmers who produce food at the minimum productivity rate make ‘distress sales’ to meet the emergent needs based on their socio-economic and cultural background, whereas the commercial farmers of the market sector who produce relatively high profitable cash crops and food crops benefiting to farm resources avail of considerably better remunerative prices because of having better capacity to withhold their farm produce. They respond well to price behavior whereas the subsistence farmer is compelled to sell a part of his produce, however small it

\(^{34}\) K. Mathaiya, Knowledge and Adoption of Mago Growers, Unpublished M.Sc. (Agri.) Thesis, Agricultural College and Research Institute, Tamilnadu Agricultural University, Madurai, 1987.

may be, at harvest price so that he can buy his hire requirements without considering whether the price he gets for his produce is high or profit bearing.\textsuperscript{36}

Dwelling at length on price determination price policy, marketing, etc., A.S. Kahlon points out that in developing countries market price tends to decline proportionately to the increase in production during periods of bumper harvest and hence the need for an incentive support price policy to guard the farmers against insecurities arising from unfortunate slumps in rice price. But a support price policy for an agricultural commodity cannot be decided in isolation. An efficient agricultural price policy requires a co-ordinated approach, taking into account policies relating to production including supply of inputs, credit and marketing including grading and standardization. Kahlon concludes his analysis by emphasizing that the task of agricultural price policy is much more than that of determining appropriate prices in the short run.\textsuperscript{37}

M. Nazer and P. Chilar Mohamed have made an in depth study of the role of marketing agencies such as marketing co-operatives and regulated markets in rescuing the farmers from ‘distress sales’ of their produce. According to them the unpredictable nature of the demand and supply positions as well as the pressing personal needs and conditions of the farmers are the forces that drive them to the necessity of indulging in distress sales of their produces at a price not profitable to them. The researchers suggest that institutional marketing agencies like marketing co-operatives and regulated markets should create awareness among farmers about the marketing services provided by them so


as to enable them to get reasonable price for their produce. Moreover marketing intelligence and marketing information system should be strengthened at local, regional and national level.\textsuperscript{38}

D.S. Sinthu has dealt with some aspects of agricultural marketing and pricing policies in India and pointed out that marketing efficiency can be improved by increasing operational efficiency and by increasing pricing efficiency. The former focuses on cost effectiveness, that is, reducing costs involved in the performance of different marketing functions like transportation, storage and processing and the latter reforms to the structural characteristics of the marketing system under which the sellers get the true value of their produce and the consumers receive the true worth of their money. He concludes that marketing will be meaningful only if it is sensitive to the needs of the sellers as well as the buyers.\textsuperscript{39}

T.S. Devaraja’s case study of vegetable marketing in the Hasan District of Karnataka points out that the impact of new production technology cannot be sustained unless simultaneous efforts are made in the direction of effective improvements in the marketing system of agricultural produces. If necessary steps are not taken by the Government for improving marketing efficiency farmers will not have any inducement for increasing production. Even though the regulated markets ensure better services in


terms of weighment, grading, storage, transportation and low marketing charges, the existing facilities are not adequate.⁴⁰

Srinivasan’s paper on “Competitive Agricultural Marketing System Prospects in 21st Century” says that in the northern districts of Tamil Nadu like Cuddalore and Villupuram, Regulated Markets have a record of good performance whereas in the southern districts like Tirunelveli and Virudhunagar, their performance is very poor. Though a very large number of farmers are aware of the existence of regulated markets, only a few of them avail of the marketing facilities offered by the regulated markets.⁴¹

Haridoss opines that the extent of awareness generated by the Regulated Markets can be measured by the quantum of market arrivals. His study reveals that market arrivals of all the crops except groundnut are determined chiefly by the marketable surplus.⁴²

Baradhan formulated a function for marketed surplus and found that the response of marketed surplus of paddy to its price was negative while that of output supply to price was positive. The input prices had positive effect on marketed surplus whereas they had negative effect on output supply.⁴³

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Kahage and Suryawanshi observed that the producer’s share in the consumer’s price was 47.73 per cent while 43 per cent of the total cost was the commission and profits of traders. The share of the different intermediaries in consumer’s rupee worked out to 19.01, 16.12 and 8.47 per cent for wholesaler, retailer and commission agent respectively in the marketing of roses.\(^{44}\)

