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**Performance of Indigenous and Imported Seedlings of Oil Palm in Tamil Nadu**

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**Chapter I**

**Introduction**

Palm oil is one of the main sources of oil in the global economic conditions. It is a most wanted economic crop in the global oil market economy. This oil is used for food consumption and industrial inputs. It is used every activity of human beings in the society in recent days. In depth it is uses as cosmetics, soaps, detergents, shampoo and biodiesel. The production of palm oil has been growing tremendously in the recent years of the world economy. The production of palm oil is increased from 1.26 million tonnes in 1960 to 58.52 million tonnes in 2013. The sector is an important role in the economic growth of Southeast Asia, Central and Western Africa. About 80 percent of palm oil production is consumed in the form of food in the world.

Palm oil has been most important vegetable oil in the world. The contribution of Malaysia and Indonesia in the world palm oil production is 85 percent and largest exporter in the economy. Other countries like Nigeria, Thailand, Colombia, Ecuador, Papua New Guinea, Ivory Coast and Brazil are also exporting the item. The palm oil trade is progressive contribution to the local economic growth and poverty reduction of those countries.

This sector is given an employment opportunities nearly 6 million people in the world. It is covered by the private sector investment and a majority of the small size farmers. The income of the small size of farmers is mainly depending up on the engagement and market access. The small size of farmers is earning more income in recent years because of palm oil cultivation in the Southeast Asia and Africa. This is main reasons for increasing number of small size of farmers to enter into the sector (World Bank, 2011).

Oil palm cultivation has been expanded rapidly in recent years and is now second only to soybean as a major source of the world supply of oils and fats. It is the highest edible oil yielding crop, yielding up to 5-6 tonnes of mesocarp oil, i.e., Crude Palm Oil (CPO) and 0.4 to 0.6 metric tonnes of palm kernel oil (PKO) per hectare per year which is much higher (5-8 times) than that of any major oil producing crop. This crop offers viable solution for the ever increasing shortage of vegetable oils in the country and in saving valuable foreign exchange being incurred annually for import of edible oils.

In 2013, the global consumption of palm oil stands at 58.5 Mn MT. The consumption has been increasing by 6.1 percent over the last five years due to the growing demand for the oil like India and China. The contribution of palm oil consumption in India in the global consumption is increased. The growth rate is increased from 13 percent in 2007-08 to 15 percent in 2011-12. Our economy plays a crucial role in driving the production of palm oil global level. India is followed by Indonesia, which is now a larger consumer of palm oil than China, contributing 23 percent of global palm oil consumption in 2011/12.

We are the largest market for palm oil in the world. The global use of palm oil was 8.67 million metric tonnes (MMT) during 2012-13, of which 20 percent was consumed by Indians, which is more than China (at 16 percent) and the EU (at 14 percent). Therefore, India is increasingly playing an important role in the demand and consumption of palm oil. Today palm oil is the cheapest edible oil available in the Indian market. Consequently, the share of palm oil in total edible oil consumption in India has hike from 29 percent in 2001-02 to 50 percent in 2012-13.

Palm oil has excellent health attributes. It is rich in vitamins A and E. Palm oil can be used in formulation of margarine and cooking fat such as vanaspati. It can be used in manufacture of biscuits, ice creams, soaps, detergents and shampoos and also as frying fat. Palm kernel oil has variety of industrial uses. It is commercially cultivated in Indonesia, Malaysia, Thailand, Nigeria, Colombia, India and so on. The total area existing under oil palm in the country during 2010 was 164803 hectares. The state wise break up of area under oil palm is given in Table 1.1.

Table 1.1: State- wise Area under Oil Palm in India (as on March, 2010)

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| --- | --- | --- |
| State | Area of Hectare | District where grown |
| Andhra Pradesh | 106206 | East Godavari, Guntur, Khammam, Krishna, Nellore, Prakasam, Srikakulam, Visakhapatnam, Vizianagaram and West Godavari |
| Karnataka | 22836 | Belgaum, Davangere, Hospet, Koppal, Mysore, Shimoga and Kodagu |
| Tamil Nadu | 11105 | Trichy, Karur,  Nagapattinam, Perambalur, Thanjavur, Theni,  Thiruvallur, Tiruvarur, Trichy and Tuticorin |
| Mizoram | 10459 | Kolasib & Lunglei |
| Kerala | 5217 | Alappuzha, Idukki, Kottayam, Kollam, Pathanamthitta, Thiruvananthapuram, Thrissur, Wynad |
| Orissa | 3269 | Dhenkanal, Gajapati, Jajpur, Kendrapada, Koraput, Nayagarh, Rayagada, Sundergarh |
| Gujarat | 2227 | Valsad, Surat, Navsari and Bharuch |
| A&N | 1593 | Little Andamans |
| Maharashtra | 1000 | Sindhudurg |
| Goa | 856 | North and South Goa |
| Tripura | 31 | Tripura |
| Chhattisgarh | 4 | Bastar and Dantewada |
| Total | 164803 |  |

Source: Progress and Potential of Oil Palm in India. Report of the Committee to reassess fresh/potential areas of Oil Palm in India

**Importance of Oil Palm in Providing Food Security in Edible Oils**

Palmolein, the liquid fraction of RBD (refined, bleached and de-odourized) palm oil is commonly used for cooking at home, in fast food restaurants and also in snack foods and instant noodles manufacture. Palm oil and its fractions are also used in production of margarine, bakery and frying shortenings, vanaspati, confectionery fats, ice creams and as a replacement for butter fat in some dairy products. Palm oil is particularly suitable for deep frying because it is relatively stable at high temperature, compared with the more unsaturated oils. Palm kernel oil is used for simulated dairy products, like coffee whiteners. Hydrogenated palm kernel oil and palm kernel stearin are used in whipped toppings and in toffee and caramel. A variety of different palm kernel oil derivatives is used in chocolate flavoured coatings. About 10 percent of palm oil is used for non-food products like oleo-chemicals, biodiesel, etc. The oleo-chemicals are used for the production of candles, cosmetic products, soaps, pharmaceuticals, textile and in rubber/plastic processing.

Oil palm is considered as one of the best options for bio-energy production in different agro-ecological conditions as the plantation  is maintained for 35 years  without tillage, which adds to soil fertility and  provide  permanent coverage by avoiding the direct impact of heavy rains that cause erosion and leaching.  It also has a great capacity for carbon sequestration, high efficiency in energy conversion and also generates energy using various products.

Oil palm requires a well distributed rainfall of 2500 to 4000 mm per annum and a temperature range of 22-33° C. It requires bright sunlight for at least five hours per day and relative humidity of more than 80 percent. Even though oil palm comes in almost all types of soils, well-drained deep loamy alluvial soil, rich in organic matter with adequate water holding capacity is the most suitable medium for oil palm cultivation. Broadly, there are three varieties viz., Dura, Pisifera and Tenera. Tenera, a hybrid of Dura and Pisifera is the ruling hybrid grown all over the world.  It is characterized by a thin shell, medium to high mesocarp (65-90 percent) and high oil content (16-20 percent). Oil Palm seed sprouts are raised in the nursery and healthy seedlings of 12-14 months age and height of 1-1.3 m from the base with thirteen functional leaves are best suited for planting. Planting can be done in any season. However, the best period is June to December.

Oil palm requires adequate irrigation, as it is a fast growing crop with high productivity and biomass production. For yielding palms of above three years age, a minimum of 200-250 litres of water per palm per day is required. In older plantations, during peak summer the requirement may go up to 300-350 litres per day. The crop responds well to drip or micro sprinkler irrigation particularly when water is limited. Drip irrigation increases the productivity by 15-20 percent, reduces wastage of water, and requires less power/fuel per irrigation compared to conventional irrigation methods. It is important to note that any physiological stress shifts sex ratio in favour of male flowers and consequently the productivity is reduced.

During the initial stages of plantation in oil palm i.e., up to 3rd year, some of the light feeder inter crops such as pulses, cereals, vegetables, grasses etc., can be grown. Regular manual weeding has to be taken up.  Mulching of the palm basins with dried leaves, male flowers and empty bunches can help in moisture conservation and preventing weed growth. Ablation or removal of male and female flowers at the early stages of the palm i.e., up to three years has to be resorted to enable the plant to gain adequate stem girth and vigour. In general, oil palm is affected by only a few pests and diseases. Of late, the pests of other palm species are also infesting oil palm necessitating the farmers to go for management of these pests. Oil palm starts bearing from 4th year onwards and its economic life varies from 25 to 30 years. The yield of oil palm varies according to age and management. Each palm may produce 5-12 bunches per year, each having around 2000 fruits. The average bunch weight is about 25 kg, even though bunches of weight of 70-80 kg have been reported.  Under average management conditions in a mature plantation (8 to 9 years old), yield of 15-18 tonnes of fresh fruit bunches (FFBs) per hectare is expected. Under good maintenance and management, yield up to 25-30 tonnes of FFBs per hectare is possible.

Fresh Fruit Bunches (FFBs) of oil palm are highly perishable and should be processed within 24 hours after harvesting.  Delay in processing adversely affects the quality due to increase in free fatty acid content and quantity of palm oil.  Since, FFBs can’t be utilized in fresh form development of oil palm plantation should go hand in hand with development of processing facility. Oil palm marketing in the country is well streamlined, earmarking plantation zones for each palm oil mill.  Most of the factories have established collection centres at various locations for procurement of fresh fruit bunches.

In many of the states like Andhra Pradesh, Tamil Nadu, Mizoram and Goa, Oil Palm Plantation Act has been enacted which mandates the palm oil mills to buy FFBs produced by all the oil palm growers or their co-operative societies in their factory zone at a price not less than the price fixed by the price fixation committee. At the same time, the oil palm growers are also under an obligation to supply the fresh fruit bunches from the oil palm plantations in that area only to the factory/mill to whom the factory zone is attached. Government of India has been supporting oil palm cultivation through its Oil Palm Development Programme (OPDP) by providing subsidies on oil palm planting material, fertilizers, micro irrigation facilities etc. Various state governments also provide assistance for oil palm development. The price of oil palm Fresh Fruit Bunches (FFBs) is fixed by the Price Fixation Committee constituted by the State Governments. The price is revised by the committee on a quarterly basis. The prices of FFB will depend upon the international prices of crude palm oil and it has been established that international prices of crude petroleum has a bearing on the prices of crude palm oil. Another factor which influences the prices of palm oil and consequently FFBs is the import duty structure fixed for palm oil.

**Background of the Study**

The global economic system is mainly depending upon the modern technology, which leads to growth and development in the world. In the coming years, the global population will be reaching 9 billion and the 1.6 billion in the Indian region. The growth rate of population is the global economy is leading demand for foodgrains and other edible consumption increased in the world. There is functional relation between the rising population and changes in consumption patterns among the people. Out of various demand of food items, vegetable is one of the important factors is responsible for future generations. During 2013, palm oil production is 58.52 million tonnes in the global level. The demand for it is expected to increase 77.2 million tonnes in 2050. The demand and consumption of palm oil is increased tremendously in the World.

Our economy is the major producers and consumers of vegetable oils. During 2013-14, the production of vegetable oil is 9.64 million tonnes. The domestic availability of edible oil is continues to remain inadequate to meet the demand for it. There is wide gap between demand and availability of edible oils. Therefore, the government is imported from other countries. During 2013-14, we are imported 11.72 million tonnes of edible oils. The value of it is in terms of US $ 7.58 billion. In terms of volume, it was 54.86 percent of domestic availability. Oil palm satisfies 30 percent of the world edible oil and fat requirements with little fewer than seven percent of the area planted to oil crops.

During 2013-14, population of our country is 1200 million and 21.36 million tonnes of vegetable is used. The current per capita consumption of 16.7 kg is lower than nutritional needs based on FAO guidelines. The palm oil production is 0.785 lakh tonnes in India. The production level is very meagre level. In future, there is wide demand for consumption of common men in India. But the area under palm oil is 19.30 lakh ha from 19 states and 2.62 lakh ha was planted upto March 2014. Within various oil components, oil palm is the highest potential prospective for the long- period of time. It will contribute significantly towards meeting the growing edible oil demand. In the fourth coming years of 2050, the country will be needed to expand the area under oil palm is to 14.04 million tonnes from 31.03 million of vegetable oils for solving 1620 million population. The per capita requirement is to be increased to 19.16 kg. The share of palm sector in the vegetable oil requirement will be 45 percent in India (Vision 2050, Indian Institute of Oil Palm Research, 2015).

The domestic production of palm oil is inadequate to meet the palm oil demand in India. We are mainly depending upon the imports from Indonesia and Malaysia. The import of that is increased from 41 percent in 2001-02 to 61 percent in 2012-13. During 2012-13, the palm oil was imported of 10.40 MMT. The palm oil is consumed all most all the people in India in recent years due to price rise of other oil. During 2012-13, we are use of vegetable oil of 8.67 MMT. Out of that, palm oil accounted for 50 percent of the total edible oil consumption. This oil is cheapest available in the Indian markets. To meet the increasing per capita consumption of palm oils along with the population growth, there was an urgent need to increase the production and productivity of palm oils in India. To tackle this problem, the Government of India has been initiated expand the large scale cultivation in the country. The Palm Oil Area Expansion scheme was started for the expansion of that oil.

India is one of the major producers and consumers of vegetable oils, accounting for 12 to 15 percent of the area under oilseeds and 6 to 7 percent of the production of vegetable oils in the world. Despite production of over 9.64 million tonnes of vegetable oils during 2013-14 in the country, the domestic availability of edible oil continues to remain inadequate to meet the demand. The gap between demand and availability of edible oils is met by imports and palm oil constitutes bulk of these imports. During 2013- 14, India has imported 11.72 million tonnes of edible oils valued at US $11.32 billion. In terms of volume, it was 56 percent of domestic availability of edible oils. The quantity of edible oils imported along with its value from 2005-06 to 2013-14. The quantum of import is likely to go up due to increase per capita consumption and population pressure, resulting in higher future demand.

**Oil Palm Scenario in India**

It was introduced as National Royal Botanical Gardens in Kolkata during 1886. There after Maharashtra Association for Cultivation of Sciences (MACS), Pune later introduced African dura palm along canal bunds, home gardens and, to some extent, in forest lands near Pune during 1947 to 1959. In Kerala, the sector was used at large scale planting from 1971 to 1984 in the name of Plantation Corporation of Kerala Ltd. After that, Oil Palm India Ltd was taken over the company. In Andaman, Andaman Forest and Plantation Development Corporation Ltd., was established in the name of Little Andaman Islands of Andaman and Nicobar Islands during 1976 to 1985. The sector has been successfully established and planting the crop in the various parts of the state of India. The productivity levels is achieved at 4-6 tonnes per ha (Vision 2050, Indian Institute of Oil Palm Research, 2015).

**1.3. Oil Palm Development Programme in India**

The palm oil cultivation is promoted under Technology Mission on Oilseeds and Pulses (TMOP) set up in 1986 by the Ministry of Agriculture, Government of India. The scheme was launched during 1991-92 under the Technology Mission on Oilseeds and Pulses. The main objective is on expansion of area under oil palm cultivation in India along with other nine annual oilseed crops. In India, the field is identified of 19.33 lakh hectares in 18 states for suitable cultivation of this crop. The Government of India has been given Minimum Support Price to the farmers. The prices for Oil Palm fresh fruit bunches to the growers are determined by the government. During the fixation of price of that commodities are taken into considerations of International Crude Palm Oil prices.

According to Chadha Committee recommended that the 7, 96, 00 ha of land for suitable for oil palm cultivation by union government. The scheme is being implemented in the part of Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize on 2004. Various states like Andhra Pradesh, Assam, Gujarat, Goa, Karnataka, Kerala, Maharashtra, Mizoram, Orissa, Tamil Nadu, Tripura and West Bengal are provide adequate support to cultivation of palm oil. The government are expended the Oil Palm Area Expansion Programme in 2011-12. The main motive is to increase additional 60,000 ha under the scheme (Agricultural Statistics, Government of India, 2014). The Government of India has been declared that the various subsidies are distributed to oil palm growers for planting, buying pump set and drip irrigation systems. Some of the compensation is given to the plantation growers due to loss during the gestation period and supporting to process centre. The government allocation is Rs. 300 crore for the plantation growers in term of subsidies, financial support and loss compensation.

**1.3.1. Government Supports for Oil Palm**

The importance and potential of this versatile crop has been recognized by the Government of India and adequate support is being extended for conducting research and development in oil palm. The Technology Mission on Oil seeds and Pulses (TMOP) set up by the Ministry of Agriculture Government of India during 1986 launched a massive Oil Palm Development Programme (OPDP) during the eighth five year plan (in the year 1991-92). From 2004-05 onwards, the scheme is being implemented as part of the “Integrated Scheme of Oilseeds, Pulses, Oil Palm & Maize” (ISOPOM) and provides support for Oil Palm cultivation in 12 states viz., Andhra Pradesh, Assam, Gujarat, Goa, Karnataka, Kerala, Maharashtra, Mizoram, Orissa, Tamil Nadu, Tripura and West Bengal. Under ISOPOM, support is provided for planting material, cultivation cost, installation of drip irrigation system, diesel pump sets, training, development of waste land and technology transfer through demonstration and publicity. At present Andhra Pradesh, Tamil Nadu, Mizoram and Goa have enacted Oil Palm Act while other States are yet to initiate such regulatory provision.

**Indigenous and Exotic Seedling Plantation**

The Department of Agriculture and Cooperation (DAC), Government of India launched a special programme on Oil Palm Area Expansion (OPAE) during 2011-12 in identified eight States like Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Maharashtra, Mizoram, Orissa and Tamil Nadu to bring an additional area of 60,000 hectares with an allocation of Rs. 300 crore. A Mission on Oilseeds and Oil Palm is proposed to be launched during XII Plan period (2012-13 to 2016-17) by subsuming ongoing Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM), Central Sector Scheme on Tree Borne Oilseeds (TBOs) and Oil Palm Area Expansion (OPAE). Under the above programmes large quantities of oil palm planting material (sprouts) had to be imported to cover the targeted area.

To achieve the targets proposed in Oil Palm Development Programme (OPDP) efforts were made by the Government of India to meet the requirement of planting materials through both establishments of seed gardens for enhancing the indigenous hybrid seed production and identification of exotic sources for imports. In India oil palm hybrid seed production has been started in the exclusive ‘Oil Palm Seed Gardens’ established in different parts of the country from time to time. The first seed garden established at Palode (near Trivandrum, Kerala) with base material from OPIL, Thodupuzha (basic breeding materials introduced from Malaysia and Nigeria) started seed production from the year 1982. Subsequently to boost the indigenous production of planting material, TMOP encouraged establishment of oil palm seed gardens in the country. Accordingly, five more seed gardens one at Directorate of Oil Palm Research (DOPR, Pedavegi), two under State Departments of Horticulture (in Andhra Pradesh at Rajahmundry and in Karnataka at Taraka), one under Oil Palm India Limited at Thodupuzha (joint venture of Governments of India and Government of Kerala State) and one under private sector (M/s Navabharat Agro Products Limited, Andhra Pradesh at Lakshmipuram, Near Jangareddygudem, West Godavari District, Andhra Pradesh) were established.

Owing to the ambitious Oil Palm Area Expansion (OPAE) programme proposed by the Government of India, it has become necessary to augment the indigenous seed production by establishing more seed gardens. Three more seed gardens were planted at Kabini (Department of Horticulture, Govt. of Karnataka); Morampudi (Department of Horticulture, Government of Andhra Pradesh) and at Taraka (Taraka-II) (Department of Horticulture, Government of Karnataka) during 2012 which were expected to come in to production from the year 2020.

Oil palm once planted lasts long (giving economic yields for more than 30-35 years), hence, any variation (quality issues or defects) in the planting material will have serious adverse effects on its sustainability. Quality checks are required right from processing of seed (mesocarp removal or depericarping, physical abnormalities, moisture content, etc), heating treatment (intended for dormancy breaking), during and after germination, primary nursery, secondary nursery and finally at the time of dispatch.

**Oil Palm Cultivation in India: Constraints and Opportunities**

They uprooted the plants and switched back to cultivation of seasonal crops, fruits and vegetables. The changes in government policies to freely allow import of palm oil to India affected the domestic oil palm sector which was benefiting from the increased domestic oil palm prices, partially as a result of government protection in the late 1980’s. Presently oil palm cultivation is focused in five Indian States namely Andhra Pradesh, Karnataka, Tamil Nadu, Kerala and Maharashtra. The other states having oil palm cultivation include Orissa, Gujarat, Tripura, Mizoram and Andaman and Nicobar Islands. The state wise break of important oil palm areas. Nevertheless, Palm Oil cultivation in some areas has shown very impressive results. This is due to effective public private partnerships supported by appropriate policies. For example, the State Government of Andhra Pradesh initiated several innovative steps to address the constraints in palm oil cultivation. The State Government as part of implementing the Oil Palm Project (OPP) of TMOP has identified suitable implementing agencies such as Godrej Agrovet, Palmtech India, etc., having experience and expertise in the oil palm sector. Each agency has been allotted specific villages. The agency has to establish a mill in the locality at the beginning. This is to encourage farmers to grow oil palm since a major constraint is the lack of mills in the locality. The fruit has normally to be processed within 24 hours to get the best results. The agencies provide best quality seedlings at a nominal cost and facilitate getting all necessary support to oil palm growers. The support from the government also includes free electricity and irrigation facilities, providing loans through financial institutions at low rates, and insurance coverage. The agency collects FFB from the growers at the determined price and transfers the amount to their bank account. This is to ensure transparency and accountability in OPP implementation.

The State Government was more concerned about social issues associated with oil palm cultivation than economic issues. The Department of Biotechnology (DBT) initiated several studies to understand different aspects of oil palm cultivation in India. It was pointed out that the size of land holding is an important factor in determining the economic viability of the cultivation. There are several positive effects associated with oil palm cultivation in addition to the immediate economic returns. Oil palm is a humid tropical crop and its cultivation requires evenly distributed rainfall of 150 mm/month or 2500- 4000mm/annum. Therefore, it can be cultivated only with assured irrigation source. It is not suitable for highly alkaline, highly saline, waterlogged and coastal sandy soils (NRCOP, 1997).

Apart from these, the results of the interviews held with oil palm farmers and company representatives show several factors. The oil palm cultivation should not be a threat to the availability of staple food crops such as rice, wheat, plantain, fruits, vegetables etc. (to ensure food security). Similarly, there should not be blindfolded promotion of oil palm at the cost of other commercial crops such as rubber and arecanut.

Many farmers still feel that oil palm is a drought crop with the belief that palm oil requires only one third of the water required for sugarcane. A palm oil entrepreneur in Andhra Pradesh stated that “oil palm cultivation is a long term marriage with a crop rather than short term honeymoon.” The results of the interviews also revealed that there should not be fall in income for the farmers from oil palm cultivation because this may force them to uproot the existing oil palm for raising other crops. This crop should not be promoted where irrigation systems have been constructed (integrated power and irrigation projects) for food crops. No forests should be cut for oil palm. There are huge areas of land available in the country where the crop can be cultivated. For this, there has to be a proper documentation and one has to look at beyond the areas identified by the Chaddha Committee Report. Private sector participation in government land including waste lands should be encouraged with proper documentation and legal backup to safeguard against any misuse of the land. However, this has to be carried out with adequate safe guars such as the effect of plantation on property rights, livelihoods and biodiversity. “Proven Technology” for growing oil palm should be brought to the grass root level with proper mechanism. Distribution of plant material to the growing nation should be ensured.

**Literature Review**

The oil palm cultivation is important perspective at the global and national level in the world. Various researchers are study about the oil palm cultivation and its impact on human development at the global perspective. Rethinam, Singh, Olagunju,Noormahayu. M. N, Khalid. A.R and Elsadig are focus about the oil palm cultivation in the world level.

Rethinam (2007)in his article on oil palm. A versatile oil yielding crop focused on the importance of oil palm and identified that oil palm emerged as second largest oil yielding crop in the world. He conducted a collaborate study on the advantages of cultivating oil palm and found oil palm to be the crop for future. It is eco-friendly, environmentally sustainable, nutritive, import substitute and useful for cogeneration as well as bio-fuel. Above all it can help in elevating the socio-economic status of the small and marginal farmers. Once planted in field it starts yielding from the third year and upto 25 years. He also focused on oil palm promotional activities in India, commercial plantation of oil palm and oil palm development project.

Singh (2008) has noted that the study on global perspective of oil palm industry. He has express that oil palm a gift from Guinea coast of West Africa. The crop has become the most important oil producing tree. It is yields highest oil per unit area compared to any other oil producing crop. It is grown as a commercial crop in the twenty countries around the world. Malaysia and Indonesia with favourable temperature and well distributed rainfall emerged as the largest producers of palm oil and they contributed more than 85 percent of palm oil production. In India, importance to oil palm was given by establishing an oil palm research station in 1960. He concluded that although oil palm proved economical for the farmers, due to long gestation period coupled with high investment, there had been less interest. However, owing to support from Govt. and technology, enhanced interest prevailed in the matter of oil palm.

Olagunju (2008) has explores the study on economics of palm oil processing in Southwest Nigeria. He has focused on medium-large scale processers. The research has undertaken to pursue the objectives of identifying the existing rural holders processing techniques, evaluating the profitability of palm oil processing enterprises and determining the factors affecting the net return of the processors.

Noormahayu. M. N, Khalid. A.R and Elsadig (2009) explores the financial assessment of oil palm cultivation on Peatland in Selangor, Malaysia. They are in-depth analysis about the social and economic basis of oil palm cultivation in the study area. They were arrived Cobb-Douglass Production function model for the financial output from oil palm in terms of costs of chemical inputs and labour. The results noted that chemical inputs are more important than labour cost in determining the level of financial output. It is found that the oil palm cultivation is a profitable investment so long as growth conditions, costs, selling price and interest rate do not fluctuate substantially.

V.K. Abraham (1988)studied the potential of oil palm cultivation in India and found that the cultivation of oil palm required good rainfall throughout the year; soil must be physically fit, chemically balanced and biologically active. He opines that in India Karnataka, Andhra Pradesh, Maharashtra, Kerala and Tamil Nadu are suitable for the cultivation of oil palm.

J.S.Khan, N.D. Seth and S.D. Gara (1998)in their article “Development of oil palm processing Technologies” identified that per capita consumption of edible oils is raising due to increase in population as well as improvement in socio economic conditions of population. So it is imperative to increase productivity per hectares of all oil seed crops. He suggested the precautions that should be taken to improve the productivity of oil palm.

K.L.Chada (1998)in his article, “Oil Palm Development in India: Opportunities and Challenges”, opines that oil palm is a potential heavy yielder and as the harvest is at 10-day interval there is every possibility to get income round the year from its cultivation. But the challenges like shortage of power and limited or non-availability of new electrical connections, non-availability of refinancing by NABARD, reduction in import duty on edible oils are to be considered. K.Arya in his article, “History of Oil Palm Development in India”, feels that oil Palm is most reliable source of edible oil to meet the ever increasing demand of edible oil and to achieve self-sufficiency. He studied the introduction, development and Present Status of Oil Palm Cultivation*.*

P. Rethinam (1999)in his another study on “oil palm research and development in India” analyses the historical background of oil palm production, present status of production, yield and area, constraints in production and finally research and development in the area. His observation is that India is going for a vast expansion of about one million ha by 2020 AD so that 3 to 4 million tonnes of crude palm oil and 0.3 to 0.4 million tonnes of palm kernel oil can be produced by 2025 AD which can substantially contribute to the vegetable oil pool of the country to meet the growing demand.

K.J. Prabhakara Rao (1999) in his study on “oil palm processing in Andhra Pradesh”, observes that prospects for small scale plantations and matching processing facilities are brighter as compared to large scale plantations. He states that concentrations on small scale plantations by the farmer are more and it helps to increase in yield levels. He identified that in Andhra Pradesh, the first plantation was taken up in 1987-88. An extent of 120 was planted and at later stages a pilot project was taken up by Department of bio technology in the year 1990- 91. In the initial years the return was low due to newness of the cultivation & processing of oil palm crop. Taking real care was actually stated in 1993.

A.R. Sukumar (1999)through his study on status of oil palm in Andhra Pradesh opines that Andhra Pradesh has tremendous potential for oil palm cultivation. . He made a study on district wise potential of oil palm and found that krishna district had an estimated area of 1,00,000 hectares and identified as potential for the cultivation of oil palm . He focused on the incentives given to the farmers, constraints in the implementation of oil palm project along with the oil palm act, first implemented in Andhra Pradesh.

K.L.Chadha (2006)committee in their report on “progress and potential of oil palm in India’ found that during last 15 years, the industry had seen several ups and downs in the rate of area expansion, yield potential, price fixation and establishment of processing facilities in the states. Government of India supported the oil palm development progress with a number of subsidies and incentives to achieve the desired momentum. The committee critically assessed the experience of oil palm cultivation in India, briefly reviewed oil palm technologies, identified suitable areas for oil palm cultivation, identified sources for supply of planting material assessed the processing facilities available and suggested ways and means for financing oil palm development schemes.

Madhusudhana Rao (2008)in his article on Oil palm development program in Andhra Pradesh focused on oil palm Act identified mandals for oil palm development program and implementation of Technology Mission on Oilseeds and Pulses (TMOP) His identification is that Andre Pradesh is the first state to formulate and promulgate an oil palm act in 1993 and the act provided regulation for cultivation of oil palm, processing and matters connected there with. He also identified that 227 mandals were allotted to oil palm companies / processors as factory zone in 8 districts for development of oil palm. His conclusion is that if proper care is taken oil palm can become successful for commercial cultivation.

