better varieties of mango' with a factor loading of 0.6217, 'borrowed capital is a main source of assistance for mango marketing' with a factor loading of 0.6175 and 'at the rainy season, more storage facilities is available' with a factor loading of 0.5627 are the variables with the highest factor loadings under factors F_1, F_2, F_3, F_4, F_5 and F_6. Therefore, these are the identified six variables which influence the marketing problems of mango among the respondents selected for the present study.

5.4 Summary

In this chapter the researcher has presented the various marketing problems of mango growers of Madurai District. It is found from the analysis that majority of the farmers still rely on non-banking financing sectors for their financial requirements. It is also found that 31.34 percent of the respondents have felt that the cost of transportation is very high and 32.33 percent of them were facing the problem of inadequate marketing information.

6.1 Introduction

In this chapter the researcher has presented the summary of findings of this study and also discussed the various problems faced by the mango cultivators

with appropriate suggestions for solving the problems.

6.2 Summary of Findings

The following are the summary of findings of the study

The Second chapter "Profile of Madurai District" highlights the background of the study area. The geographical area of Madurai district is 3,742 sq.km accounting far nearly 2.9 per cent of the geographical area of the Tamil Nadu State. There are two revenue divisions and seven taluks and there are 596 villages in this district. The Dindigul district,

the Sivagangai district, the Virudhunagar district and the Theni district serve as the northern, eastern, southern and western boundaries respectively of the Madurai district. Madurai district is classified into six sub-zones (southern plateau and hill region) under zone and among the 13 agro-climatic zones in the country. Normally sub-tropical climate prevails over the district without any sharp variation. Generally, Madurai district has a hot, dry and variable climate. The summer season here extends from March to July and in April-May the summer reaches its zenith.

The population of the district as per the 2001 Census was 2578201 of which 1303363 were male and 1274838 were female. The rural population was 1134025 and the urban population was 1444176. The density of population in the district is 525 per sq.km against the state average of 528 per sq.km.

Madurai district favourably uses the tropical climate. The mean minimum temperature ranges from 21.0°C to 26.7°C and the maximum temperature varies from 30.5°C to 38.7°C. The temperature in degree centigrade is minimum 27.8°C and maximum 39.5°C. May and June are the hottest

months and the lowest temperature recorded.

The district receives maximum amount of rainfall from the North-east and the south-west monsoons. But the rainfall is scanty in other seasons. The majority of working population of Madurai district is predominantly engaged in agriculture and other allied activities. The district has a total geographical area of 374173 hectares.

Madurai district is surrounded by various hills Yanamalai, Nagamalai and Pasumalai are the most prominent. Periyar and Vaigai are the two important dams whose reservoirs

irrigate most of the cultivable land. River and tank wells are the other important sources of irrigation. Well irrigation is also important and a large number of small and big wells are found in the district.

In Madurai district, the livestock population consists of cattle and buffaloes, sheep, goats, pigs and poultry. Madurai district is not rich in minerals even through it is not totally extinct. Crystalline limestone and building stone are available in large quantities in Thirumangalam and Melur taluk of the district, which are used for making cement and for constructions purposes. Madurai district is one of the

leading industrial and trading – populated districts in Tamil Nadu.

The two important rivers in Madurai district are Vaigai and Suruliar. Both these rivers originate from the Western Ghats in the Cumbum valley. They run a considerable distance on a parallel course and join near Allinagaram in Theni District and pass through Madurai district and enter the adjoining district.

Among the major crops grown in Madurai district, paddy, sugarcane, banana are cultivated in irrigated conditions only. Cholam, cumbu, greengram, groundnut and

cotton are the major crops which are cultivated both in irrigated and in unirrigated conditions.

The Third chapter “Mango Cultivation Practices.” deals with mango cultivation practices adopted by mango growers in the world. Mango is a tropical fruit. It can be grown at a height of 1500m above mean sea level at a temperature as low as 0°C and as high as 45°C the ideal temperature range for mango is 24-30°C during the growing season, along with high humidity. Temperatures below 10°C and above 43°C discourage growth.