Patil et al., analysed the marketing costs and price-spread for mangoes in four marketing channels. Among the four channels, direct sale from producer to consumer was found to be the most profitable, while the one through pre-harvest contractor was the least profitable.\(^{45}\)

Sundaresan and Thanesekaran in their study on production and marketing of grapes identified severity of diseases, pest attack, lack of adequate capital facilities to meet the initial establishment costs and high cost of inputs as the major production problem, while unorganised market structure, high marketing costs unnecessary deductions and lack of finance facilities rank as the important marketing problems.\(^{46}\)

Patil et al., observed that the Channel I (direct sale to consumer) and Channel II (sale through co-operatives) were the most efficient channels of mango trade. In these channels each marketing function was also found to be the most efficient as compared to

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the corresponding market functions performed in Channel III (sales through commission
agents) and Channel IV (sale through pre-harvest contractors).  

Agarwal and Sharma opined that the marketing cost of red chillies as percentage
of consumer’s price was higher as compared to semi-dried and dried forms because of
higher transport costs for wet and semi-dried ones. The marketing margins were 35.48,  
33.11 and 35.70 per cent in wet, dried and semi-dried chillies respectively.  

Warde et al., observed that the rotting losses of stoned onion after 120 and 240
days had shown a significant difference. The total loss of onion bulbs after 90 and 150
days was found to be significant while after 30, 60 and 120 days, it was non-significant.

K. Ramamoorthy and N. Srinivasan, in their study “The problems of production
and marketing of tomatoes in Coimbatore Taluk”, have observed that in the wholesale
market, tomato has been sold on volume basis in bamboo baskets and the retailers have
sold tomato on weight basis. The farmers are not aware of the ruling price for tomato in
the retail market and this has led to a low share of consumer’s rupee to the farmers.

Gopal studied the existing market structure for vegetables in Bangalore and
concluded that the producers obtained a net share of about 55 per cent in the consumer’s

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47 H.N. Patil, P. Kumar and M.A. Muralidharan, “Efficiency of Marketing Mangoes in
Ratnagiri District, Maharashtra”, Indian Journal of Marketing, Vol.XIV, No.7, 1984,  
pp.15-17.  
48 N.I. Agarwal and S.L. Sharma, “Marketing of Red Chillies in Rajasthan”, Spice India,
August, 1992, pp.16-21.  
49 S.D. Warde, S.B. Desale, and K.G. Shinde, “Storage Behaviour of Onion Cultivators in
Rangda (Late Rainy) Season”, Vegetable Science, Vol.XXII, No.2, 1995, pp.120-121.  
50 K. Ramamoorthy and N. Srinivasan, An Economic Enquiry into the Problems of
Production and Marketing of Tomato in Coimbatore Taluk, Department of Agriculture
Economics, Tamilnadu Agricultural University, Coimbatore, 1975, p.45.
rupee. Among different modes of transport used by the producers, lorry has been the cheapest.\textsuperscript{51}

J. S. Sharma and S. L. Shah, in their study, have observed that Agriculture marketing is concerned with demand and supply conditions, marketing operations, including marketing function, market structure, conduct and performance of marketing efficiency.\textsuperscript{52}

According to Irvin, agricultural marketing includes all the services, intangible and physical rendered between the farmers and the ultimate consumers. The intangible functions include pricing plus financing and risking and physical functions including, transporting, processing, sorting and grading farm products.\textsuperscript{53}

Star et.al, refer marketing as the process through which a business enterprise. Institution or organisation would i) select target customers or constituents, ii) assess the needs or wants of such target customers, and iii) manage its resources to satisfy those customers’ needs or wants.\textsuperscript{54}

Hariharan and Rajagobalan analysed the marketing channels for vegetables including banana. According to them the auction could be conducted between 12 noon and 4 p.m. and the percentage of the commission to agent on sale identified. The problems faced by the commission agents on sale value could be fixed at ten per cent.


They also identified the problems faced by the commission agents like requirement of working capital, bad debt, irregular supply and competition from new marketing centres. Retailers face problems like the perishable nature of goods, high interest rate and uncertainty of profit.  

Joshi. et al stated that marketing was a very complex procedure which involved many marketing channels at different stages with the involvement of a number of intermediaries. There was exploitation of the farmers by the intermediaries who gained a lion’s share of the income. In spite of token to solve the marketing problem, it still remains. Improving market efficiency was necessary to understand marketing practices and the behaviours of the farmers.  