Kochu Babu (2008)in his study on oil palm Research in India: A National perspective, conducted a comprehensive research on initiation of oil palm research, present setup of oil palm research, research achievements in terms of crop improvement, crop production, crop protection, Harvesting and post-harvest technology, transfer of technology, ongoing research programs and future strategies for improving oil palm research. He feels that oil palm is a perennial and totally a new crop introduced under irrigated conditions in different agro-climatic regions, warrants meticulous planning and conducting of suitable research programs.

Rethenam (2008) has identified the oil palm in India and it was introduced as ornamental palm in India during 19th century. The crop was obtained the status of plantation crop of the forest land in Kerala and Little Andaman during 1970s and 1980s. Thereafter, the crop was cultivated by the marginal, small and big farmers. During the period, the crop was cultivated in eleven states in India. During that period, a large number of farmers were taking up the oil palm replacing the then existing low value labour intensive crops. He expressed that Society for Promotion of Oil Palm Research and Development (SOPOPRAD) was formed to discuss common issues and also to get to know technology transfer, programs identified and solutions found out in the cultivation of oil palm.

Singh (2009) has focus on oil palm in India with special focus on Technological developments, methods of enhancing efficiency of utilization, waste recycling and utilization, product diversification coupled with details of oil palm processing units in various states of India. He is noted that the Malaysia and Indonesia are leading producers and exporters of palm oil. Both accounting for more than 85 percent of world palm oil production. In India, Andhra Pradesh, Karnataka and Tamil Naidu are the potential states. He found that there has been an appreciable development in oil palm production, processing and utilization across the globe including India.

Kalanithi Nesaretnam (2009) has been focus on Nutritional Attributes of vegetable oils with special reference to palm oil. He has noted that the palm oil contribution is significant to the world oil market and it would continue to play a leading role in world oils and fats market with greater acceptance amongst the consumers. His nutritional studies showed no detrimental effects on palm oil consumption.

Rethinam (2009) is studied about recent advances in oil palm at global perspective. He has adopted Three Pronged Strategy in planning the research and development activities for the industry. The three strategies are high-income strategy for maximization of the land use, biomass utilization to optimally exploit non-oil biomass and value added strategy to focus on high value products such as oleo chemicals and phytonutrients. He suggested measures like enhancing productivity, improving efficiency of ECO plantation, capacity development and community development, crop insurance, strengthening the research infrastructure to satisfy the developmental need in order to meet the requirement of economically viable, environmentally sound and socially acceptable oil palm development.

Rao (2009) is focus about the oil palm development in Andre Pradesh with reference to production and productivity. The study is covering Nellore to Srikarkulam districts of Andre Pradesh. He has made efforts for oil palm growers, officials of Science Department, entrepreneurs and policy makers as golden palm under Indian conditions. He has suggested that the learning experience from Malaysia, Indonesia. He concluded that the adequate training and effective implementation of technologies to the farmers to cultivate the oil palm.

**1.4. Need for the Study**

The nine oilseeds, viz., groundnut, soybean, rapeseed and mustard, sunflower, sesamum, safflower, niger, castor and linseed, presently grown in about 29 million ha in India are unable to meet the demand for edible oil in India. During 2013, production of vegetable oil in India was about 9 million tonnes whereas the consumption was about double the amount of production. Consumption of palm oil in India is the highest compared to that of other edible oils, followed by soybean, rapeseed-mustard and groundnut oil. India has been mainly depending on import of oil from other countries to meet its vegetable oil requirements. During 2009-10, India imported 8.82 million tonnes of vegetable oil of which palm oil accounted for about 6.44 million tonnes (73 percent of total import), which implies that the country is dependent on palm oil imports for about 40 percent of its annual edible oil requirement. In addition, the total demand for edible oils is expected to increase further. Among the highest palm oil importing countries during 2009-10, India (6.44 million tonnes) leads followed by China (5.85 million tonnes), EU-27 imported 5.94 million tonnes and Pakistan (1.97 million tonnes). India will continue to depend on imports to the extent of about 40 percent of its consumption requirement.

At present, Malaysia is the leading producer and exporter of palm oil followed by Indonesia, Ivory Coast and Papua New Guinea. In India, a detailed study made by Chadha Committee in 2006 identified 10.4 lakh ha as potential area for Oil Palm growing in the identified states. Out of this identified potential area, 1.08 lakh ha has already been covered at the end of X Plan. The total area existing under Oil Palm at the end of 2011-12 (XI Plan) was 2.08 lakhhectares. Andhra Pradesh ranks first in the area coverage followed by Karnataka, Tamil Nadu and Mizoram. The Oil Palm Development Programme under ISOPOM provides assistance to encourage oil palm. In addition to the Oil Palm Development Programme, a special programme of Oil Palm Area Expansion Programmme (OPAE) under Rashtriya Krishi Vikas Yojna (RKVY) is under implementation from 2011-12 onwards with the focus to bring 60,000 ha per annum additional area under Oil Palm. Under OPAE Programme, assistance for planting material i.e. Oil Palm Area Expansion, cost of cultivation during gestation period of four years, supply of Drip Irrigation systems, supply of Diesel/Electric Pumpsets for drip systems, Inputs to inter-cropping in Oil Palm fields, INM, IPM, Fertigation, Plant Protection Chemicals & tree guard etc, construction of Vermi-compost units, bore-wells at Oil Palm farm and setting up of Oil Palm processing units is being provided to promote the Oil Palm cultivation. The present study is envisaged with the following objectives:

**1.5. Objectives of the Study**

The study addresses to the following objectives

* To delineate the total area under indigenous and exotic seedling plantation of oil palm crop in Tamil Nadu.
* To study the resource usage and productivity differences between the indigenous and exotic seedling plantation of oil palm in Tamil Nadu
* Compare profitability of indigenous and exotic seedling plantation and their feasibility in the long run in Tamil Nadu.
* To provide the policy suggestions for the promotion of prefer variety of palm oil.

**1.6. Data Base and Methodology**

The study is based on primary and secondary sources in Tamil Nadu. The secondary data obtained from Government of Tamil Nadu publications relating to arrive at the trends in area, production and productivity in indigenous and exotic varieties of oil palm in Tamil Nadu and Agricultural Statistics, Government of India. The secondary data on area, production and productivity of oil palm for 8th to 11th  Five Year Plan was used. The average annual growth rates, correlation and graphical analysis were applied.

Primary data has been collected from two districts namely Cuddalore and Thanjavur of Tamil Nadu. The two districts are chosen for the present study within the group of Oil Palm Area Expansion (OPAE) programme in Tamil Nadu. The information containing details of palm oil area under indigenous and exotic variety district is collected from the Agriculture Department, Government of Tamil Nadu. Two highest area districts like Cuddalore and Thanjavur is selected from Tamil Nadu. From the selected districts, ten taluks are selected having highest area under Oil Palm. From each selected taluk an appropriate numbers of villages are selected having significant area under exotic and indigenous varieties. We have select the farmers from taluk like Mangaloe, Nallur, Panrutti and Virudhachalam from Cuddalore District. In Thanjavur district, we have select the taluk like Boodalur, Thanjavur, Thiruvaiyaru, Pattukottai, Puthalur and Orathanadu. In this way from each selected district like Cuddalore and Thanjavur 50 households is selected who grow indigenous variety and 50 households is selected who grow exotic variety of oil palm. Thus, a total number of 109 indigenous farmers and 91 exotic farmers are surveyed in details in the state. In addition to collection of information from the households, the State, District and Village/Taluk officials is interviewed and information relevant for the study.

Table 1.2: Sample Size of Cuddalore and Thanjavur Districts in Tamil Nadu

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name of Selected District | Name of Selected Taluk/ Block | Number of Farmers | Indigenous  Varieties | Exotic  Varieties |
| Cuddalore | Mangalore | 7 | 1 | 6 |
|  | Nallur | 28 | 2 | 26 |
|  | Panrutti | 53 | 35 | 18 |
|  | Virudhachalam | 9 | 7 | 2 |
| Thanjavur | Boodalur | 5 | 4 | 1 |
|  | Thanjavur | 20 | 10 | 10 |
|  | Thiruvaiyaru | 11 | 6 | 5 |
|  | Pattukottai | 25 | 18 | 7 |
|  | Puthalur | 6 | 2 | 4 |
|  | Orathanadu | 36 | 24 | 12 |
|  | Total Sample Size | 200 | 109 | 91 |

Source:

**1.7. Organisation of the Study**

The research study is divided into five chapters. The first chapter is introductory in nature; it contains the background, objectives, data base and methodology of the study. The second chapter describes the role of oil palm in oilseeds sector in Tamil Nadu. It covers importance of oilseeds in Indian agriculture, programmes and policies governing edible oilseeds in India, oilseeds production in Tamil Nadu, share of oilseeds in gross cropped area in Tamil Nadu and share of oil palm area in oilseeds in Tamil Nadu. The third chapter analyses the review household characteristics, cropping pattern and value of output in the study area. The fourth chapter examines the pproduction structure and resource use under horticultural crops in Tamil Nadu. The last chapter provides the concluding remarks and policy suggestions on the basis of the study.

**Chapter II**

**Role of Oil Palm in Oilseeds Sector: Prospects in Tamil Nadu**

The edible oil consumption is increased from 123 million metric tonnes in 2007 to 158 in 2012 in the global level. The growth trend is increased due to population growth, incomes and per capita consumption increased. Particularly, in developing countries like India, Indonesia and China and other countries are increased the consumption. Out the various edible oil, palm oil is one of the significant oil in the world economy as well as a large majority of people consuming the oil is common phenomenon. The origin of the oil is West Africa. Over a period of time, it is spread to other countries of South East Asian countries, African Countries and South American countries. At presently, Malaysia, Indonesia and Papua New Guinea, Nigeria, Ghana, Liberia, Cameroon, Congo, Panama, Columbia, Guyana, Peru, Ecuador, Venezuela and Brazil are producing the oil in the world. Out of that, Malaysia, Indonesia and Nigeria are one of the top most producers of oil palm in the world.

**Global Palm Oil Scenario**

Indonesia and Malaysia are the leading producers of palm oil in the world. Both the countries are contributing 89 percent during 2011-12. The average area under palm oil in Malaysia is stagnated. There is not significant improvement over the last few years. Global consumption of palm oil stands at 48.7 Mn MT in 2011-12. Consumption has been increasing by 6.1 percent over the last five years on the back of growing demand for the oil, especially from developing countries like India and China. The demand for palm oil is increases because of more consumption of people in the world. The high cost of other edible oil in the economic conditions, the people are preferred the palm oil is due to low cost. According to WWF Report, 2015, the expansion of oil palm plantations is estimated to increase 4 million ha (USDA, Foreign Agricultural Service, 2015).

It is highest produced vegetable oil in the world. It is increased from 15.2 million tonnes in 1995 to 54 million tonnes in 2011. The area under oil palm is increased from 4 million ha. in 1980 to 17 million ha. in 2014. In, Malaysia, it is increased from 3.25 million ha. in 2000 to 5.1 million ha. in 2013. In Indonesia, it is increased from 4 million ha. to 9 million ha. in the same period. Indonesia, China, European countries and India is major consumers of the palm oil in the world. During 2012, India, China and European countries are imports of 8.75 million tonnes, 6.6 million tonnes and 6.3 million tonnes. It accounts for 52 percent of the global imports in the world (Facts and Figures on Palm Oil, 2014).

The oil are contributes highest share in the global supply of edible oils. During 2013, palm oil and palm kernel oil accounted for 40 percent, which is 169 million tonnes of global vegetable oil. The palm oil is growing 17 countries in the world. According to 2014, Indonesia (8, 28,470 ha.) Liberia (98,485 ha.), Cameron (69,975 ha.), Goben (67,179 ha.), Guina (51,178 ha.), Cambodia (10,719 ha.), Nigeria (5,594), are the countries with the new area expansion of plantation.

Oil crops have been growing at an even faster rate. Over the 2000-2010 decade alone, the oil crop sector grew by almost 5 percent per annum as food consumption increased in developing countries. Most of the oil crops are used in the form of vegetable oil, but direct consumption of soybeans, groundnuts and processed products other than oilseeds is also common. Highest growth in oil crop production was registered in Australia, at 18.6 percent per year over the period. The Marshall Islands increased production by 15.9 percent per year and Kazakhstan by 14.5 percent (FAO, Statistical Year Book, 2014).

Table 2.1: World Production of Nine Major Vegetable Oils (Million Mt)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Vegetable Oils | 1980 | 1990 | 2000 | 2007 | 2008 | 2009 |
| Palm Oil | 4.54 | 11.01 | 21.87 | 38.85 | 43.43 | 45.08 |
| Soyabean | 13.38 | 16.10 | 25.54 | 37.28 | 36.63 | 35.87 |
| Rape Seed | 3.48 | 8.16 | 14.47 | 17.91 | 19.16 | 21.18 |
| Sunflower | 5.02 | 7.87 | 9.70 | 11.19 | 11.06 | 13.23 |
| Palm Kernel | 0.55 | 1.45 | 2.69 | 4.98 | 5.50 | 5.73 |
| Groundnut | 2.86 | 3.90 | 4.56 | 5.71 | 5.52 | 5.56 |
| Cotton | 2.99 | 3.78 | 3.86 | 4.99 | 4.88 | 4.66 |
| Coconut | 2.72 | 3.39 | 3.28 | 3.69 | 3.40 | 3.50 |
| Olive | 1.70 | 1.86 | 2.54 | 2.76 | 2.62 | 2.91 |
| Total | 37.25 | 57.51 | 88.52 | 127.36 | 132.21 | 137.73 |

Source: FAO Statistics, 2011

In the global level, the vegetable oils, soybean oil used to highest share. It accounted for 29 percent of total production of vegetable oils in the world. It showily lost its first position to palm oil, whose share increased to 33 percent while that of soyabean dwindled to 26 percent in 2009. This seems to have happened mainly due to higher productivity and the lower the prices of palm oil.

Table 2.2: World and India Production of Oil and Fats: 2012-13

|  |  |  |
| --- | --- | --- |
| Oil and Fats | World | India |
| Palm | 54.9 | 0.08 |
| Soyabean | 43.54 | 1.76 |
| Rape | 23.69 | 2.01 |
| Sun | 14.7 | 0.21 |
| Cottonseed | 4.89 | 1.13 |
| Groundnut | 4.21 | 0.12 |
| Other | 42.79 | 2.14 |
| Total | 188.72 | 7.45 |

Source: World Data from Oil World 2012 and SEA Data Bank for India

Major Vegetable Oils Produced in India is Rapeseed Oil, Soybean Oil, and Cottonseed Oil, Rice Bran Oil & Groundnut Oil, India’s contribution towards world Oil production is just 4 Percent

The global production of palm oil is increased at 9.5 percent per year from 24.3 million tonnes in 2000-01 to 48 million tonnes in 2010-11. The palm oil accounted for third of the world output of major vegetable oils. Even though, the palm oil markets are facing main challenges in the world. It is highly profitable one and considerable into global agro industry. These oil is retains its position is because of numerous global supplies of vegetable oils is because of competitive nature of business. The oil palm yield per hectare is 5 to 10 time higher than other oils in the world. According to FAO Statistics (2012), production of palm oil is more than double growth trend during the past decade in the world. The growth is increased from 22 million tonnes in 2000 to 50.3 million tonnes in 2011. Malaysia and Indonesia is contributing 90 percent of the world palm oil production. Production of Indonesia and Malaysia increased from 4 million tonnes in 2000 to 6.6 million tonnes in 2011. Of which, 2.5 million tonnes in Latin America, 1.5 million tonnes in Thailand and 1.8 million tonnes in West Africa. During 2011, India, Indonesia, China and European Union are consuming half portion of the total production in the world. These countries are consuming 15 percent, 14 percent, 13 percent and 10 percent, respectively.

**Roundtable on Sustainable Palm Oil (RSPO)**

At the global level, the organization was set up on 2004 in the name of Roundtable on Sustainable Palm Oil (RSPO). The objective is to promote the growth and sustainable use of palm oil. This organization is discussed with palm oil growers, oil processors, manufacturers, retailers, and palm oil investors. It is set as goal for maintain the quality product of palm oil plantation. They have independent system for auditing the plantations, mills and supply chain. The organization is to address the issue like soil erosion, pollution, health and safety, labour conditions and others (WWF: India, 2013).

After 2013, again the Roundtable on Sustainable Palm Oil (RSPO) are meet and discussed about the balance between the economic benefits and environmental and social cost of clearing tropical rainforest to make way for palm oil cultivation. The motive of the discussion is the coalition of business and civil society. It is given guidelines to the cultivation and trade of sustainable palm oil. In recent years, about 20 percent of all palm oil production is now certified under RSPO’s standards. Some of the guideline followed by European markets and it is considered the minimum requirement for consumers. RSPO is supporting to improving the production standards, increasing production efficiency. It is also reduce the convert forests and reducing illegal activities. The supply chain is increasing by the way of legal safeguards and certification (WWF, 2012).

The activities of the organization are focused relating to expansion of production, finance and use of sustainable palm oil products. It is implementing periodical review of global standards for palm oil products and provide certificate for the standard products. The roundtable discussion is to evaluate and assess the economic, environmental and social impacts of the palm oil market. It is also done the cooperation between the multinational companies and WWF. The plantation of palm oil is to 11.1 million tonnes in the 12 countries during 2014. The share of global palm is to about be 18 percent in the year. The organization is ensuring good delivering of the system, which are impacts on social, economic and environmental benefits to the stakeholders (Roundtable on Sustainable Palm Oil, Impact Report, 2014).

**Importance of Oilseeds in Indian Agriculture**

The agricultural sector is given high priority for foodgrains productions during green revolution. Other crops like oilseeds, pulses and coarse cereals are not considerable progress. The government is focusing these agricultural commodities after the green revolution and post-reform period. The oilseed sector is given high priority and important area concern by policymakers. We are occupies an important place in terms of area and production. Our economy is occupying fourth largest edible oil in the world and contributes 10 percent of the world oilseed production. The production covering is 273.8 lakh tonnees in 2014-15. This constitutes about 15 percent of the gross cropped area (Government of India, 2016).

Out of nine oilseeds, three main oilseeds like groundnut, soybean, and rapeseed-mustard accounted for approximately 90 percent of total oilseeds output. Soybean is the most important crop with production of 10.7 million tonnes in 2014-15. It is mainly cultivated in Madhya Pradesh, Maharashtra, and Rajasthan accounting for more than 95 percent of total production. The second most crops is rapeseed-mustard (6.8 million tonnes). It is cultivated in Rajasthan, Madhya Pradesh, Haryana, Uttar Pradesh, West Bengal and Gujarat. It account for 93 percent in total production. Groundnut is the third largest share in the production. The average production is 6.6 million tonnes. It is mainly cultivated in the state of Gujarat, Andhra Pradesh, Tamil Nadu, Rajasthan, Karnataka and Maharashtra. The share of the state is 91 percent in total groundnut production in the country.

**Palm Oil Scenario in India**

In India, the share of palm oil consumption in the global consumption is increased from 13 percent in 2007 to 15 percent in 2012. The growth trend is at tremendous one. Nearly 90 percent is imported from foreign countries. It is uses for domestic food consumption. Palm oil is highest share of consumption among the vegetable oil. The change of consumption pattern, availability, pricing and policy changes of imports is main determining factors in the economy. The oil is consumed in the country in refined form in the food industry (World Wide Report, 2013). After 1990s, the oil consumption is increases among the public and it is imported. The share of imports is grown at 17.09 percent (7.4 million metric tonnes) in 2011-12. The share of oil contribution in total edible oil is around 77 percent, which are imported. The oil price is mainly depending upon imported from Malaysia and Indonesia. They are fixing the price rate. The share of our economy in palm oil production is very meagre level. It accounts for 0.2 percent of the world production. The area under palm oil is 15 million ha. in the world. Of which, India stands at 1, 55,202 ha. It contributes 1 percent of the global average area. The area is growing at a tremendous trend of 21 percent during last five years.

During 2013, we are imported the palm oil at 83, 42, 285 million tonnes. The total demand for edible vegetable oils is 17.5 million metric tonnes in 2012-13. It is estimated to increase at the rate of 3 to 4 percent per annum to 26.78 million metric tonnes in 2025 (The Solvent Extractors Association of India, 2013). We are mainly depending upon the imports of edible and palm oil to meet domestic demand. Andhra Pradesh is leading state in contributing of palm oil production in India. It accounts for 86 percent and Kerala, Karnataka contributes 10 percent, 2 percent, respectively. Some of the States like Orissa, Tamil Nadu, Goa and Gujarat also contributing with meagre level. In India, the agro ecological conditions is suitable for growing the nine oilseeds, of which, seven edible oilseeds like groundnut, rapeseed and mustard, soybean, sunflower, sesame, safflower and niger. Remaining two non-edible oilseeds is covered under castor and linseed.

The total nine oilseeds in India during 1950-51 to 2015-16 is presented in Table 2.3. The area and production of nine oilseeds which was 10.73 million ha. and 5.16 million tonnes in 1950-51, reached 28.05 million ha. and 32.75 million tonnes in 2013-14. There was a significant increase in three fold level of area and six fold increase of production level. The area and production of nine oilseeds have increased consistently and have been ups from decade to decade. The area and production of oilseeds is next to foodgrains production in India. We are third largest producers of oilseeds in the world. The productivity of nine oilseeds crops has risen from 481 kg/ha in 1950-51 to 1168 in 2013-14. The main reason for decline of nine oilseeds is because of drought conditions during that year. The oilseeds cultivations is mainly used marginal farming holds and rainfed farming.

Table 2.3: Total Nine Oilseeds in India: 1950-51 to 2015-16

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Area Million Hectares | Production (Million Tonnes) | Yield (Kg./Hectare) |
| 1950-1951 | 10.73 | 5.16 | 481 |
| 1960-1961 | 13.77 | 6.98 | 507 |
| 1970-1971 | 16.64 | 9.63 | 579 |
| 1980-1981 | 17.6 | 9.37 | 532 |
| 1990-1991 | 24.15 | 18.61 | 771 |
| 2000-2001 | 22.77 | 18.44 | 810 |
| 2001-2002 | 22.64 | 20.66 | 913 |
| 2005-2006 | 27.86 | 27.98 | 1004 |
| 2010-2011 | 27.22 | 32.48 | 1193 |
| 2011-2012 | 26.31 | 29.8 | 1133 |
| 2012-2013 | 26.48 | 30.94 | 1168 |
| 2013-2014 | 28.05 | 32.75 | 1168 |
| 2014-2015 |  | 26.68 |  |
| 2015-2016 |  | 19.89 |  |

Table 2.4: Production of Oilseeds and other Commercial Crops in India

(in Lakh Tonnes/Lakh Bales)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Crop | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 |
| Groundnut | 82.65 | 69.64 | 46.95 | 97.14 | 66.48 |
| Castor seed | 13.50 | 22.95 | 19.64 | 17.27 | 18.24 |
| Sesamum | 8.93 | 8.10 | 6.85 | 7.15 | 7.70 |
| Niger seed | 1.08 | 0.98 | 1.02 | 0.98 | 0.85 |
| Rapeseed and Mustard | 81.79 | 66.04 | 80.29 | 78.77 | 67.57 |
| Linseed | 1.47 | 1.52 | 1.49 | 1.41 | 1.45 |
| Safflower | 1.50 | 1.45 | 1.09 | 1.13 | 0.64 |
| Sunflower | 6.51 | 5.17 | 5.44 | 5.04 | 3.82 |
| Soyabean | 127.36 | 122.14 | 146.66 | 118.61 | 107.05 |
| Total Nine Oilseeds | 324.79 | 297.99 | 309.43 | 327.50 | 273.80 |

Source: Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, New Delhi

Production of oilseeds and other commercial crops in India during 2010-11 to 2014-15 is presented in Table 2.4. The total production of nine oilseeds is decline from 324.79 lakh tonnes in 2010-11 to 273.8 lakh tonnes in 2014-15. There were significant ups and downs in the growth trend of production. Out of nine crops, soyabean is the top most crops cultivated in India during the five years of 2010-11 to 2014-15. The groundnut is recorded second highest crops cultivated in this region. Rapeseed and mustard is recorded third place of cultivation. The soyabean production was decline from 127.36 lakh tonnes in 2010-11 to 107.05 lakh tonnes in 107.05 in 2014-15. The growth rate is decline from 39 percent to 29 percent during the same period. The production of groundnut is decline from 82.65 to 66.48 lakh tonnes in the same period. The growth of groundnut is decline from 25 percent to 24 percent. But during 2013-14, the growth of oilseeds is 327.5 lakh tonnes of which, soyabean, groundnut and rapeseed is recorded 118.61, 97.14 and 78.77 lakh tonnes.

Table 2.5: Oilseeds and Vegetable Oil Production in India (Quantity in Million Tonnes)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | Oil Production | Availability Vegetable Oil | |  |
| Nov-Oct |  | Edible Oil | Non-Edible Oil | Total |
| 2003-04 | 25.18 | 7.21 | 0.38 | 7.5 |
| 2004-05 | 24.35 | 7.16 | 0.43 | 7.59 |
| 2005-06 | 27.98 | 7.56 | 0.47 | 8.03 |
| 2006-07 | 24.29 | 7.33 | 0.43 | 7.76 |
| 2007-08 | 29.76 | 7.75 | 0.49 | 8.24 |
| 2008-09 | 27.72 | 7.71 | 0.5 | 8.21 |
| 2009-10 | 24.88 | 7.26 | 0.51 | 7.77 |
| 2010-11 | 32.48 | 7.92 | 0.6 | 8.52 |
| 2011-12 | 29.8 | 7.34 | 0.78 | 8.12 |
| 2012-13 | 29.46 | 6.8 | 0.65 | 7.45 |

Source: SEA & Ministry of Agriculture, The Average Availability of Vegetable Oil is 7.9 Million Tonnes only

**Programmes and Policies Governing Edible Oilseeds in India**

We are export of oilseeds and edible oil upto 1960s. Thereafter, there was stagnation in production and consumption pattern is increase among the people for edible oils. The country was became import the edible oil during 1970s. During mid-1980s, edible oils were highest import from other countries. It accounts for 30 percent of the total imports. The Government was deciding to achieve in self-sufficiency in edible oilseeds through technological inventions. The Government has control the stagnant oilseed production and introduce the new technologies in oilseed production through various schemes.

During 1984-85, the Government of India was initiated the National Oilseed Development Project. Thereafter, Government of India launched Technology Mission on Oilseeds in 1986. The main motives of the schemes are to increase oilseeds production and achieve self-sufficiency in edible oils. In 1991-92, Oil Palm Development Programme (OPDP) was launched under the “Technology Mission on Oilseeds and Pulses” with a focus on area expansion in Andhra Pradesh, Karnataka, Tamil Nadu, Orissa, Gujarat and Goa. During the Tenth Plan, Integrated Scheme on Oilseeds, Pulses, Oil Palm and Maize (ISOPOM) was implemented by converging earlier schemes like Oilseeds Production Programme (OPP), Oil Palm Development Programme (OPDP), National Pulses Development Programme (NPDP) and Accelerated Maize Development Programme (AMDP). From April 2010, pulses component of ISOPOM has been merged with Natural Food Security Mission (NFSM) to intensify efforts for production of pulses.

Oil Palm Development Programme was started on 1991- 92 under the "Technology Mission on Oilseeds and Pulses. The scheme was focus on area expansion in the states like Andhra Pradesh, Karnataka, Tamil Nadu, Orissa, Gujarat and Goa. From 2004-05 onwards, the scheme is being implemented as part of the "Integrated Scheme of Oilseeds, Pulses, Oil Palm & Maize" (ISOPOM) and provides support for Oil Palm cultivation in twelve states like Andhra Pradesh, Assam, Gujarat, Goa, Karnataka, Kerala, Maharashtra, Mizoram, Orissa, Tamil Nadu, Tripura, and West Bengal. Even though, Assam, Maharashtra and West Bengal did not undertake Oil Palm cultivation though Maharashtra has now undertaken oil palm area expansion from 2010-11. Under ISOPOM scheme, the government is given support for planting material, cultivation cost, installation of drip irrigation system, diesel pump sets, training, development of waste land and technology transfer through demonstration and publicity in the respective states.

Fresh Fruit Bunches (FFBs) of oil palm are highly perishable and need to be processed within 24 hours of harvest. Realizing the special circumstances regarding the cultivation, gestation, sustainability, production, harvesting and processing of Oil Palm, the State Departments of Agriculture/ Horticulture have tried to establish a linkage of oil palm farmers with oil palm processors and oil palm industry.

The States are implementing area expansion programme under ISOPOM in association with the oil palm industry. Identified areas are allocated to private entrepreneurs for overall development of the sector i.e. from plantation to procurement of Fresh Fruit Bunches (FFBs) at the prices fixed by the Project Management Committee (PMC) constituted under OPDP. Presently Andre Pradesh, Tamil Nadu, Mizoram and Goa have enacted Oil Palm Act while other States are yet to initiate such regulatory provision.

Table 2.6: Area Coverage under Oil Palm during Five Year Plan Period in India

|  |  |
| --- | --- |
| Period | Area (000 ha) |
| Area covered upto Ninth Five Year Plan (Upto 2001-02) | 62.73 |
| Area covered upto Tenth Five Year Plan (Upto 2002-03 to 2006-07) | 47.07 |
| Area covered upto Eleventh Five Year Plan (Upto 2007-08 to 2011-12) | 81.27 |
| Cumulative Area Planted upto March, 2011 | 191.07 |
| Area uprooted | -17.94 |
| Net Available Area (March, 2011) | 173.13 |

The area under oil palm cultivation in India was seen to 8585 ha. before introduce of OPD Programme during 1991-92. The area under palm oil cultivation is increased to 1.73 lakh ha. during 2011. It is noted that the area expansion of palm oil is because of very successful implementation of the scheme phased manner by the Government. The area covered is increased from 62730 ha. during Ninth Five Year Plan period to 81270 ha. during Eleventh Five Year Plan period. The total area cultivation during the three plan period is 191070 ha. the area under palm oil cultivation is increased mount amount of twenty two times during the past two decades in India.

