

population of District is 25.78 lakhs which includes 12.14 lakh of women.

3.1 Introduction

Cultivation of fruits contributes to the health, happiness and prosperity of the people. The standard of living of the people can be judged by production and consumption of fruits per capita.⁹⁸ Mango, the world's most luscious fruit, has been recognized as the "kings of fruits" long back.⁹⁹ Mangoes (*mangifera indica*) are perennial trees grown in India in the states of Tamil Nadu, Karnataka, Andhra Pradesh, West Bengal, Assam, Gujarat, Maharastra, Madhya Pradesh, Uttar Pradesh and Parts of Bihar.¹⁰⁰

3.2 Cultivation Practices

In this part of chapter, the researcher has made an attempt to present the cultivation practices of mango growers in the world and their production and productivity.

⁹⁸ J.S.Bal, **Fruit Growing**, Kalayani Publishers, Ludhiana, 1997, pp.8-9.

⁹⁹ Room Singh and R.R. Sharma, "Eldon: a future mango for export" *Journal of Indian Horticulture*, April-June 2002, p.26.

¹⁰⁰ K. Anand Singh and E. Srinivas "Control of leaf Webber in Mango", *Kisan World*, October, 2000, p.46.

3.2.1 Climate

Mango is a tropical fruit.¹⁰¹ It can be grown at a height of 1500m above mean sea level¹⁰² 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.

Temperature affects the flowering time of mango trees. A cool and dry period generally is essential for inducing flowering during winter, which slows or stops mango growth in regions of both heavy (2,540 mm) or Scant (254mm) rainfall. Precipitation of 890-1015mm in a year, if well distributed, is best. If prolonged rainless period occurs, supplementary irrigation should be provided. Rainfall during the flowering period adversely affects fruit setting .Fog, and cloudy weather at the time of flowering from November to February results in poor setting of fruits and favours disease incidence.¹⁰³ High velocity winds affect pollination also. Places, where occurrence of hailstorms is frequent are not suitable for mango cultivation.¹⁰⁴

¹⁰¹ K.L. Chandha, *Hand Book of Horticulture*, Indian Council of Agricultural Research, New Delhi, June 2002, p. 239.

¹⁰²Atul Chandra and Anju Chandra, *Production and Post Harvest Technology of Fruits*, NBS Publishers, Bikaner, 1996, p. 86.

¹⁰³M.K. Sadhu and P.K. Chattopadhyay, *Introductory Fruit Crops*, Naya Prokash, Calcutta, August 2001, pp. 111-112.

¹⁰⁴ *Ibid.*, p.117.

3.2.2 Soil

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.¹⁰⁵

3.2.3 Propagation

Mango is propagated on mango rootstock. For raising rootstock, the seeds of mango are sown within 4-5 weeks after extraction. Otherwise they lose their viability for sowing seeds. Raised beds are prepared with a mixture of farmyard manure, red soil and sand. In some places, seeds are sown directly in polythene bags. After germination, the leaves turn green in 2-4

¹⁰⁵A.K. Sacheti, *Op.cit.*, P.24

weeks. These seedlings are transplanted to polythene covers containing red soil, sand and farmyard manure. Addition of nitrogenous fertilizer to polythene covers after the establishment of plants helps in quick growth of seedlings. The seedlings thus raised should be used for grafting at different ages. Several methods of grafting are practised. They are:

3.2.3.1 Inarching

It is one of the most widely practiced methods of grafting. One can get a big-sized plant material for planting with over 95 percent success rate.

3.2.3.2 Veneer and Side grafting

These can be utilised for preparing a grafted plant material or for in-situ grafting, that is for the rootstocks which are already planted.

3.2.3.3 Epicotyl/stone grafting

This method is widely practiced in the Konkan region of Maharashtra. The

germinated seedlings of 8-15 days old are used for grafting.¹⁰⁶

3.2.4 Planting

Prior to planting, the field should be deeply ploughed and harrowed. Pits of proper size should be dug at appropriate distance generally at 10 x 10 m and filled by adding sufficient quantity of farmyard manure. The grafts should be procured from reliable nurseries for planting.¹⁰⁷

3.2.5 Time of Planting

There are two planting seasons for mango namely spring (February-March) and Monsoon (August – September).¹⁰⁸ The best time for planting in the plains is during the monsoon when there is sufficient humidity in the atmosphere. However, in heavy rainfall area the best time of planting mango is at end of the rainy season, whereas in tracts where the rainfall is less, the planting can be done in the early part of the monsoon for better establishment. The planting should be done in the cool hours of

¹⁰⁶K.L. Chadha, *Hand Book of Horticulture*, Directorate of Information and Publication of Agriculture, ICAR, New Delhi, June 2002, p. 242.

¹⁰⁷ A.K. Sacheti, *Op.cit.*, p..26.

¹⁰⁸J.S. Bal, *op.cit.*, p. 163.

the evening. Otherwise if the day turns out to be unusually hot or dry, the plants may wither due to excessive transpiration.¹⁰⁹

3.2.6 Planting System

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.¹¹⁰ 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.¹¹¹ The planting system adopted with the plant density is presented in Table 3.1

Table 3.1
Planting System in Mango Cultivation

S l. N o	Distance between plants (ft)	Number of plants /ha.		
		Square system	Hexagonal system	Quincunx system
1 .	10	435	870	500

¹⁰⁹A.K.Sacheti., *op.cit.*, pp.26-27.

¹¹⁰T.K. Bose and S.K. Mitra, *Fruits: Tropical and Subtropical*, Volume II, Naya Udyog, Calcutta, January 2001, p. 34.

¹¹¹A.K.Sacheti., *op.cit.*, pp.26-27.

2 .	16	170	340	195
3 .	20	109	218	125
4 .	24	75	150	86
5 .	28	56	112	64
6 .	36	34	68	39
7 .	40	27	54	31

Source: Crop production technique of Horticultural crops, Tamil Nadu Agricultural University, Coimbatore, 2004

It is clear from Table 3.1 that the maximum of plants registering (870 plants) are planted per hectare under the hexagonal system with the distance between 10 feet, whereas only 27 plants are planted under the system of square with the distance between 40 feet. The number of mango grafts planted depends on the system that the farmers have followed.