In the view of Varma and Agarwal, Agricultural Marketing in the study of all activities agencies and policies involved in the procurement of farm inputs by the farmers and the movement of rural products from the farms to the consumers.  

Akbar and Rahman stated marketing of banana in selected areas of Bangladesh. They found that largest volume of banana was sold (63 per cent) at the market place itself. They identified the different channels and worked out the price-spread and found

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that as the consumer’s rupee. They found that as the length of the marketing channels increased, the farmer’s share declined considerably and vice versa.58

According to Suresh and Devaraja, for elimination of pre – harvest contractors in fruit marketing, steps like advancing for production and marketing against hypothecating the future produce, entering into direct with processing units and the like should be taken up.59

The description of Pawar and Patil on the system followed in the Bombay markets was different. They found that the wholesales played the role of commission agents as well as brokers in the trade. They acted as the pre – harvest contractors with the producers of fruits. They undertook all responsibilities right from the movement of consignment to the final payment of bills.60

Venkatraman studied the economics of grape cultivation in Bangalore South Taluk by classifying costs into establishment and maintenance costs. He considered the expenditure incurred in the first year of planting as establishment cost and all other cost incurred in the subsequent years as maintenance cost. He extended the establishment cost over the life period of the vineyard viz., 25 years along with a 10 per cent interest on apportioned value of land, and was considered as constituting the components of fixed capital. The study indicated very high investments of fixed capital and comparatively

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small investments of variable capital spent on items like human labour, manure, plant protection and irrigation.\textsuperscript{61}

Krisagar, et. al., analysed the Marketing of Mango in South Konkan Region of Maharashtra State. The farmers reported that in Vashi market mangoes are not having healthy competition among traders while purchasing mango, also reported by the farmers that price received from wholesaler of Vashi market less than their expectation. The traders decide the price secretly. The farmers faced problems of skilled labour at the time of harvesting of mangoes and have to pay heavy transport cost.\textsuperscript{62}

Thambi points out that agricultural is not mere selling or distribution. It embraces all activities that begin with ascertaining the needs of the consumer and market opportunity, setting up production to meet the anticipated demand, pricing, distribution, advertising and culminating in the sale of the product, hopeful at a small profit.\textsuperscript{63}

National Commission on Agriculture has stated that, “Agriculture Marketing” is a process which starts with a decision to produce a saleable farm commodity and it involves all aspects of market structure or system, both functional and institutional based on system, both functional and considerations and includes pre-and post – harvest operation assembly, storage, transportation and distribution.\textsuperscript{64}


\textsuperscript{64} Government of India, Ministry of Agriculture and Irrigation, Report of the National Commission of Agriculture, Part XII, New Delhi, 1976, P.110.
Bell defines marketing as primarily a sophisticated strategy of supplying what the consumers would want in quality and quantity.\textsuperscript{65}

Haque. T and G. Singh, while analyzing the problem of small farmers in the production and marketing of fruits and vegetables, have observed that the farmers are facing non-availability of labour, monsoon, disease problem in production inadequacy of transport and exploiting commission agents.\textsuperscript{66}

Thambi has defined marketing as that part of business, which concerns itself with expectation and income generation for profitable operation. It is concerned with both revenue and costs. It consists of a complicated set of choices concerning the product and services the firm should offer to the market. It involves the questions of the generation of what and how much and to whom, through whom and when, on what terms.\textsuperscript{67}

According to Cundiff and Still, market is the aggregate of forces as conditions within which buyers and sellers make decision that result in transfer of goods and services.\textsuperscript{68}

Cundiff and Still have stated that Marketing comprises activities to meet the consumer’s needs at a reasonable profit to the producer and at a reasonable price to the consumer.\textsuperscript{69}

Singla and George found that most of the products sold their orange production through pre–harvest contract system and through direct sale to retailers and consumers.\(^70\)

Amita Shah and Sah studied the relative performance of irrigated and rain fed farming in Gujarat’s agriculture sector. The study illustrated that area under crops has contributed to output growth in rain fed areas. Higher productivity was achieved in irrigated crops. The study observed inter farm variations in field. The variations in yield in rain fed farming were found to be higher. The study also found the agronomic practices in irrigated farming and soil moisture conservation in rain fed farming increased yield.\(^71\)