**Oil Palm Area Expansion (OPAE)**

In order to bring 182500 hectares area under oil palm cultivation during 2014-15, it is proposed to provide incentives to growers for identified critical interventions like planting material, compensation for loss of income of the farmers during the gestation period, pump set, drip irrigation system, support for intercropping, vermi-compost pit, bore wells/water harvesting tanks/fertigation tanks, PP chemicals/INM/IPM/fertigation/tree guards etc. The States may also dovetail these components with other interventions under ISOPOM and other schemes for wasteland development, creation of irrigation facilities and publicity, contingency.

Oil Palm plantations will require to be maintained during the entire gestation period of 4 years before they start bearing fruit. Support for this purpose would have to be provided to the growers. Further, oil palm growers would be encouraged to grow intercrops during the gestation period of 4 years till the oil palm start yielding FFBs to partially compensate them for loss of income. For this, funds of Rs. 151.50 crore will be required during next three years i.e Rs.43.50 crore in 2012-13, Rs.49.50 crore in 2013-14 and Rs58.50 crore in 2014-15.

The state-wise targets and achievements of area under oil palm development programme during 2005-06 to 2013-14 is given in Table. The total area under this scheme is increased from 12661 ha in 2005-06 to 22948 ha. in 2013-14. Out of that, Andre Pradesh is registered top state among the various states in India. During 2005-06, the target was 4800 ha and achieved 9563 ha. The state achieve more than the target area. Whereas, the target is 18081 ha and achieved to 11890 ha during 2013-14. The state is achieved less than the target fixed.

Karnataka is second highest state among the different states for cultivation of palm oil. During 2005-06, the target was 1500 ha and achieved 1591 ha. The area under palm oil is increased to 6173 ha. of target and 2880 ha. during 2013-14. During the 2013-14, the state could not achieve the target of the state. The half portion of the target area is not achieved by the stated during that period. There is no popular about the scheme among the cultivating farmers.

Tamil Nadu is third highest state for cultivation of palm oil. The state is fixed the target of 2000 ha and achieved 1210 ha. during 2005-06. The state was achieved less area cultivation then the target fixed. During 2013-14, the state is targeted 6166 ha. and achieved 926 ha. The state is totally neglected the expansion of area. The farmers do not know about the palm oil cultivation in India. This is the new arrival and therefore, the farmers are neglected and scheme cannot reach the farmers.

Table 2.7: State-wise Targets and Achievements of Area under Oil Palm Development Programme (Area in Hectare)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2005-06 | | 2006-07 | | 2007-08 | | 2008-09 | | 2009-10 | | 2010-11 | | 2011-12 | | 2012-13 | | 2013-14 | |
| State | T | A | T | A | T | A | T | A | T | A | T | A | T | T | A | T | T | A |
| Andre Pradesh | 4800 | 9563 | 5200 | 11882 | 15000 | 12074 | 20000 | 17049 | 15000 | 7755 | 15000 | 7455 | 40000 | 14500 | 27000 | 14919 | 18081 | 11890 |
| Karnataka | 1500 | 1591 | 1800 | 3714 | 500 | 4314 | 5000 | 3005 | 3500 | 2325 | 3600 | 2936 | 7000 | 4314 | 5186 | 2513 | 6173 | 2880 |
| Tamil Nadu | 2000 | 1210 | 2200 | 1746 | 3500 | 1780 | 2000 | 1939 | 3375 | 1423 | 3000 | 2200 | 7000 | 2134 | 5866 | 1200 | 6166 | 926 |
| Gujarat | 500 | 24 | 550 | 57 | 1000 | 356 | 1000 | 518 | 1000 | 740 | 1000 | 286 | 1000 | 904 | 1130 | 377 | 1253 | 454 |
| Odhisa | 500 | 0 | 500 | 300 | 1000 | 991 | 1000 | 1000 | 0 | Na | 3000 | 3000 | 3700 | 4300 | 5000 | 3150 | 4000 | 2000 |
| Goa | 350 | 7 | 400 | 3 | 100 | 9 | 25 | 5 | 20 | 7 | 20 | 2 | 20 | 6 | 0 | 0 | 0 | 0 |
| Tripura | 300 | 55 | 300 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Assam | 300 | 0 | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Kerala | 400 | 188 | 400 | 270 | 480 | 182 | 475 | 115 | 350 | 91 | 400 | 89 | 250 | 60 | 250 | 36 | 50 | 54 |
| Maharashtra | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 250 | 80 | 200 | 200 | 250 | 194 | 306 | 0 |
| Mizoram | 350 | 24 | 350 | 185 | 3500 | 1614 | 2000 | 2547 | 4466 | 3499 | 2500 | 1877 | 1000 | 1970 | 5000 | 3711 | 5000 | 4532 |
| Chhattisgarh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 250 | 200 | 318 | 212 |
| Total | 11000 | 12661 | 12000 | 18176 | 29580 | 21321 | 31500 | 26178 | 27711 | 15840 | 28770 | 17925 | 60170 | 28388 | 49932 | 26300 | 41347 | 22948 |

Source: Department of Agriculture and Cooperation, \* Implemented under OPAE (RKVY). However, Kerala and Goa are not covered under OPAE

Note: T refer for Targets, A refer to Achievements

Table 2.8: Area covered under Oil Palm Development Programme (Area in Hectare)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| State | Area covered under Oil Palm | | | Area uprooted | Net Area up  to March, 2014 |
| Prior to OPDP | under OPDA | Total Cultivated Area |
| Andre Pradesh | 1232 | 149552 | 150784 | 5457 | 145327 |
| Karnataka | 1114 | 37277 | 38391 | 6842 | 31549 |
| Tamil Nadu | 0 | 28238 | 28238 | 219 | 22854 |
| Gujarat | 0 | 4415 | 4415 | 0 | 4196 |
| Odhisa | 0 | 16225 | 16225 | 42 | 16225 |
| Goa | 0 | 924 | 924 | 0 | 882 |
| Tripura | 0 | 530 | 530 | 0 | 530 |
| Assam | 0 | 10 | 10 | 0 | 10 |
| West Bengal@ | 0 | 0 | 0 | 0 | 0 |
| Kerala | 3646 | 2094 | 5740 | 0 | 5740 |
| Maharashtra | 1000 | 474 | 1474 | 0 | 1474 |
| Andaman & Nicober | 1593 | 0 | 1593 | 0 | 1593 |
| Mizoram | 0 | 19971 | 19971 | 0 | 19971 |
| Chhattisgarh\* | 0 | 412 | 412 | 0 | 412 |
| Total | 8585 | 260122 | 268707 | 17944 | 250763 |
| Year-wise average area | 0 | 17944 | 17944 | 0 | 0 |
| Existing Net Area | 8585 | 242178 | 250793 | 17944 | 250763 |

Source: Dept. of Agriculture and Cooperation, Note: P-Provisional, NA-Not Available, NR-Not Reported,

Notes: OPDP scheme not implemented so far. Included under OPAE since 2011-12

Area covered under oil development programme in Indian states is shown in Table 2.8. Kerala is recorded highest area under cultivation during the prior implementation of oil development scheme. Followed by Andaman and Nicober is recorded second place of 1563 ha. Andre Pradesh is recorded third place of 1232 ha. during the same period. Out of fourteen states, only five states like Kerala, Andaman and Nicober, Andre Pradesh, Karnataka and Maharashtra are cultivated the oil crop during the prior to introduce the scheme. The total cultivation area under prior to introduce the scheme is 8585 ha.

After the oil palm development scheme implementation, Andre Pradesh is recorded first place (149552 ha.). Followed by Karnataka are recorded 37277 ha. and Tamil Nadu recorded 28238 ha. Mizoram and Odisha states are recorded fourth and fifth place in the cultivation of oil palm. On the contrary, Assam is recorded meagre level of 10 ha. and followed by Chhattisgarh and Maharashtra are recorded lowest level of area cultivation after the implantation of the scheme. Out of fourteen states, 13 states are cultivating the oil palm crop.

When comparative look between prior and after the implementation of the scheme, Andre Pradesh, Karnataka and Tamil Nadu are registered rising trends in area cultivation. There is significant growth trend during the implementation of the scheme. On the other hand, Kerala, Maharashtra states are recorded decline the area under the cultivation. But Mizoram is recorded enough growth trends during that period. Kerala, Maharashtra states are withdrawn of the scheme. The two states are not interested to implement the scheme due to decline in area cultivation. But Andre Pradesh, Karnataka, Tamil Nadu, Mizoram and Odisha are implemented the scheme with effective and efficient manner. These states are increasing the area under oil palm scheme with high motivation.

Table 2.9: State wise Quantity of Crude Palm Oil under Oil Palm Development Programme

(in Tonnes)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| State | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 |
| Andre Pradesh | 23905 | 43500 | 35509 | 38000 | 43953 | 57402 | 63487 | 97987 | 127570 | 161566 |
| Karnataka | 681 | 793 | 974 | 1037 | 1170 | 1118 | 1459 | 1740 | 1770 | 1736 |
| Tamil Nadu | 110 | 178 | 249 | 273 | 366 | 365 | 486 | 759 | 1035 | 820 |
| Gujarat | NR | NR | NIL | NA | 0 | 0 | 0 | 0 | 0 | 0 |
| Odhisa | 0 | 0 | 0 | NA | 476 | 589 | 871 | 2162 | 443 | 558 |
| Goa | 349 | 379 | 345 | 342 | 393 | 279 | 329 | 394 | 372 | 371 |
| Tripura | NA | NA | NA | NA | NA | NA | NA | NA | 0 | 0 |
| Assam | 0 | 0 | 0 | NA | NA | NA | NA | NA | 0 | 0 |
| Kerala | 5793 | 6478 | 6888 | 5750 | 7400 | 6600 | 6900 | 7500 | 7378 | 6303 |
| Andaman & Nicrobar | 0 | 0 | 0 | NA | NA | NA | 0 | 0 | 0 | 0 |
| Mizoram | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 30838 | 51328 | 43965 | 45403 | 53397 | 66353 | 73532 | 110542 | 138568 | 171354 |

Source: Information from based on input provided by state governments and dept. of oilseeds development , Hyderabad, Complied by Ministry of Agriculture, Notes P- Provisional, NR - Not Reported, NA-Not Available

State-wise quantity of crude palm oil under oil palm development programme in Indian states during 204-05 to 2013-14 is presented in Table 2.9. Among 11 states, Andre Pradesh is recorded highest production during the decade of 2004-05 to 2013-14. The state is increased from 23905 tonnes in 2004-05 to 161566 tonnes in 2013-14. There is a significant progress in production level of crude palm oil. Even though, there are some up and downs in the decade. The state is increased the production of five times. There is mountain amount of production increased during a decade. The state is successfully implemented the scheme with effective manner.

Kerala is recorded second place in production of crude palm oil during the whole years. The state is increase from 5793 tonnes in 2004-05 to 6303 tonnes in 2013-14. The state is recorded little pit of the production increased during the decade. Even though, the state is recoded 7400, 7500 and 7378 tonnes of production during 2008-09, 2011-12 and 2012-13, respectively. The state is stagnant in production of crude palm oil. Followed by Karnataka is recorded third place in the production of crude palm oil. The state is increased from 681 tonnes to 1736 tonnes during the same period. The state is recorded three time increase in production.

It is found that, Andre Pradesh, Kerala, Karnataka, Tamil Nadu, Goa Odisha are successfully implement the scheme and production level is increase some enough during the period of time. Out of 11 states, Gujarat, Tripura, Assam, Andaman and Mizoram states are recorded zero level of production during the past ten years.

According to FAO, Fresh Fruit Bunches was cultivated 14.52 million ha. in fourth four countries in the world. The production of FFB was 208.29 million tonnes during 2009. Out of that, five countries like Indonesia, Malaysia, Nigeria, Thailand and Colombia are producing major share. These countries share in the world production account for 90 percent. Indonesia is leading producer of palm oil production. It accounted for 45 percent of the world production (Ashok Vishandass and Ashok Gulati, 2012). This bunches are used within 24 hours, otherwise it is perished.

Table 2.10: State-wise Production of Oil Palm Fresh Fruit Bunches under Oil Palm Development Programme

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| State | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 |
| Andre Pradesh | 138929 | 203000 | 215000 | 226200 | 259495 | 347892 | 385009 | 573024 | 790881 | 933981 |
| Karnataka | 4127 | 4528 | 5415 | 5764 | 6685 | 6387 | 8337 | 9942 | 10112 | 9917 |
| Tamil Nadu | 681 | 1202 | 1584 | 1659 | 1987 | 2080 | 2920 | 4743 | 5244 | 5495 |
| Gujarat | 6 | 20 | 10 | 12 | 2 | 6 | 26 | 91 | 134 | 158 |
| Odhisa | 0 | 0 | 0 | 0 | 2799 | 3464 | 5128 | 12720 | 2920 | 3722 |
| Goa | 1994 | 2143 | 1951 | 1936 | 2236 | 1591 | 1878 | 2229 | 2056 | 2046 |
| Tripura | 465 | NA | 447 | NR | 0 | NR | NR | NR | 0 | 0 |
| Assam | 0 | 0 | 0 | NR | NR | NR | NR | NR | 0 | 0 |
| Kerala | 29940 | 33795 | 34496 | 29300 | 38400 | 35100 | 41000 | 43200 | 41350 | 38350 |
| Andaman & Nicrobar | 0 | 0 | NR | NR | NR | NR | NR | NR | 0 | 0 |
| Mizoram | 0 | 0 | 0 | 0 | 2 | 32 | 88 | 480 | 1339 | 1544 |
| Total | 176142 | 244688 | 258903 | 264871 | 311607 | 396551 | 444385 | 6E+05 | 9E+05 | 995212 |

Source: Dept. of Agriculture and Cooperation, Note: P-Provisional, NA-Not Available, NR-Not Reported

State-wise production of oil palm fresh fruit bunches under oil palm development programme during 2004-05 to 2013-14 is given in Table 2.10. The total production of major states of India is increased from 176142 tonnes in 2004-05 to 995212 tonnes in 2013-14. There is improvement in production at six times over the period of ten years. Of which Andre Pradesh is leading producer of the FFB compared two major states of India. The state is recorded 78 percent (138929 tonnes) of production during 2004-05, followed by Kerala occupied 17 percent (29940 tonnes) and Karnataka produced of 2.3 percent (4127 tonnes).

During 2013-14, again Andre Pradesh dominated in production. The share of FFB is 94 percent (933981 tonnes) followed by Kerala produced 4 percent (38350 tonnes) and Karnataka occupied by 1 percent (9917 tonnes) and Tamil Nadu produced at 0.56 percent (5495 tonnes). Andre Pradesh is leading producer in FFB. The state is improved it producer of 7 timed over the ten years. Kerala is occupied with little improvement in production at one time. Karnataka and Tamil Nadu are improved their production.

* 1. **Oilseeds Production in Tamil Nadu**

The Department of Agriculture, Government of Tamil Nadu was introduced oil palm crop as alternative crop during 1993-94. The interested farmers are involved in the palm oil cultivation. The farmers are seeking the profit and alternative crops. In Tamil Nadu, the plantations process was started in Thanjavur district during 1997. Large size of plantations of oil palm was done at Aduthurai and Sirugamani Research Station of the Tamil Nadu Agricultural University. The Government of Tamil Nadu has been identified 10 districts as potential for commercial cultivation of palm oil. Tamil Nadu Government has contracted with companies like Ruchi Soya Industires (Chennai), Foods and Fats (Hyderabad), Vaidehi Properties (Kolkata), Godrej Agrovet (Mumbai) and Cauvery Oil Palm (Trichy). These companies are establishing the contract farming with the farmers for cultivation of palm oil. Government of Tamil Nadu has planned to industrials’ the oil palm and increase the profitable ventures. The all the companies are cultivate palm oil to 45,000 ha upto 12th Five Year Plan Period.

The distribution of planting material is one of the subsidy provide by the government. The Government of Tamil Nadu is providing 85 percent subsidy for cultivating the oil palm. In terms of Rs.10, 000 per ha. is provide for entire land holding of the farmer. During the first year, the government is providing 50 percent (Rs. 6000/ha.) subsidy for assistance of cost of cultivation during gestation period. During second year, they also provide maintenance cost at 50 percent (Rs. 3500/ha.). Under the scheme, the farmers are providing 50 percent subsidy for irrigation uses. And they are get Rs. 15,000/ha. at maximum. The farmers are providing 50 percent subsidy for diesel or electric pump set for drip irrigation with 10 HP. They are get maximum at Rs. 10, 000 per pump set. They are providing 50 percent subsidy for inter-cropping inputs in oil pal fields and maximum of Rs.10, 000/ha.

Under the scheme, area under expansion of oil palm coverage in watersheds and wastelands. The scheme is being implemented in districts like Cuddalore, Villupuram, Vellore, Tiruchirapalli, Karur, Perambalur, Ariyalur, Thanjavur, Tiruvarur, Nagapattinam, Theni and Tirunelveli. During 2014-15, oil palm cultivation was taken up in an area of 398 hectares besides providing maintenance support for older plantations. Planting material for intercropping in oil palm fields was provided at subsidized cost. All these activities were carried out at a cost of Rs.1.62 crore. During the year 2015-16 the scheme is proposed to be implemented with the outlay of Rs.4.40 crore (Policy Note 2015-16, Government of Tamil Nadu).

* 1. **Share of Oilseeds in Gross Cropped Area in Tamil Nadu**

After the economic reforms period, the oilseed sector have been given more priority by the policy makers. We are one of the largest importers of edible oils in the world and occupies a prominent position under area and production. Our economy have fourth largest edible oil economy in the world. It is contributing 10 percent of the world oilseeds production. The sector is covering an area of 26.5 million ha. with total production of over 29 million tonnes during TE 2011-12 (Government of India, 2013). This constitutes about 14.8 percent of the gross cropped area in the country. The oilseeds accounted for about 9.8 percent (at 2004-05 prices) of the total value of output from agriculture in TE 2011-12 (Central Statistical Organization, 2013).

The district-wise geographical, cultivable and oilseeds crop area in Tamil Nadu is presented in Table 2.11. The cultivable area of the state to the total geographical area has been decline from 40. 2 percent in TE 2005-06 to 37 percent in TE 2015-16. Of which, Villupuram, Salem, Tiruvarur, Theni, Ramanathapuram and Thoothukudi districts have been increasing slightly cultivable area. Remaining 26 districts are registered decline trends. Kancheepuram, Coimbatore, Erode, Perambalur districts are heavily decline the cultivable area in the state. The main reason behind is urbanization of the district area and commercial encouragement and business development. Remaining districts have maintain slow and up and down movements in the cultivable area among the state economy.

These districts having maintain the regular practice of agricultural activities. The percentage share of oilseeds area to the cultivable area in the state is declining movement from 21 percent in TE 2005-06 to 18 percent in TE 2015-16. Coimbatore, Thanjavur, Theni and Kanniyakumari districts are recorded increasing trends in the cultivation of oilseeds. 28 districts are registered decline trends in these cultivation.

Table 2.11: District wise Geographical, Cultivable and Oilseeds Crop Area in Tamil Nadu (in Hectares)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Geographical Area | Cultivable Area  During | | Percentage Cultivable Area  to Geographical Area | | Area under Oilseed Crops | | Percentage Oilseeds  Area to cultivable area | |
| TE 2005-06 | TE 2015-16 | TE 2005-06 | TE 2015-16 | TE 2005-06 | TE 2015-16 | TE 2005-06 | TE 2015-16 |
| Chennai | 17098 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Kancheepuram | 443210 | 135998 | 85281 | 30.68 | 19.24 | 31220 | 16294 | 22.96 | 19.11 |
| Thiruvallur | 342243 | 115724 | 102768 | 33.81 | 30.03 | 21591 | 9636 | 18.66 | 9.38 |
| Cuddallore | 367781 | 219891 | 219759 | 59.79 | 59.75 | 28000 | 18694 | 12.73 | 8.51 |
| Villupuram | 722203 | 330712 | 337606 | 45.79 | 46.75 | 68478 | 44295 | 20.71 | 13.12 |
| Vellore | 592018 | 209903 | 170522 | 35.46 | 28.80 | 84200 | 60558 | 40.11 | 35.51 |
| Thiruvannamalai | 631205 | 242387 | 186570 | 38.40 | 29.56 | 97611 | 74796 | 40.27 | 40.09 |
| Salem | 520530 | 217446 | 218448 | 41.77 | 41.97 | 48003 | 37937 | 22.08 | 17.37 |
| Namakkal | 336719 | 176544 | 159001 | 52.43 | 47.22 | 57099 | 39970 | 32.34 | 25.14 |
| Dharmapuri | 449777 | 163053 | 150941 | 36.25 | 33.56 | 27237 | 15746 | 16.70 | 10.43 |
| Krishnagiri | 514326 | 182119 | 180902 | 35.41 | 35.17 | 39553 | 29421 | 21.72 | 16.26 |
| Coimbatore | 472322 | 314957 | 173437 | 66.68 | 36.72 | 126592 | 88925 | 40.19 | 51.27 |
| Thiruppur | 519559 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Erode | 572264 | 300982 | 178687 | 52.59 | 31.22 | 82647 | 42892 | 27.46 | 24.00 |
| Tiruchirapalli | 440383 | 191347 | 162226 | 43.45 | 36.84 | 27317 | 17787 | 14.28 | 10.96 |
| Karur | 289557 | 111719 | 87906 | 38.58 | 30.36 | 23907 | 18545 | 21.40 | 21.10 |
| Perambalur | 175739 | 211186 | 105541 | 120.17 | 60.06 | 31598 | 3320 | 14.96 | 3.15 |
| Ariyalur | 193398 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pudukkottai | 466329 | 160231 | 115421 | 34.36 | 24.75 | 31661 | 16873 | 19.76 | 14.62 |
| Thanjavur | 339657 | 192030 | 191598 | 56.54 | 56.41 | 40402 | 47548 | 21.04 | 24.82 |
| Thiruvarur | 209709 | 153227 | 157165 | 73.07 | 74.94 | 9772 | 6823 | 6.38 | 4.34 |
| Nagapatinam | 271583 | 148542 | 149687 | 54.69 | 55.12 | 7108 | 6241 | 4.79 | 4.17 |
| Madurai | 374173 | 153082 | 124496 | 40.91 | 33.27 | 20073 | 15057 | 13.11 | 12.09 |
| Theni | 324230 | 111599 | 112555 | 34.42 | 34.71 | 18935 | 24369 | 16.97 | 21.65 |
| Dindigul | 626664 | 253505 | 229483 | 40.45 | 36.62 | 50174 | 39608 | 19.79 | 17.26 |
| Ramanathapuram | 408957 | 185563 | 198818 | 45.37 | 48.62 | 18407 | 12796 | 9.92 | 6.44 |
| Virudhunagar | 424323 | 142882 | 123831 | 33.67 | 29.18 | 21949 | 18777 | 15.36 | 15.16 |
| Sivagangai | 418900 | 120451 | 95930 | 28.75 | 22.90 | 12398 | 9527 | 10.29 | 9.93 |
| Thirunelveli | 675850 | 166621 | 165753 | 24.65 | 24.53 | 23657 | 19332 | 14.20 | 11.66 |
| Thoothukudi | 470724 | 171815 | 197695 | 36.50 | 42.00 | 13198 | 10801 | 7.68 | 5.46 |
| The Nilgiris | 254485 | 81000 | 74471 | 31.83 | 29.26 | 60 | 84 | 0.07 | 0.11 |
| Kanniyakumari | 167200 | 79323 | 75888 | 47.44 | 45.39 | 24565 | 24402 | 30.97 | 32.16 |
| Tamil Nadu | 13033116 | 5243839 | 4819018 | 40.23 | 36.98 | 1087412 | 848527 | 20.74 | 17.61 |

Source: Seasonal Crop Reports, Various Issues, Government of Tamil Nadu, Chennai

**2.3. Share of Oil Palm Area in Oilseeds in Tamil Nadu**

Among nine oilseed crops in Tamil Nadu, groundnut and sesame are grown over an area of 4.19 lakh ha. The state was covered under the scheme Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize implemented from 2004-05. The area under oil palm is cover 6491 ha. during 2015-16. There is meagre percentage of area cover under the oil palm cultivation as compared with other nine oilseeds crops in Tamil Nadu.

The state planned for 45 lakh MT millets and 9.80 lakh MT pulses in addition to 15.76 lakh MT oilseeds, 6.09 lakh bales of cotton and 350 lakh MT of cane during 2016-17. To ensure additional acreage under various crops, the government undertook measures like “cultivating 12,628 acres fallow lands benefitting 9133 farmers in Villipuram and Tiruvanamalai districts. Ensuring better spacing and uniform plant population to overcome labour shortage (Tharain Mathew, Economic Times, Chennai, 16th September, 2016).

The area under oil palm cultivation is increased under Mini Mission-II of NMOOP in Tamil Nadu. The oil palm cultivation is started from 1993-94 with guidelines from Government of India. The Government of Tamil Nadu has been identified an area of 2.05 lakh ha from 26 districts of Tamil Nadu. The districts are Cuddalore, Karur, Nagapattinam, Perambalur, Thanjavur, Theni, Thoothukudi, Tiruvarur, Thirunelveli, Pudukottai, Sivagangai, Vidudunagar, Trichy, Vellore, Villupuram, Thiruvannamalai, Kanchipuram, Thiruvallur, Dharmapuri, Krishnagiri, Dindugal, Coimbatore, Erode, Thiruppur, Salem and Namakkal of the state. The scheme is implemented in 26 districts of Tamil Nadu. During 2015-16, the area under the scheme are recorded of 29, 510 ha.

* 1. **Area, Production and Yield of Oilseeds in Tamil Nadu**

The area under oilseeds had increased from 6.95 lakhs ha. in 2003-04 to 7.09 lakhs ha. in 2005-06. The oilseeds (groundnut, gingelly, castor and sunflower) production increased from 9.64 lakh tonnes to 11.52 lakh tonnes due to increase in production from 1387 kg/ha. to 1527 kg/ha. in the same period. Among the oilseeds, groundnut is one of the important crop, whose production performance had shown negative growth in majority of the districts. A positive trend in growth of area, production and productivity in groundnut was observed in three, four and five districts respectively. Therefore, before reaching an alarming situation of down trends, strategy planning must aim at increasing growth trend, especially in area and production. A positive growth rate in area, production and productivity of groundnut was observed in the district of Thiruvarur only. Similarly negative growth rate of area, production and productivity was observed in Salem, Coimbatore, Karur and Virudhunagar districts. The positive growth rate of productivity in groundnut was more pronounced in Theni district (7.66 percent) as compared to other districts (State Agriculture Plan, Tamil Nadu Agricultural University, Tamil Nadu, 2009).

The area and production of major crops in Tamil Nadu (area in lakh hectares, production in lakh tones) is furnished in Table. 2.12.The data collected for the period from 1990 to 2015 were taking into consideration of one year average area and production. The area under oilseeds are increased from 13.3 lakh ha. TE1990-91 to 15.1 lakh ha. TE1994-95. The production of oilseeds also increase from 12.7 lakh tonnes to 19.1 lakh tonnes in the same period. Thereafter, the trend has been decline to 9.4 lakh ha. and the production 7.9 lakh tonnes during 2002-03. There is slowly decline in area and production level due to alternative crops occupation. There is slow progress in area as well as production level, the area increase and production increase to 9.7 lakh ha. and 11.4 lakh tonnes during 2006-07. During 2012-13, the trend has been decline to 8.1 lakh ha. and 8.7 lakh tonnes and slow progress to 8.7 lakh ha. and 10 lakh tonnes during 2014-15. There is stagnant growth in area and production level in Tamil Nadu due to shortfall in monsoon and urban encouragement.

The area under oil palm cultivation has been stagnant growth trend for the past one decade in Tamil Nadu. The area under these cropsare decline from 0.019 lakh ha. during 2004-05 to 0.017 lakh ha. during 2006-07. Thereafter, it has decline to 0.014 lakh ha. in 2009-10. During 2011-12, the trend has been increase to 0.021 lakh ha. This period is growth period for expansion of area, after that, it has decline to 0.011 lakh ha. and 0.009 lakh ha. during 2012-13 to 2013-14. There is slow progress in area under oil palm cultivation. It is slow expansion of area in the state.