Mango is found growing in several types of soils such as lateritic, alluvial sandy loam and sandy soils. Although it grows very well in soils of high to medium fertility, its cultivation can be successfully done in less fertile soils by providing good management especially in the early stages. The loamy, alluvial, well-drained and deep soils with a high percentage of humus are ideal for mango cultivation. Extremely sandy, shallow, rocky, waterlogged and alkaline or calcareous soils are not suitable for mango cultivation.

The various systems in vogue are the, (i) Rectangular, (ii) Square (iii) Quincunx, (iv)

Hexagonal and (v) contour (Sing 1960), of these, the square system is the most popular in mango. The planting distance may vary according to variety, fertility level of the soils and general growth conditions in the area. However, as most of the grafted fruit trees develop medium tree stature a spacing of 10*10m will be enough for their proper growth and development.

The application of manure and fertilizers in mango depends upon factors such as climatic conditions, variety planted and above all, the nutrient status of the soil. It is recommended to get the soil tested at regular intervals before giving and dose of

fertilizer. Nitrogen is the most important nutrient required. Regular applications of nitrogen promote healthy growth flushes and flower production especially if potash and phosphorus are present in sufficient quantities. The mango can withstand deficiency of phosphorus but not of potassium. Chelated micro- nutrients, especially iron, are also necessary. Organic fertilizers, that is, farm yard manure, bone meal, wood ash, castor cake and ammonium sulphate perform best, since the trees are subject to fertilizer burn. Young trees are particularly sensitive to overfertilizing but respond well to fish emulsion.

The common pests affecting the mango were found to be mealy bug, mango-hopper, shoot-borer, stem-borer and caterpillar. It was estimated that various pests affected 51.3 per cent of the total number of trees. Short-borer was the most serious pest accounting for 26.6 per cent of the total number of affected trees. The percentage number of trees affected by stem-borer and mango hopper was estimated to be 15.8 and 8.3 respectively.

The grafted trees start bearing at the age of five years (15-20 fruits) and the optimum yields starts from the 9th to 10th year onward, when each tree would yield about

400 to 500 fruits, depending on the variety. The yield continues to increase upto the age of 35 to 40 years (2,500 fruits) after which it starts declining. However, in certain grafted varieties, like langra and chausa, the full bearing potential is realised much later (15-20 years) than in a variety like Dashiri (10 years). In a fully matured mango tree, depending upon the age and spread of the tree, the total number of fruits harvested may range from 1,000 (250 kg.) to 2,500 (625 kg.). In India, the average production of mango is only 8.5 tonnes /ha. Which is much below the potential. It needs to be improved through efficient management.

Mango, presently besides India, is being cultivated in Pakistan, Bangladesh, Burma, Sri Lanka, Vietnam, Malaysia, the Philippines, Indonesia, The Fiji Islands, Tropical Australia, Egypt, Israel, Sudan, Somalia, Kenya, Uganda, Tanzania, South Africa, Nigeria, Zaire, Madagascar, Mauritius, the USA (Florida, Hawaii, Puerto Rico), Venezuela, Mexico, Brazil, Australia, West Indies Islands and Cambodia. Production of mango in the world ranged from minimum of 16903407 metric tonnes in 1990 to a maximum of 26286255 metric tonnes in 2004.

India, by virtue of her varying agro climatic condition, is highly conductive for production of large varieties of fruits. India has produced over 32 million tonnes of fruits against the global production of 350 million tonnes. Mango is grown almost all parts of India. However, there are distinct differences in the pattern of the crop in the country. The fruit is covering about 39 per cent of area and also accounting for 23.1 per cent total production of total fruits in the country, which is highest in the world with India's share of about 46 per cent.

India is the largest producer of mango in the world, but its productivity is very low

compared to other mango growing countries of the world. The reasons for low productivity are unavailability of high yielding varieties, irregular bearing, incidence of pests and diseases, unscientific method of planting, irrigation and the like.