P.M. Kahage et.al., observe marketing cost is generally measured by the difference in the price received by its producer and price paid for it by the final user. The difference between the consumer price and producer price is known as the price spread.\(^72\)

G.S. Chandra Sekar observes that the cost of marketing each mango fruit worked out to 2.07 paise. The pre-harvest contractor paid on an average Rs. 47.60 to the producer. For every 1200 mangoes, he sold them for Rs.97.15 at wholesale market. The producer gained about 47 per cent of the whole sales price. The average gross margin made by the pre-harvest contractor was Rs.46.25 per 1200 mangoes. A net return obtained by the pre-harvest contractor for every 1200 mangoes is Rs.23.65. In other words he makes a net profit margin of 2.21 paise per fruit. On an average each pre-


harvest contractor handled 392780 mangoes and thus obtained a net profit of Rs.10,092 for a period of four months, which amounts to about Rs.2,800 per month. Including his entrepreneurial ability he needs an operating capital of Rs.30,868.\textsuperscript{73}

Senam Raju in, “Fruit marketing in India,” includes a detailed study of problem and prospects of fruit marketing with specific reference to mango and banana fruits. He gives a good account of the different aspects of fruit production and marketing like suitable climate and soil condition required for growing output trends, and the role of middlemen, price fixing methods, problems of growers and the like.\textsuperscript{74}

Kusum Budhwar studied the Romance of mango, which includes a detailed description of mango by a history and lore, botany of the mango plant and using the mango. It is a complete study of the king of fruits.\textsuperscript{75}

Ram Prakash Srivastava has studied the mango cultivation it includes the cultivation practices from planting to till marketing of mango and also his studied history, origin and nomenclatures of mango, disease affected to the mango.\textsuperscript{76}

Singh has analysed various problems at production and marketing level faced by the off-season vegetables growers in Himachal Pradesh. Further he studied ways of meeting uncertainty and income variability of the farmers.\textsuperscript{77}

\textsuperscript{73} G.S. Chandra Sekar and H.G. Shankara Murthy, “Economics of Production and Marketing of Mangoes in Karnataka”, November 1978, No.3, p.27.
1.6 METHODOLOGY AND DATA COLLECTION

The present study is based on both primary and secondary data. The primary data were collected from mango growers of Tirunelveli District with the help of an interview schedule (vide Appendix A). The secondary data were collected from various journals, books and mango statistics published by National Horticulture Board and Directorate of Horticulture, Chennai, Indian Institute of Horticulture Research, Bangalore and Agricultural University in Karnataka, Tamil Nadu State Agricultural University, Coimbatore, Horticultural College, Madurai and also from various websites.

1.7 SAMPLING DESIGN

The researcher has adopted for the present study Multi-Stage Random Sampling with Tirunelveli district as the universe, the Taluk as the stratum, the Village as the Primary Unit of sampling and the Mango Growers as the Ultimate Unit.

Tirunelveli district consists of 11 taluks namely Alangulam, Ambasamudram, Nanguneri, Palayamkottai, Radhapuram, Sankarankovil, Shenkottai, Sivagiri, Tenkasi, Tirunelveli and Veerakeralampudur. There are nineteen Revenue Blocks, One Block in Alangulam Taluk (Alangulam), Four Blocks in Ambasamudram Taluk (Ambasamudram, Cheranmahadevi, Kadayam and Pappakudi), Two Blocks in Nanguneri Taluk (Nanguneri and Kalakkadu), One Block in Palayamkottai Taluk (Palayamkottai), Two Blocks in Radhapuram Taluk (Radhapuram and Valliyoor), Three Blocks in Sankarankovil Taluk (Sankarankovil, Melaneelithanallur and Kuruvikulam), One Block in Shenkottai Taluk (Shenkottai), One Block in Sivagiri Taluk (Vasudevanallur), Three Blocks in Tenkasi Taluk (Tenkasi, Kadayanallur and Keelapavoor), and One Block in Tirunelveli Taluk (Manur). There is no separate Block in Veerakeralampudur Taluk and it is included in Keelapavoor Block.
On enquiry with the office of the Assistant Director of Horticulture of Tirunelveli, it is understood that there are around 3000 growers actively engaging in mango cultivation in the district. Out of the 3000 growers that constitute the total population 15 per cent numbering 450 respondents is considered as an ideal sample size. Eleven taluks consist of 425 villages which were arranged in a descending order of Area under mango. The first 75 villages were selected which amount for more than 70 per cent of mango cultivation in this District. The proportionate probability sampling technique has been used to select 450 sample orchardists from these 75 villages.