Table 2.12: Area and Production of Major Crops in Tamil Nadu: (Area in Lakh Hectares, Production in Lakh Tones)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | Rice | | Coarse cereals | | Pulses | | Foodgrains | | Oilseeds | | Hort. crops | | Palm Oil | |
| Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. |
| TE 90-91 | 18.6 | 57.8 | 30.4 | 71.4 | 8.5 | 3.6 | 38.9 | 75.0 | 13.3 | 12.7 | 6.0 | 52.2 | 0.00 | 0.00 |
| TE 91-92 | 21.2 | 66.0 | 32.1 | 79.1 | 7.8 | 3.5 | 39.9 | 82.7 | 14.9 | 16.2 | 6.3 | 59.9 | 0.00 | 0.00 |
| TE 92-93 | 21.8 | 68.1 | 32.1 | 80.2 | 7.4 | 3.4 | 39.5 | 83.6 | 15.8 | 18.9 | 6.8 | 56.8 | 0.00 | 0.00 |
| TE 93-94 | 23.1 | 67.5 | 33.4 | 79.8 | 6.9 | 2.8 | 40.3 | 82.6 | 15.7 | 20.0 | 7.2 | 69.3 | 0.00 | 0.00 |
| TE 94-95 | 22.3 | 75.6 | 31.6 | 87.4 | 6.9 | 3.4 | 38.5 | 90.8 | 15.1 | 19.1 | 7.2 | 81.0 | 0.00 | 0.00 |
| TE 95-96 | 19.5 | 52.9 | 27.6 | 61.7 | 5.8 | 2.3 | 33.4 | 64.1 | 13.3 | 16.3 | 6.9 | 76.6 | 0.00 | 0.00 |
| TE 96-97 | 21.7 | 58.1 | 29.8 | 67.0 | 5.8 | 2.3 | 35.6 | 69.3 | 13.0 | 15.5 | 7.2 | 69.2 | 0.00 | 0.00 |
| TE 97-98 | 22.6 | 68.9 | 30.5 | 78.6 | 5.9 | 2.4 | 36.4 | 81.0 | 12.7 | 15.2 | 7.6 | 91.6 | 0.00 | 0.00 |
| TE 98-99 | 22.7 | 81.4 | 30.4 | 91.1 | 6.4 | 3.0 | 36.8 | 94.1 | 12.8 | 16.8 | 7.9 | 76.8 | 0.00 | 0.00 |
| TE 99-00 | 21.6 | 75.3 | 29.4 | 85.5 | 6.9 | 2.9 | 36.3 | 88.4 | 12.2 | 14.4 | 7.3 | 74.8 | 0.00 | 0.00 |
| TE 00-01 | 20.8 | 73.7 | 28.1 | 83.0 | 6.9 | 3.1 | 35.0 | 86.2 | 11.6 | 14.7 | 8.5 | 86.8 | 0.00 | 0.00 |
| TE 01-02 | 20.6 | 65.8 | 27.7 | 74.2 | 6.9 | 2.7 | 34.5 | 76.9 | 11.1 | 13.5 | 8.5 | 88.3 | 0.00 | 0.00 |
| TE 02-03 | 15.2 | 35.8 | 22.3 | 42.6 | 5.6 | 2.0 | 27.9 | 44.6 | 9.4 | 7.9 | 7.8 | 62.6 | 0.00 | 0.00 |
| TE 03-04 | 14.0 | 32.2 | 23.0 | 41.1 | 5.4 | 2.0 | 28.4 | 43.1 | 10.5 | 9.9 | 8.2 | 68.7 | 0.00 | 0.00 |
| TE 04-05 | 18.7 | 50.6 | 27.0 | 59.3 | 5.9 | 2.2 | 32.9 | 61.5 | 10.7 | 11.0 | 8.6 | 92.3 | 0.019 | 0.00 |
| TE 05-06 | 20.5 | 52.1 | 27.9 | 59.4 | 5.3 | 1.8 | 33.2 | 61.2 | 10.8 | 12.0 | 8.9 | 107.0 | 0.023 | 0.00 |
| TE 06-07 | 19.3 | 66.1 | 26.3 | 79.7 | 5.4 | 2.9 | 31.7 | 82.6 | 9.7 | 11.4 | 9.2 | 122.0 | 0.017 | 0.00 |
| TE 07-08 | 17.9 | 50.4 | 24.9 | 64.0 | 6.1 | 1.8 | 31.0 | 65.8 | 10.4 | 12.1 | 9.3 | 127.0 | 0.018 | 0.00 |
| TE 08-09 | 19.3 | 51.8 | 26.6 | 69.3 | 5.4 | 1.7 | 31.9 | 71.0 | 9.7 | 11.0 | 9.9 | 110.6 | 0.019 | 0.00 |
| TE 09-10 | 18.5 | 56.7 | 25.0 | 73.0 | 5.4 | 2.0 | 30.3 | 75.0 | 9.0 | 10.0 | 9.2 | 103.6 | 0.014 | 0.00 |
| TE 10-11 | 19.1 | 57.9 | 25.4 | 71.5 | 6.4 | 2.5 | 31.7 | 75.9 | 8.4 | 9.9 | 9.4 | 107.0 | 0.021 | 0.00 |
| TE 11-12 | 19.0 | 74.6 | 25.4 | 69.5 | 6.7 | 3.5 | 32.1 | 101.5 | 8.7 | 11.8 | 10.0 | 152.6 | 0.021 | 0.00 |
| TE 12-13 | 14.9 | 40.5 | 21.3 | 69.5 | 5.1 | 2.1 | 26.5 | 56.1 | 8.1 | 8.7 | 10.8 | 174.0 | 0.011 | 0.00 |
| TE 13-14 | 17.3 | 71.2 | 26.6 | 103.9 | 8.2 | 6.1 | 34.7 | 110.0 | 8.4 | 9.5 | 11.5 | 191.3 | 0.009 | 0.00 |
| TE 14-15 | 17.9 | 79.5 | 27.2 | 120.3 | 8.8 | 7.7 | 36.1 | 128.0 | 8.7 | 10.0 | 10.8 | 172.6 | 0.011 | 0.00 |

* 1. **Area, Production and Yield of Oil Palm in Tamil Nadu**

Area under oil palm development programme in Tamil Nadu is presented in Table 2.13. The area under oil palm is gradually increased over a period in Tamil Nadu. The area under Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize is increased from 1907 ha. in 2004-05 to 2053 ha. in 2010-11. After 2011-12, the scheme is divided into ISOPOM and NADP in Tamil Nadu. During 2014-15, National Mission for Oilseeds and Oil Palm is started. The area under NMOOP is increased from 1106 ha in 2014-15 to 1348 ha. in 2015-16. The productivity of palm oil is increased from 4697 kg/ha. in 2011-12 to 7810 kg/ha. in 2015-16. The productivity of the oil is increased to 40 percent over the five years in Tamil Nadu. There is significant growth in productivity in Tamil Nadu.

Table 2.13: Area under Oil Palm Development Programme in Tamil Nadu

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | Scheme | Expenditure | Area in Ha. | Productivity |
| 2004-05 | ISOPOM | 212.64 | 1907 |  |
| 2005-06 | ISOPOM | 312.13 | 2291 |  |
| 2006-07 | ISOPOM | 355.84 | 1746 |  |
| 2007-08 | ISOPOM | 440.64 | 1805 |  |
| 2008-09 | ISOPOM | 349.30 | 1937 |  |
| 2009-10 | ISOPOM | 315.43 | 1380 |  |
| 2010-11 | ISOPOM | 398.17 | 2053 |  |
| 2011-12 | ISOPOM  NADP | 123.87  709.53 | 2133 | 4697 |
| 2012-13 | ISOPOM  NADP | 113.50  343.32 | 1084 | 5221 |
| 2013-14 | ISOPOM  NADP | 89.90  555.71 | 927 | 5463 |
| 2014-15 | NMOOP | 161.84 | 1106 | 6568 |
| 2015-16 | NMOOP | 175.48 | 1348 | 7810 |

Source: Directorate of Agriculture, Government of Tamil Nadu, Chennai-05

* 1. **District wise Cropping Pattern in Tamil Nadu**

The major crops are cultivated in the state cover food and non-food crops. The food crops like paddy,millets, pulses and oilseeds and non-food crops like cotton and sugarcane. Paddy is cultivated in almost all the districts of the state. The growthrate of area during 1970-2006 was positive only in two districts namely Tiruvannamalai andVirudhunagar. In all other 27 districts the trend was negative. The growth rate ofproductivity was found to be positive in 21 districts and negative in eight districts. Similarly, the production trend was positive in eight districts of Thiruvannamalai, Dharmapuri, Pudukottai, Sivaganagi, Virudhunagar, Kanyakumari, Tirunelveli and Thoothukudi. Thestrategy must be to increase production through productivity increase in all thedistricts of Tamil Nadu (State Agriculture Plan, Tamil Nadu Agricultural University, Tamil Nadu, 2009).

Pulse is cultivated invariably in all the districts, with the exception of theNilgiris, in Tamil Nadu. Majority of the districts experienced negative growthtrends regarding area and production. More than half of the districts in Tamil Naduhad positive productivity growth. It implies that the excessive moisture the unusualcontinuous rain and flooding devastate the entire rice-fallow pulses once in 3 or4 years, reducing production drastically.The area and production of cotton has been dwindling to thealarming level especially in Coimbatore, Salem, Erode, and Theni districts. Sugarcane is an important industrial crop grown in more than 26 districts inTamil Nadu. The growth was quite convincing withpositive trend in more than 15 districts (State Agriculture Plan, Tamil Nadu Agricultural University, Tamil Nadu, 2009).

The area and production of major crops at districts level in Tamil Nadu (TE 2005-06) (area in lakh ha., production in lakh tonnes) is presented in Table 2.14. The area under oilseeds and production in Tamil Nadu as total is 6.19 lakh ha. and 10.66 lakh tonnes during 2005-06. Of that, Thiruvannamalai, Vellore and Villupuram districts are recorded highest area and production during that period. On the contrary, Thoottukudi, Theni, Thiruvar and Karur districts are recorded lowest area and production. It is implies that the all these districts are positive growth rate at area and production level except Ariyalur, The Nilgiris and Thiruppur.

The area and production under total foodgrains in the state is shown as 33.17 lakh ha. and 61.16 lakh tonnes during 2005-06. Among the districts, Nagapattinam, Thiruvarur, Villupuram, Thanjavur and Cuddalore are the leading districts in area cultivation and production level in the period. On the other hand, The Nilgiris, Kanniyakumari and Theni districts are recorded the least level of area cultivation and production level.

Table 2.14: Area and Production of Major Crops at Districts level in Tamil Nadu (TE 2005-06) (Area in Lakh Hectares, Production in Lakh Tones)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name of the Districts | Rice | | Coarse cereals | | Pulses | | Foodgrains | | Oilseeds | | Palm Oil | |
| Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. |
| Kancheepuram | 1.15 | 2.94 | 1.15 | 2.95 | 0.049 | 0.027 | 1.20 | 2.98 | 0.24 | 0.76 | 0.00 | 0.00 |
| Thiruvallur | 0.97 | 2.72 | 0.99 | 2.74 | 0.124 | 0.066 | 1.11 | 2.81 | 0.18 | 0.66 | 0.00 | 0.00 |
| Cuddallore | 1.14 | 2.18 | 1.27 | 2.34 | 0.260 | 0.090 | 1.53 | 2.43 | 0.21 | 0.62 | 0.00 | 0.00 |
| Villupuram | 1.68 | 5.12 | 1.89 | 5.31 | 0.215 | 0.104 | 2.11 | 5.42 | 0.58 | 1.21 | 0.00 | 0.00 |
| Vellore | 0.58 | 1.67 | 0.82 | 1.98 | 0.201 | 0.067 | 1.02 | 2.05 | 0.60 | 0.78 | 0.00 | 0.00 |
| Thiruvannamalai | 1.43 | 3.94 | 1.56 | 4.03 | 0.084 | 0.027 | 1.65 | 4.06 | 0.95 | 1.31 | 0.00 | 0.00 |
| Salem | 0.37 | 1.37 | 0.82 | 1.95 | 0.117 | 0.046 | 0.94 | 1.99 | 0.32 | 0.48 | 0.00 | 0.00 |
| Namakkal | 0.19 | 0.69 | 0.52 | 1.02 | 0.070 | 0.049 | 0.59 | 1.07 | 0.48 | 0.76 | 0.00 | 0.00 |
| Dharmapuri | 0.29 | 0.85 | 0.77 | 1.39 | 0.241 | 0.107 | 1.01 | 1.49 | 0.17 | 0.41 | 0.00 | 0.00 |
| Krishnagiri | 0.22 | 0.58 | 0.79 | 1.19 | 0.268 | 0.064 | 1.06 | 1.25 | 0.22 | 0.26 | 0.00 | 0.00 |
| Coimbatore | 0.07 | 0.21 | 1.07 | 0.76 | 0.281 | 0.110 | 1.35 | 0.87 | 0.23 | 0.23 | 0.00 | 0.00 |
| Thiruppur | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Erode | 0.44 | 1.80 | 0.67 | 2.06 | 0.192 | 0.085 | 0.87 | 2.14 | 0.47 | 0.72 | 0.00 | 0.00 |
| Tiruchirapalli | 0.80 | 2.37 | 1.27 | 2.63 | 0.057 | 0.018 | 1.33 | 2.64 | 0.17 | 0.28 | 0.001 | 0.00 |
| Karur | 0.18 | 0.48 | 0.45 | 0.56 | 0.079 | 0.023 | 0.53 | 0.59 | 0.09 | 0.15 | 0.00 | 0.00 |
| Perambalur | 0.46 | 1.15 | 1.17 | 1.89 | 0.018 | 0.007 | 1.19 | 1.90 | 0.27 | 0.48 | 0.004 | 0.00 |
| Ariyalur | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pudukkottai | 0.96 | 2.33 | 0.98 | 2.34 | 0.027 | 0.011 | 1.01 | 2.35 | 0.25 | 0.36 | 0.00 | 0.00 |
| Thanjavur | 1.55 | 3.99 | 1.55 | 4.00 | 0.164 | 0.056 | 1.72 | 4.06 | 0.07 | 0.15 | 0.003 | 0.00 |
| Thiruvarur | 1.56 | 2.43 | 1.56 | 2.43 | 0.653 | 0.116 | 2.21 | 2.55 | 0.02 | 0.04 | 0.002 | 0.00 |
| Nagapatinam | 1.58 | 1.37 | 1.58 | 1.37 | 0.650 | 0.127 | 2.23 | 1.49 | 0.03 | 0.06 | 0.003 | 0.00 |
| Madurai | 0.71 | 2.34 | 0.94 | 2.58 | 0.096 | 0.053 | 1.03 | 2.64 | 0.07 | 0.11 | 0.00 | 0.00 |
| Theni | 0.16 | 0.65 | 0.40 | 1.07 | 0.085 | 0.043 | 0.49 | 1.11 | 0.03 | 0.06 | 0.00 | 0.00 |
| Dindigul | 0.24 | 0.75 | 1.05 | 1.58 | 0.271 | 0.085 | 1.32 | 1.67 | 0.22 | 0.36 | 0.00 | 0.00 |
| Ramanathapuram | 1.27 | 2.47 | 1.34 | 2.50 | 0.027 | 0.007 | 1.37 | 2.51 | 0.08 | 0.11 | 0.00 | 0.00 |
| Virudhunagar | 0.31 | 0.98 | 0.59 | 1.29 | 0.205 | 0.067 | 0.80 | 1.36 | 0.09 | 0.09 | 0.00 | 0.00 |
| Sivagangai | 0.90 | 1.93 | 0.90 | 1.93 | 0.009 | 0.003 | 0.91 | 1.94 | 0.06 | 0.10 | 0.00 | 0.00 |
| Thirunelveli | 0.86 | 3.09 | 0.98 | 3.31 | 0.318 | 0.127 | 1.30 | 3.43 | 0.05 | 0.08 | 0.00 | 0.00 |
| Thoothukudi | 0.20 | 0.82 | 0.57 | 1.30 | 0.473 | 0.183 | 1.04 | 1.49 | 0.02 | 0.04 | 0.00 | 0.00 |
| The Nilgiris | 0.01 | 0.05 | 0.01 | 0.05 | 0 | 0 | 0.01 | 0.05 | 0 | 0.0001 | 0.00 | 0.00 |
| Kanniyakumari | 0.22 | 0.83 | 0.22 | 0.83 | 0.019 | 0.003 | 0.24 | 0.83 | 0.0002 | 0.0007 | 0.00 | 0.00 |
| Tamil Nadu | 20.50 | 52.09 | 27.91 | 59.39 | 5.252 | 1.770 | 33.17 | 61.16 | 6.19 | 10.66 | 0.013 | 0.00 |

Table 2.15: Area and Production of Major Crops at Districts level in Tamil Nadu (TE 2015-16) (Area in Lakh Hectares, Production in Lakh Tones)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name of the Districts | Rice | | Coarse Cereals | | Pulses | | Food-grains | | Oilseeds | | Palm Oil | |
| Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. |
| Kancheepuram | 0.62 | 2.90 | 0.62 | 2.91 | 0.02 | 0.02 | 0.64 | 2.93 | 0.16 | 0.42 | 0.0004 | 0.00 |
| Thiruvallur | 0.96 | 4.26 | 0.99 | 4.38 | 0.13 | 0.14 | 1.12 | 4.52 | 0.10 | 0.35 | 0.0002 | 0.00 |
| Cuddallore | 1.35 | 6.42 | 1.64 | 8.24 | 0.66 | 0.75 | 2.30 | 8.98 | 0.19 | 0.56 | 0.0139 | 0.00 |
| Villupuram | 1.71 | 8.33 | 2.17 | 10.65 | 0.73 | 0.80 | 2.89 | 11.45 | 0.44 | 1.12 | 0.0177 | 0.00 |
| Vellore | 0.37 | 1.95 | 0.62 | 3.04 | 0.33 | 0.40 | 0.95 | 3.44 | 0.61 | 1.07 | 0.0080 | 0.00 |
| Thiruvannamalai | 0.93 | 4.39 | 1.13 | 5.06 | 0.28 | 0.21 | 1.41 | 5.26 | 0.75 | 1.73 | 0.0017 | 0.00 |
| Salem | 0.19 | 1.03 | 1.17 | 6.13 | 0.55 | 0.41 | 1.72 | 6.54 | 0.38 | 0.53 | 0.0010 | 0.00 |
| Namakkal | 0.10 | 0.53 | 1.08 | 3.07 | 0.17 | 0.12 | 1.25 | 3.19 | 0.40 | 0.65 | 0.0002 | 0.00 |
| Dharmapuri | 0.18 | 0.95 | 0.82 | 3.27 | 0.57 | 0.46 | 1.40 | 3.73 | 0.16 | 0.25 | 0.0003 | 0.00 |
| Krishnagiri | 0.19 | 0.94 | 0.71 | 2.64 | 0.52 | 0.39 | 1.24 | 3.03 | 0.29 | 0.29 | 0.0002 | 0.00 |
| Coimbatore | 0.02 | 0.10 | 0.35 | 0.85 | 0.10 | 0.07 | 0.45 | 0.92 | 0.89 | 0.19 | 0.0007 | 0.00 |
| Thiruppur | 0.11 | 0.62 | 0.71 | 2.33 | 0.21 | 0.12 | 0.92 | 2.45 | 0.67 | 0.24 | 0.0006 | 0.00 |
| Erode | 0.37 | 1.77 | 0.63 | 3.22 | 0.05 | 0.05 | 0.68 | 3.27 | 0.43 | 0.46 | 0.0007 | 0.00 |
| Tiruchirapalli | 0.51 | 2.40 | 0.95 | 3.76 | 0.14 | 0.12 | 1.09 | 3.88 | 0.18 | 0.24 | 0.0018 | 0.00 |
| Karur | 0.13 | 0.69 | 0.42 | 1.36 | 0.16 | 0.13 | 0.58 | 1.49 | 0.19 | 0.19 | 0.0015 | 0.00 |
| Perambalur | 0.09 | 0.43 | 0.48 | 4.54 | 0.02 | 0.02 | 0.50 | 4.56 | 0.03 | 0.05 | 0.0023 | 0.00 |
| Ariyalur | 0.23 | 1.16 | 0.40 | 2.64 | 0.04 | 0.04 | 0.44 | 2.68 | 0.11 | 0.40 | 0.0021 | 0.00 |
| Pudukkottai | 0.67 | 2.79 | 0.74 | 3.26 | 0.05 | 0.05 | 0.79 | 3.30 | 0.17 | 0.21 | 0.0002 | 0.00 |
| Thanjavur | 1.78 | 6.96 | 1.79 | 7.07 | 0.24 | 0.12 | 2.03 | 7.19 | 0.48 | 0.25 | 0.0062 | 0.00 |
| Thiruvarur | 1.93 | 8.53 | 1.93 | 8.53 | 1.21 | 0.90 | 3.14 | 9.43 | 0.07 | 0.09 | 0.0023 | 0.00 |
| Nagapatinam | 1.59 | 5.80 | 1.60 | 5.80 | 0.85 | 0.52 | 2.45 | 6.32 | 0.06 | 0.06 | 0.0021 | 0.00 |
| Madurai | 0.48 | 1.97 | 0.77 | 2.97 | 0.10 | 0.07 | 0.87 | 3.04 | 0.15 | 0.08 | 0.0000 | 0.00 |
| Theni | 0.14 | 0.72 | 0.33 | 1.92 | 0.14 | 0.10 | 0.48 | 2.02 | 0.24 | 0.10 | 0.0013 | 0.00 |
| Dindigul | 0.12 | 0.71 | 0.94 | 4.21 | 0.29 | 0.19 | 1.23 | 4.40 | 0.40 | 0.35 | 0.0005 | 0.00 |
| Ramanathapuram | 1.17 | 4.23 | 1.24 | 4.43 | 0.04 | 0.03 | 1.28 | 4.46 | 0.13 | 0.08 | 0 | 0.00 |
| Virudhunagar | 0.20 | 0.81 | 0.60 | 3.12 | 0.11 | 0.09 | 0.71 | 3.20 | 0.19 | 0.14 | 0 | 0.00 |
| Sivagangai | 0.65 | 2.25 | 0.66 | 2.29 | 0.01 | 0.01 | 0.67 | 2.30 | 0.10 | 0.04 | 0.0001 | 0.00 |
| Thirunelveli | 0.85 | 4.33 | 0.96 | 5.29 | 0.33 | 0.56 | 1.29 | 5.85 | 0.19 | 0.08 | 0.0024 | 0.00 |
| Thoothukudi | 0.16 | 0.84 | 0.63 | 2.64 | 0.77 | 0.77 | 1.40 | 3.42 | 0.11 | 0.06 | 0.0003 | 0.00 |
| The Nilgiris | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 |
| Kanniyakumari | 0.13 | 0.67 | 0.13 | 0.67 | 0.01 | 0.01 | 0.14 | 0.68 | 0.24 | 0.06 | 0 | 0.00 |
| Tamil Nadu | 17.95 | 79.49 | 27.22 | 120.28 | 8.84 | 7.67 | 36.06 | 127.95 | 8.49 | 10.34 | 0.068 | 0.00 |

Table 2.16:Average Annual Growth Rate in Area and Yield of Horticultural Crops at Districts level in Tamil Nadu from TE 2005-06 to TE 2015-16 (%)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name of the Districts | Rice | | Coarse cereals | | Pulses | | Foodgrains | | Oilseeds | | Palm Oil | |
| Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. | Area | Prodn. |
| Kancheepuram | -0.06 | 0.01 | -0.06 | 0.01 | 0.23 | 0.64 | -0.06 | 0.01 | -0.04 |  |  | 0.00 |
| Thiruvallur | 0.00 | 0.07 | 0.005 | 0.07 | 0.07 | 0.20 | 0.01 | 0.07 | -0.06 |  |  | 0.00 |
| Cuddallore | 0.02 | 0.19 | 0.03 | 0.22 | 0.14 | 0.39 | 0.05 | 0.22 | 0.00 |  |  | 0.00 |
| Villupuram | 0.01 | 0.09 | 0.04 | 0.14 | 0.23 | 0.68 | 0.06 | 0.15 | -0.01 |  |  | 0.00 |
| Vellore | -0.04 | 0.03 | -0.02 | 0.07 | 0.06 | 0.28 | -0.001 | 0.08 | 0.01 |  |  | 0.00 |
| Thiruvannamalai | -0.04 | 0.02 | -0.03 | 0.03 | 0.22 | 0.40 | -0.01 | 0.04 | 0.00 |  |  | 0.00 |
| Salem | -0.01 | 0.06 | 0.07 | 0.21 | 0.26 | 0.46 | 0.10 | 0.22 | 0.03 |  |  | 0.00 |
| Namakkal | -0.01 | 0.08 | 0.21 | 0.26 | 0.18 | 0.33 | 0.19 | 0.26 | -0.01 |  |  | 0.00 |
| Dharmapuri | 0.04 | 0.12 | 0.08 | 0.27 | 0.24 | 0.39 | 0.10 | 0.26 | 0.04 |  |  | 0.00 |
| Krishnagiri | 0.02 | 0.11 | 0.00 | 0.16 | 0.09 | 0.30 | 0.03 | 0.16 | 0.06 |  |  | 0.00 |
| Coimbatore | -0.10 | -0.03 | -0.02 | 0.29 | -0.08 | 0.01 | -0.03 | 0.26 | 0.62 |  |  | 0.00 |
| Thiruppur | 3.23 | 0.63 | 0.19 | 0.51 | 0.01 | 0.12 | 0.14 | 0.06 | 1.76 |  |  | 0.00 |
| Erode | 0.31 | 0.41 | 0.06 | 0.18 | -0.06 | 0.13 | 0.04 | 0.18 | 0.02 |  |  | 0.00 |
| Tiruchirapalli | -0.04 | 0.05 | -0.02 | 0.10 | 0.33 | 0.97 | -0.01 | 0.10 | 0.02 |  |  | 0.00 |
| Karur | -0.02 | 0.10 | 0.03 | 0.15 | 0.20 | 0.49 | 0.05 | 0.16 | 0.28 |  |  | 0.00 |
| Perambalur | -0.12 | -0.05 | -0.05 | 0.33 | 0.30 | 1.32 | -0.05 | 0.33 | 0.46 |  |  | 0.00 |
| Ariyalur | 0.18 | 0.51 | 0.09 | 0.80 | 0.17 | 0.41 | 0.10 | 0.19 | 0.08 |  |  | 0.00 |
| Pudukkottai | -0.04 | 0.13 | -0.03 | 0.11 | 0.24 | 0.58 | -0.03 | 0.11 | -0.03 |  |  | 0.00 |
| Thanjavur | 0.02 | 0.14 | 0.02 | 0.14 | 0.16 | 0.43 | 0.03 | 0.14 | 0.56 |  |  | 0.00 |
| Thiruvarur | 0.03 | 0.65 | 0.03 | 0.60 | 0.35 | 1.17 | 0.06 | 0.63 | 0.56 |  |  | 0.00 |
| Nagapatinam | 0.00 | 0.62 | 0.005 | 0.62 | 0.06 | 0.92 | 0.02 | 0.62 | 0.17 |  |  | 0.00 |
| Madurai | 0.06 | 0.15 | 0.04 | 0.17 | 0.03 | 0.13 | 0.03 | 0.16 | 0.22 |  |  | 0.00 |
| Theni | 0.00 | 0.04 | -0.01 | 0.10 | 0.09 | 0.25 | 0.01 | 0.10 | 1.06 |  |  | 0.00 |
| Dindigul | 0.07 | 0.14 | 0.00 | 0.20 | 0.02 | 0.18 | 0.01 | 0.20 | 0.22 |  |  | 0.00 |
| Ramanathapuram | -0.01 | 1.77 | -0.01 | 1.40 | 0.05 | 0.56 | -0.01 | 1.37 | 0.10 |  |  | 0.00 |
| Virudhunagar | 0.09 | 0.05 | 0.004 | 0.24 | -0.04 | 0.33 | -0.01 | 0.24 | 0.14 |  |  | 0.00 |
| Sivagangai | 0.12 | 0.51 | -0.03 | 0.42 | 0.10 | 0.44 | -0.03 | 0.41 | 0.14 |  |  | 0.00 |
| Thirunelveli | 0.03 | 0.19 | 0.02 | 0.13 | 0.03 | 0.59 | 0.02 | 0.14 | 0.57 |  |  | 0.00 |
| Thoothukudi | 0.06 | 0.15 | 0.03 | 0.24 | 0.07 | 0.79 | 0.04 | 0.25 | 0.64 |  |  | 0.00 |
| The Nilgiris | 6.53 | 8.29 | -0.17 | -0.14 | -0.30 | -0.30 | -0.17 | -0.14 | 7.17 |  |  | 0.00 |
| Kanniyakumari | 9.48 | 13.16 | -0.05 | -0.01 | 0.14 | 0.82 | -0.04 | -0.01 | 123.56 |  |  | 0.00 |
| TN | -0.01 | 0.10 | 0.003 | 0.14 | 0.08 | 0.33 | 0.02 | 0.15 | 0.06 |  |  | 0.00 |

The area and production of major crops at districts level in Tamil Nadu (TE 2015-16) (area in lakh hectares, production in lakh tones) is furnished in Table 2.15. The area under oilseeds and production in Tamil Nadu are shown in 8.49 lakh ha. and 10.34 lakh tonnes during 2015-16. The comparative analysis between 2005-06 and 2015-16, the area is expended to 2 lakh ha. But the production level is remain the same as compare previous decade. The area is expanded by the government of Tamil Nadu with effective manner. There is very hot season without any rainfall all these districts in Tamil Nadu. All these districts are affected with heavy water failure as well as lack plantation. Among the districts, Coimbatore, Thiruvannamalai and Vellore districts are the leading districts in area cultivation as well as production. The production in Coimbatore is very meagre level due to very dry conditions. On the contrary, Perambalur, Nagapattinam and Thiruvallur districts are recorded lowest area cultivation as well as production level.