3.2.7 Land Preparation

Land is ploughed, cross-ploughed and then levelled before preparatory tillage and layout. The selected site should be thoroughly studied for its size, topography, slope, fertility status, water table and drainage facilities. The land is then levelled, thoroughly ploughed and divided with blocks by positioning main and subsidiary roads. The planting distance varies according to the vigour of the cultivators, fertility status of the soil and general growth conditions in the area. Where excessive growth of the tree is expected, a spacing of 12x12 m is suggested. But in the dry areas where luxuriant growth is not expected, a spacing of 10x10 m is considered sufficient. After making the places for the plants, pits are dug out during the summer months. In locations where the soil is deep and loamy, a pit of 50m³ is quite suitable for mango. However, for shallow and rocky soils, pits measuring 100cm³ are considered optimum.¹¹²

3.2.8 Rejuvenation of Old Mango Trees

It is a well known fact that mango trees live for long years and grow to huge dimensions. Old trees have a tendency to develop hollows in their trunks and in main branches starting from crotch or the point of bifurcation. Rain water is deposited here and this causes the bark and wood inside it to rot, and as the process continues year

¹¹² M.K.Sadhu and P.K.Chattopadhyay, *op.cit.*, p.117.

after year, large cavities are formed. Similarly when a branch is broken by wind or by other means the untrimmed stub left behind usually rots and dies. Gradually a cavity may be formed at this point too. Old trees in neglected condition with unhealthy branches full of Loranthus and stem bores need to be rejuvenated by removing all bores and Loranthus. Addition of 10 kg of bone meal, 100 kg of well rotten F.Y.M and 2.5kg of oil cakes is recommended for a plant.¹¹³

3.2.9 Irrigation

No watering is required during the monsoon except in the intervening spells of dry weather. From the second year during the winter, water may be given to the young trees at intervals of a week and during the hot weather at intervals of four to six days or even at shorter intervals depending upon the nature of the soil and severity of the weather. After five years, the mango trees will grow and fruit satisfactorily without irrigation in most parts of the country. But in comparatively drier zones they may have to be irrigated throughout their life if satisfactory crops are desired.¹¹⁴

The amount and frequency of irrigation to be given to mango orchards depend on the type of soil, climatic conditions especially rainfall and its distribution and age of

¹¹³Amar Singh, *Fruit Physiology and Production*, Kalyani Publishers, New Delhi, 1980, p. 350.

¹¹⁴Sham Singh, S. Krishnamurthi and S.L. Katyal, *Fruit Culture in India*, ICAR, New Delhi, 1967, p. 87.

the tree.¹¹⁵ Irrigation should be stopped at least 2-3 months before flowering. Irrigation during this period usually promotes vegetative growth and adversely affects flowering.¹¹⁶

3.2.10 Pruning

Pruning is the art of removing scientifically certain portion of a plant with a view to producing superior quality of fruits. Pruning of any kind, according to its severity, changes the nutritive condition within the tree.¹¹⁷

It has been reported that pruning can be helpful in overcoming the problem of irregular bearing in mango. This type of pruning is recommended for opening the centre of the tree by topping off or thinning of branches. This is reported to have helped in reducing irregular bearing.¹¹⁸

3.2.11 Manuring

The application of manure and fertilizers in mango depends upon factors such as

¹¹⁵M.K. Sadhu and P.K. Chattopadhyay, *Introductory Fruit Crops*, Naya Prakash Publications, Calcutta, August 2001, p. 119.

¹¹⁶*Ibid.*, p.129.

¹¹⁷Y.N. Kunte, *Introduction to Principles of fruit Growing*, Agri-Horticultural Publishing House, Nagpur, p.59.

¹¹⁸Bijendra Singh, Lakshmi Ram Singh and A.R. Singh, *A Text Book of Fruit Production*, Aman Publishing House, Meerut, 1997, p. 7.

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 a 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. Sandy soils require more fertilizer than loamy or clayey soils do. The fertilizer doses in mango cultivation are described in Table 3.2.

Table 3.2
Fertilizer Doses in Mango Cultivation

(Kg. Per tree)

Manure and Fertilizers	1 Year Old	Annual Increase	6th year onwards
FYM	10.00	10.00	50.00
N	0.20	0.20	1.00
P	0.20	0.20	1.00
K	0.30	0.30	1.50

Source: Crop Production Techniques of Horticultural Crops, 2004, Directorate of Horticulture and Plantation Crops, Chennai

From Table 3.2 it is clear that the fertilizer doses in mango cultivation is based on the ages of mango grafts. It is also clear that the FYM 10kg per tree in a year with annual increase the same figure doubles up to 5th year. After the 6th year 50kg per tree per year is applied .The N, P and K respectively 0.20 kg and 0.30kg per tree is applied with gradual increase up to 5th year. From 6th onwards 1.00kg and 1.50kg respectively

regularly applied up to 15 years. In India, fertilizer is applied at an increasing rate until the tree is fifteen years old, and then it is discontinued.¹¹⁹

3.2.12 Incidence of Pests and Diseases

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. It was further found that 40 per cent total of the number of affected trees was attacked by two or more pests. The common diseases affecting the mango trees were found to be malformation, dieback, gummosis and black-tip. It was found that 41.3 per cent of the total number of trees were diseased. Gummosis was found to be the most common disease accounting for 37.4 per cent of the total of diseased trees.¹²⁰

3.2.13 Irregular Bearing in Mango

This crop suffers from the problem of irregular bearing (Bakhshi and Singh, 1970). There are three categories of mangoes: (i) annual and regular bearers which

¹¹⁹Kusum Budhwar, *Romance of the Mango*, Penguin Books, 2002, p. 167.

¹²⁰ G.R.Seth, B.V.Sukhame and A.H. Manwanim, *Sample surveys of Mango and Guava in Utter Pradesh*, ICAR, New Delhi, 1961, p.47.

bear good crop of fruits almost every year, (ii) biennials or alternate bearers which show rhythmic habit of profuse reproductive growth and fruiting in the 'on' year and profuse vegetative with little or no reproductive growth in the next 'off' year, and (ii) irregular bearers in which there is one 'on' year for every 4-5 'off' years. The problem is so severe and the yield so unpredictable that mango is in danger of being replaced by other regular-bearing fruit crops.¹²¹

3.2.14 Harvesting

The grafted trees start bearing at the age of five years (15-20 fruits) and the optimum yield 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.¹²²

¹²¹A.K. Srivastava, (ed.), *Irregular Bearing in Mango Problem and Strategy*, Rajendra Agriculture University, Pusa (Bihar), 1991, p. 47.

¹²²A.A. Farooqi and A.K. Sacheti, *op.cit.*, p.35.