Tenkasi Taluk covers 27 per cent of area, Ambasamudram Taluk 17 per cent, Shenkottai Taluk 16 per cent, Nanguneri Taluk 10 per cent, Alangulam Taluk 7 per cent, Radhapuram Taluk 5 per cent, Tirunelveli, Sankarankovil, Sivagiri and Veerakeralampudur Taluks individually cover 4 per cent of mango cultivating area. Palayamkottai Taluk separately covers 2 per cent of mango cultivating area.

122 growers were selected at random from all the 16 villages from Tenkasi Taluk, 77 growers from 11 villages of Ambasamudram, 72 growers from 5 villages of Shenkottai, 45 growers from 5 villages of Nanguneri, 31 growers from 12 villages of Alangulam, 22 growers from 5 villages of Radhapuram, 18 growers were selected each from Tirunelveli, Sankarankovil and Sivagiri and 9 growers from Five villages of Palayamkottai Taluk. Table 1.3 explains the sample selection of the study area.
Table 1.1
Sample Framework in Tirunelveli District

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Taluk</th>
<th>Block</th>
<th>No. of Villages Selected</th>
<th>Growers’ Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tenkasi</td>
<td>Tenkasi</td>
<td>7</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kadayanallur</td>
<td>5</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Keelapavoor</td>
<td>4</td>
<td>36</td>
</tr>
<tr>
<td>2.</td>
<td>Ambasamudram</td>
<td>Ambasamudram</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cheranmahadevi</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kadayam</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pappakudi</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>3.</td>
<td>Shenkottai</td>
<td>Shenkottai</td>
<td>5</td>
<td>72</td>
</tr>
<tr>
<td>4.</td>
<td>Nanguneri</td>
<td>Nanguneri</td>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kalakkadu</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>5.</td>
<td>Alangulam</td>
<td>Alangulam</td>
<td>12</td>
<td>31</td>
</tr>
<tr>
<td>6.</td>
<td>Radhapuram</td>
<td>Radhapuram</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Valliyoor</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>7.</td>
<td>Tirunelveli</td>
<td>Manur</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>8.</td>
<td>Sivagiri</td>
<td>Vasudevanallur</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>9.</td>
<td>Sankarankovil</td>
<td>Sankarankovil</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Melaneelithanallur</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kuruvikulam</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>10.</td>
<td>Veerakeralampudur</td>
<td>Keelapavoor</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>11.</td>
<td>Palayamkottai</td>
<td>Palayamkottai</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Sample</td>
<td>75</td>
<td>450</td>
</tr>
</tbody>
</table>
It is clear from Table 1.3 that the total 450 respondents identified in the study consisted of 150 each from Small, Marginal and Large growers. The growers having up to 2.5 acres were grouped as Small Size, the growers having up to 5 acres were grouped as Marginal Size and the growers having more than 5 acres were grouped as Large Size.

1.8 CONSTRUCTION OF INTERVIEW SCHEDULE

In order to collect the primary data from the mango growers of Tirunelveli District, a comprehensive interview schedule was prepared. For preparing the interview schedule the researcher had trial interview with many farmers. Based on the variables and the objectives identified for the present study, the interview schedule was prepared. The schedule thus got ready was handed over to the experts for their critical evaluation. It was revised in the light of their comments. Then, a pre – test of the schedule was conducted with 25 farmers belonging to Tirunelveli District. In the light of their comments, the schedule was modified by incorporating all valid comments. After the pre – test schedule was revised and the final draft was prepared, a pilot Study by identifying 30 farmers belonging to Tirunelveli District was conducted and then the schedule was finalized for collecting the primary data. Even though the growers did not maintain adequate farm records and accounts, by virtue of their experience and long association with farming, they could furnish the required information. However, to recall bias, suitable cross-checks and rechecks were carried out.