Tamil Nadu is one of the largest mango cultivation centres in India. It is in sixth position under mango cultivation compared to other states of India. The major mango growing Districts in Tamil Nadu are Madurai, Salem, Krishnagiri, Dharmapuri, Dindigul, Theni, Thiruvallur and Vellore, out of 29 districts in Tamil Nadu. As per world production data, India ranked second in

production of fruits and vegetables after China. In fruits, India stood first in the global production of mangoes and banana, fourth in guava, fifth in pine-apple, sixth in oranges, tenth in apples and seventh in grapes. The area of mango cultivation in Madurai district has considerably increased from 1990 to 1995. Then it increases from 1998 to 2003. Madurai being the 6th largest producer of mango in Tamil Nadu, with the total area under its cultivation about 7957 hectares during the year 1991 increased to 9430 hectares by the year end 1995. The increase touched 4.14 per cent, over the five years of period.

The Fourth Chapter "Production Problems in Mango Cultivation" evaluates the problems faced by the farmers at various production levels. The total mango production is depending upon the total number of trees grown in the field. As per the recommendation of agricultural department, a farmer should grow below 30 trees in an acre. But the number of trees per acre varies from farmer to farmer. The productivity of mango depends on the synergistic influence of several variables within and beyond farmers' control. The mango can be grown in different types of soil and it grows on any well-drained soil. The soil type of study area is not uniform.

For want of healthy production and high quality of mangoes, there is need to use proper manure and fertilizers in their mango orchard. In the study area, the farmers used both organic and inorganic manures. It is helpful to the farmers for getting more quality and bigger type of mangoes. Irrigation is an important source of mango cultivation. The amount and frequency of irrigation to be given to mango orchard depends on the type of soil and climatic conditions especially rainfall and its distribution, age of the tree and the like. Water problems in mango cultivation can be

divided into two categories, adequate and inadequate.

In India there are thousands of varieties of mangoes cultivated, but only about 30 varieties are grown on a commercial scale. The search for higher quality and better varieties of mangoes has been going on for many years. For successful mango growing, it is necessary that the varieties planted in a commercial orchard are productive, of good quality and adoptable to the climate of the tract.

It is found from the study that most of the farmers (67 per cent) have practised in

cultivation of Bangalara variety in this field and 6.33 per cent and 11 per cent have taken up Palamani and Banganappalli respectively. Remaining 15.67 per cent of them cultivated Neelum variety. In normal course of mango cultivation, the farmers faced a number of problems like high initial orchard investment, long juvenile period of fruit plants, lack of high quality fruit plants and lack of technical knowhow and the like.

Out of 300 respondents, almost equal number of farmers has the problem of high initial orchard investment (31.67 per cent) and lack of technical know-how (31 per cent). It is also clear that the 20.67 per

cent of the growers feel long juvenile period of plants is the problem of cultivation and rest of 16.66 per cent refer to the problem of lack of procuring high quality of fruit plants.

The mango growers met various problems during the blossoming period due to natural and biological reasons. Blossoming period is very vital in the mango yield. Sometimes, the mango flowers fall due to over rain or under rain or disease. As a result the mango yield might be seriously affected. 40.67 per cent have fewer yields due to monsoon problems like over rain or under rain during the blossoming days and another 122

respondents constituting 39 per cent contribute fewer yields due to disease.

It is clear from the study that in the total annual operation and maintenance cost per acre is Rs.13025.78. Among these costs, the cost of labour constitutes the lion's share followed by the cost of manure. The cost of labour includes the expenditure on labour employed for application of manure, pesticide, harvesting mango, weeding, ploughing, mulching, earthing up around the tree and the like. The average cost of labour was Rs. 2694.93 per acre, which contributed to 20.69 per cent of the operation and maintenance cost. The cost of production of

mango includes both variable and fixed cost. The variable cost included annual operation and maintenance cost and fixed cost includes land revenue, rental value of land and annual share of establishment cost.

It is also found from the study that the total cost of production of mango per acre was worked out to Rs.29718.01. The total variable cost per acre was worked out to Rs.13025.78 and its share is 43.83 per cent of the total cost of production. It was found that the total fixed cost was worked out to Rs.16692.23 per acre, constituting 56.17 per cent of the total cost of production. It could also be observed that the gross returns were

32231.30 per acre, which were computed after deducting the marketing cost incurred by the growers from the sale proceeds of mangoes. The contribution was calculated at Rs.19205.52 per acre after deducting the variable cost from gross returns. The net profit per acre arrived at after subtracting the fixed cost from the contribution was Rs.3437.79. The fixed cost is higher for the large growers than the small growers. The cost incurred in the total cost for small and large growers was respectively Rs.6650.42 and Rs.8183.95. But the cost of cultivation is lower for small growers (Rs.21257.24 per acre) than the large growers (Rs.22579.27 per acre).