3.2.15 Post Harvesting

The harvested fruits should first be graded according to size and appearance, although this is not the usual practice. Ripe fruits and damaged fruits of relatively poor quality are usually retained for local markets and better types are packed for distant places. Proper packaging is an essential pre-requisite for maintaining good appearance and quality of the produce on reaching the marketing centres. The most common practice in Western India is to pack the fruits in bamboo baskets of 50 to 100 fruits capacity.¹²³

The mango is a climactic fruit and unless the fruits are stored properly, one cannot be sure of the condition in which the fruits will reach the desired market. Proper storage is absolutely essential during the year of the glut. Also, the processing units cannot utilize the entire produce at a time and proper storage conditions become vital. In general green but mature fruits store better than those harvested ripe from the trees. Studies have shown that fruits of many cultivars can be stored successfully for about 4 to 7 weeks at a temperature of 3.9 to 8.9C.¹²⁴

3.3 Area Under Cultivation of Mango in the World

¹²³ T.K.Bose and Mitra, *Fruits*, Vol.1, Maya Prakash, Calcutta, March 1996, pp.47-48.

¹²⁴ *Ibid.*, p.49.

The lands are used for the cultivation of different crops depending on the fertility of the soil. The soil which is highly suitable for the cultivation of all kinds of fruits is alluvial soil. This soil is very much available only in the countries namely India, Indonesia, Brazil, Pakistan and the like.

Mango, besides India, is being presently 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.¹²⁵

The area under mango cultivation and the percentage of increase or decrease, trend values and compound growth rate are presented in Table 3.3.

Table 3.3
Area under Mango Cultivation in the World from 1990 to 2004

Sl.No.	Year	Area (in Ha.)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	1970912	--	--	2150730.12
2.	1991	2310910	339998	14.71	2271772.48
3.	1992	2406683	95773	3.98	2392814.83
4.	1993	2524934	118251	4.68	2513857.19
5.	1994	2633195	108261	4.11	2634899.54
6.	1995	2872527	239332	8.33	2755941.89

¹²⁵Ram Prakash Srivastava, *Mango Cultivation*, International Book Distributing Co, Lucknow, 1998, p.3.

7.	1996	2918904	46377	1.59	2876984.25
8.	1997	2864333	-54571	-1.90	2998026.60
9.	1998	3209262	344929	10.75	3119068.95
10.	1999	3276447	67185	2.05	3240111.66
11.	2000	3502477	226030	6.45	3361153.66
12.	2001	3481562	-20915	-0.60	3482196.01
13.	2002	3634390	152828	4.20	3603238.37
14.	2003	3664429	30039	0.82	3724280.72
15.	2004	3699434	35005	0.95	3845323.07
CGR		4.28			

Source: FAO Statistics

**Assistant Director, National Horticulture Board, Guindy,
Chennai.**

Note: CGR= Compound Growth Rate (in percentage).

From Table 3.3 it could be seen that the area under mango cultivation in the world was the highest in 2004 and lowest in 1990. The area under mango cultivation has gone up from 2310910 thousand hectare to 3699434. The cultivation increased remarkably by 344929 thousand hectares in 1998 and 339998 thousand hectares in 1991 registering 10.75 per cent and 14.71 per cent increase. It is also observed from Table 3.3 that the area under mango cultivation had gone down in 1997 and 2001, from – 54571 thousand hectares in 1997 and – 20915 hectares in 2001, registering –1.90 per cent in 1997 and –0.60 per cent in 2001

decreased. The table shows that the trend value for area under mango cultivation had increased from 1970912 thousand hectares in 1990 to 3699434 thousand hectares in 2004. The compound growth rate of area of mango cultivation in the world is 4.28.

3.4 Mango Production in the World

There are different fruits being produced around the world. Among these mango is one of the acceptable fruits of any countries. The major producing countries in the world are India, Brazil, Mexico, Pakistan, Thailand, China, Indonesia, Philippines, Haiti, Zaire and the like. Among these countries that produce mango, India has been placed in number one position, followed by Brazil. The total mango production in the world and the percentage increase or decrease, trend values and compound growth rate are presented in Table 3.4.

**Table 3.4
Production of Mango in the World from 1990 to 2004**

Sl.No.	Year	Production (in Metric Tonnes)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	16903407	--	--	17544835.13
2.	1991	17517338	613931	3.50	18239808.02
3.	1992	17851353	334015	1.87	18934780.90
4.	1993	19365571	1514218	7.82	19629753.79
5.	1994	21266888	1901317	0.09	20324726.68
6.	1995	22467662	1200774	5.34	21019699.56
7.	1996	22629232	161570	0.71	21714672.45
8.	1997	23665317	1036085	4.38	22409645.33
9.	1998	22486605	-1178712	-5.24	23104618.22
10.	1999	23482490	995885	4.24	23799591.10
11.	2000	24749036	1266546	5.12	24494563.99
12.	2001	24970898	221862	0.89	25189536.88
13.	2002	26497284	1526386	5.76	25884509.76
14.	2003	26005344	-491940	-1.89	26579482.65
15.	2004	26286255	280911	1.07	27274455.53
CGR	3.26				

Source: FAO Statistics

Assistant Director, National Horticulture Board, Guindy, Chennai.

Note: CGR= Compound Growth Rate (in percentage).

From Table 3.4, it is observed that the production of mango in the world ranged from minimum of 16903407 metric tonnes in 1990 to a maximum of 26286255 metric tonnes in 2004. In the year 1993, 1995, 2000 and 2002 there was notable increase over the previous year, whereas during the other years it was reasonable. There was

decreasing trend during 1998 and 2003 over the respective previous years registering –5.24 per cent and –1.89 per cent decrease. It is also inferred from the table that the trend value for mango production should an upward climb. The trend value increased from 17544835.13 metric tonnes in 1990 to 27274455.53 metric tonnes in 2004. The compound growth rate of expansion of the production was 3.26 per cent per annum.

3.5 Productivity of Mango in the World

The productivity of mango depends on the synergistic influence of several variables within and beyond farmer's control. It is dependent on soil type, season, rainfall distribution during the crop period, crop variety, system of irrigation, quality of water cost, of input such as manures, fertilizers, plant protection, time and methods of their use and application, management skill and the like. The average yield of mango per hectare, the percentage increase or decrease, trend values and compound growth rate are presented in Table 3.5.