1.9 DATA PROCESSING

After completion of the data collection, the filled up interview schedule was edited properly to make it ready for coding. A master table had been prepared to sum up all the information obtained in the interview schedule. With the help of the master table, all information was coded and then transcribed on transcription cards. With the help of
the transcription cards classifications tables were prepared. The classification tables were used for further analysis.

1.10 HYPOTHESES

In order to establish the above stated objectives, the following hypotheses are formulated and tested in this study.

a) There is no significant difference in problems relating to marketing among different age group of mango cultivators in Tirunelveli district.

b) There is no significant difference in problems relating to marketing among different literacy level of mango cultivators in Tirunelveli district.

c) There is no significant difference in problems relating to marketing among different strength of family members of mango cultivators in Tirunelveli district.

d) There is no significant difference in problems relating to marketing among different number of family members engaged in mango cultivation of mango cultivators in Tirunelveli district.

e) There is no significant difference in problems relating to marketing among different status of land of mango cultivators in Tirunelveli district.

f) There is no significant difference in problems relating to marketing among different experience of mango cultivators in Tirunelveli district.

g) There is no significant difference in problems relating to marketing among different operational land holdings of mango cultivators in Tirunelveli district.
1.11 PERIOD OF STUDY

Primary data were collected from mango growers. The secondary data on area, production and productivity of mango were collected for the period from 2001-02 to 2010-2011. The field survey was carried out during November 2011. Thus the present study is related to Agriculture Year 2010-2011.

1.12 OPERATIONAL DEFINITIONS OF CONCEPTS

The researcher has used many concepts in this thesis. The definitions of those concepts are presented below.

1.12.1 Mango Grafts

It is the earlier stage of mango trees. Mango grafts were produced in the private farm, horticulture department and the sample farms itself. In the case of farm produced grafts, the prevailing market price was taken into account.

1.12.2 Labour

Labour means persons who are directly involved in the mango cultivation. Men and women were standardized into man-day. In this study, family labour and hired labour are treated alike and converted into common physical units in terms of man days equivalent and valued at existing wage rate of Rs.350 for men and Rs.150 for women.

1.12.3 Manure

It is a type of fertilizer produced with help of dung, which is obtained from house animals such as cow, buffalo, oxen and sheep. The farm-produced manure was valued at the market price prevailing in the area. The purchased farmyard manure was valued at the purchase price plus the cost of overhead charges.
1.12.4 Pesticide

It is a type of chemical used to control the pest and some diseases. The purchased farmyard pesticide was valued at the purchase price plus the cost of applying charges.

1.12.5 Fertilizer

It is a type of chemical, which is used for improving the mango production. The purchased farmyard fertilizers were valued at the purchase price plus cost of overheads.

1.12.6 Garden Protection

Generally it includes the tying the mango at the time of yielding, cleaning and ward and watch. The coir threads are used to tie mango for protection of mango. In the actual purchase price of tying materials, cleaning and day-to-day operation of orchard protection was taken in to account.

1.12.7 Land Revenue

The common land tax as per the Government rate was charged.

1.12.8 Depreciation

Depreciation was calculated under Straight Line Method. It was done separately for Farm Building, Machinery, Tools and Equipment and Material. Depreciation was charged at the rate specified below.\(^78\)

\[
\begin{align*}
\text{Farm building} & : 2 \text{ per cent} \\
\text{Machinery} & : 10 \text{ per cent} \\
\text{Tools and Equipment} & : 25 \text{ per cent} \\
\text{Material} & : 50 \text{ per cent}
\end{align*}
\]

\(^78\) Studies on Economics of Farm Management in Coimbatore District, Tamilnadu.
1.12.9 Interest on Working Capital

Interest on fixed capital was calculated at the rate of 8 per cent annum. It is the rate which a grower can get if he makes any deposit in a co-operative bank. Interest on working capital was calculated at the rate of 11.5 per cent annum.

1.12.10 Total Establishment Cost

It refers to the cost incurred in the establishment of mango orchard up to the commercial bearing stage of 5 years. This included rental value of land, cost incurred seedling, tillage practice, garden protection, manure fertilizer, labour involved in various operations of the farm, interest on working capital and other costs such as interest on fixed capital, depreciation and maintenance.

1.12.11 Annual Share of Net Establishment Cost

The value of yield of mango during the establishment period was deducted from the total establishment cost to arrive at the net establishment cost. These costs were spread over to the economic life span of the mango, which was taken as 55 years. The annual share of net establishment cost thus arrived at was used in estimating the cost of production.