During 2015-16, the total area under foodgrains and production is shown as 36.06 lakh ha. and 127.95 lakh tonnes. There is small increase in area cultivation leading mount amount of increased in production in the state due to the effective implementation of schemes like NFSM, NMOOP. Among the districts, Tiruvarur, Villupuram, Nagapattinam, Cudallore, Thanjavur and Salem are leading districts in area under foodgrains and production. These six districts are occupy the largest area and production in Tamil Nadu. On the contrary, Nilgiris and Kanniyakumari are lowest area under cultivation and production. The area under cereals and production level is seen s 27.22 lakh ha. and 120.28 lakh tonnes in the period. Vilupuram, Thiruvarur, Thanjavur and Nagapattinam districts are leading producing state in area cultivation and production of cereals.

District-wise area covered under oil palm in Tamil Nadu is presented in Table 2.17. During 1993-94, four districts were cultivating the oil palm in Tamil Nadu. Districts like Trichirapalli (744 ha.), Nagapattinam (502 ha.), Thanjavur (425 ha.) and Tiruvarur (304 ha.) were cultivate the crop. During 2012-13, 17 districts were cultivating the crop. The area expansion under the scheme is increased from 4 in 1993-94 to 25 districts in 2015-16. Villupuram is the highest district in area expansion. Cuddalore is the second top district and Vellore district is third highest area occupied. Thanjavur is the fourth highest district. It is implies that the area expansion is because subsidy provide by the government and private companies worked towards in-depth manner in the area. On the other hand, Sivagangai, Thiruvallore, Krishnagiri, Pudukottai and Virudhunagar districts are occupied with lowest sizable area in Tamil Nadu during 2015-16. These district’s farmers are not interested to cultivate the oil palm crop is because of regular cultivation of crops in their farm field. Even though, Government of Tamil Nadu, other private companies are involved in the area expansion in the state of Tamil Nadu.

Table 2.17: District-wise Area covered under Oil Palm in Tamil Nadu (Area in ha.)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name of the District | 1993-94 | 1997-98 | 2002-03 | 2005-06 | 2012-13 | 2013-14 | 2015-16 |
| Thanjavur | 425 | 774 | 5 | 330 | 470 | 431 | 615 |
| Thiruvarur | 304 |  |  | 210 | 550 | 298 | 232 |
| Nagapattinam | 502 | 212 |  | 270 | 116 | 80 | 206 |
| Ariyalur |  |  |  |  | 86 | 102 | 206 |
| Perambalur |  | 335 | 461 | 363 | 73 | 88 | 226 |
| Tiruchirapalli | 744 | 358 | 102 | 113 | 97 | 95 | 184 |
| Karur |  | 90 | 2 | 15 | 36 | 78 | 148 |
| Cuddalore |  |  |  |  | 220 | 256 | 1394 |
| Villupuram |  |  |  |  | 520 | 477 | 1772 |
| Tirunelveli |  |  |  |  | 149 | 154 | 241 |
| Virudhunagar |  |  |  |  | 0 | 13 | 26 |
| Pudukkottai |  |  |  |  | 1 | 18 | 20 |
| Sivaganagai |  |  |  |  | 0 | 4 | 10 |
| Dindugal |  |  |  |  | 2 | 7 | 51 |
| Erode |  |  |  |  | 0 | 13 | 68 |
| Namakkal |  |  |  |  | 0 | 2 | 18 |
| Salem |  |  |  |  | 1 | 39 | 97 |
| Theni |  |  |  |  | 191 | 167 | 130 |
| Tiruppur |  |  |  |  | 0 | 7 | 55 |
| Coimbatore |  |  |  |  | 4 | 0 | 65 |
| Vellore |  |  |  |  | 69 | 37 | 801 |
| Thiruvannamalai |  |  |  |  | 0 | 22 | 170 |
| Kanchipuram |  |  |  |  | 0 | 3 | 42 |
| Thiruvallur |  |  |  |  | 0 | 3 | 17 |
| Krishnagiri |  |  |  |  | 3 | 0 | 17 |
| Dharmapuri |  |  |  |  | 0 | 19 | 30 |
| Total | 1672 | 2073 | 570 | 1301 | 2588 | 2416 | 6841 |

Source: Directorate of Agriculture, Government of Tamil Nadu, Chennai-05

District-wise area under oil palm in Tamil Nadu during 2015-16 is given in Table 2.18. The Government of Tamil Nadu have been identified some of the area is 1, 82,500 ha. uses for cultivation oil palm in Tamil Nadu. The Government of Tamil Nadu have been identified some of the districts like Thanjavur, Cuddalore, Tirunelveli and Theni. These districts are highly potential area expansion upto 25, 000 ha. in future course of time. Followed by Villupuram district is highest potential area (20,000 ha.) for expansion of oil palm. On the other hand, Karur and Trichirapalli districts are occupying lowest potential area expansion. Some of districts like Virudhunagar, Pudukottai, Sivaganagai, Dindugal, Erode, Namakkal, Salem, Thirupur, Coimbatore, Thiruvannamalai, Kanchipuram, Krishnagiri and Dharmapuri are not potential identified.

Table 2.18: District-wise Area under Oil Palm in Tamil Nadu: 2015-16

|  |  |  |
| --- | --- | --- |
| Name of the District | Area in Ha. | Potential Area Identified |
| Thanjavur | 614.68 | 25000 |
| Thiruvarur | 232.35 | 15000 |
| Nagapattinam | 206.30 | 10000 |
| Ariyalur | 205.72 |  |
| Perambalur | 225.51 | 8000 |
| Tiruchirapalli | 183.38 | 2500 |
| Karur | 147.92 | 1000 |
| Cuddalore | 1393.65 | 25000 |
| Villupuram | 1771.76 | 20000 |
| Tirunelveli | 241.29 | 25000 |
| Virudhunagar | 25.50 |  |
| Pudukkottai | 20.30 |  |
| Sivaganagai | 9.80 |  |
| Dindugal | 51.0 |  |
| Erode | 68.0 |  |
| Namakkal | 17.59 |  |
| Salem | 97.0 |  |
| Theni | 130.0 | 25000 |
| Tiruppur | 55.0 |  |
| Coimbatore | 65.0 |  |
| Vellore | 800.95 | 11000 |
| Thiruvannamalai | 170.0 |  |
| Kanchipuram | 42.20 |  |
| Thiruvallur | 17.0 | 15000 |
| Krishnagiri | 16.50 |  |
| Dharmapuri | 29.50 |  |
| Total | 6837.90 | 182500 |

Source: Directorate of Agriculture, Government of Tamil Nadu, Chennai-05

**Summary**

The area covered is increased from 62730 ha. during Ninth Five Year Plan period to 81270 ha. during Eleventh Five Year Plan. The total area cultivation during the three plan period is 191070 ha. The area under palm oil cultivation is increased mount amount of twenty two times during the past two decades in India. Andre Pradesh, Karnataka and Tamil Nadu are registered top states and rising trends in area cultivation. There is significant growth trend during the implementation of the scheme. On the other hand, Kerala, Maharashtra states are recorded decline the area under the cultivation. But Mizoram is recorded enough growth trends during that period. Kerala, Maharashtra states are withdrawn of the scheme. The two states are not interested to implement the scheme due to decline in area cultivation.

The total production of major states of India is increased from 176142 tonnes in 2004-05 to 995212 tonnes in 2013-14. There is improvement in production at six times over the period of ten years. Of which Andre Pradesh is leading producer of the FFB and the share of FFB is 94 percent (933981 tonnes) followed by Kerala produced 4 percent (38350 tonnes) and Karnataka occupied by 1 percent (9917 tonnes) and Tamil Nadu produced at 0.56 percent (5495 tonnes) during 2013-14. Andre Pradesh is leading producer in FFB. The state is improved it producer of 7 timed over the ten years. Kerala is occupied with little improvement in production at one time.

In Tamil Nadu, the scheme is implemented in districts like Cuddalore, Villupuram, Vellore, Tiruchirapalli, Karur, Perambalur, Ariyalur, Thanjavur, Tiruvarur, Nagapattinam, Theni and Tirunelveli. During 2014-15, oil palm cultivation was taken up in an area of 398 hectares besides providing maintenance support for older plantations. Planting material for intercropping in oil palm fields was provided at subsidized cost. All these activities were carried out at a cost of Rs.1.62 crore. During the year 2015-16 the scheme is proposed to be implemented with the outlay of Rs.4.40 crore.

The cultivable area of the state to the total geographical area has been decline from 40. 2 percent in TE 2005-06 to 37 percent in TE 2015-16. Of which, Villupuram, Salem, Tiruvarur, Theni, Ramanathapuram and Thoothukudi districts have been increasing slightly cultivable area. Remaining 26 districts are registered decline trends. Kancheepuram, Coimbatore, Erode, Perambalur districts are heavily decline the cultivable area in the state. The main reason behind is urbanization of the district area and commercial encouragement and business development. Remaining districts have maintain slow and up and down movements in the cultivable area among the state economy.

These districts having maintain the regular practice of agricultural activities. The percentage share of oilseeds area to the cultivable area in the state is declining from 21 percent in TE 2005-06 to 18 percent in TE 2015-16. Coimbatore, Thanjavur, Theni and Kanniyakumari districts are recorded increasing trends in the cultivation of oilseeds. 28 districts are registered decline trends in these cultivation.

The area under oilseeds are increased from 13.3 lakh ha. TE1990-91 to 15.1 lakh ha. TE1994-95. The production of oilseeds also increase from 12.7 lakh tonnes to 19.1 lakh tonnes in the same period. The area increase and production increase to 9.7 lakh ha. and 11.4 lakh tonnes during 2006-07. During 2012-13, the trend has been decline to 8.1 lakh ha. and 8.7 lakh tonnes and slow progress to 8.7 lakh ha. and 10 lakh tonnes during 2014-15. There is stagnant growth in area and production level in Tamil Nadu due to shortfall in monsoon and urban encouragement.

The area under oil palm cultivation has been stagnant growth trend for the past one decade in Tamil Nadu. The area under these crop is decline from 0.019 lakh ha. During 2011-12, the trend has been increase to 0.021 lakh ha. This period is growth period for expansion of area. After that, it has decline to 0.011 lakh ha. and 0.009 lakh ha. during 2012-13 to 2013-14. There is slow progress in area under oil palm cultivation. The area under Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize is increased from 1907 ha. in 2004-05 to 2053 ha. in 2010-11. After 2011-12, the scheme is divided into ISOPOM and NADP in Tamil Nadu. During 2014-15, National Mission for Oilseeds and Oil Palm is started. The area under NMOOP is increased from 1106 ha in 2014-15 to 1348 ha. in 2015-16. The productivity of palm oil is increased from 4697 kg/ha. in 2011-12 to 7810 kg/ha. in 2015-16. The productivity of the oil is increased to 40 percent over the five years in Tamil Nadu. There is significant growth in productivity in Tamil Nadu.

The area under oilseeds and production in Tamil Nadu as total is 6.19 lakh ha. and 10.66 lakh tonnes during 2005-06. Of that, Thiruvannamalai, Vellore and Villupuram districts are recorded highest area and production during that period. On the contrary, Thoottukudi, Theni, Thiruvar and Karur districts are recorded lowest area and production. It is implies that the all these districts are positive growth rate at area and production level except Ariyalur, The Nilgiris and Thiruppur.

The area and production under total foodgrains in the state is shown as 33.17 lakh ha. and 61.16 lakh tonnes during 2005-06. Among the districts, Nagapattinam, Thiruvarur, Villupuram, Thanjavur and Cuddalore are the leading districts in area cultivation and production level in the period. On the other hand, The Nilgiris, Kanniyakumari and Theni districts are recorded the least level of area cultivation and production level.

The area under oilseeds and production in Tamil Nadu are shown in 8.49 lakh ha. and 10.34 lakh tonnes during 2015-16. The area is expanded by the government of Tamil Nadu with effective manner. There is very hot season without any rainfall all these districts in Tamil Nadu. All these districts are affected with heavy water failure as well as lack plantation. Among the districts, Coimbatore, Thiruvannamalai and Vellore districts are the leading districts in area cultivation as well as production. The production in Coimbatore is very meagre level due to very dry conditions. On the contrary, Perambalur, Nagapattinam and Thiruvallur districts are recorded lowest area cultivation as well as production level.

During 2015-16, the total area under foodgrains and production is shown as 36.06 lakh ha. and 127.95 lakh tonnes. There is small increase in area cultivation leading mount amount of increased in production in the state due to the effective implantation of schemes like NFSM, NMOOP. Among the districts, Tiruvarur, Villupuram, Nagapattinam, Cudallore, Thanjavur and Salem are leading districts in area under foodgrains and production. These six districts are occupy the largest area and production in Tamil Nadu. On the contrary, Nilgiris and Kanniyakumari are lowest area under cultivation and production. The area under cereals and production level is seen s 27.22 lakh ha. and 120.28 lakh tonnes in the period. Vilupuram, Thiruvarur, Thanjavur and Nagapattinam districts are leading producing state in area cultivation and production of cereals.

During 1993-94, four districts were cultivating the oil palm in Tamil Nadu like Trichirapalli, Nagapattinam, Thanjavur and Tiruvarur. The area expansion under the scheme is increased from 4 in 1993-94 to 25 districts in 2015-16. Villupuram is the highest district and Cuddalore is the second top district in the area expansion. Vellore district is third highest area occupied. Thanjavur is the fourth highest district. It is implies that the area expansion is because subsidy provide by the government and private companies worked towards in-depth manner in the area. On the other hand, Sivagangai, Thiruvallore, Krishnagiri, Pudukottai and Virudhunagar districts are occupied with lowest sizable area in Tamil Nadu during 2015-16.

Government of Tamil Nadu have been identified districts like Thanjavur, Cuddalore, Tirunelveli and Theni. These districts are highly potential area expansion upto 25, 000 ha. in future course of time. Followed by Villupuram district is highest potential area (20,000 ha.) for expansion of oil palm. On the other hand, Karur and Trichirapalli districts are occupying lowest potential area expansion. Some of districts like Virudhunagar, Pudukottai, Sivaganagai, Dindugal, Erode, Namakkal, Salem, Thirupur, Coimbatore, Thiruvannamalai, Kanchipuram, Krishnagiri and Dharmapuri are not potential identified.

**Chapter III**

**Household Characteristics, Cropping Pattern and Value of Output**

Oil palm cultivation is one of the important crop in Tamil Nadu in recent decade. Due to non-availability of oil consumption in India as well as in Tamil Nadu, the Government of India is introduced the oil palm development schemes. The present chapter mainly discusses the socio-economic conditions of sample households from the oil palm beneficiaries in depth indigenous and exotic varieties of oil palm cultivation farmers in the districts of Cuddalure and Thanjavur of Tamil Nadu. The data relating to family size and its composition, educational status, caste system and land using pattern have been analyzed. In addition to that, cropping pattern and production structure in the study area of Cuddalore and Thanjavur districts are also discussed. It gives a comprehensive analysis of operational holdings, sources of irrigation and structure of tenancy, cropping pattern and costs and returns, asset holdings and sources and purpose of credit in the study area.

National Mission on Oilseeds and Oil Palm scheme is one of the flagship schemes adopted by the farmers in the two districts of Tamil Nadu. The Government of Tamil Nadu supports the farmers under the NMOOS scheme. During 2014, the state had adopted eight districts under the scheme. At present, Karur, Perambalur, Ariyalur, Thiruvarur, Nagapatinam, Thanjavur, Theni and Tirunelveli districts have adopted the scheme in recent years. But the present study has chosen only Cuddalore and Thanjavur districts for evaluation. The chapter also examines the paddy cultivation practices followed by the oil palm and other cultivators in the study area.

**3.1. Socio-economic Characteristics of the Selected Farmers**

In the socio-economic profile of the study area, the sample farmers are classified into indigenous and exotic varieties. A majority of the farmers in the sample use indigenous seeds for cultivation of oil palm. The Department of Agriculture, Government of Tamil Nadu and Godrej Agrovet Ltd, has chosen the oil palm beneficiaries with the guidelines given by the Government of India. In a village, the farmers are chosen based on some eligible criteria fixed by the Union Government.

The socio-economic profile of the sample households in the Cuddalore and the Thanjavur districts are presented in Table 3.1. In the study area, household size, members engaged in farming activities, age group of the sample farmers, educational status, caste system, occupational structure and net operated area are analysed.

Table 3.1: Demographic Profile of the Selected Farmers (Percent of Households)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Characteristics | | Marginal | Small | Medium | Large | Total |
| No of HH | | 42.00 | 66.00 | 50.00 | 42.00 | 200.0 |
| Household size (numbers) | | 5.24 | 5.19 | 4.28 | 4.98 | 4.92 |
| Average numbers doing farming | |  |  |  |  |  |
| Years of farming experience | | 29.59 | 25.38 | 28.87 | 27.68 | 27.88 |
| Gender of head (%) | Male | 92.86 | 98.48 | 92.00 | 92.86 | 94.50 |
| Female | 7.14 | 1.52 | 8.00 | 7.14 | 5.50 |
| Age of the head (%) | <16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 16-60 | 80.95 | 75.76 | 76.00 | 78.57 | 77.5 |
| >60 | 19.05 | 24.24 | 24.00 | 21.43 | 22.5 |
| Identity of  Respondent % | Head | 83.33 | 95.45 | 90.00 | 95.24 | 91.5 |
| Others | 16.67 | 4.55 | 10.0 | 4.76 | 8.5 |
| Education status of head, number of years of education (%) | Illiterate | 28.57 | 9.09 | 0.00 | 0.00 | 9.0 |
| Up 5 | 26.19 | 42.42 | 70.0 | 71.43 | 52.0 |
| Up to 10 | 26.19 | 30.30 | 8.0 | 16.67 | 21.0 |
| Up to 12 | 14.29 | 9.09 | 2.0 | 2.38 | 7.0 |
| Up to 15 (graduate) | 4.76 | 9.09 | 10.0 | 9.52 | 8.5 |
| Above graduate | 0.00 | 0.00 | 10.0 | 0.00 | 2.5 |
| Caste (% of households) | SC | 4.76 | 7.58 | 4.0 | 4.76 | 5.5 |
| ST | 0.00 | 0.00 | 2.0 | 0.00 | 0.5 |
| OBC | 71.43 | 66.67 | 90.0 | 95.24 | 79.5 |
| General | 23.81 | 25.76 | 4.0 | 0.00 | 14.5 |
| Main occupation of head  (%) | Agriculture and allied | 76.00 | 78.00 | 81.00 | 70.00 | 76.25 |
| Agricultural labour | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Non-agricultural labour | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Self- business | 20.00 | 20.00 | 16.00 | 25.00 | 20.25 |
| Salaried/pensioners | 4.00 | 2.00 | 3.00 | 5.00 | 3.50 |
| Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Source: Field Survey Data Collected by AERC, University of Madras

The demographic profile of the selected farmers were presented in Table 3.1. The average family size in the household samples was 4.92 persons per family with an average experience of 27.8 years. On average, 96.2 percent of the households had crop farming as their main occupation and farm production was the main source of income in these areas. Small, medium marginal and large farm households have 66, 50 and 42 sample size, respectively. Almost all households were male headed. The average male of the household were 94.5 percent. The average age of the head were 77.5 percent belonging to 16-60 years and 22.5 percent belonging above 60 years. Out of that, marginal farm were 81percent belonging to 16-60 years and 19 percent above that years. The remaining small to large farming were more or less same years.

The educational attainment of the head of the family, 52 percent, 21 percent 7 percent were attained by primary, secondary, higher secondary level. On the other hand, meagre level were illiterate. Large, medium and small farmers were attained 71.43 percent, 70 percent and 42.42 percent of primary level education. Small and marginal farmers were attained 30. 30 percent and 26.19 percent of secondary level of education. Among the caste category, OBC, general and SC were 79.25 percent, 14.5 percent and 5.5 percent, respectively. Large, medium and marginal farmers were 95.42 percent, 90 percent and 71.43 percent belonging to OBC category. The meagre percent belonging to SC.

**3.2. Characteristics of Operational Holdings**

The total holdings of State had 81.18 lakh ha. and an operating area of 64.88 lakh ha. The marginal farmers constitute 77 percent, who operated 35 percent of the total area. The small farmers had a share of 15 percent and operated 25.3 percent of the total area. The medium farmers accounted for 7.5 percent and operated 34 percent of the total area. The large farmers had a share of 0.4 percent operated 5.4 percent of total area. The average size of holding in the state was 0.80 ha (Agricultural Census, Government of India, 2011).

Table 3. 2: Characteristics of Operational Holdings (Acres per Household)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Farm size | Owned  land | Non  cultivable | Leased-  in | Leased –  out | NOA | GCA | Cropping intensity |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Marginal | 1.90 | 0.05 | 0.05 | 0.21 | 1.68 |  |  |
| Small | 4.49 | 0.18 | 0.16 | 0.11 | 4.36 |  |  |
| Medium | 8.61 | 0.16 | 0.07 | 0.10 | 8.42 |  |  |
| Large | 20.52 | 1.35 | 0.10 | 0.00 | 19.26 |  |  |
| Total | 8.34 | 0.39 | 0.10 | 0.11 | 7.94 |  |  |

Source: Field Survey Data Collected by AERC, University of Madras

The characteristics of operational holdings are presented in Table 3.2. The average net operated area per household was 7.94 acre. The average net operated holding ranged from 1.68 acre on marginal households to 19.26 acre on large households. The average owned landing were calculated to 8.34 acre, out of which, large, medium, small and marginal farmers are having 20.52 acre, 8.61 acre, 4.49 acre and 1.90 acre, respectively. The average leased in land were 0.10 acre. Marginal, small, medium and large farmers are having 0.05, 0.16, 0.07 and 0.10 acre, respectively. On the contrary, the marginal, small and medium farmers are having 0.21, 0.11 and 0.10 acre, respectively. The comparative analysis of leased in and out land holdings, leased out are more than the leased in land. The net operated area is restricted to 7.94 acre.

**3.3 Sources of Irrigation**

Generally, palm oil cultivation needed distributed annual rainfall of 2000 m without a defined dry season; in areas with dry spells, a deep soil with high water holding capacity and a shallow water table augmented with copious irrigation. Water is a crucial input for oil palm cultivation. A monthly average rainfall of 150 mm (1800 mm annually) is optimum for growing oil palm. Almost, all the states identified as potential oil palm areas, except Mizoram, experience seasonal rains and witness extended period of dry period. Inadequate water leads to non-opening of spear leaves and decrease leaf production rate, which in turn affects the photosynthesis. Any deficit in the availability of moisture adversely affects yield, both in terms of number of bunches and their weights. As oil palm in the country is mostly grown under irrigated conditions in contrast to rainfed conditions in leading oil palm producers in the world, it may be tough for India to be globally competitive if oil palm is cultivated in areas where water tables are too low. Given the fact that ground water depletion is a major concern, it is imperative to have a hard look at distribution of water tables across major oil palm producing states (Ashok Vishandass and Ashok Gulati, 2014).

Table 3.3: Source of Irrigation of Net Operated Area (Percent)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Farm size | Only canal | Borewell | Dugwell | Tank | Others | Rainfed area | TOA |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Marginal | 10.50 | 6.00 | 3.00 | 1.50 | 0.00 | 0.00 | 21.00 |
| Small | 12.00 | 18.00 | 2.00 | 1.00 | 0.00 | 0.00 | 33.00 |
| Medium | 14.00 | 9.00 | 2.00 | 0.00 | 0.00 | 0.00 | 25.00 |
| Large | 13.50 | 6.50 | 1.00 | 0.00 | 0.00 | 0.00 | 21.00 |
| Total | 50.00 | 39.50 | 8.00 | 2.50 | 0.00 | 0.00 | 100.00 |

Source: Field Survey Data Collected by AERC, University of Madras,TOA-Total Operated Area

The percentage share of source of irrigation to net operated area in the study area is presented in Table 3.3. The small size of farmers are operated highest irrigated area (33 percent) and followed by medium farmers irrigated 25 percent of total area. On the other hand, large and marginal farmers are operated 21 percent, respectively to the total operated area. Among various sources of irrigation, the share of canal irrigation is the highest uses by the farmers and followed by borewell is second place in the study area. 50 percent and 40 percent of the canal users and borewell irrigation used by the farmers. It implies that the half portion of the farmers are using the canal as predominately and borewell is used alternatively non uses of canal area. The farmers are using their canal sources from Cauvery river, Pambai, Pennaiyar, Gadilam and Vellar river basin.

**3.4 Sources and Purpose of Credit**

The Government of India has adopted various policy measures to the farmers for institutional credit. The main objectives of the policies have been providing finance with timely and adequate support the farmers, especially on small, marginal farmers and weaker sections. The Farm Credit Package has announced in June 2004. The banks are advised to double credit to agriculture sector. After, 2003, the flow of agricultural credit has continually exceeded the fixed target. The agriculture credit flow has increased from Rs.86,981 crore in 2003-04 reached to Rs.468,291 crore in 2010-11. During 2011-12, the target was fixed at Rs.475,000 crore and the disbursement of Rs.511,029 crore was achieved (107 percent of the target). During 2012-13, the target was fixed at Rs.575,000 crore and credit disbursement was Rs.607,376 crore forming more than 105 percent. Agriculture credit of Rs. 7,11,621.47 crore (102 percent of the target) was disbursed exceeding the target of Rs.700,000 crore fixed for the year 2013-14. The target for the year 2014-15 was fixed at Rs.800,000 crore and achievement was Rs.845,328.23 crore. The target for 2015-16 is Rs.8,50,000 crore and achievement is Rs.8,77,527 crore. The target for 2016-17 has been set at Rs. 9,00,000 crore and a sum of Rs. 755,995.17 crore has been disbursed as agriculture credit during April-September, 2016 (Credit Policy, Reserve Bank of India, 2017).

Table 3.4: Details of Source of Borrowing by the Selected Households

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Farm size | Institutional loan by banks | Traders/ Com.Agents | Money  Lenders | Friends/  relatives | Others | Total |
|
| Rs. per household) | | | | | | |
| Marginal | 27500 | - | 14286 | - | - | 41786 |
| Small | 41679 | - | 3030 | - | - | 44709 |
| Medium | 57360 | - | - | - | - | 57360 |
| Large | 136524 | - | 28714 | 3143 | - | 168381 |
| Total | 263063 | - | 46030 | 3143 | - | 312236 |
| (Rs. per acre) | | | | | | |
| Marginal | 4206.80 | - | 498.58 | - | - | 4707.38 |
| Small | 9551.39 | - | 694.44 | - | - | 10245.83 |
| Medium | 6812.35 | - | - | - | - | 6812.35 |
| Large | 7087.32 | - | 1490.64 | 163.15 | - | 8741.12 |
| Total | 27657.86 | - | 2683.6 | 163.15 | - | 68504.68 |

Source: Field Survey Data Collected by AERC, University of Madras

The details of source of borrowing by the selected households are presented in Table 3.4. The total borrowing per household were calculated to Rs. 3, 12, 236. Out of which, institutional credit were more contributed to the farmers. The large farmers were borrowing Rs. 136, 524, it accounted for 50 percent. Followed by medium, small farmers were borrowed Rs. 57, 360 and Rs. 41, 679. Money lenders also providing credit facilities to the farmers. Large farmers are got Rs. 28, 714 from money lenders and followed by marginal farmers (Rs. 14, 286).The total loan per acre borrowed by the farmers were worked out at Rs. 68, 505. Small farmers are borrowing Rs. 9551 from money lender and followed by large farmers (Rs. 7087) and medium farmers (Rs. 6812). The small, large and medium farmers are borrowing more credit from institutional source. Large farmers borrowing Rs. 1491 and followed by small farmers (Rs. 694).

**3.5 Assets Holdings**

Table 3.5: Ownership of Productive Assets

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Assets | | Rs. Per household | | | | | Rs per acre | | | | |
| Marginal | Small | Medium | Large | Total | Marginal | Small | Medium | Large | Total |
| Tractor | | 0 | 480000 | 494000 | 534206 | 377052 | 0 | 192000 | 131733 | 179043 | 125694 |
| Trolley | | 51667 | 40000 | 38000 | 40250 | 42479 | 21500 | 20000 | 21500 | 19213 | 20553 |
| Harrow | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tiller | | 70000 | 88000 | 86250 | 90833 | 83771 | 20769 | 32000 | 28750 | 15648 | 24292 |
| Plank | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Threshing machine | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Combine harvester | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other reaper | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pumpset | | 148286 | 103375 | 190052 | 213333 | 163761 | 78226 | 48239 | 62277 | 76190 | 66233 |
| Bullock cart | | 45982 | 33339 | 32996 | 30385 | 35676 | 25018 | 26058 | 20808 | 25490 | 24344 |
| Fodder Chaffer | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spray Pump | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Bin | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Poultry Sheds | | 9800 | 9700 | 10000 | 10600 | 10025 | 62250 | 8766 | 5000 | 5600 | 20404 |
| Dairy Sheds | | 10750 | 13229 | 14690 | 19333 | 14501 | 8600 | 6257 | 6672 | 6872 | 7100 |
| Animals | Cows | 27904 | 26000 | 32889 | 34500 | 30323 | 18055 | 23693 | 14439 | 18684 | 18718 |
| Buffaloes | 29808 | 29654 | 33250 | 34550 | 31816 | 27200 | 20210 | 21400 | 18333 | 21786 |
| Calves | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Any Other | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | | 394197 | 823297 | 932127 | 1007990 | 789403 | 261618 | 377223 | 312579 | 365073 | 329123 |

Source: Field Survey Data Collected by AERC, University of Madras.

The ownership of productive assets in the study area are presented in Table 3.5. The total asset value per household were worked out at Rs. 7,89, 403. Of which, tractor, pump set and tiller are having more asset value. It account for 48 percent (Rs. 3, 77,052) and 21 percent (Rs. 1, 63, 761) and 11 percent (Rs. 83,771). Large farmers are having more asset value Rs. 10, 07, 990. Tractor and pump set are recorded at 53 percent (Rs. 5, 34,206) and 21 percent (Rs. 2, 13,333). The total asset value of marginal farmers were worked out to Rs. 3, 94,197. Pump set are contributing 38 percent (Rs. 1, 48, 246). On the other hand, bullock cart, buffaloes and cows are contributing lowest asset value among the households in the study area.