Table 3.5**Productivity of Mango Cultivation in the World from 1990 to 2004**

Sl.No.	Year	Productivity (in Kg./ Ha.)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	85764	--	--	80051.27
2.	1991	75803	-9961	-13.14	79326.03
3.	1992	74174	-1629	-2.20	78600.80
4.	1993	76697	2523	3.29	77875.56
5.	1994	80765	4068	5.04	77150.32
6.	1995	78216	-2549	-3.26	76425.08
7.	1996	71526	-6690	-9.35	75699.84
8.	1997	82621	11095	13.43	74974.60
9.	1998	70068	-12553	-17.91	74249.36
10.	1999	71671	1603	2.24	73524.12
11.	2000	70662	-1009	-1.43	72798.88
12.	2001	71723	1061	1.48	72073.64
13.	2002	72907	1184	1.62	71348.40
14.	2003	70967	-1940	-2.73	70623.16
15.	2004	71055	88	0.12	69897.92
CGR	-0.95				

Source: FAO Statistics

Assistant Director, National Horticulture Board, Guindy, Chennai.

Note: CGR= Compound Growth Rate (in percentage).

Table 3.5 shows that the yield of mango per hectare in world had a fluctuating trend during the period under study. The Table exhibits that the productivity of mango ranged from 75803kg.per hectare in 1991 to 82621kg.per hectare in 1997. The productivity increased from 74174kg.per hectare in 1992, to 76697kg.per hectare in 1993. It was registering 3.29 per cent increase in annual growth rate.

The yield per hectare under mango cultivation had gone down in 1991, 1992, 1995, 1996, 1998, 2000 and 2003 from -9961kg.per hectare, -1629kg.per hectare, -2549kg.per hectare, -6690kg.per hectare, 12553kg.per hectare, 1009kg.per hectare, and 1940kg.per hectare respectively, registering -13.14 per cent in 1991, -2.20 per cent in 1992, -3.26 per cent in 1995, -9.35 per cent in 1996, -17.91 per cent in 1998, -1.43 per cent in 2000 and -2.73 per cent decrease in 2003. Generally, the trend of world mango productivity was negative. The compound growth rate of expansion of the production was -0.95.

Figure 3.1 depicts the area, production and productivity of mango in the world.

3.6 Area under Cultivation of Mango in India

India, by virtue of her varying agro climatic condition, is highly conducive for production of large varieties of fruits. India has produced over 32 million tonnes of fruits against the global production of 350 million tonnes.¹²⁶ Mango is grown in almost all parts of India. However, there is distinct difference in the pattern of the crop in the country. The fruit covers about 39 per cent of area and accounts for 23.1 per cent total production of total fruits in the country, which is highest in the world

¹²⁶K.P. Ganesan “ Production, processing and Packaging of fruits”, *Kisan World*, February, 2004, p.13.

with India's share of about 46 per cent.¹²⁷ The major portion of mango production is contributed by the eleven states namely Uttar Pradesh, Bihar, Andhra Pradesh, Orissa, Kerala, West Bengal, Tamil Nadu, Karnataka, Madhya Pradesh, Gujarat and Maharashtra. The area under mango cultivation and the percentage increase or decrease of trend values and compound growth rate are presented in Table 3.6.

Table 3.6

Area under Mango Cultivation in India from 1990 to 2004

Sl.No.	Year	Area (in Ha.)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	846292	--	--	1001699.82
2.	1991	1077621	231329	21.47	1047938.71
3.	1992	1136668	59047	5.19	1094177.60
4.	1993	1220000	83332	6.83	1140416.49
5.	1994	1230000	10000	0.81	1186655.39

¹²⁷Dvinv Prasada Rao, "Marketing Strategies for Horticultural Products a case Study in Varanasi District," *Economic Affairs*, December, 2004.

6.	1995	1280000	50000	3.91	1232894.28
7.	1996	1300000	20000	1.54	1279133.17
8.	1997	1200000	-100000	-8.33	1325372.07
9.	1998	1400000	200000	14.28	1371610.96
10.	1999	1400000	0	0	1417819.85
11.	2000	1490000	90000	6.04	1464088.74
12.	2001	1520000	30000	1.97	1510327.64
13.	2002	1580000	60000	3.80	1556566.53
14.	2003	1600000	20000	1.25	1602805.42
15.	2004	1600000	0	0	1649044.32
CGR				3.70	

Source: FAO Statistics

Assistant Director, National Horticulture Board, Guindy, Chennai.

Note: CGR= Compound Growth Rate (in percentage).

It could be observed from Table 3.6 that there was a steady expansion of land under mango cultivation in India during the first five years of the study period. It could be seen that the area under mango cultivation in India was the highest in 2003 and 2004 and the lowest in 1990. The area under mango cultivation has gone up from 846292 hectares in 1990 to 1300000 hectares in 1996. But the area of cultivation decreased in 1997 registering 100000 hectare and then increased. There was no increasing or decreasing area of mango in 1999 and 2004 based on the same figure in 1998 and 2003. Area under mango cultivation was positive, but was negative during 1997 only, registering –8.33 per cent was decreased. The compound growth rate of expansion of the land under mango cultivation was 3.70 per cent per annum.

3.7 Mango Production in India

Mango is the fruit of mangi fera indica tree, the native to India. They are low land tropical plants that tolerate a wide range of rainfall, although they need dry weather at the time fruits are formed. Worldwide production heavily concentrated in Asia, is estimated at 17 millions metric tonnes per year.¹²⁸ The production of mango, the percentage of increase or decrease and the trend values are exhibited in Table 3.7.

Table 3.7

Production of Mango Cultivation in India from 1990 to 2004

Sl.No.	Year	Production (in Metric Tonnes)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	8645405	--	--	9497725.97

¹²⁸Agriculture Marketing Board, Chennai, India.

2.	1991	8752134	106729	1.22	9602915.55
3.	1992	9223256	471122	5.11	9708105.12
4.	1993	10110000	886744	8.77	9813294.70
5.	1994	10990000	880000	8.01	9918484.27
6.	1995	11000000	10000	1.00	10023673.85
7.	1996	11000000	0	0	10128863.43
8.	1997	11000000	0	0	10234053.00
9.	1998	10230000	-770000	-7.53	10339242.58
10.	1999	9780000	-450000	-4.60	10444432.15
11.	2000	10500000	720000	6.86	10549621.73
12.	2001	10060000	-440000	-4.37	10654811.30
13.	2002	10640000	580000	5.45	10760000.88
14.	2003	10780000	140000	1.30	10865190.45
15.	2004	10800000	20000	0.18	10970388.03
CGR		1.10			

Source: FAO Statistics

Assistant Director, National Horticulture Board, Guindy, Chennai.