1.12.12 Mango Orchard

It is the area of mango tree grown by a single grower and situated within the sample village limits.

1.12.13 Farm Houses

It refers to the shed used for storage of mango and for keeping agricultural implements.
1.12.14 Machinery

It refers to the oil engine, tractor, tiller and motor pump owned by a grower.

1.12.15 Tools and Equipments

It includes sprayer, spade, crowbar, hammer, sickle, net and mango picker, owned by the grower.

1.12.16 Materials

It includes knife, basket, gunny and tarpaulin purchased by a grower for the garden.

1.13 STATISTICAL ANALYSIS

In order to study the production and marketing problems of the mango growers of Tirunelveli District, the researcher has identified a number of statistical tools, which are described.

1.13.1 Compound Growth Rate

The Compound Growth Rate with regard to area, production and productivity has been estimated on the basis of the semi-log or exponential function.

\[
\text{Compound Growth Rate} = \left[\frac{(\text{Anti log } B - 1) \times 100}{\sum \log y - \frac{(\sum \log y)(\sum t)}{n}}\right]
\]

\[
B = \frac{\sum t^2 - \frac{(\sum t)^2}{n}}{\sum t^2}
\]
1.13.2 Cost and Return Analysis

To study the Cost and Return Structure in the mango cultivation, Cost has been classified into as Cost A, Cost B and Cost C for the purpose of suitable analysis. Each of these categories contains a separate set of elements. The category and the elements are given below.

**Cost A**

- Wages of hired labourers,
- Value of Manure owned and purchased,
- Cost incurred for Watch and ward
- Cost of Pesticides purchased
- Expenses of irrigation charges,
- Value of purchased fertilizer,
- Depreciation, repairs and maintenance cost of implements and farm buildings, land tax, and other taxes, interest on working capital

**Cost B**

- Cost A + imputed rental value of owned land + imputed interest on owned fixed capital

**Cost C**

- Cost B + imputed value of family labour
The individual cost items are included in total cost, which its cost C also has been grouped into operational cost and fixed cost as under:


Fixed Costs  =  Cost C – Operational Cost

1.13.3 Garrett’s Ranking Technique

An attempt has been made in the section to rank the factors Garrett’s Ranking Technique, which is used to identify the problems in production and marketing of mango. The growers were asked to rank the identified problems. The order of merit assigned to the respondents was converted into scores by using by the Garret’s Ranking Technique.79

The following formula is given:

\[
\text{Per Cent Position} = \frac{100 \left( R_{ij} - 0.5 \right)}{N_j}
\]

Where,

\[
R_{ij} = \text{Rank given for } i^{th} \text{ factor by } j^{th} \text{ farmer},
\]

\[
N_j = \text{Number of factors ranked by } j^{th} \text{ farmer}
\]

By referring to Garrett’s table, the per cent positions estimated was converted into
scores. The scores of various respondents were added and mean values were calculated.
The mean values were arranged in descending order. The problem with the highest mean
value was considered to be the most important, followed by second, third and so on.

1.13.4 ANOVA

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

The ANOVA technique is based on the concept of sum of squared deviations from
a mean. Corresponding to the total variance and its two components, we have the total
sum of squares (SS), between groups sum of squares (SS\(_b\)), within groups of squares
(SS\(_w\)) is obtained by combining the sum squares i.e., the squared deviations of every raw
score from its sample mean. The formula used is

\[ SS_w = \sum d^2 + \sum d^2 + \sum d^2 + \sum d^2 + \sum d^2 + \ldots \ldots \sum d^2 \]

Where \(d\) = a deviation of every raw score of a category from its sample mean.