It is found that the co-efficient of determination (R^2) was 0.7791, indicating that 77.91 per cent of variation in the output of mango could be explained by the entire six explanatory variables included in the production function. The F-value indicated that the fitted Cobb-Douglas type production was significant at one per cent level and is valid to draw inference. Out of six independent variables, watch and ward, irrigation and fertilizer would influence that output as in the case of other types of farmers in a significant manner. The yield of mango could be increased by 0.0682 per cent, 0.0392 per cent and 0.3322 per cent by one per cent increase in the present level of

watch and ward, irrigation and fertilizer respectively allowing the respective input to vary while the other factors remain constant.

The Fifth Chapter "Marketing Problems in Mango Cultivation" analyses the problems faced by the farmers at marketing level. Out of total 300 respondents 23.67 per cent mango growers have sold their produce soon after harvest due to non-availability of storage facility in the area followed by 20.34 per cent who have anticipated price lowering and 17.66 per cent of them due to clearing debts. It is clear from the Table that the maximum of large

growers (32.67 per cent) sold their produce due to non-availability of storage facility. In the case of small growers the percentage was only 14 per cent. The mango cultivators have sent their produce to local market, rural market and urban market. The growers sell their produce through direct or with the help of middlemen including commission agent, local traders, wholesalers and the like. The major parts of the mango growers have sold their produce through commission agents registering 48.67 per cent, followed by 22.67 per cent of them through direct and middlemen.

It is found from the study that the majority of the sample respondents registering 60.67 per cent had problem of no storage facilities at their orchards and about 31.66 per cent confirmed that they have storage facility but that is inadequate. Needless to add that absence of storage facilities at farm has direct relation with the size of the farm. This means that as the size of holding increases the problem becomes more acute. Transportation is the most important factor in the marketing of mango, which has to be carried from producing areas to the consuming markets. The problems faced by mango growers of Madurai district with regard to the transportation of mango

have been examined. The main problems identified by the growers with regard to transportation of mango were delay, loss in transport, inadequate transport facility, high cost of transport and frequent strikes.

It is also found from the study that the majority of the mango growers registering 31.34 per cent were affected by the problem of high cost of transport followed by 29.33 per cent of respondents who have the problem of inadequate transport facility. Among the small and large size farmers, 27.34 per cent in small size growers have reported that vehicles during the season are hardly adequate to carry their produce. The

same problem has also been experienced by 31.3 per cent of the large size farmers. The mango growers are facing a number of problems during the marketing of their product. The problems include getting unreasonable prices of mango, low demand, bad debts, delay in collection of dues and so on.

Majority of the sample growers have viewed that low demand was the major problem for their produce and followed by unreasonable price of mango registering 33 per cent is the second problem. Sometimes, mango growers would get very little amount out of their sale because of more charges,

part payment, multiplicity of charges, malpractices by commission agents and other market functionaries.

It is also found from the study that 33.67 per cent of the growers have complained that more charges were levied by the commission agents. It is also clear from the Table that 14.67 per cent and 14.33 per cent of the growers were exploited by the commission agents due to part payment and multiplicity of charges. In order to meet the various financial requirements, the mango growers have mobilised money from various sources apart from their own sources. The sources of

borrowing include banks, moneylenders, wholesale merchants and their friends.

It is clear from the study that the maximum of 113 (37.67 per cent) mango growers borrowed money from wholesale merchants followed by 111 (37 per cent) sample growers who have got money from local moneylenders who charge maximum interest rate. It is also noted that the growers who got loans from bank were only 40 (13.33 per cent) respondents and 36 (12 per cent) sample growers secured money from their friends and relatives.

6.3 Problems and Suggestions

The following are the major problems identified by the researcher during the course of study especially at time of data collection. The researcher offers appropriate suggestions for solving the problems so as to improve the condition of mango growers.