Note: CGR= Compound Growth Rate (in percentage).

Table 3.7 presented the mango production in India. There was a normal growth of production during first three years of the study period. Table 3.7 reveals that the production of mango ranged from 86,45,405 metric tonnes to 1,10,00,000 metric tonnes. The production of mango has gone up from 86,45,405 metric tonnes in 1990 to 1,10,00,000 metric tonnes in 1995.

But it has decreased in 1998, 1999 and 2001.

It is also observed from Table 3.7 that the production under mango had gone down to 7,70,000 metric tonnes in 1998, 4,50,000 metric tonnes in 1999 and 4,40,000 metric tonnes in 2001, owing to unfavourable climatic conditions. There was a strong reduction in the year 1998 registering –7.53 per cent decrease. The production of mango remains constant from 1995 at 1997 at the amount of production 1,10,00,000 metric tonnes. It is also inferred from the table that the trend value for mango production had shown increasing trend. The trend value increased from 9497725.97 metric tonnes in 1990 to 10970388.03 metric tonnes in 2004. The compound growth rate was 1.10 per cent per annum.

3.8 Productivity of Mango in India

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. Post infestation in mango causes severe losses to farmers.¹²⁹

¹²⁹Dvinv Prasad Rao, *op.cit.*, p.3

The fruit occupies a unique place of pride among the family of fruits grown in India. It is highly known as the most important 'national fruit' of India because of its largest area and annual production. Harvesting time of different mango varieties differs in different parts of country. In Kerala, harvesting starts as early as February and in Tamil Nadu in April-May. The harvesting is at the peak in south in India during May-June and in northern regions like Punjab last upto August. The harvesting season in different parts of country according to the varieties is given below:

Maharashtra	-	April-May
Tamil Nadu	-	April-May
Andhra Pradesh	-	April-May (Coastal districts)
Gujarat	-	May-June
Karnataka	-	May-June
Uttar Pradesh, Bihar and Other Parts of North India	-	June-August

The average yield of mango in hectare, the percentage increase or decrease, trend values and compound growth rate per annum are presented in Table 3.8.

Table 3.8

Productivity of Mango Cultivation in India from 1990 to 2004

Sl.No.	Year	Productivity (in Kg./ Ha.)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	102156	--	--	92760.31
2.	1991	81217	-20939	-25.78	90754.11
3.	1992	81143	-74	-0.09	88747.91
4.	1993	82869	1726	2.08	86741.72
5.	1994	89350	6481	7.25	84735.52
6.	1995	85938	-3412	-3.97	82729.33
7.	1996	84615	-1323	-1.56	80723.13
8.	1997	91667	7052	7.69	78716.93
9.	1998	73071	-18596	-25.45	76710.74
10.	1999	69857	-3214	-4.60	74704.54
11.	2000	70470	613	0.87	72698.34
12.	2001	66184	-4286	-6.47	70692.15
13.	2002	67342	1158	1.72	68685.95
14.	2003	67375	33	0.05	66679.75
15.	2004	67500	125	0.18	64673.56
CGR	-2.51				

Source: FAO Statistics

Assistant Director, National Horticulture Board, Guindy, Chennai.

Note: CGR= Compound Growth Rate (in percentage).

From Table 3.8 it could be seen that the productivity of mango in India had fluctuating showing largely decreasing trend during the period under study. The table exhibits that the productivity of mango per hectare had strongly decreased – 20939kg.per hectare in 1991 was registering –25.78 per cent and –18596kg.per hectare in 1998 was registering –25.45 per cent decrease. The productivity of mango was increasing at a low level with 613kg.per hectare in 2000 registering 0.87 per cent, 33kg.per hectare in 2003 registering 0.05 per cent and 125kg.per hectare in 2004 registering 0.18 per cent increase. Normally, the productivity of mango in India was negative. Also the trends of Indian mango productivity were negative. The compound growth rate was –2.51 per cent per annum.

Figure 3.2 depicts the area, production and productivity of mango in India.

3.9 Area under Mango Cultivation in Tamil Nadu

Tamil Nadu is one of the largest mango cultivation centres in India. It occupies 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. The area under mango cultivation in Tamil Nadu and the percentage increase or decrease trend value and compound growth rate are presented in Table 3.9.

Table 3.9
Area under Mango Cultivation in Tamil Nadu from 1990 to 2004

Sl.No.	Year	Area (in Ha.)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	52908	--	--	49714.97
2.	1991	54724	1816	3.32	54760.47
3.	1992	55392	668	1.20	59805.97
4.	1993	62487	7095	11.35	64851.47
5.	1994	67818	5331	7.86	69896.97
6.	1995	72335	4517	6.24	74942.47
7.	1996	81841	9506	11.61	79987.97
8.	1997	85009	3168	3.73	85033.47
9.	1998	92631	7622	8.23	90078.97
10.	1999	100487	7856	7.82	95124.47
11.	2000	104301	3814	3.66	100169.97
12.	2001	107850	3549	3.29	105215.47
13.	2002	110835	2985	2.69	110260.57
14.	2003	111958	1123	1.00	115306.47
15.	2004	114926	2968	2.58	120351.97

CGR	6.43
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Source: Directorate of Horticulture and Plantation Crops. Chepauk, Chennai.

Note: CGR = Compound Growth Rate (in percentage)

From the Table 3.9, it is observed that the area of mango in Tamil Nadu ranged from minimum of 52908 hectare in 1990 to a maximum of 114926 hectares in 2004. Table 3.9 shows that there is no downward trend during the period of study. There was a gradual expansion of area under mango cultivation from 1990 onwards upto 2004. The maximum expansion of area under mango cultivation in 1996 was registering 11.61 per cent and the minimum of expansion of area under mango cultivation in 2003 was registering 1.00 per cent. It also inferred from the table that the trend value for area under mango cultivation had an increasing trend. The compound growth rate of expansion of the cultivation was 6.43 per cent. It is compared to higher than India and the world expansion of area under mango cultivation.

3.10 Mango Production in Tamil Nadu

Mango, the king of the fruits happens to be an attractive farm growing occupation in Tamilnadu, since Tamil Nadu enjoys the requisite climatic condition for growing of this fruit. Therefore, Tamil

Nadu has occupied 6th rank from dimension of area under this fruit cultivation and also from the production point of view. The production of mango in Tamil Nadu the percentage increase or decrease and the trend values are exhibited in Table 3.10.