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

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

Where,

\(X\) = any sample mean

\(X_1\) = the total mean

\(n\) = the number of scores in any sample

\(SS_b\) = the between groups sum of squares
The total sum of squares (SS₁) is equal to a sum of within and between groups sum of squares.

\[ SS₁ = SS_b + SS_w \]

1.13.5 Mean Square

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

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

Where,

\[ MS_b = \text{the between-groups mean squares} \]
\[ MS_w = \text{the within-group mean squares} \]
\[ df = \text{the degrees of freedom} \]
\[ df_b = k - 1 \]
\[ df_w = n_1 - k \]

Where,

\[ k = \text{the number of samples (groups)} \]
\[ n = \text{the total number of scores in all samples combined} \]

1.13.6 Factor Analysis

Mathematically, Factor Analysis is somewhat similar to multiple regression analysis, in which each variable is expressed as a linear combination of underlying factors. The amount of variance a variable share with all other variables included in the analysis is referred to communality. The co-variation among the variables is described in terms of a small number of common factors plus a unique factor for each variable. These
factors are not over observed. If the variables are standardized, the factor model may be represented as:

\[ X_1 = A_1 F_1 + A_2 F_2 + A_3 F_3 + \ldots + A_{im} F_m + V_i U_i \]

Where,

- \( X_1 \) = \( i^{th} \) standardized variable,
- \( A_i \) = Standardized multiple regression coefficient of variable \( i \) on Common factor \( j \)
- \( F \) = Common factor,
- \( V_i \) = Standardized regression coefficient of variable \( i \) on unique factor \( i \)
- \( U_i \) = The unique factor for variable \( i \)
- \( m \) = Number of common factors

The unique factors are uncorrelated with each other and with the common factors. The common factors themselves can be expressed as linear combination the observed variables.

\[ F_1 = W_{i1} X_1 + W_{i2} X_2 + W_{i3} X_3 + \ldots + W_{ik} X_k \]

Where,

- \( F_1 \) = Estimate of \( i^{th} \) factor
- \( W_i \) = Weight or factor score coefficient
- \( K \) = Number of variables.
1.14 LIMITATIONS OF THE STUDY

The study suffers from the respondent’s recall bias and the inherent limitation of cross sectional studies namely the absence of proper farm records with the sample growers. These had been minimised by suitable interaction as well as cross checks then and there with the agricultural departmental field’s staff during the survey. As the study is based on opinion survey provided by the sample respondents, results of the study cannot be generalized and should be used with caution.

1.15 SCHEME OF THE REPORT

The Thesis consists of Six Chapters.

The First Chapter “Introduction and Design of the Study” deals with methodological aspects of the study. It covers Statement of the Problem, Review of Literature, Methodology, Objectives, Limitations and the Scheme of the Report.

The Second Chapter “Mango Cultivation Practices and Profile of the Study Area” highlights the background of Mango Cultivation Practices adopted by mango growers and the study area namely Tirunelveli District. It covers origin and growth of Tirunelveli District.

The Third Chapter “An Analysis of Mango Cultivation” deals with Area, Production and Productivity of Mango. It covers Mango Production in the World, Area under Cultivation of Mango in India, Mango Production in India, Area under Cultivation of Mango in Tamil Nadu, Mango Production in Tamil Nadu, Productivity of Mango in Tamil Nadu, Area under Mango Cultivation in Tirunelveli District, Mango Production in Tirunelveli District, Productivity of Mango in Tirunelveli District, Share of Tamil Nadu
in Area under Mango Cultivation in India, Share of Tamil Nadu Mango Production in India and Share of Tirunelveli District Area under Mango Cultivation in Tamil Nadu.

The Fourth Chapter “An Analysis of Production Problems of Mango Cultivators” evaluates the problems faced by the Mango Growers at Production Level which include, Water Problem, Problems of Fruit Losses, Problems in Mango Cultivation, Input Problems, Labour Problems, Problems faced by the growers at the time of Blossoming Days, Disease in Mango Cultivation, Cost and Return Analysis of Mango Production.

The Fifth Chapter “An Analysis of Marketing Problems of Mango Cultivators” analyses the problems faced by the Mango Growers at Marketing Level, which include, Problems in Storage Facilities of Mango by Growers, Problems in Transporting, Problems of getting Marketing Information, Problems faced by the Growers in the Market, Problems of Expenses in Marketing of Mango, Problems of Malpractices by Middlemen, Nature of Problems for Mobilizing Finance from Unorganized Sector, Interest charged by the Unorganized Sector from the Growers, Problems in getting Finance from the Organized Sector and Reasons for Satisfaction and Dissatisfaction in the Mango Cultivation by the Farmers.

Sixth and Final Chapter, “Summary of Findings and Conclusion” deals with the conclusion aspects of study. It covers Summary of Findings, Suggestions and Conclusion.