6.3.1 Unreasonable Price

The pricing pattern of the mango varies from season to season and place to place influenced by many factors. When the demand and supply of mangoes is at a higher level the price automatically comes down, with the result the mango growers are seriously affected in many ways. For solving the above problem, the researcher has suggested that the price of mangoes should be fixed after studying the actual situations prevailing in the market. It is also felt that the price of the mango should never go below the level of the cost of production.

6.3.2 Establishing Storage Facilities

Mango is one among the perishable products and it must be consumed within two or three days, so that the quality is maintained. There is ample chance of

contaminating the fruits due to some reasons like unsuitable hot temperature and low standard transportation facilities.

In order to solve the above mentioned problems it is necessary to establish cold storage facility at headquarters Madurai, since it is interconnected with sufficient transport and marketing facilities and the mango growers can effectively utilize the services of cold storage.

6.3.3 Non-Availability of Sufficient Agricultural Labourers

The mango cultivation is a seasonal based activity. It requires sufficient amount of work force to deal with mango cultivation. The mango growers are facing shortage of labourers for the same reason. Every farmer wants to engage the labourers for his own cultivation. Also during the cultivation period labourers are actively engaged in preparing the groundwork for getting the soil fit for the next round of production.

For solving the above mentioned problems, the researcher has suggested that

the wages payable to the mango cultivation related workers must be increased further which may attract the workers to come forward for mango cultivation activities.

6.3.4 Improper Methods of Mango Cultivation

The majority of mango growers are illiterate. They are not having sufficient knowledge about the proper modern cultivation methods. As a result, they are facing loss of production in quantity wise as well as quality wise. They also found to waste manpower and other resources.

The services of agricultural experts from the department of agriculture should be sought. The mango growers should be educated to adopt right methods of cultivation for better production. They shall be encouraged by offering certificate of merit and other incentives.

6.3.5 Exploitation of the Middlemen

The marketing system for mango is primitive and dominated by middlemen who exploit both the producers and the consumers. Though the mangoes are sold by

auction, it is only an eyewash. The buyers are mainly commission agents who then sell the produce to the retailers and vendors.

In order to solve the above mentioned problems it is suggested that the Government of Tamil Nadu should purchase the mango produce from the farmers directly or quote the standard price for mango according to the market condition. Otherwise a system should be developed where the farmers can sell the produce directly to the consumers at retail outlets without the involvement of middlemen.

6.3.6 Problems in the Mango Ripening

Mango ripening is the most important activities in the part of the mango growers. The traditional method of ripening mango is not suitable in the present

market conditions because it is time consuming. Besides only a limited amount of mangoes only can be treated. Nowadays majority of the mango growers are using artificial methods for ripening the mangoes by using chemical like calcium carbide. It is creating negative impact on the consumer directly and the marketing in general. It affects the health of mango consumers. Also the government of India has banned the use of artificial method like using calcium carbide for ripening of fruits. The premature mango fruits ripened by the calcium carbide rabidly colour and the taste may be acidic and insipid. Such fruits show uneven ripening and sometime show excessive shrinkages. Consumers naturally refuse to buy such suspected fruits.

In order to solve the above mentioned problems the proper method of ripening should be adopted by the mango growers like the modern ethrel method adopted for ripening the mangoes. This method is a hygienic method; it induces uniform ripening with acceptable quality in the maturity of the mango fruits.

6.3.7 Setting Up of the Regulated Market

In Tamil Nadu, there are a number of regulated markets functioning successfully to meet the requirements of farmers but there is no regulated market dealing with and in mango fruits. As a result the marketing of mangoes takes place locally and openly. As a result the quality of the mango is seriously affected.

In order to solve the above mentioned problem the government of Tamil Nadu should establish a separate regulated market during the mango season for the benefit of the mango growers.

6.3.8 Setting up of Mango Processing Units

The mango fruit is a highly tasteful fruit sweeter than other fruits. There are a number of mango based units in various developed countries. But in India in general

and the study area in particular, there are not sufficient number of mango processing units and it will affect the overall economic status of the mango growers.

For solving the above mentioned problem, it is suggested that both government and private agencies should establish more number of processing units in this study area for the benefit of the individual mango cultivators as well as country's betterment.