The total asset value of all the farmers per acre were worked out Rs. 3, 29,123. Out of which, tractor, pump set estimated by 38 percent and 20 percent, respectively. Small farmers are contributing more asset and it accounted for Rs. 3, 77, 223. It account for 51 percent (Rs. 1,92, 000) and 13 percent (Rs. 48, 239). On the other hand, bullock cart, buffaloes and cows are sharing lowest asset value.

Table 3.6: Details of Purpose of Credit by the Selected Households

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Farm size | Productive uses | | | | Non-productive uses | | |
| Seasonal crop | Purchase  of tractor | Purchase of livestock | Non-farm activity | Consumption | Social ceremonies | Others |
| (Rs. per Household) | | | | | | | |
| Marginal | 80000 | 175000 | 115000 | 100000 | 100000 | 200000 | - |
| Small | 63600 | 121667 | 250000 | 162500 | 151933 | 25000 | - |
| Medium | 96182 | 525000 | 152000 | - | - | - | - |
| Large | 380545 | 1000000 | 304750 | - | 166750 | - | - |
| Total | 620327 | 1821667 | 821750 | 262500 | 418683 | 225000 | - |
| Percent of Total | | | | | | | |
| Marginal | 1.92 | 4.20 | 2.76 | 2.40 | 2.40 | 4.80 | - |
| Small | 1.53 | 2.92 | 6.00 | 3.90 | 3.64 | 0.60 | - |
| Medium | 2.31 | 12.59 | 3.65 | - | - | - | - |
| Large | 9.13 | 23.98 | 7.31 | - | 4.00 | - | - |
| Total | 14.88 | 43.69 | 19.71 | 6.30 | 10.04 | 5.40 | - |

Source: Field Survey Data Collected by AERC, University of Madras.

The details of purpose of credit by the selected households are given in Table 3.6. The purposes of credit facilities is one of the influencing factors. The farmers are using their credit for productive and non-productive purposes. Among the productive purposes, the farmers are using their credit for purchases of tractors, purchase of livestock and seasonal credit. It accounts for 44 percent (Rs.18,21, 667), 20 percent (Rs. 8, 21, 750) and 15 percent (Rs. 6, 20, 321). On the other hand, the farmers are using for non-productive with meagre level. The consumption purposes and social ceremonies are using at 10 percent and 5.4 percent, respectively.

**3.6 Cropping Pattern**

The cropping pattern of selected farmers during 2015-16 is given in Table 3.7. Paddy occupies the major share during kharif season and it accounts for 77 percent. Of which, large farmers are cultivate with 29.11 percent and followed by medium farmers occupies 23 percent and small farmers cultivate 17 percent in the study area. Sugarcane is occupy second place during the season and it accounts for 28.4 percent and cotton (8.28 percent). Large farmers are cultivate the sugarcane crop and it account for 11 percent and followed by marginal farmers (8.5 percent). Paddy, sugarcane and cotton are the major crop cultivation during kharif season in the study area.

Table 3.7: Cropping Pattern of Selected Farmers (Percent of GCA for 2015-16)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name of the crop | Marginal | Small | Medium | Large | Total |
| Kharif crops July to Nov 2015 | | | | | |
| Paddy | 8.50 | 16.81 | 22.80 | 29.11 | 19.31 |
| Sugarcane | 8.50 | 3.99 | 4.87 | 11.04 | 7.10 |
| Cotton | 4.25 | 4.03 | 0.00 | 0.00 | 2.07 |
| Rabi crops Nov 2015 to March 2016 | | | | | |
| Paddy | 12.04 | 11.72 | 21.62 | 16.44 | 15.46 |
| Sugarcane | 4.25 | 6.94 | 2.97 | 2.35 | 4.13 |
| Cotton | 1.42 | 1.04 | 0.00 | 0.00 | 0.62 |
| Summer crops March to June 2016 | | | | | |
| Pulses | 1.42 | 3.47 | 4.63 | 13.91 | 5.86 |
| Perennial crops including inter cropping other than palm oil | | | | | |
| Palm Oil | 59.62 | 52.00 | 43.11 | 27.15 | 45.47 |
| Gross cropped area | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Source: Field Survey Data Collected by AERC, University of Madras

During rabi season, paddy occupy 62 percent and followed by sugarcane (16.5 percent). The medium farmers are planting 22 percent and marginal farmers (12.04 percent). During summer season, pulses accounts for 23.43 percent, of that large size of farmers are cultivating 14 percent and followed by medium farmers (5 percent).

During perennial crops, oil palm cultivation is one of the highest area operated as inter-crop cultivation. The percentage share of palm oil cultivation to the total area are calculated at 45.47 percent. The percentage share area under oil palm cultivation by the marginal farmers are highest area to 60 percent. On the other hand, large farmers are cultivate lowest area of 27 percent in the study area. It implies that the percentage share of area by oil palm cultivation are half portion.

**3.7 Production, Cost and Returns by Farm Size**

The value of output, cost and net returns for all crops during 2015-16 is presented in Table 3.8. The total value of output per household were worked out to Rs. 5,9 8,789. Of that, large farmers are receive the output of Rs. 3,12,392 and followed by medium farmers (Rs.1,52, 642). On the other hand, marginal farmers are got the lowest output value Rs. 46, 263. It implies that the large and medium size farmers are recorded three-fourth of output in the study area. Marginal and small farmers are receive one-fourth of the output value.

Table 3.8: Value of Output, Cost & Net Returns:Aggregate of All Crops: 2015-16

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Value of output  (main + byproduct) | | Cost of production per acre | | Net returns (Farm business income) | | Non-farm income per household | Total income per household |
| Per household | Per  Acre | Material cost | Labour cost | Per household | Per  acre |
| Marginal | 46262.7 | 28176.6 | 14107.6 | 7364.3 | 24790.8 | 6704.7 | 12498.5 | 37289.3 |
| Small | 87492.2 | 32072.8 | 14946.4 | 7574.7 | 64971.1 | 9551.7 | 26789.6 | 91760.7 |
| Medium | 152642.3 | 30167.7 | 14211.9 | 7216 | 131214.4 | 8739.8 | 47865.3 | 179079.7 |
| Large | 312391.7 | 28264.5 | 14068.9 | 6785.5 | 291537.3 | 7410.1 | 86567.6 | 378104.9 |
| Landless | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 598789 | 112681.6 | 57334.9 | 28940.5 | 512513.6 | 26406.2 | 173721.0 | 686234.6 |

Source: Field Survey Data Collected by AERC, University of Madras

Note: Labour cost includes the imputed value of family labour

The total value of output per acre were calculated to Rs. 1,12, 682. Of that, small and medium size farmers are receive Rs. 32, 073 and Rs. 30, 168, respectively. The large farmers are receive lowest output value Rs. 22, 265. It implies that the small and medium size farmers are recorded highest value received and lowest value received by the large farmers.

The cost of cultivation is consists of material and labour costs. The material costs are contributes more cost than labour costs. The small farmers are recorded highest spending as material cost Rs. 14, 946 and followed by medium farmers (Rs. 14, 212). In terms of labour cost, the small and marginal farmers are spent with highest cost Rs. 7,575 and Rs. 7,364, respectively. The material cost are spending more than the labour cost for the all the farming community in the study area. The material cost spending with two-thirds of their total cost and labour costs spent with one-third of their total costs.

**3.8 Summary**

The average family size was 4.92 persons with an average experience of 27.8 years. On average, 96.2 percent had crop farming as their main occupation. Almost all households were male headed. The average male of the household were 94.5 percent. The average age of the head were 77.5 percent belonging to 16-60 years and 22.5 percent belonging above 60 years. The educational level, 52 percent, 21 percent 7 percent were attained by primary, secondary, higher secondary level. On the other hand, meagre level were illiterate. Among the caste category, OBC, general and SC were 79.25 percent and 14.5 percent respectively.

The average net operated area was 7.94 acre. The average NOA ranged from 1.68 acre on marginal to 19.26 acre on large size. The average leased in land were 0.10 acre. The comparative analysis of leased in and out land holdings, leased out are more than the leased in land. The small farmers are operated highest irrigated area (33 percent) and followed by medium farmers (25 percent). On the other hand, large and marginal farmers are lowest irrigated area (21 percent). The share of canal irrigation is the highest uses and followed by borewell is second place. It implies that the half portion of the farmers are using the canal as predominately and borewell is used alternative uses. The farmers are using their canal sources from Cauvery river, Pambai, Pennaiyar, Gadilam and Vellar river basin.

The institutional credit were more contributed to the farmers. The large farmers were borrowing 50 percent (Rs. 136, 524). Large farmers are got Rs. 28, 714 from money lenders and followed by marginal farmers (Rs. 14, 286). The total loan per acre were borrowed at Rs. 68, 505. Small farmers are borrowing Rs. 9551 from money lender and followed by large farmers (Rs. 7087). The small, large and medium farmers are borrowing more credit from institutional source.

The tractor, pump set and tiller are having more asset value. It account for 48 percent (Rs. 3, 77,052) and 21 percent (Rs. 1, 63, 761) and 11 percent (Rs. 83,771). Large farmers are having more asset value Rs. 10, 07, 990. Tractor and pump set are recorded at 53 percent (Rs. 5, 34,206) and 21 percent (Rs. 2, 13,333). Pump set are contributing 38 percent (Rs. 1, 48, 246). On the other hand, bullock cart, buffaloes and cows are contributing lowest asset value among the households in the study area.

The farmers are using their credit for productive and non-productive purposes. Among the productive purposes, the farmers are using their credit for purchases of tractors, purchase of livestock and seasonal credit. It accounts for 44 percent, 20 percent and 15 percent. On the other hand, the farmers are using for non-productive with meagre level. The consumption purposes and social ceremonies are using at 10 percent and 5.4 percent, respectively.

Paddy occupies the major share during kharif season and it accounts for 77 percent. Sugarcane is occupy second place during the season and it accounts for 28.4 percent and cotton (8.28 percent). During rabi season, paddy occupy 62 percent and followed by sugarcane (16.5 percent). During summer season, pulses accounts for 23.43 percent, of that large size of farmers are cultivating 14 percent and followed by medium farmers (5 percent).

During perennial crops, oil palm cultivation is one of the highest area operated as inter-crop cultivation. The percentage share of palm oil cultivation to the total area are calculated at 45.47 percent. The percentage share by the marginal farmers are highest area to 60 percent. On the other hand, large farmers are cultivated lowest area of 27 percent. Palm oil cultivation are occupy the half portion share.

The total value of output per household were worked out to Rs. 5,9 8,789. It implies that the large and medium farmers are recorded three-fourth of output. Marginal and small farmers are receive one-fourth of the output value. The total value of output per acre were calculated to Rs. 1,12, 682. It implies that the small and medium farmers are recorded highest value received and lowest value received by the large farmers. The small farmers are recorded highest spending as material cost (Rs. 14, 946) and followed by medium farmers (Rs. 14, 212). In terms of labour cost, the small and marginal farmers are spent with highest cost (Rs. 7,575 and Rs. 7,364, respectively). The material cost are spending more than the labour cost for the all the farming community in the study area. The material cost spending with two-thirds of their total cost and labour costs spent with one-third of their total costs.

**Chapter IV**

**The Production Structure and Resource Use under Horticultural Crops in Tamil Nadu**

There is continues expansion of planted area due to increasing demand in the global level. The impact of oil palm expansion on social, economic level. Adverse economic impacts of oil palm development on increasing profit margin and safeguard the livelihood of the farmers (Oil Palm Cultivation in Indonesia, 2014). The yield of oil palm is increased in Malaysia, Indonesia, Thailand, Costa Rica and Ivory Coast. Malaysia have recorded highest of 4-5 tonnes per ha and lowest yield of 1.3 tonnes in Germany. The oil palm cultivation was introduced in India during 1970s and particularly, the plantation cultivated in Kerala, Andman Nicobar and Goa. The cultivation have been transferred into commercial cultivation and an area of 2.69 lakh ha during 2013-14. Of which, 1.75 lakh ha is at fruiting stage and 1.5 lakh tonnes of palm oil is being produced. In India, states such as Andhra Pradesh, Karnataka, Tamil Nadu, Mizoram, Kerala, Odisha, Gujarat, Goa, Maharashtra and Chhattisgarh are major producing states (Status Paper on Oil Seeds, Government of India, 2014).

The Government of India has introduced palm oil during 1985-86. It was started as small holder’s crop under the Technology Mission on Oil Seeds (TMO). After that, these cultivation initiated at massive scale basis. Oil Palm Development Programme (OPDP) was launched during 1991-92. The programme was brought under the purview of the “Technology Mission on Oilseeds and Pulses” (TMOP) (Ministry of Agriculture during the VIII Five Year Plan (1992-97). During Eight Five Year Plan Period (1992-97), target of 80,000 ha. The potential area identified in the states of Andhra Pradesh, Karnataka, Tamil Nadu, Orissa, Gujarat and Goa from 1992 onwards. The OPDP was continued during IX Plan to bring an additional area of 80,000 ha. under oil palm. (Ashok Vishandass and Ashok Gulati, 2012) Andhra Pradesh is the leading palm oil producing state in India. It contributing 86 percent of the total production in the country and followed by Kerala (10 percent) and Karnataka (2 percent). Other states like Orissa, Tamil Nadu, Goa and Gujarat are producing reaming part.

**National Mission on Oilseeds and Oil Palm in Tamil Nadu**

NMOOP comprises of three mini mission one each for oilseeds, oil palm and three born oilseeds. The fund is provided on 50:50 bases by the centre and state. The objective is to increase the area under oilseeds through crop diversification from low yielding cereal crops to oilseeds crops and expansion of cultivation area of oil palm and oilseeds in wastelands. The scheme is being implemented with equal sharing between centre and the state.

It focuses on expansion of oil palm coverage in watersheds and waste lands. The scheme is implemented in districts like Karur, Perambalur, Ariyalur, Thanjavur, Thiruvarur, Nagapattinam, Theni and Tirunelveli. During the year 2014-15, oil palm cultivation was taken up in an area of 398 ha. besides providing maintenance support for older plantations, planting material for intercropping in oil palm fields was provides at subsidized costs. All these activities were carried out at a cost of Rs. 1.62 crore. During the year 2015-16, the scheme is proposed to be implemented with the outlay of Rs. 4.40 crore (Policy Note, Government of Tamil Nadu, 2015-16).

**4.1 Area, Production and Productivity of Oil Palm: Indigenous versus Exotic Varieties**

The oil palm cultivation are presently more efficient and highest yielding crop in the world. In the commercial plantations point of view, the productivity mainly depends on climatic conditions and pest and diseases and soil conditions. The yields are directly dependent on the ratio between smallholders and large plantations. The smallholders are producing low productivity due to inadequate inputs, cultural practices and crop management skills.

The area and production under oil palm in the study area is given in Table 4.1. The area under indigenous varieties per household were worked out to 12.68 acre as compared with 11.34 acre for exotic varieties. Among the indigenous users, the large and medium farmers are cultivate the varieties of 5.60 acre and 3.59 acre, respectively. On the other hand, the marginal farmers are cultivate 1.14 acre. Among the exotic variety users, the large farmers are cultivate 4.79 acre and marginal farmers are use 1.05 acre. Among the farming community, they are more using the indigenous varieties than the exotic variety.

The percentage share of oil palm to net operated area by the small and medium farmers are cultivate the indigenous varieties of 30.3 percent and 29.8 percent, respectively. The marginal farmers are cultivate 16.08 percent. Among exotic varieties users, the marginal farmers are cultivating 48 percent and larger farmers are cultivating 8.28 percent.

The average production for indigenous and exotic varieties per acre are calculate to 15.02 tonnes and 7.70 tonnes, annual respectively. It implies that the indigenous varieties are more production than the exotic varieties. The main reason behind the high production are recorded among the indigenous varieties users due to the long-period from 10 to 20 years plantation. Whereas for exotic varieties, it is nearly three to five years plantation. It is main causes behind the long period of plantation. Among indigenous users, medium farmers are produce higher of 16.5 tonnes and against to lowest of 11.4 tonnes by the large farmers. But for exotic varieties users, marginal farmers are producer higher of 8.36 tonnes and against to large farmers producer lowest of 7.06 tonnes.

Table 4.1: Area and Production under Oil Palm: Variety Wise

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Farm size | Area under oil palm (per hh) | Area of oil palm as % NOA | No of plants per acre | No of bunches per plant | Production  of FFB per acre (Tones) | Value of Output per acre (Rs) | Value of  output per  hh (Rs) | Reco-mmended MSP (Rs per tone) | Actual price obtained Rs per tone |
| Exotic variety | | | | | | | | | |
| Marginal | 1.05 | 47.80 | 56.13 | 7.99 | 8.36 | 42441.5 | 44762.6 | 5503.2 | 5076.7 |
| Small | 2.07 | 20.83 | 54.68 | 10.76 | 7.60 | 38451.4 | 79554.5 | 5476.9 | 5059.4 |
| Medium | 3.43 | 12.23 | 56.15 | 8.87 | 7.77 | 40695.8 | 139722.4 | 5685.1 | 5237.6 |
| Large | 4.79 | 8.28 | 56.17 | 10.04 | 7.07 | 43455.1 | 207963.8 | 6614.8 | 6146.4 |
| Total | 11.34 | 89.15 | 55.8 | 9.42 | 7.70 | 41261.0 | 118000.8 | 5820.0 | 5380.0 |
| Indigenous variety | | | | | | | | | |
| Marginal | 1.14 | 16.08 | 56.4 | 8.80 | 15.95 | 163663.6 | 185758.2 | 7068.7 | 6610.0 |
| Small | 2.36 | 30.33 | 56.14 | 11.19 | 16.52 | 104522.5 | 246757.9 | 6773.7 | 6327.0 |
| Medium | 3.59 | 29.81 | 56.26 | 10.94 | 16.24 | 103665.9 | 371716.4 | 6837.7 | 6383.4 |
| Large | 5.60 | 19.37 | 56.07 | 10.32 | 11.40 | 72125.4 | 403773.5 | 6780.1 | 6326.8 |
| Total | 12.68 | 95.59 | 56.22 | 17.23 | 15.02 | 110994.4 | 302001.5 | 6865.1 | 6411.8 |
| Aggregate | | | | | | | | | |
| Marginal | 2.2 | 63.9 | 112.5 | 16.8 | 33.1 | 206105.1 | 230520.8 | 12571.9 | 11686.7 |
| Small | 4.4 | 51.2 | 110.8 | 22.0 | 24.1 | 142973.9 | 326312.5 | 12250.6 | 11386.4 |
| Medium | 7.0 | 42.0 | 112.4 | 19.8 | 24.0 | 144361.8 | 511438.8 | 12522.8 | 11620.9 |
| Large | 10.4 | 27.7 | 112.2 | 20.4 | 18.5 | 115580.5 | 611737.3 | 13394.9 | 12473.2 |
| Total | 24.0 | 184.7 | 112.0 | 26.6 | 24.9 | 152255.3 | 420002.3 | 12685.0 | 11791.8 |

Source: Field Survey Data Collected by AERC, University of Madras

The total value of output for indigenous and exotic cultivators are worked out to Rs. 1,10,994 and Rs. 41, 261, respectively. Among the indigenous cultivators, marginal farmers are receive highest value of Rs. 1, 63, 664 and lowest value received by the large farmers (Rs. 72,125). It implies that the marginal farmers are receiving more output value because of regular work and continued work in their farm field. On the contrary, the large farmers are receive with lowest value because cutting their plantation trees for alternative crops and ignorance of their work.

The total value of output for indigenous and exotic varieties cultivation per household are worked out Rs. 3,02, 002 and Rs. 1, 18, 001, respectively. Among indigenous varieties, the large farmers are receive output of Rs. 4, 03, 774 and lowest value got by marginal farmers (Rs. 1, 85, 758). Whereas, for exotic varieties, the large farmers are got the highest value of Rs. 2, 07, 964 and marginal farmers are receive lowest value of Rs. 44, 763. It implies that the large farmers are receive the highest value of money than the marginal farmers due to the large land holding and more financial capacity.

The actual price receive by the indigenous and exotic cultivators are Rs. 6,412 and Rs. 5, 380, respectively. It implies that the indigenous are recovery more extraction ratio than the exotic varieties. The domestic prices of oil palm are significantly influenced by production capacity. There is continuous drought conditions and improper and inadequate nutrition guidance for new plantations is inadequate and imbalance resulting in lower FFB yields and low Oil Extraction Ratio (OER).

The average value of output per acre from indigenous varieties of oil palm growers is significantly receive higher than income from exotic varieties users. In 2015-16, annual output to farmers from mature indigenous oil palm were around Rs. 110994.4 compared to Rs. 41261 from exotic users. The study indicate that many villagers hope to enter the regular cash economy. The oil palm cultivation is an attractive choice and alternative cultivation crops in recent decades in Tamil Nadu.

**4.2 Productivity Comparison of Oil Palm with Other Major Crops Grown**

The role of productivity is mainly depending upon the competitiveness of agricultural commodities and influenced by prices. The reduction of prices for commodities is to increase their total factor productivity much faster than demand. Land productivity is part of total factor productivity and it is a critical factor influencing real prices of agricultural products.

The productivity comparison of palm oil with other crops grown in the study area is given in Table.4.2. Paddy occupies the average productivity of 21. 75 quintal during rabi season as against of 18. 28 quintal during kharif season. During rabi season, sugarcane is producing highest yield of 29.28 tonnes as against 26.75 tonnes duing kharif season. The cotton production is highest yield of 4.75 quintal as against 4.14 quintals during kharif season. It implies that the paddy, sugarcane and cotton production are highest yield during rabi season than the kharif season.

The average value output of paddy crop per acre are worked out Rs.30,189 during kharif season as against Rs. 29, 352 during rabi season. The average value of sugarcane are Rs. 63, 886 during rabi season compared with Rs. 59,684 for kharif season. The value of cotton are Rs. 21,891 during rabi season as against to Rs. 21, 072 for kharif season. It implies that the value for paddy is occupies the highest output during kharif season than the rabi season. Whereas, for sugarcane and cotton is highest output during rabi season than the kharif season.

Table 4.2: Productivity Comparison of Palm Oil with Other Crops Grown

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Farm Size | Marginal | Small | Medium | Large | | Total |
| Quantity Quintals per Acre | | | | | | |
| Main Kharif Crops: Paddy | 17.33 | 20.63 | 18.47 | | 16.67 | 18.28 |
| Sugarcane | 21.11 | 31.48 | 24.54 | | 29.85 | 26.75 |
| Cotton | 7.33 | 9.23 | 0.00 | | 0.00 | 4.14 |
| Main Rabi Crops: Paddy | 21.89 | 22.42 | 19.97 | | 18.71 | 20.75 |
| Sugarcane | 29.18 | 32.95 | 28.54 | | 27.17 | 29.28 |
| Cotton | 10.12 | 9.08 | 0.00 | | 0.00 | 4.75 |
| Main Summer Crops: Pulses | 2.00 | 2.50 | 2.40 | | 2.33 | 2.31 |
| Any other plantation crop | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| Value Rs per Acre | | | | | | |
| Main Kharif Crops: Paddy | 33195 | 27445 | 28800 | | 31315 | 30189 |
| Sugarcane | 63162 | 62892 | 56946 | | 55735 | 59684 |
| Cotton | 41583 | 42703 | 0.00 | | 0.00 | 21072 |
| Main Rabi Crops: Paddy | 33575 | 28205 | 28121 | | 27507 | 29352 |
| Sugarcane | 64315 | 60579 | 67768 | | 62880 | 63886 |
| Cotton | 43212 | 44351 | 0.00 | | 0.00 | 21891 |
| Main Summer Crops: Pulses | 6318 | 6215 | 6326 | | 5956 | 6204 |
| Any other plantation crop | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |

Source: Field Survey Data Collected by AERC, University of Madras

**4.3 Economics of Production, Cost and Resource Use: Indigenous versus Exotic Varieties**

The productivity difference in palm during peak and lean season is illustrated in Table 4.3. Among indigenous cultivators, productivity during the peak season is calculated to 15.26 tonnes annually. Of which, marginal farmers are recorded highest produce of 21.63 tonnes and largest farmers produce least with 10.22 tonnes. Whereas in lean season, marginal farmers are recorded highest produce 17.52 tonnes and large farmers produce lowest value of 8.2 tonnes. The average productivity among the two seasons are worked out to 2.95 tonnes. In terms of percentage difference, it accounts for 19.42 percent variation. The large farmers are receive the highest variation of 19.77 percent and marginal farmers are receive lowest variation of 19 percent. It implies that the productivity received from indigenous variety during peak season is higher than the lean season.

Among exotic varieties, the average productivity during peak and lean season are got 7 tonnes and 5.73 tonnes, respectively. The marginal farmers are got highest of 7.35 tonnes and large farmers are recorded lowest produce of 6.75 tonnes during peak season. During lean season, large farmers are produce highest produce of 6 tonnes and lowest produce of 5.4 tonnes by small farmers. The percentage variation among peak and lean season for exotic cultivators are calculated to 18 percent. The highest productivity are recoded by small farmers (21. 5 percent) and lowest produce recoded by large farmers (11.26 percent). It implies that the low yield due to unfavorable climatic conditions, poor quality planting material, improper intercropping practices, inadequate application of fertilizers. The most important causes are irrigation and it has been found to be a critical factor for getting low yields in the study area.

Table 4.3: Productivity Difference in Palm during Peak and Lean Season(Tones per Acre)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Farm Size | Marginal | Small | Medium | Large | Total |
| Exotic variety | | | | | |
| Productivity in the peak season | 7.35 | 6.88 | 6.99 | 6.75 | 6.99 |
| Productivity in the lean season | 5.93 | 5.40 | 5.59 | 5.99 | 5.73 |
| Productivity difference in the two season | 1.42 | 1.48 | 1.40 | 0.76 | 1.27 |
| Percentage Difference | 19.32 | 21.51 | 20.03 | 11.26 | 18.03 |
| Indigenous variety | | | | | |
| Productivity in the peak season | 21.63 | 14.73 | 14.46 | 10.22 | 15.26 |
| Productivity in the lean season | 17.52 | 11.85 | 11.66 | 8.20 | 12.31 |
| Productivity difference in the two season | 4.11 | 2.88 | 2.80 | 2.02 | 2.95 |
| Percentage Difference | 19.00 | 19.55 | 19.36 | 19.77 | 19.42 |
| Aggregate | | | | | |
| Productivity in the peak season | 28.98 | 21.61 | 21.45 | 16.97 | 22.25 |
| Productivity in the lean season | 23.45 | 17.25 | 17.25 | 14.19 | 18.04 |
| Productivity difference in the two season | 5.53 | 4.36 | 4.20 | 2.78 | 4.22 |
| Percentage Difference | 19.08 | 20.18 | 19.58 | 16.38 | 18.97 |

Source: Field Survey Data Collected by AERC, University of Madras

Table 4.4: Percentage Area under Oil Palm Age wise

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Farm Size | Marginal | Small | Medium | Large | Total |
| Age wise difference in area | | | | | |
| Percentage area with bearing period up to 2 years | 1.00 | 2.00 | 5.00 | 2.50 | 10.50 |
| Percentage area with bearing period 3 to 5 years | 1.13 | 2.19 | 3.61 | 5.45 | 12.39 |
| Percentage area with bearing period 6 to 10 years | 1.05 | 2.28 | 3.50 | 2.36 | 9.19 |
| Percentage area with bearing period 11 to 15 years | 0.00 | 2.20 | 3.33 | 5.00 | 10.53 |
| Percentage area with bearing period 16 to 20 years | 0.00 | 3.00 | 5.00 | 0.00 | 8.00 |
| Percentage area with bearing period above 20 years | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Age wise difference in productivity (tones per acre) | | | | | |
| Productivity with bearing period up to 2 years | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Productivity with bearing period 3 to 5 years | 0.00 | 1.58 | 3.97 | 3.00 | 8.55 |
| Productivity with bearing period 6 to 10 years | 21.47 | 14.90 | 17.25 | 12.24 | 65.87 |
| Productivity a with bearing period 11 to 15 years | 0.00 | 16.27 | 15.58 | 24.60 | 56.45 |
| Productivity with bearing period 16 to 20 years | 0.00 | 26.00 | 21.20 | 15.40 | 62.60 |
| Productivity with bearing period above 20 years | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Source: Field Survey Data Collected by AERC, University of Madras

The percentage area under oil palm is given in Table 4.4. The percentage area planted under oil palm mature area are attain about 2.65 acre for the first two years. The marginal farmers are cultivate 1 acre and as compared with 5 acre for medium farmers. The percentage area planted are attain 5 acre for bearing 11-15 years. The area under palm oil cultivation by marginal, small, medium and large farmers are taken risk and opportunity cost is high. They are bear the opportunity cost high and no inflow of cash during the entire gestation period of 3 years before palm start bearing FFBs is zero. It implies that the majority of the farmers are cutting down the palm oil tree after 15 years period. The farmers are interested to cultivate alternative crops and production also decline trend.