Table 3.10

Production of Mango in Tamil Nadu from 1990 to 2004

Sl.No.	Year	Production (in Metric Tonnes)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	566115	--	--	390719.86
2.	1991	329760	-236355	-71.68	404919.13
3.	1992	308880	-20880	-6.75	419118.39
4.	1993	372490	63610	17.07	433317.66
5.	1994	422036	49546	11.74	447516.93
6.	1995	570170	148134	25.98	461716.20
7.	1996	574030	3860	0.67	475915.46
8.	1997	413900	-160130	-38.69	490114.73
9.	1998	502050	88150	17.56	504314.00
10.	1999	611490	109440	17.90	518513.26
11.	2000	313990	-297500	-94.75	532712.54
12.	2001	556287	242297	43.56	546911.80
13.	2002	438658	-117629	-26.81	561111.07

14.	2003	756495	317837	42.01	575310.34
15.	2004	615370	-141125	-22.93	589509.61
CGR	7.91				

Source: Directorate of Horticulture and Plantation Crops. Chepauk, Chennai.

Note : CGR = Compound Growth Rate (in percentage)

From Table 3.10, it could be seen that the production of mango in Tamil Nadu was the highest in 2003 and lowest in 1992. The production of mango has gone up from 308880 metric tonnes to 756495 metric tonnes. The production of mango increased remarkably by 242297 metric tonnes in 2001 and 317837 metric tonnes in 2003, registering 43.56 per cent and 42.01 per cent.

It is also known from the Table 3.10 that the production of mango had gone down in 1991, 1992, 1997, 2000, 2002 and 2004. From -236355 metric tonnes in 1991, -20880 metric tonnes in 1992, -160130 metric tonnes in 1997, -297500 metric tonnes in 2000, -117629 metric tonnes in 2002 and 141125 metric tonnes in 2004 registering -71.68 per cent in 1991, -6.75 per cent in 1992, -38.69 per cent in 1997, -94.75 per cent in 2000, -26.81 per cent in 2002 and -22.93 per cent in 2004 decrease. Generally the trends of Tamil Nadu production of mango were positive. The compound growth rate was 7.91 per cent per annum.

3.11 Productivity of Mango 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.¹³⁰ The average yield of mango in metric tonnes in Tamil Nadu, the percentage increase or decrease, trend value and compound growth rate per annum are presented in Table 3.11.

Table 3.11

Productivity of Mango in Tamil Nadu from 1990 to 2004

Sl.No.	Year	Productivity (in Metric Tonnes)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	10.70	--	--	7.4757
2.	1991	6.02	-4.68	-77.74	7.2641
3.	1992	5.57	-0.45	-8.08	7.0525
4.	1993	5.96	0.39	6.54	6.8410
5.	1994	6.22	0.26	4.18	6.6294
6.	1995	7.88	1.66	21.06	6.4178
7.	1996	7.01	-0.87	-12.41	6.2062
8.	1997	4.86	-2.15	-44.24	5.9947

¹³⁰S.Shrikant, "Liberalisation and India's Horticultural Export," *Economic Affairs*, December 2003, p.203

9.	1998	5.41	0.55	10.17	5.7831
10.	1999	6.08	0.67	11.02	5.5715
11.	2000	3.01	-3.07	-101.99	5.3600
12.	2001	5.15	2.14	41.55	5.1484
13.	2002	3.95	-1.20	-30.37	4.9368
14.	2003	6.75	2.80	41.48	4.7252
15.	2004	5.35	-1.40	-26.17	4.5137
CGR		-3.31			

Source: Directorate of Horticulture and Plantation Crops. Chepauk, Chennai.

Note : CGR = Compound Growth Rate (in percentage)

It is inferred from Table 3.11 that the yield of mango per hectare is top in the year 1990 registering 10.70 metric tonnes per hectare followed by 1995, when the productivity of mango of 7.88 metric tonnes per hectare registered 21.06 per cent increase. The productivity of mango per hectare decreased from 10.70 metric tonnes per hectare in 1990 to 6.02 metric tonnes in 1991 registering 77.74 highest level percentage decrease over the previous year. The productivity per hectare which stood at 5.57 metric tonnes in 1992, 7.01 metric tonnes in 1996, 4.86 metric tonnes in 1997, 3.01 metric tonnes in 2000, 3.95 metric tonnes in 2002 and 5.35 metric tonnes in 2004 registering 8.08 per cent in 1992, 12.41 per cent in 1996, 44.24 per cent in 1997, 101.99 per cent in 2000, 30.37 per cent in 2002 and 26.17 per cent in 2004 decrease.

The productivity of mango output had a positive annual growth rate of 6.54, 4.18, 21.06, 10.17, 11.02, 41.55 and 41.48 per cent respectively for 1993, 1994, 1995, 1998, 1999, 2001 and 2003. The trend value of productivity over the years was negative. The average compound growth rate was -3.31 per cent per annum.

Figure 3.3 depicts the area, production and productivity of mango in Tamil Nadu.

3.12 Area under Cultivation of Mango in Madurai District

Mango is the most popular fruit in Madurai district. It is equally liked by both rich and the poor. In this district many people are engaged in mango cultivation. Presently in Maudurai, it is being cultivated in Alanganallur, Vadipatti, Melur, Kottampatti, Sedapatti, Madurai West, Thirumangalam and the like. The area under mango cultivation and the percentage of mango increase or decrease, trend value and compound growth rate are presented in Table 3.12.

Table 3.12
Area under Mango Cultivation in Madurai District from 1990 To 2004

Sl.No.	Year	Area (in Ha.)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	7957	--	--	9009.47
2.	1991	8301	344	4.14	8687.58

3.	1992	8631	330	3.82	8365.68
4.	1993	8809	178	2.02	8043.78
5.	1994	9049	240	2.65	7721.89
6.	1995	9430	381	4.04	7399.99
7.	1996	9307	-123	-1.32	7078.10
8.	1997*	4060	-5247	-129.24	6756.20
9.	1998	4445	385	8.66	6434.30
10.	1999	4593	148	3.22	6112.41
11.	2000	4961	368	7.42	5790.51
12.	2001	5198	237	4.56	5468.61
13.	2002	5397	199	3.69	5146.72
14.	2003	5647	250	4.43	4824.82
15.	2004	5558	-89	1.60	4502.92
CGR	-4.62				

Source: Directorate of Horticulture and Plantation Crops. Chepauk, Chennai.