6.3.9 Flexible Lending Policies

The mango cultivators require finance for meeting cultivation activities. Because of inflexible lending policies adopted by organized financial institutions many mango growers are approaching non-formal financial institutions like moneylenders for financial aid. As a result, they pay exorbitant interest to the moneylenders.

In order to solve the above mentioned problem, it is suggested that the banking companies must adopt flexible lending policies to suit the needs of the mango growers.

6.3.10 Supply of Fertilizers and Pesticides at Subsidised Rates

During the period of cultivation of mango, the farmers have used both fertilizers as well as pesticides to increase the volume of mango production. For that purpose they have spent huge amounts of money and sometime the sellers of these inputs have fixed extraordinary and unaffordable prices for the fertilizers and pesticides. With a result the cultivators have used only minimum quantity fertilizers and therefore the overall productivity of mango has highly declined.

In order to solve the above problem, it is suggested that the government must provide all types of fertilizers and pesticides required for mango cultivation at subsidised rates.

6.3.11 Problems of Poor Varieties of Mango

Every year India has retained number one position in the production of mangoes in the world. However, the export of mango is very meager compared to other countries. The Indian mango varieties have not proved their worth in the international market except the Alphonsa variety. In the study area the Bangalara and Neelam varieties which are wildly cultivated, show poor quality, taste and colour.

To find the solution to the above mentioned problem, it is suggested that the government should make a good quality of mango grafts to be issued to the farmers with subsidized rates. The farmers generally do not adopt proper soil testing in their field. The agricultural department may take suitable steps before issuing the good quality mango grafts for mango cultivations.

6.3.12 Lack of Modern Equipments

In the agriculture sector foreign countries have been using modern tools and equipments and therefore they are cultivating more number of plants with minimum utilization of land. In the study area namely Madurai district the farmers are not even aware of the availability of modern equipment for the mango cultivation. For example, the mango growers did not use equipment for picking up the mangoes from the tree. Instead of they are shaking the branches for this purpose. As results many branches are broken and fruits are also damaged at extent.

For solving the above discussed problems, the researcher has suggested that the government should give modern equipments to the mango growers at a subsidized rates and also provide proper training to operate the modern equipments. It is very much helpful to the farmers for elevating their economic status.

6.3.13 Problems of Packing Material

Mango being fragile in nature it needs good packaging which may ensure least damage to the fruit during transportation from producing areas to the distant markets. Normally in the study area the farmers who are using gunny bag or simply spread over the vehicle, therefore it causes more damage to the fruits on the transport and also there is no packing material easily available in the study area.

For solving the above mentioned problem, the government should take necessary steps for the availability of modern packing material easily with reasonable price in the study area. It will also attract the consumers.

6.3.14 Problems in Transportation

Transportation is the most important factor in the marketing of mango which has to be carried from producing areas to consuming markets. In the study area namely Madurai District the farmers face a number of problems while transporting the produce due to lack of vehicles, overdemand for vehicles and the absence of neat mettalled roads.

In order to solve the above mentioned problem the researcher has suggested that the transport facility in the state should be increased on a large scale to facilitate efficient marketing of mango on one hand and reduce losses due to spoilage of the crops on the other hand.

6.3.15 Insufficient Information

In the study area, the farmers are getting insufficient information regarding prices of their produce, which shows larger variation in daily prices and across different markets. Thus, the farmers have to face problems in setting the best price for their produce.

In order to solve the above discussed problem, it is suggested that there is an urgent need to set up efficient market information network so that farmers can get timely and adequate market related information which will help them to get better prices for the mango.

6.4 Conclusion

It is a gratifying experience to study at close quarters the harrowing experience of some of the mango cultivators in Madurai district. The highly volatile price pattern, lack of storage facilities, non-availability of agricultural labourers at times, the primitive methods of mango cultivation and stranglehold of middlemen are some of the crippling roadblocks faced by the mango entrepreneurs desirous of a study

progress. Mango has remained the topmost fruit in India ever since ancient days. It is highly tasty and luscious table fruit for Indians. To meet the ever-growing demand of the mangoes, a larger area of Indian soil should be used for mango cultivation. The mango cultivation provides employment opportunities to many people and also helps the mango growers for improving their economic status. In this context, the present study is highly unique in nature and the findings of the study are very much helpful to many people including government departments for further research as well formulating their future plans.