The productivity by the marginal farmers are recorded highest yield of 21. 47 tonnes as against to 12.24 tonnes for large farmers annually during 10 years. The small farmers are recorded highest yield of 26 tonnes as compared with 15.4 tonnes for larger farmers after bearing twenty years. Thereafter, the palm plantation are cutting off their plants due to dry conditions and lack of availability of water. The bearing plantation period are 5 to 25 years. Some marginal farmers are uprooted their plants after 10-15 years. It implies that the yield of palm plantation is mainly depending upon its age. The age-specific land productivity of oil palm garden is take into consideration of the entire economic life span.

The percentage area under palm plantation is gives the highest yield. The average yield per acre by small farmers is worked out to 26 acre against with 1.58 tonnes for small farmers. It is found that the modern high-yielding varieties of palm are produce highest yield due to climate conditions and good management. Even though, non-availability of quality indigenous planting material in proportion to the area expansion is main problem. The second constraints is non-availability of processing mills within in the district.The third constraint is inadequate water. It leads to no opening of spear leaves and decrease leaf production rate. Any deficit in the availability of moisture adversely affects yield, both in terms of number of bunches and their weights.

**4.2 Net Returns from Indigenous versus Exotic Varieties of Oil Palm**

Cost of cultivation is one the determine factors to the farming community. There is cost variation among the new planting and existing planting. When compare the two cost, existing planting is very less cost than new planting. The establishment cost for a new plantation will be incurred more 20-30 percent of cost. New plantings are need more intensive land preparations, including the setup of new terraces, drainage systems, roads and pathways. The costs are depending the farming and management systems. There is needed higher cost incurred during the first three years. Thereafter, the cost will be decline and became mature and fresh fruit bunches could be harvested monthly and economically during 16 to 25 years.

The direct costs like inputs, harvesting, maintenance and plantation maintenance are involved. The inputs like fertilizers, products for controlling pests, weeds, and diseases are incurred. The second cost harvesting like pruning, harvesting, collection, transport, maintenance, management and agricultural equipment are incurred. The third expenses for plantation like roads, harvesting paths, bridges, drainage. Indirect costs comprise the depreciation of plantation and equipment, overheads

The total cost of cultivation can be classified into two broad categories such as establishment cost (EC) and maintenance cost (MC). The total cost of cultivation including fixed cost value is estimated at Rs. 36,932/acre. The average production costs of a mature plantation are estimated at Rs. 36, 932. The major cost components are weeding (14. 38 percent), fertilizers (12. 38 percent), land preparation (10.84 percent) and harvesting cost (9.86 percent). The marginal farmers are spending the fertilizercosts with 14.13 percent. The average cost of establishing for palm mature area could attain about Rs.32, 510 for the first three years.

Cost of production depends on land productivity besides cost of cultivation. In terms of land-use, oil palm gives the highest yield per acre area as compared with any other crops like paddy, sugarcane, cotton and pulses. The average oil yield per acre for oil palm is 7.70 tonnes, as compared with paddy, sugarcane, cotton and pulses, respectively. The production per acre for small farmers has estimated at 7.07 tonnes as compared with 8.36 tonnes for large farmers. It is found that there is considerable potential for small holders to expand output on existing acreages through the use of fertilizer and new genetic stock. Increasing the yield of palm oil production gives the potential to increase the production without requiring additional land conversion. Land-use returns from oil palm are significant as compared with many other forms of land-use. Due to low levels of mechanization, large oil palm plantations are labor intensive. A majority of palm oil plantations are smallholders involved. The income generation is higher than other competing crops. While incomes earned by smallholders vary widely and are impacted by market access, international pricing, and the form of smallholder engagement, many smallholders their income from oil palm cultivation is significantly higher than income from subsistence farming or from competing cash crops. The more transport cost are incurred by the farmers. Every time, the farmer are spending high transport cost. It will take care by the concerned company.

Table 4.5: Net Returns per Acre from Oil Palm: Exotic Variety (Rs per Acre)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Farm Size | Marginal | Small | Medium | Large | Total |
| Average Area Planted (acres) | 1.05 | 2.07 | 3.43 | 4.79 | 2.84 |
| Preparatory tillage | 4006.35  (10.65) | 4014.27  (10.87) | 3976.42  (10.83) | 4012.09  (11.0) | 4002.28  (10.84) |
| Manure & FYM | 5313.12  (14.13) | 4313.39  (11.68) | 4327.04  (11.78) | 4352.0  (11.93) | 4576.39  (12.38) |
| Major and minor nutrients | 998.98  (2.66) | 1008.9  (2.73) | 1000.97  (2.73) | 1005.3  (2.760) | 1003.54  (0.0) |
| Transplanting and gap filling | 2954.41  (7.86) | 2951.63  (7.99) | 2940.55  (8.01) | 2945.75  (8.08) | 2948.09  (7.98) |
| Irrigation charges | 1611.57  (4.29) | 1610.96  (4.36) | 1609.85  (4.38) | 1606.58  (4.40) | 1609.74  (4.36) |
| Inter cultural operations | 1602.63  (4.24) | 1601.6  (4.34) | 1610.85  (4.39) | 1592.04  (4.36) | 1601.78  (4.34) |
| Plant protection chemicals | 1069.18  (2.84) | 1078.48  (2.92) | 1091.98  (2.97) | 1070.95  (2.94) | 1077.65  (2.92) |
| Weeding and plant protection measures | 5306.26  (14.11) | 5300.01  (14.35) | 5310.17  (14.46) | 5329.55  (14.61) | 5311.50  (14.38) |
| Harvesting and collection | 3652.59  (9.71) | 3682.05  (9.97) | 3632.27  (9.89) | 3598.8  (9.87) | 3641.43  (9.86) |
| Pruning | 3112.57  (8.28) | 3118.02  (8.44) | 3110.61  (8.47) | 3117.92  (8.55) | 3114.78  (8.44) |
| Grading, storage, transport, packing | - | - | - | - | - |
| Market/mandi fee etc. | - | - | - | - | - |
| Interest on Working Capital# | - | - | - | - | - |
| Variable labour cost | 3548.29  (9.44) | 3845.43  (10.41) | 3675.9  (10.01) | 3423.24  (9.38) | 3623.22  (9.41) |
| Total Variable Cost | 33175.95  (88.23) | 32524.74  (88.07) | 32286.61  (87.93) | 32054.22  (87.88) | 32510.38  (88.03) |
| Fixed cost including planting material, field preparation cost, supporting material and irrigation setup (Amortized over the life time)## | 4427.55  (11.73) | 4405.05  (11.93) | 4430.91  (12.07) | 4421.62  (12.12) | 4421.28  (11.97) |
| Total Cost | 37603.5  (100.0) | 36929.79  (100.0) | 36717.52  (100.0) | 36475.84  (100.0) | 36931.66  (100.0) |
| Total Revenue | 47024.31 | 48976.15 | 48838.45 | 46305.52 | 47786.11 |
| Total Revenue - Total Cost | 9420.81 | 12046.36 | 12120.93 | 9829.68 | 10854.45 |
| Total Revenue - Variable Cost | 13848.36 | 16451.41 | 16551.84 | 14251.3 | 15275.73 |
| Output produced per acre (quintals) | 8.36 | 7.6 | 7.77 | 7.07 | 7.70 |

Source: Field Survey Data Collected by AERC, University of Madras

Note: All variable cost items consist of two components:

Bearing period cost - that is already during the reference period (i.e., 2015-16)

Cost during the plantation year/gestation period - that has been brought into the 2015-16 prices from the year of plantation

/gestation, using the wholesale price index of all commodities for Karnataka state.

@ Repair, maintenance and depreciation is 10% discounted value of agricultural assets holdings including tractor &

implements and tubewell motor etc. that is divided in proportionate to each crop sown during the year.

# Interest on working capital is interest paid on the loans/borrowing divided in proportionate to each crop sown

during the year.

## For amortization refer to the literature Subrahmanyam and Mohandoss (1982), Misra (1992), Sarma (1996),

Chand (1994) – the details given in Chapter Plan References

Table 4.6: Net Returns per Acre from Oil Palm: Indigenous Variety (Rs per Acre)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Farm Size | Marginal | Small | Medium | Large | Total |
| Average Area Planted (acres) | 1.62 | 2.36 | 3.59 | 5.60 |  |
| Preparatory tillage | 3743.81  (10.57) | 2827.76  (7.53.0) | 3397.22  (8.71) | 3068.12  (8.24) | 3259.23  (8.74) |
| Manure & FYM | 3852.08  (10.87) | 4261.34  (11.35) | 4810.13  (12.34) | 5333.57  (14.32) | 4564.28  (12.24) |
| Major and minor nutrients | 2947.61  (8.32) | 3170.65  (8.44) | 3109.08  (7.97) | 2989.18  (8.03) | 3054.13  (8.19) |
| Transplanting and gap filling | 2947.61  (8.32) | 3439.45  (9.16) | 3282.99  (8.42) | 2943.56  (7.90) | 3153.40  (8.45) |
| Irrigation charges | 1557.71  (4.40) | 1868.97  (4.98) | 1783.10  (4.57) | 1605.64  (4.31) | 1703.86  (4.57) |
| Inter cultural operations | 1589.55  (4.49) | 1858.97  (4.95) | 1790.92  (4.59) | 1602.92  (4.30) | 1710.59  (4.59) |
| Plant protection chemicals | 1040.99  (2.94) | 1248.81  (3.33) | 1191.06  (30.06) | 1069.92  (2.87) | 1137.70  (3.05) |
| Weeding and plant protection measures | 5243.47  (14.80) | 5035.29  (13.41) | 5901.44  (15.14) | 5299.42  (14.23) | 5369.91  (14.40) |
| Harvesting and collection | 3570.02  (10.08) | 4261.34  (11.35) | 4064.26  (10.42) | 3629.02  (9.74) | 3881.16  (10.41) |
| Pruning | 1571.01  (4.43) | 1840.01  (4.90) | 1758.51  (4.51) | 1610.31  (4.32) | 1694.96  (4.54) |
| Grading, storage, transport, packing | - | - | - | - | - |
| Market/mandi fee etc. | - | - | - | - | - |
| Interest on Working Capital# | - | - | - | - | - |
| Variable labour cost | 2809.00  (7.93) | 3117.10  (8.30) | 3451.11  (8.85) | 3614.17  (9.71) | 3247.85  (8.71) |
| Total Variable Cost | 30872.86  (87.15) | 32929.69  (87.70) | 34539.82  (88.59) | 32765.83  (87.99) | 32777.05  (87.88) |
| Fixed cost including planting material, field preparation cost, supporting material and irrigation setup including that of gestation period (Amortized over the life time)## | 4550.55  (12.85) | 4617.59  (12.30) | 4446.70  (11.41) | 4474.35  (12.01) | 4522.30  (12.12) |
| Total Cost | 35423.41  (100.0) | 37547.28  (100.0) | 38986.52  (100.0) | 37240.18  (100.0) | 37299.35  (100.0) |
| Total Revenue | 117647.60 | 105354.11 | 104346.67 | 72074.32 | 99855.68 |
| Total Revenue - Total Cost | 82224.19 | 67806.83 | 65360.15 | 34834.14 | 62556.33 |
| Total Revenue - Variable Cost | 86774.74 | 72424.42 | 69806.85 | 39308.49 | 67078.62 |
| Output produced per acre (quintals) | 15.95 | 16.52 | 16.23 | 11.4 | 15.02 |

Source: Field Survey Data Collected by AERC, University of Madras

Note: All variable cost items consist of two components:

Bearing period cost - that is already during the reference period (i.e., 2015-16)

Cost during the plantation year/gestation period - that has been brought into the 2015-16 prices from the year of plantation

/gestation, using the wholesale price index of all commodities for Karnataka state.

@ Repair, maintenance and depreciation is 10% discounted value of agricultural assets holdings including tractor &

implements and tubewell motor etc. that is divided in proportionate to each crop sown during the year.

# Interest on working capital is interest paid on the loans/borrowing divided in proportionate to each crop sown

during the year.

## For amortization refer to the literature Subrahmanyam and Mohandoss (1982), Misra (1992), Sarma (1996),

Chand (1994) – the details given in Chapter Plan References

Out of various cost components, costs on weeding (14.4 percent), fertilisers (12.24 percent), harvesting (10.41 percent), land preparation (8.74 percent), transplantation (8.45 percent) and nutrients (8.19 percent) constitute 63.4 percent of total cost of cultivation. On the other hand, plant protection (3.05 percent), pruning (4.54 percent), irrigation charges (4.57 percent) and inter-cultural operations (4.59 percent) constitute lowest costs incurred.

The total cost of cultivation are worked out to Rs. 37, 299 and of which, medium farmers are spent highest cost of Rs. 38, 986 and against lowest cost spent by marginal farmers (Rs. 35, 423).The total income to the farmers are calculated to Rs. 99, 856 and of that, marginal farmers are receive highest revenue of Rs. 1,17, 648 and lowest income earned by large farmers (Rs. 72,074). The net income are received Rs. 62, 556. The marginal farmers are got the highest income of Rs. 82, 274 as compared with Rs. 34, 834 for large farmers. The average output produced by the farmers are driven out to 15.02 tonnes. The small farmers are recorded highest output of 16.52 tonnes as compared with 11.4 tonnes for large farmers. The farmers are spending more cost during the time harvesting time and clear the wastage from the trees. There is huge incidental charges at the time harvesting stage.

**4.3 Use of Human Labour in Oil Palm by Activities**

The use of human labour in palm oil by activities (man days per Acre) are presented in Table 4.7. The total man days for palm oil cultivation are worked out at 81 days per year.

Table 4.7: Use of Human Labour in Palm Oil by Activities (Man Days per Acre)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Farm Size | Marginal | Small | Medium | Large | Total |
| Preparatory tillage | 4.72 | 4.74 | 4.72 | 4.75 | 4.73 |
| Manure & FYM | 3.98 | 4.00 | 3.97 | 3.92 | 3.97 |
| Major and minor nutrients | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Transplanting and gap filling | 12.84 | 12.83 | 12.81 | 12.88 | 12.84 |
| Irrigation | 7.01 | 7.00 | 7.00 | 6.98 | 7.00 |
| Inter cultural operations | 6.97 | 6.96 | 6.97 | 6.97 | 6.97 |
| Plant protection | 4.65 | 4.68 | 4.64 | 4.65 | 4.66 |
| Weeding and plant protection measures | 11.81 | 11.81 | 11.86 | 11.89 | 11.84 |
| Harvesting and collection | 15.88 | 15.89 | 15.91 | 15.78 | 15.87 |
| Pruning | 13.53 | 13.53 | 13.51 | 13.53 | 13.53 |
| Grading, storage, transport, packing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total man days (palm oil) | 81.39 | 81.44 | 81.39 | 81.35 | 81.39 |
| Total man days (main kharif crops) | 46.78 | 42.95 | 48.34 | 44.12 | 45.55 |
| Total man days (main rabi crops) | 38.15 | 40.56 | 39.10 | 42.14 | 39.99 |
| Total man days (main summer crops) | 10.14 | 12.18 | 15.29 | 16.43 | 13.51 |
| Total man days (other perennial crops) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Source: Field Survey Data Collected by AERC, University of Madras

Note: # Mandays are calculated by dividing the labour cost by the prevailing wage rate during the year in which cost was incurred for example, for the bearing period wage rate is for 2015-16

The harvesting, pruning, transplantation and weeding are constitutes the highest use of human days. It accounts for 16 days, 14 days, 13 days and 12 days, respectively. On the contrary, manure, plant protection and land preparation constitutes for lowest man days used in the field. It accounts for 4 days and 5 days, respectively used by the farmers. It is found that the harvesting, pruning, transplantation and weeding are incurred more number of days used by the farmers. Generally, manure, plant protection and land preparation are uses at one time basis.

Table 4.8: Marketing Channels through which Oil Palm Sold by the Selected Households (Percent)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Wholesale market | Local market | Village directly | Coop-erative | Govt.  agencies | Intermediaries  at farm gate | Merchant or pre-arranged Contract | Others |
| Exotic variety | | | | | | | | |
| Marginal | - | - | - | - | - | - | 100.0 | - |
| Small | - | - | - | - | - | - | 100.0 | - |
| Medium | - | - | - | - | - | - | 100.0 | - |
| Large | - | - | - | - | - | - | 100.0 | - |
| Total | - | - | - | - | - | - | 100.0 | - |
| Indigenous variety- | | | | | | | | |
| Marginal | - | - | - | - | - | - | 100.0 | - |
| Small | - | - | - | - | - | - | 100.0 | - |
| Medium | - | - | - | - | - | - | 100.0 | - |
| Large | - | - | - | - | - | - | 100.0 | - |
| Total | - | - | - | - | - | - | 100.0 | - |

Source: Field Survey Data Collected by AERC, University of Madras

The marketing channels through which oil palm sold by the selected households is given in Table 4.8. All the farming community are selling their bunch of fruits to the Godrej Agro Private Ltd, Trichirapalli. The Company is located near Ariyalur. Every village have collection centre and the company officials are collecting the fruits regularly inner around the districts of Tamil Nadu. The Godrej Agro Private Ltd have collection van and collecting regularly from the farmers without any delay.

**4.3 Subsidy Received by Households Growing Oil Palm**

The Government of India have identifying the potentiality of the oil palm and offering the subsidy for the farmers. The State Departments of Agriculture have been given support to the promoting the crop. It also provided the subsidy for seed material as well as cultivation practices during the juvenile stage.

Table 4.9: Subsidy Received for Growing Palm Oil (Rs per Acres)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| S.No | Details of subsidy received | Marginal | Small | Medium | Large | Total |
| Details of activities for which subsidy received (% of households) | | | | | | |
| 1 | Establishment of seed /provision of seed | 25.19 | 24.74 | 25.09 | 25.15 | 25.05 |
| 2 | Planting material | 29.61 | 29.87 | 29.65 | 29.75 | 29.72 |
| 3 | Installation of pump set | 0 | 0 | 0 | 0 | 0 |
| 4 | Bore well/water harvesting /ponds | 0 | 0 | 0 | 0 | 0 |
| 5 | Establishment of drip irrigation | 0 | 0 | 0 | 0 | 0 |
| 6 | Establishment of sprinkler irrigation | 0 | 0 | 0 | 0 | 0 |
| 7 | Inputs for intercropping like seed, fertilizer | 11.05 | 11.05 | 10.99 | 11.09 | 11.05 |
| 8 | Construction of vermi compost unit | 5.71 | 5.67 | 5.69 | 5.72 | 5.70 |
| 9 | Machinery and other tools | 13.68 | 13.87 | 13.87 | 13.47 | 13.72 |
| 10 | Tree guard | 0 | 0 | 0 | 0 | 0 |
| 11 | Maintenance cost during gestation period | 14.76 | 14.80 | 14.71 | 14.81 | 14.77 |
| 12 | Harvesting incentives | 0 | 0 | 0 | 0 | 0 |
| 13 | Oil palm processing unit | 0 | 0 | 0 | 0 | 0 |
| 14 | Farmer’s training and information | 0 | 0 | 0 | 0 | 0 |
| 15 | Demonstration, farmers visit etc. | 0 | 0 | 0 | 0 | 0 |
| Amount of subsidy received (Rs per household) | | | | | | |
| 1 | Establishment of seed /provision of seed | 2670.71 | 2609.32 | 2667.26 | 2657.52 | 2651.20 |
| 2 | Planting material | 3139 | 3150.39 | 3151.76 | 3142.95 | 3146.03 |
| 3 | Installation of pump set | 0 | 0 | 0 | 0 | 0 |
| 4 | Bore well/water harvesting /ponds | 0 | 0 | 0 | 0 | 0 |
| 5 | Establishment of drip irrigation | 0 | 0 | 0 | 0 | 0 |
| 6 | Establishment of sprinkler irrigation | 0 | 0 | 0 | 0 | 0 |
| 7 | Inputs for intercropping like seed, fertilizer | 1171.64 | 1165.62 | 1168.16 | 1171.64 | 1169.27 |
| 8 | Construction of vermi compost unit | 605.45 | 597.55 | 604.42 | 604.74 | 603.04 |
| 9 | Machinery and other tools | 1449.9 | 1462.42 | 1474.4 | 1423.57 | 1452.57 |
| 10 | Tree guard | 0 | 0 | 0 | 0 | 0 |
| 11 | Maintenance cost during gestation period | 1565.38 | 1560.45 | 1563.52 | 1564.38 | 1563.43 |
| 12 | Harvesting incentives | 0 | 0 | 0 | 0 | 0 |
| 13 | Oil palm processing unit | 0 | 0 | 0 | 0 | 0 |
| 14 | Farmer’s training and information | 0 | 0 | 0 | 0 | 0 |
| 15 | Demonstration, farmers visit etc. | 0 | 0 | 0 | 0 | 0 |
| Amount of subsidy received (Rs per acre of palm oil planted) | | | | | | |
| 1 | Establishment of seed /provision of seed | 2487.14 | 2646.82 | 2644.15 | 2694.15 | 2618.07 |
| 2 | Planting material | 2923.24 | 3146.78 | 3145.93 | 3128.78 | 3086.18 |
| 3 | Installation of pump set | 0 | 0 | 0 | 0 | 0 |
| 4 | Bore well/water harvesting /ponds | 0 | 0 | 0 | 0 | 0 |
| 5 | Establishment of drip irrigation | 0 | 0 | 0 | 0 | 0 |
| 6 | Establishment of sprinkler irrigation | 0 | 0 | 0 | 0 | 0 |
| 7 | Inputs for intercropping like seed, fertilizer | 1091.11 | 1168.79 | 1178.36 | 1146.79 | 1146.26 |
| 8 | Construction of vermi compost unit | 563.84 | 602.44 | 609.73 | 612.44 | 597.11 |
| 9 | Machinery and other tools | 1350.24 | 1454.63 | 1451.86 | 1459.63 | 1429.09 |
| 10 | Tree guard | 0 | 0 | 0 | 0 | 0 |
| 11 | Maintenance cost during gestation period | 1457.78 | 1573.08 | 1562.39 | 1578.08 | 1542.83 |
| 12 | Harvesting incentives | 0 | 0 | 0 | 0 | 0 |
| 13 | Oil palm processing unit | 0 | 0 | 0 | 0 | 0 |
| 14 | Farmer’s training and information | 0 | 0 | 0 | 0 | 0 |
| 15 | Demonstration, farmers visit etc. | 0 | 0 | 0 | 0 | 0 |

Source: Field Survey Data Collected by AERC, University of Madras

Active participation of private as well as state government undertakings in the development and processing, zonalization of the area, formation of project management committee and price fixation committee and reviewing them at quarterly interval are the few reasons for its successful launching. (P Kalidas, S Chander Rao and K J Prabhakar, 2014)

Major assistance for planting material, cultivation and drip irrigation would be made available under OPDP scheme. The Government are providing assistance for planting material with 85 percent of cost of seedlings with a ceiling of Rs.8, 000/ha, for entire land holding of the farmer. The second assistance is cultivation cost with 50 percent of the cost of inputs during the gestation period of 4 years. The assistance for drip irrigation will be 50 percent of the cost for small, marginal, SC, ST and Women farmers and for other category of farmers the assistance will be 35 percent of total cost of the prevailing competitive market rate. Assistance for diesel pump sets is in view of shortage of power, assistance of 50 percent of the cost subject to a maximum of Rs. 15,000 for installation of diesel pump sets will be provided, at least to those farmers who take up 5 ha. The fourth assistance is vermin compost worth of Rs. 15, 000/ha and cutter (Rs. 1500/ha), protective wiring (Rs. 15,000/ha.) and Motered Diesel (Rs. 10,000/ha.) (National Mission on Oilseeds and Oil Palm in Tamil Nadu, 2015-16).

The subsidy received for growing palm oil in the study area is given in Table 4.9. Out of various subsidies, planting material is one of the highest subsidy provide by the government to the farmers. The plantation material per household are received at Rs. 3,146 and followed by establishment of seed cost worth of Rs. 2,651. The third highest subsidy received by the farmers are maintenance cost (Rs. 1563) and followed by machinery tolls (Rs.1,453).

The percentage of planting material subsidy to the total subsidy per household are receive at 29.72 percent and followed by establishment of seed (25 percent). The percentage of maintenance subsidy are received at 15 percent and followed by machinery tools (11.05 percent). On the contrary, the lowest percentage of subsidy are vermi compost (6 percent). Among the planting material, all the size of farmers are receive the more or less same cash kind of subsidy. Whereas for establishment of seed, the four kinds of farmers are receive same cash.

The amount of subsidy received were worked out to Rs. 10, 420. Of which, the medium farmers are receive the highest subsidy of Rs. 10, 620 as compared with Rs. 9,873 for marginal farmers. It implies that the all the farmers irrespective of size are receive more or less same kind of cash subsidy in the study area. It is gathered that farmers, particularly marginal and small farmers are not get properly the subsidies by the government. The farmers are not known the subsidies amount for different incentives. There is a need to scale up the incentives in a big way to accelerate area expansion. The second is increase their subsidies for oil palm growers in the study area.

**4.5 Farmers Motivation and their Perception about Oil Palm Cultivation**

Table 4.11: What motivated farmers to grow oil palm crop (Percent of households)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Details of training | Marginal | Small | Medium | Large | Total |
| What motivated farmers to grow oil palm | | | | | |
| High Yielding from Oil Palm Cultivation | 7.50 | 11.00 | 10.50 | 11.00 | 40.00 |
| More Profit from Oil Palm Cultivation | 8.50 | 15.00 | 10.50 | 8.00 | 42.00 |
| Less labour uses | 5.00 | 7.00 | 4.00 | 2.00 | 18.00 |
|  |  |  |  |  |  |
| Who provided technical knowhow? | | | | | |
| Godrej Agrovet Private Ltd | 15.00 | 19.00 | 16.00 | 13.50 | 63.50 |
| Dept. of Agriculture, Govt.of Tamil Nadu | 4.50 | 7.50 | 2.50 | 3.00 | 17.50 |
| Fellow Farmers | 1.50 | 6.50 | 6.50 | 4.50 | 19.00 |
|  |  |  |  |  |  |
| Farmers knowledge about the existing varieties | | | | | |
| Yes | 3.50 | 13.00 | 4.00 | 4.00 | 24.50 |
|  |  |  |  |  |  |
| Why growers prefer particular variety they grow | | | | | |
| Good Yield received | 10.50 | 22.50 | 15.00 | 15.00 | 63.00 |
|  |  |  |  |  |  |
| The government support received in growing oil palm | | | | | |
| Financial Assistance from Government | 9.00 | 18.50 | 13.00 | 12.50 | 51.00 |
| Subsidy Assistance from Government | 12.00 | 17.00 | 12.00 | 8.00 | 49.00 |
|  |  |  |  |  |  |
| Support received from oil palm procuring company | | | | | |
| Nursery and Planting Material provide | 13.00 | 23.50 | 18.00 | 11.00 | 66.00 |
| Procurement facilities arrangement | 8.00 | 9.50 | 7.00 | 9.50 | 34.00 |

Source: Field Survey Data Collected by AERC, University of Madras

The motivated farmers to grow oil palm crop from the farmers perception is given in Table 4.11. About 42 percent and 40 percent precept that they are motivated by the way of high yielding and earning more profit from oil palm growing. The Department of Agriculture, Government of Tamil Nadu, Godrej Agrovet Ltd and Fellow farmers are providing technical support to the farmers in the village. 64 percent, 19 percent and 17 percent reported that they have receive the technical support from Godrej Agrovet Ltd, Fellow farmers and Department of Agriculture, Government of Tamil Nadu. It implies that the Godrej Agrovet Ltd are providing technical support to the farmers. Two-third of the technical support provide by the Godrej Agrovet Ltd and Fellow farmers.

The farmer’s knowledge about the existing oil palm varieties are very poor conditions in the study area. About 25 percent viewed that they are known about the existing varieties is very lack. The farmers are using the varieties without knowing about the features. The main motive of the oil palm growers are preferring the varieties due to the good yielding for the long-period of time. 63 percent viewed that the growers prefer particular variety due to good yielding. Two-thirds of growers are prefer due to good yielding from oil palm cultivation.

The oil palm growers are generally receive the government support in Tamil Nadu. Two components like financial assistance and subsidy are provided by the government. 51 percent and 49 percent viewed that they receive the financial assistance and subsidy from government. It implies that the financial assistance and subsidy are provide with equal share in the study area. Godrej Agrovet Ltd also provides supports to the farmers for the oil palm cultivation. 66 percent and 34 percent reported that they are received nursery and planting material and procurement facilities to the farmers from the concerned company. It implies that the all the farmers are receiving nursery and planting and procurement facilities. The company have establishing nursery for the oil palm plantation in 11 districts of Tamil Nadu.

Table 4.12: Did Government Help Households to Increase their Area under Oil Palm (Percentage of households saying yes to the following questions)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Description | Marginal | Small | Medium | Large | Total |
| Making available good quality seedling | 13.50 | 14.08 | 14.35 | 15.28 | 14.30 |
| Making available good quality other planting material | 14.50 | 15.16 | 16.14 | 15.28 | 15.27 |
| Making available inter cropping facility like seed, fertilizer for the intercrop | 14.00 | 18.77 | 13.00 | 12.50 | 14.57 |
| Making provision for pump house for sufficient irrigation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Facilitating for drip/sprinkler irrigation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Protected cultivation like green house, shade net, plastic tunnel etc | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Making provision for buy back of FFB through a company | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Promotion of integrated nutrient management or integrated pest management | 14.00 | 15.88 | 13.00 | 15.28 | 14.54 |

Source: Field Survey Data Collected by AERC, University of Madras

The Government help households to increase their area under oil palm is presented in Table 4.12. The cent percent reported that the making provision for buy back of FFB through a company. All the farmers are selling their fruits to the Godrej Agrovet Private Ltd, Ariyalur. About 14.30 percent of the farmers reported that the making available good quality seeds. The ranging from 13.50 percent to 15.28 percent for the marginal farmers to large farmers viewed that the quality of seeds. 15.27 percent viewed that the making available good quality other planting materials. 15 percent viewed that the making available inter cropping facility like seed, fertilizer for the intercrop in the study area. 14.54 percent viewed that the promotion of integrated nutrient management or integrated pest management. It implies that the quality of seed is normal conditions. The intercropping facilities like fertilizers, seeds are available to the farmers with short supply. The integrated nutrient management or integrated pest management are available with meagre level.