Note : CGR = Compound Growth Rate (in percentage)

Table 3.12 shows that the area of mango cultivation in Madurai district considerably increased from 1990 to 1995. Then it increased 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 maximum increase was of 4.14 per cent, over the five year period. In the year 1997 the Madurai district was divided into two separate

districts, namely Madurai and Theni. This is the reason for the sudden decline of the area under mango cultivation in Madurai district. After dividing the district there was no decrease in area under mango cultivation except in the year 2004 registering 1.60 per cent decrease. The percentage increase was negative during 1996 and 2004. The compound growth rate of expansion of the land under mango cultivation was negative resulting in -4.62 per cent per annum.

3.13 Mango Production in Madurai District

The farmers around the villages of Madurai district produced different kinds of fruits and vegetables. There are about 1000 varieties of mangoes found in our country. Among these the ruling mango varieties with good export potentials are Alphonso, Banganapalli, Pancharasa, Kalasa, Chinna Raskalasa, Olur, Padiri, Rumani and Neelum. Among these Bangalora and Neelum are widely cultivated in Madurai district. The total production of mango in Madurai district, the percentage increase or decrease and the trend value are exhibited in Table 3.13.

Table 3.13

Production under Mango Cultivation in Madurai District from 1990 to 2004

Sl.No.	Year	Production (in Metric Tonnes)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	85140	--	--	40933.86
2.	1991	19960	-65180	-326.55	38709.41
3.	1992	17800	-2160	-12.13	36484.96
4.	1993	14760	-3040	-20.60	34260.52
5.	1994	22410	7650	34.14	32036.07
6.	1995	50040	27630	55.21	29811.63
7.	1996	37270	-12800	-34.34	27587.18
8.	1997*	9230	-28040	-303.79	25362.73
9.	1998	22190	12960	58.40	23138.29
10.	1999	24240	2050	8.46	20913.84
11.	2000	5690	-18550	-326.01	18689.39
12.	2001	35588	29898	84.01	16464.95
13.	2002	11547	-24041	-208.20	14240.50
14.	2003	14344	2797	19.50	12016.05
15.	2004	10232	-4112	-40.19	9791.61
CGR	-7.40				

**Source: Directorate of Horticulture and
Plantation Crops. Chepauk, Chennai.**

**Note : CGR = Compound Growth Rate (in
percentage)**

It is revealed from Table 3.13 the overall level performance of production of mango in the study area from the year 1990 to 1996. The highest production of mango was 85140 tonnes in the year 1990 and lowest production of mango was 14760 tonnes

mango in 1993. In the year 1995, 1998 and 2001 there was notable increase over the previous year whereas during the other years it was reasonable. There was decreasing trend during 1991, 1992, 1993, 1996, 2000, 2002 and 2004 over the respective previous years, registering the highest 326.55 per cent in 1991, 12.13 per cent in 1992, 20.60 per cent in 1993, 34.34 per cent in 1996, 326.01 per cent in 2000, 208.20 per cent in 2002 and 40.19 per cent in 2004. The production of mango highly depends on the climatic and natural conditions. This is the reason for the sudden increase or sudden decrease of mango in the study area. The trend value of productivity for the year was negative. The average compound growth rate was -7.40 per cent per annum.

3.14 Productivity of Mango in Madurai District

Mango grows on any well-drained soil. In water logged area the tree will not remain healthy. Under wet soil conditions, the flowering, fruiting and vegetative growth will be adversely affected. Therefore, the area which are subject to frequent floods are not suitable for mango growing. The average yield of mango per hectare, the percentage increase or decrease trend values and compound growth rate are presented in Table 3.14.

Table 3.14

Productivity under Mango Cultivation in Madurai District from 1990 to 2004

Sl.No.	Year	Productivity (in Metric Tonnes)	Increase / Decrease	Percentage of Increase / Decrease	Trend Value
1.	1990	10.70	--	--	4.79
2.	1991	2.40	-8.30	-345.83	4.63
3.	1992	2.06	-0.34	-16.50	4.48
4.	1993	1.67	-0.39	-23.35	4.32
5.	1994	2.47	0.80	32.39	4.17
6.	1995	5.30	2.83	53.40	4.02
7.	1996	4.00	-1.30	-32.50	3.86
8.	1997*	2.27	-1.73	-76.21	3.71
9.	1998	4.99	2.72	54.51	3.55
10.	1999	5.27	0.28	5.31	3.40
11.	2000	1.14	-4.13	-362.28	3.24
12.	2001	6.84	5.70	83.33	3.09
13.	2002	2.13	-4.71	-221.13	2.94
14.	2003	2.54	0.41	0.16	2.78
15.	2004	1.84	-0.70	-0.38	2.63
CGR	-2.92				

Source: Directorate of Horticulture and Plantation Crops. Chepauk, Chennai.

Note : CGR = Compound Growth Rate (in percentage)

It is very interesting to note from Table 3.14 that the maximum yield of mango per hectare, over the study period in Madurai district was 10.70 metric tonnes and the minimum of 2.47 metric tonnes of mango respectively in the years 1990 and 1994

before the division of the district. There was no uniformity of productivity of mango. From 1990 to 2004, in the year 1995, 1998 and 2001 there was notable increase over the previous year whereas during the other years it was reasonable. There was decreasing trend during 1991, 1992, 1993, 1996, 2000, 2002 and 2004 over the respective previous years. Generally, the trend value for mango productivity had a decreasing trend. The compound growth rate of expansion of the productivity was – 2.92.

Figure 3.4 depicts the area, production and productivity of mango in Madurai district.

3.15 Share of Tamil Nadu in Area under Mango Cultivation in India

The State of Tamil Nadu accounts for an area of 114926 ha and a production of 6.15 lakh tonnes thereby contributing to 7.18 per cent of the total area and 5.7 per cent of the total production in the country. Dharmapuri district in Tamil Nadu alone

accounts for an area of 40,000 ha with an annual production of 3 lakh tonnes. Some of the main varieties shown in the State are Alphonso (kadar), Rasapuri (peter), Totapuri (Bangalora), Sendura, Rumani, Malgova, Banganapalli, Neelam and Imampasand. The share of Tamil Nadu in area under mango cultivation of India is presented in Table 3.15.

Table 3.15
Area Under Mango in India Share in Tamil Nadu from 1990 to 2004

Sl.No.	Year	Area in India (in Ha.)	Area in Tamil Nadu (in Ha.)	Share in Tamil Nadu (in percentage)
1.	1990	846292	52908	6.25
2.	1991	1077621	54724	5.08
3.	1992	1136668	55392	4.87
4.	1993	1220000	62487	5.12
5.	1994	1230000	67818	5.51
6.	1995	1280000	72335	5.65
7.	1996	1300000	81841	6.29
8.	1997	1200000	85009	7.08
9.	1998	1400000	92631	6.62
10.	1999	1400000	100487	7.18
11.	2000	1490000	104301	7.00
12.	2001	1520000	107850	7.09
13.	2002	1580000	110835	7.01
14.	2003	1600000	111958	7.00
15.	2004	1600000	114926	7.18

Source: Compiled from Tables 3.6 and 3.9.

It is observed from Table 3.15 that the percentage of share of Tamil Nadu to the all India mango area ranged between 4.87 per cent and 7.18 per cent during the period under study. The share of Tamil Nadu in all India production was the maximum of 7.18 per cent during the periods 1999 and 2004. With the minimum of 4.87 per cent during the period 1992. The percentage share of area under mango cultivation was same in the years 2000 and 2003.

3.16 Share of Tamil Nadu in Mango Production in India

The comparative position of mango production in India and Tamil Nadu is presented in Table 3.16.

Table 3.16

Mango Production in India Share in Tamil Nadu from 1990 to 2004

Sl.No.	Year	Production in India (in Metric Tonnes)	Production in Tamil Nadu (in Metric Tonnes)	Share in Tamil Nadu (in Percentage)
1.	1990	8645405	566115	6.55
2.	1991	8752134	329760	3.77
3.	1992	9223256	308880	3.35
4.	1993	10110000	372490	3.68
5.	1994	10990000	422036	3.84
6.	1995	11000000	570170	5.18
7.	1996	11000000	574030	5.22
8.	1997	11000000	413900	3.76
9.	1998	10230000	502050	4.91
10.	1999	9780000	611490	6.25
11.	2000	10500000	313990	2.99
12.	2001	10060000	556287	5.53
13.	2002	10640000	438658	4.12
14.	2003	10780000	756495	7.02
15.	2004	10800000	615370	5.70

Source: Compiled from Tables 3.7 and 3.10.

It is observed from Table 3.16 that percentage share of Tamil Nadu to the all India mango production ranged between 2.99 per cent and 7.02 per cent during the period under study. The share of Tamil Nadu in all India production was the highest 7.02 per cent during the periods 2003 and the lowest 2.99 per cent during the period 2000.

3.17 Share of Madurai District Area under Mango Cultivation in Tamil Nadu

The share of Madurai district in area under mango cultivation in Tamil Nadu is presented in Table 3.17.

**Table 3.17
Area under Mango in Tamil Nadu Share in Madurai District from 1990 to 2004**

Sl.No.	Year	Area in Tamil Nadu (in Ha.)	Area in Madurai District (in Ha.)	Share in Madurai District (in Percentage)
1.	1990	52908	7957	15.04
2.	1991	54724	8301	15.17
3.	1992	55392	8631	15.58
4.	1993	62487	8809	14.10
5.	1994	67818	9049	13.34
6.	1995	72335	9430	13.04
7.	1996	81841	9307	11.37
8.	1997*	85009	4060	4.77
9.	1998	92631	4445	4.80
10.	1999	100487	4593	4.57
11.	2000	104301	4961	4.76

12.	2001	107850	5198	4.82
13.	2002	110835	5397	4.87
14.	2003	111958	5647	5.04
15.	2004	114926	5558	4.84

Source: Compiled from Tables 3.9 and 3.12.

It is revealed from Table 3.17 the percentage of share of Madurai district compared with the Tamil Nadu State. Before the division of the district, from 1990 to 1996, the area of mango ranged between 11.37 per cent and 15.58 per cent during the period under study. After the division of the Madurai and Theni district, from 1997 to 2004, the area of mango in Madurai district ranged between 4.57 per cent and 5.04 per cent during the period under study. The share of Madurai district in Tamil Nadu area under mango cultivation was the highest 5.04 per cent during the period 2003 and lowest 4.57 per cent during the period 1999.

3.18 Share of Madurai District in Mango Cultivation in Tamil Nadu

The comparative position of mango production in Tamil Nadu and Madurai district is presented in Table 3.18.

**Table 3.18
Production under Mango in Tamil Nadu Share in Madurai District from
1990 to 2004**

Sl.No.	Year	Production in Tamil Nadu (in Metric Tonnes)	Production in Madurai Distict (in Metric Tonnes)	Share of Madurai District (in Percentage)
1.	1990	566115	85140	15.04

2.	1991	329760	19960	6.05
3.	1992	308880	17800	5.76
4.	1993	372490	14760	3.96
5.	1994	422036	22410	5.31
6.	1995	570170	50040	8.78
7.	1996	574030	37270	6.49
8.	1997*	413900	9230	2.23
9.	1998	502050	22190	4.20
10.	1999	611490	24240	3.96
11.	2000	313990	5690	1.81
12.	2001	556287	35588	6.40
13.	2002	438658	11547	2.63
14.	2003	756495	14344	1.89
15.	2004	615370	10232	1.66

Source: Compiled from Tables 3.10 and 3.13.

It could be noticed from Table 3.18 the percentage of share of Madurai district compared with Tamil Nadu State. Before the division of the district, from 1990 to 1996, the production of mango ranged between 3.96 per cent upto 15.04 per cent during the period under study.

After the division of the Madurai and Theni districts, from 1997 to 2004, production of mango in Madurai district ranged from 1.66 percent to 6.40 per cent

during the period under study. The share of Madurai district in Tamil Nadu in production of mango was the highest 6.40 during the period 1996 and the lowest 1.66 per cent during the period 2004.

3.19 Summary

In this chapter the researcher has presented various aspects of Mango cultivation practices in the world. Mango is a tropical fruit. It can be grown at a height of 1500m above mean sea level. It is found in several types of soils such as lateritic, alluvial sandy loam and sandy soils. The production of mango in the world ranged from the minimum of 16903407 in 1990 to a maximum of 26286255 metric tonnes in 2004. Madurai being the 6th largest producer of mango in Tamil Nadu, the area of mango cultivation in Madurai district increased from 1998 to 2003.

83-102,104-111,113-118,120-125,127-132

4.1 Introduction

Agriculture is fraught with risk and uncertainty. As more than two-thirds of the cultivable land is dependent on monsoon, the farmers are often not sure about the outcome from agriculture due to weather and market induced risks. Concentration of