The perception of growers about the oil palm cultivation in the study area is given in Table 4.13. Cent percent reported that they are providing seeds to the farmers for growing palm oil cultivation. The seeds nursery are provide by the Godrej Agrovet Private Ltd, Ariyalur. Cent percent percept that the providing pre-harvest contract though buy back by a company. The Godrej Agrovet Private Ltd is arrange to buy the fruits from the farmers. The seeds garden are maintained by the concerned company. Input is another important subsidy and 56.5 percent viewed that the government are providing material inputs.

Table 4.13: Perception of Growers about the Oil Palm Cultivation(Percent of Households)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Details of training | Marginal | Small | Medium | Large | Total |
| How government has helped you to increase your area under oil palm | | | | | |
| By providing seedling/nursery | 21.00 | 33.00 | 25.00 | 21.00 | 100.00 |
| By providing material inputs | 11.00 | 19.50 | 13.50 | 12.50 | 56.50 |
| By capacity building (providing training) | 9.50 | 11.50 | 12.00 | 13.00 | 46.00 |
| By providing processing facilities | 21.00 | 21.50 | 17.00 | 15.00 | 74.50 |
| By providing pre harvest contract though buy back by a company | 21.00 | 33.00 | 25.00 | 21.00 | 100.00 |
| By providing procurement facility | 21.00 | 33.00 | 25.00 | 21.00 | 100.00 |
| What are the good points in the policy towards palm oil | | | | | |
| Financial assistance | 12.00 | 17.00 | 8.00 | 8.50 | 45.50 |
| Building infrastructure | 6.00 | 9.00 | 7.00 | 8.50 | 30.50 |
| Capacity Building (awareness camps) | 13.00 | 22.00 | 16.00 | 12.00 | 63.00 |
| Subsidy provision | 13.50 | 24.50 | 16.00 | 11.50 | 65.50 |
| Any other | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Do you think your income has grown up after cultivation of oil palm crop, if yes how much? | | | | | |
| Less than 20 Percent | 16.50 | 25.00 | 14.00 | 9.50 | 65.00 |
| 20 to 40 Percent | 4.00 | 6.00 | 7.50 | 6.00 | 23.50 |
| 40 to 60 Percent | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 to 100 Percent | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| No increase at all | 0.50 | 1.00 | 3.50 | 5.50 | 10.50 |

Source: Field Survey Data Collected by AERC, University of Madras

Subsidy is one of the assistance given to the farmers. 65 percent viewed that the subsidy received from the government with healthy manner. Financial assistance is provide by the banks and cooperative institutions. 46 percent reported that they receive the adequate financial assistance from banking sector. It implies that the special subsidy and financial assistance are provide to the farmers for palm oil growers in the study area.

The generation of income from oil palm cultivation is recently way of income to the farmers. More than 64 percent of those households had increased their income 20 percent after engagement in oil palm cultivation. About 24 percent who engaged in oil palm cultivation had increased their income 20 to 40 percent over period of time. We found that oil palm cultivation is not the only source of household income. Oil palm cultivation contributed 88.5 percent of total family income. From household survey data in Cuddalore and Thanjavur Districts of Tamil Nadu, the proportion of income varied from oil palm cultivation ranging from 64 percent to 88 percent. The structure of the relationship between farmers and the plantation company that buy their fruits is a major determinant of farmer’s income. There are several significant variability even within these types. The farmers are free to sell to only to the Godgrej Agrovet Ltd. The farmers have access to support through access to credit, technical assistance, FFB transport or other means from the Godrej Agrovet Ltd. The average income from oil palm cultivation is significantly higher than income from other crops in the study area.

**4.6 Summary**

The area under indigenous varieties are 12.68 acre as compared with 11.34 acre for exotic varieties. They are using more the indigenous than the exotic varieties. Among the indigenous varieties,the small and medium farmers are cultivate 30.3 percent and 29.8 percent, respectively. Among exotic varieties, the marginal farmers are cultivating 48 percent and larger farmers are cultivating 8.28 percent.

The production for indigenous and exotic varieties are 15.02 tonnes and 7.70 tonnes, annually. It implies that the indigenous are more production than the exotic varieties due to the long-period of time (10 to 20 years) plantation. Whereas for exotic varieties, three to five years plantation. The output for indigenous and exotic cultivators are Rs. 1,10,994 and Rs. 41, 261/acre, respectively. The marginal farmers are receiving more output value because of regular work and continued work in their farm field. On the contrary, the large farmers are receive with lowest value because cutting their plantation trees for alternative crops and ignorance of their work. The output for indigenous and exotic varieties per household are Rs. 3,02,002 and Rs. 1,18,001, respectively. It implies that the large farmers are receive the highest value of money than the marginal farmers due to the large land holding and more financial capacity.

The actual price received for the indigenous and exotic varieties are Rs. 6,412 and Rs. 5, 380, respectively. It implies that the indigenous are recovery more extraction ratio than the exotic varieties. The domestic prices of oil palm are significantly influenced by production capacity. There is continuous drought conditions and improper and inadequate nutrition guidance for new plantations is inadequate and imbalanced resulting in lower FFB yields and low Oil Extraction Ratio (OER).Among indigenous cultivators, productivity during the peak season is calculated to 15.26 tonnes annually. The average productivity among the two seasons are 2.95 tonnes and accounts for 19.42 percent. The large farmers are receive the highest variation of 19.77 percent and marginal farmers are receive lowest variation of 19 percent. It implies that the productivity received from indigenous variety during peak season is higher than the lean season.

Among exotic varieties, the productivity during peak and lean season are 7 tonnes and 5.73 tonnes, respectively. The percentage variation among peak and lean season are 18 percent. It implies that the low yield due to unfavorable climatic conditions, poor quality planting material, improper intercropping practices, inadequate application of fertilizers. The most important causes are irrigation and it has been found to be a critical factor for getting low yields.

The area planted under oil palm are 2.65 acre for the first two years. The marginal farmers are cultivate 1 acre and as compared with 5 acre for medium farmers for bearing 11-15 years. The marginal, small, medium and large farmers are taken risk and opportunity cost is high. They farmers are bear the opportunity cost high and no inflow of cash during the entire gestation period of 3 years before palm start bearing FFBs is zero. It implies that the majority of the farmers are cutting down the palm oil tree after 15 years period. The farmers are interested to cultivate alternative crops and production also decline trend.

The marginal farmers are recorded highest yield of 21.47 tonnes as against to 12.24 tonnes for large farmers during 10 years. The small farmers are recorded highest yield of 26 tonnes as compared with 15.4 tonnes for larger farmers after bearing twenty years. Thereafter, the palm plantation are uproot their plants due to dry conditions and lack of availability of water and the bearing plantation period are 5 to 25 years. Some marginal farmers are uproot their plants after 10-15 years. It implies that the yield of plantation is mainly depending upon its age. The age-specific land productivity of oil palm garden is take into consideration of the entire economic life span.

It is found that the modern high-yielding varieties of palm are produce highest yield due to climate conditions and good management. Even though, non-availability of quality indigenous planting material in proportion to the area expansion is main problem. The second constraints is non-availability of processing mills within in the district. The third constraint is inadequate water. It leads to no opening of spear leaves and decrease leaf production rate. Any deficit in the availability of moisture adversely affects yield, both in terms of number of bunches and their weights.

Average production costs for exotic varieties are Rs. 36, 932. The major cost components are weeding (14.38 percent), fertilizers (12.38 percent), land preparation (10.84 percent) and harvesting cost (9.86 percent). The cost of establishing for palm mature area attain about Rs.32, 510 for the first three years. It is found that there is considerable potential for small holders to expand output on existing acreages through the use of fertilizer. Due to low levels of mechanization, large oil palm plantations are labor intensive. A majority of palm oil plantations are smallholders involved. While incomes earned by smallholders vary widely and are impacted by market access, international pricing, and the form of smallholder engagement, many smallholders their income from oil palm cultivation is significantly higher than income from subsistence farming or from competing cash crops.

Among indigenous varieties, costs on weeding (14.4 percent), fertilizers (12.24 percent), harvesting (10.41 percent), land preparation (8.74 percent) and transplantation (8.45 percent) and nutrients (8.19 percent) constitute 63.4 percent of total cost of cultivation. On the other hand, plant protection (3.05 percent), pruning (4.54 percent), irrigation charges (4.57 percent) and inter-cultural operations (4.59 percent) constitute lowest costs incurred. The cost of cultivation are Rs. 37,299 and the total income are calculated to Rs. 99, 856.

The total man days for palm oil cultivation are worked out at 81 days per year. The harvesting, pruning, transplantation and weeding are constitutes the highest use of human days. It accounts for 16 days, 14 days, 13 days and 12 days, respectively. On the contrary, manure, plant protection and land preparation constitutes for lowest man days used in the field. It accounts for 4 days and 5 days, respectively used by the farmers. It is found that the harvesting, pruning, transplantation and weeding are incurred more number of days used by the farmers. Generally, manure, plant protection and land preparation are uses at one time basis.

The plantation material are received at Rs.3,146 and followed by establishment of seed cost (Rs. 2,651). The third highest subsidy are maintenance cost (Rs. 1563) and followed by machinery tolls (Rs.1,453). The planting material per household are receive at 29.72 percent and followed by establishment of seed (25 percent). The maintenance subsidy are received at 15 percent and followed by machinery tools (11.05 percent). On the contrary, the lowest subsidy are vermi compost (6 percent). Among the planting material subsidy, all the size of farmers are receive the more or less same cash kind of subsidy. Whereas for establishment of seed, the four kinds of farmers are receive same cash.

The amount of subsidy are Rs. 10,420. The medium farmers are receive the highest subsidy of Rs. 10, 620 as compared with Rs. 9,873 for marginal farmers. It implies that the all the farmers irrespective of size are receive more or less same kind of cash subsidy. It is gathered that farmers, particularly marginal and small farmers are not get properly the subsidies by the government. The farmers are not known the subsidies amount for different incentives. There is a need to scale up the incentives in a big way to accelerate area expansion.

42 percent and 40 percent precept that they are motivated by the way of high yielding and earning more profit from oil palm growing. The Department of Agriculture, Government of Tamil Nadu, Godrej Agrovet Ltd and Fellow farmers are providing technical support to the farmers. 64 percent, 19 percent and 17 percent reported that they have receive the technical support from Godrej Agrovet Ltd, Fellow farmers and Department of Agriculture, Government of Tamil Nadu. It implies that the Godrej Agrovet Ltd are providing technical support to the farmers. Two-third of the technical support provide by the Godrej Agrovet Ltd and Fellow farmers.

The farmer’s knowledge about the existing oil palm varieties are very poor conditions. About 25 percent viewed that they are known about the existing varieties is very lack. They are using the varieties without knowing about the features. The main motive of the oil palm growers are preferring the varieties due to the good yielding for the long period of time. 63 percent viewed that the growers prefer particular variety due to good yielding. Two-thirds of growers are prefer due to good yielding from oil palm cultivation. Financial assistance and subsidy are received 51 percent and 49 percent. It implies that the financial assistance and subsidy are provide with equal share. Godrej Agrovet Ltd also provides supports nursery and planting material and procurement facilities to the farmers. It implies that the all the farmers are receiving nursery and planting and procurement facilities. The company have establishing nursery for the oil palm plantation in 11 districts of Tamil Nadu.

The cent percent reported that the making provision for buy back of FFB through a company. All the farmers are selling their fruits to the Godrej Agrovet Private Ltd, Ariyalur. It implies that the quality of seed is normal conditions. The intercropping facilities like fertilizers, seeds are available to the farmers with short supply. The integrated nutrient management or integrated pest management are available with meagre level.

Cent percent reported that they are providing seeds to the farmers for growing palm oil cultivation. The seeds nursery are provide by the Godrej Agrovet Private Ltd, Ariyalur. Cent percent percept that the providing pre-harvest contract though buy back by a company. The Godrej Agrovet Private Ltd is arrange to buy the fruits from the farmers. The seeds garden are maintained by the concerned company. Input is another important subsidy and 56.5 percent viewed that the government are providing material inputs. Financial assistance is provide by the banks and cooperative institutions. 46 percent reported that they receive the adequate financial assistance from banking sector. It implies that the special subsidy and financial assistance are provide to the farmers for palm oil growers.

More than 64 percent had increased their income 20 percent after engagement in oil palm cultivation. About 24 percent who engaged in oil palm cultivation had increased their income 20 to 40 percent. Oil palm cultivation contribute 88.5 percent. The proportion of income varied from oil palm ranging from 64 percent to 88 percent in Cuddalore and Thanjavur Districts of Tamil Nadu. The structure of the relationship between farmers and the plantation company that buy their fruits is a major determinant of farmer’s income. Farmers have access to support through access to credit, technical assistance, FFB transport or other means from the Godrej Agrovet Ltd. The average income from oil palm cultivation is significantly higher than income from other crops.

**Chapter V**

**Summary, Conclusions and Policy Implications**

Palm oil cultivation is providing significant opportunities for economic growth, employment and poverty reduction in India as well as Tamil Nadu. There is growth in demand for palm oil and other vegetable oils in India due to the more consumption of those oil. Government of India has launch suitable policy and implement adequate scheme. In India, Government of India and private sector have arrange partnership basis. The Government of India have implement the oil mission scheme through private sector in India. The main motive of the mission are area expansion of oil palm cultivation in states of India.

**5.1. Main Findings of the Study**

In India, the area increased from 62730 ha. during Ninth Five Year Plan to 81270 ha. during Eleventh FYP. Area under palm oil cultivation is increased mount amount of twenty two times during the past two decades. Andre Pradesh, Karnataka and Tamil Nadu are registered top states. There is significant growth trend during the implementation of the scheme. On the other hand, Kerala, Maharashtra states are recorded decline cultivation. But Mizoram is recorded enough growth trends during that period. Kerala, Maharashtra states are withdrawn of the scheme. The two states are not interested to implement the scheme due to decline in area cultivation. The total production of major states are increased from 176142 tonnes in 2004-05 to 995212 tonnes in 2013-14. There is an improvement in production at six times. Andre Pradesh is leading producer of the FFB and the share of FFB is 94 percent followed by Kerala produced 4 percent and Karnataka occupied by 1 percent and Tamil Nadu produced at 0.56 percent during 2013-14.

In Tamil Nadu, the scheme is implemented Cuddalore, Villupuram, Vellore, Tiruchirapalli, Karur, Perambalur, Ariyalur, Thanjavur, Tiruvarur, Nagapattinam, Theni and Tirunelveli. During 2014-15, oil palm cultivation was taken up in an area of 398 ha. All these activities were carried out at a cost of Rs.1.62 crore. During the year 2015-16 the scheme is proposed to be implemented with the outlay of Rs.4.40 crore.

The cultivable area of the state to the total geographical area has been decline from 40. 2 percent in TE 2005-06 to 37 percent in TE 2015-16. Villupuram, Salem, Tiruvarur, Theni, Ramanathapuram and Thoothukudi districts have been increasing slightly cultivable area. Remaining 26 districts are registered decline trends. Kancheepuram, Coimbatore, Erode, Perambalur districts are heavily decline the cultivable area. The main reason behind is urbanization of the district and commercial encouragement and business development.

The percentage share of oilseeds area to the cultivable area is declining from 21 percent in TE 2005-06 to 18 percent in TE 2015-16. Coimbatore, Thanjavur, Theni and Kanniyakumari districts are recorded increasing trends in the cultivation of oilseeds. 28 districts are registered decline trends in these cultivation. The area under oilseeds are increased from 13.3 lakh ha. TE 1990-91 to 15.1 lakh ha. TE 1994-95. The production of oilseeds also increase from 12.7 lakh tonnes to 19.1 lakh tonnes. The area increase and production increase to 9.7 lakh ha. and 11.4 lakh tonnes during 2006-07. During 2012-13, the trend has been decline to 8.1 lakh ha. and 8.7 lakh tonnes and slow progress to 8.7 lakh ha. and 10 lakh tonnes during 2014-15. There is stagnant growth in area and production level in Tamil Nadu due to shortfall in monsoon and urban encouragement.

The area under oil palm cultivation has been stagnant growth trend for the past one decade in Tamil Nadu. The area is decline from 0.019 lakh ha. during 2011-12, the trend has been increase to 0.021 lakh ha. This period is growth period for expansion of area. after that, it has decline to 0.011 lakh ha. and 0.009 lakh ha. during 2012-13 to 2013-14. There is slow progress in area under oil palm cultivation. The area under Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize is increased from 1907 ha. in 2004-05 to 2053 ha. in 2010-11. After 2011-12, the scheme is divided into ISOPOM and NADP in Tamil Nadu. During 2014-15, National Mission for Oilseeds and Oil Palm is started. The area under NMOOP is increased from 1106 ha in 2014-15 to 1348 ha. in 2015-16. The productivity of palm oil is increased from 4697 kg/ha. in 2011-12 to 7810 kg/ha. in 2015-16. The productivity of the oil is increased to 40 percent over the five years in Tamil Nadu. There is significant growth in productivity in Tamil Nadu.

During 2005-06, the area under oilseeds and production in Tamil Nadu as total is 6.19 lakh ha. and 10.66 lakh tonnes. Thiruvannamalai, Vellore and Villupuram districts are recorded highest area and production during that period. On the contrary, Thoottukudi, Theni, Thiruvar and Karur districts are recorded lowest area and production. It is implies that the all these districts are positive growth rate at area and production level except Ariyalur, The Nilgiris and Thiruppur.

The area and production under total foodgrains is shown as 33.17 lakh ha. and 61.16 lakh tonnes during 2005-06. Nagapattinam, Thiruvarur, Villupuram, Thanjavur and Cuddalore are the leading districts in area cultivation and production. On the other hand, The Nilgiris, Kanniyakumari and Theni districts are recorded the least level of area cultivation and production.

During 2015-16, the area under oilseeds and production are shown in 8.49 lakh ha. and 10.34 lakh tonnes. Among the districts, Coimbatore, Thiruvannamalai and Vellore districts are the leading districts in area cultivation as well as production. The production in Coimbatore is very meagre level due to very dry conditions. On the contrary, Perambalur, Nagapattinam and Thiruvallur districts are recorded lowest area cultivation as well as production level. The total area under foodgrains and production is shown as 36.06 lakh ha. and 127.95 lakh tonnes. There is small increase in area cultivation leading mount amount of increased in production in the state due to the effective implantation of schemes like NFSM, NMOOP. Tiruvarur, Villupuram, Nagapattinam, Cudallore, Thanjavur and Salem are leading districts in area under foodgrains and production. These six districts are occupy the highest area plantation and production. On the contrary, Nilgiris and Kanniyakumari are lowest area under cultivation and production. The area under cereals and production level is seen 27.22 lakh ha. and 120.28 lakh tonnes. Vilupuram, Thiruvarur, Thanjavur and Nagapattinam districts are leading producing state in area cultivation and production of cereals.

The oil palm were cultivated in Trichirapalli, Nagapattinam, Thanjavur and Tiruvarur during 1993-94 and it has expanded to 25 districts in 2015-16. Villupuram is the highest district and Cuddalore is the second district and Vellore and Thanjavur are the highest districts in area cultivation. On the other hand, Sivagangai, Thiruvallore, Krishnagiri, Pudukottai and Virudhunagar districts are occupied with lowest sizable area.Government of Tamil Nadu have been identified potential districts in area expansion like Thanjavur, Cuddalore, Tirunelveli and Theniupto 25, 000 ha. in future. Followed by Villupuram district is highest potential area (20,000 ha.) for expansion of oil palm. On the other hand, Karur and Trichirapalli districts are occupying lowest potential area expansion. Some of districts like Virudhunagar, Pudukottai, Sivaganagai, Dindugal, Erode, Namakkal, Salem, Thirupur, Coimbatore, Thiruvannamalai, Kanchipuram, Krishnagiri and Dharmapuri are not potential identified.

The average family size was 4.92 persons with an average experience of 27.8 years. On average, 96.2 percent had crop farming as their main occupation. All households were male headed and the average male of the household were 94.5 percent. The average age of the head were 77.5 percent belonging to 16-60 years and 22.5 percent belonging above 60 years. The educational level, 52 percent, 21 percent 7 percent were attained by primary, secondary, higher secondary level. On the other hand, meagre level were illiterate. Among the caste category, OBC and SC were 79.25 percent and 14.5 percent respectively.

The average net operated area was 7.94 acre. The average NOA ranged from 1.68 acre on marginal to 19.26 acre on large size. The average leased in land were 0.10 acre. Leased out are more than the leased in land. The small farmers are operated highest irrigated area (33 percent) and followed by medium farmers (25 percent). On the other hand, large and marginal farmers are lowest operated area (21 percent). The share of canal irrigation is the highest uses and followed by borewell is second place. It implies that the half portion of the farmers are using the canal as predominately and borewell is used alternatively non uses of canal area. The farmers are using their canal sources from Cauvery river, Pambai, Pennaiyar, Gadilam and Vellar river basin.

The institutional credit were more funded to the farmers. The large farmers were borrow 50 percent. Large farmers are got Rs. 28, 714 from money lenders and followed by marginal farmers (Rs. 14, 286). The total loan per acre borrow were worked out at Rs. 68, 505. Small farmers are borrowing Rs. 9551 from money lender and followed by large farmers (Rs. 7087). The small, large and medium farmers are borrowing more credit from institutional source. The tractor, pump set and tiller are having more asset value. It account for 48 percent, 21 percent and 11 percent. Tractor and pump set are recorded at 53 percent and 21 percent. Pump set are contributing 38 percent. On the other hand, bullock cart, buffaloes and cows are contributing lowest asset value among the households.

The farmers are mostly using their credit for productive purposes. Among the productive purposes, the farmers are using their credit for purchases of tractors, purchase of livestock and seasonal credit. It accounts for 44 percent, 20 percent and 15 percent. On the other hand, the farmers are using for non-productive with meagre level. The consumption purposes and social ceremonies are using at 10 percent and 5.4 percent, respectively.

Paddy occupies the major share during kharif season and it accounts for 77 percent. Sugarcane is occupy second place and it accounts for 28.4 percent and cotton (8.28 percent). During rabi season, paddy occupy 62 percent and followed by sugarcane (16.5 percent). During summer season, pulses accounts for 23.43 percent, of that large size of farmers are cultivating 14 percent and followed by medium farmers (5 percent). Oil palm cultivation is one of the highest area operated as inter-crop cultivation during perennial season. The share of palm oil cultivation are calculated to 45.47 percent. The marginal farmers were cultivated highest area to 60 percent and large farmers are cultivated lowest area of 27 percent. It implies that the percentage share of area by oil palm cultivation are half portion.

The total value of output per household were worked out to Rs. 5,9 8,789. It implies that the large and medium farmers are recorded three-fourth of output. Marginal and small farmers are receive one-fourth of the output value. The total value of output per acre were calculated to Rs. 1,12, 682. It implies that the small and medium farmers are recorded highest value received and lowest value received by the large farmers.

The small farmers are recorded highest spending as material cost (Rs. 14, 946) and followed by medium farmers (Rs. 14, 212). In terms of labour cost, the small and marginal farmers are spent with highest cost (Rs. 7,575 and Rs. 7,364, respectively). The material cost are spending more than the labour cost. The material cost spending with two-thirds of their total cost and labour costs spent with one-third of their total costs.

The area under indigenous varieties are 12.68 acre as compared with 11.34 acre for exotic varieties. They are more using the indigenous than the exotic varieties. Among the indigenous varieties,the small and medium farmers are cultivate 30.3 percent and 29.8 percent, respectively. Among exotic varieties, the marginal farmers are cultivate 48 percent and larger farmers are cultivate 8.28 percent. The production for indigenous and exotic varieties are 15.02 tonnes and 7.70 tonnes, annually. It implies that the indigenous are more production than the exotic varieties due to the long-period of time (10 to 20 years) plantation. Whereas for exotic varieties, three to five years plantation.

The output for indigenous and exotic cultivators are Rs. 1,10,994 and Rs. 41, 261, respectively. The marginal farmers are receiving more output value because of regular work and continued work in their farm field. On the contrary, the large farmers are receive with lowest value because uprooting their plantation trees for alternative crops and ignorance of their work. The output for indigenous and exotic varieties per household are Rs. 3,02,002 and Rs. 1,18,001, respectively. It implies that the large farmers are receive the highest value of money than the marginal farmers due to the large land holding and more financial capacity.

The actual price received for the indigenous and exotic varieties are Rs. 6,412 and Rs. 5, 380, respectively. It implies that the indigenous are recovery more extraction ratio than the exotic varieties. The domestic prices of oil palm are significantly influenced by production capacity. There is continuous drought conditions and improper and inadequate nutrition guidance for new plantations is inadequate and imbalanced resulting in lower FFB yields and low Oil Extraction Ratio (OER).

Among indigenous cultivators, productivity during the peak season is calculated to 15.26 tonnes annually. The average productivity among the two seasons are 2.95 tonnes and accounts for 19.42 percent. The large farmers are receive the highest variation of 19.77 percent and marginal farmers are receive lowest variation of 19 percent. It implies that the productivity received from indigenous variety during peak season is higher than the lean season.

Among exotic varieties, the productivity during peak and lean season are 7 tonnes and 5.73 tonnes, respectively. The percentage variation among peak and lean season are 18 percent. It implies that the low yield due to unfavorable climatic conditions, poor quality planting material, improper intercropping practices, inadequate application of fertilizers. The most important causes are irrigation and it has been found to be a critical factor for getting low yields.

The area planted under oil palm are 2.65 acre for the first two years. The marginal farmers are cultivate 1 acre and as compared with 5 acre for medium farmers for bearing 11-15 years. The marginal, small, medium and large farmers are taken risk and opportunity cost is high. They farmers are bear the opportunity cost high and no inflow of cash during the entire gestation period of 3 years before palm start bearing FFBs is zero. It implies that the majority of the farmers are uprooting their tree after 15 years period. The farmers are interested to cultivate alternative crops and production also decline trend.

The marginal farmers are recorded highest yield of 21.47 tonnes as against to 12.24 tonnes for large farmers during 10 years. The small farmers are recorded highest yield of 26 tonnes as compared with 15.4 tonnes for larger farmers after bearing twenty years. Thereafter, the palm plantation are uprooting their plants due to dry conditions and lack of availability of water. The bearing plantation period are 5 to 25 years. Some marginal farmers are cut down their plants after 10-15 years. It implies that the yield of palm plantation is mainly depending upon its age. The age-specific land productivity of oil palm garden is take into consideration of the entire economic life span.

It is found that the modern high-yielding varieties of palm are produce highest yield due to climate conditions and good management. Even though, non-availability of quality indigenous planting material in proportion to the area expansion is main problem. The second constraints is non-availability of processing mills within in the district. The third constraint is inadequate water. It leads to no opening of spear leaves and decrease leaf production rate. Any deficit in the availability of moisture adversely affects yield, both in terms of number of bunches and their weights.

Production costs for exotic varieties are Rs. 36, 932. The share of cost components are weeding (14.38 percent), fertilizers (12.38 percent), land preparation (10.84 percent) and harvesting cost (9.86 percent). The cost of establishing for palm mature area attain about Rs.32, 510 for the first three years. It is found that there is considerable potential for small holders to expand output on existing acreages through the use of fertilizer. Due to low levels of mechanization, large oil palm plantations are labor intensive. A majority of palm oil plantations are smallholders involved. While incomes earned by smallholders vary widely and are impacted by market access, international pricing, and the form of smallholder engagement, many smallholders their income from oil palm cultivation is significantly higher than income from other crops.

Among the indigenous varieties, costs on weeding (14.4 percent), fertilizers (12.24 percent), harvesting (10.41 percent), land preparation (8.74 percent) and transplantation (8.45 percent) and nutrients (8.19 percent) constitute 63.4 percent of total cost. On the other hand, plant protection (3.05 percent), pruning (4.54 percent), irrigation charges (4.57 percent) and inter-cultural operations (4.59 percent) constitute lowest costs incurred. The cost of cultivation are Rs. 37,299 and the total income are calculated to Rs. 99, 856.

The total man days for palm oil cultivation are worked out at 81 days per year. The harvesting, pruning, transplantation and weeding are constitutes the highest use of human days. It accounts for 16 days, 14 days, 13 days and 12 days, respectively. On the contrary, manure, plant protection and land preparation constitutes for lowest man days used in the field. It accounts for 4 days and 5 days, respectively used by the farmers. It is found that the harvesting, pruning, transplantation and weeding are incurred more number of days used by the farmers. Generally, manure, plant protection and land preparation are uses at one time basis.

The plantation material are received at Rs.3,146 and followed by establishment of seed cost (Rs. 2,651). The third highest subsidy received by the farmers are maintenance cost (Rs. 1563) and followed by machinery tolls (Rs.1,453). The planting material subsidy per household are receive at 29.72 percent and followed by establishment of seed (25 percent). The maintenance subsidy are received at 15 percent and followed by machinery tools (11.05 percent). On the contrary, the lowest subsidy are vermi compost (6 percent). Among the planting material subsidy, all the size of farmers are receive the more or less same cash kind of subsidy. Whereas for establishment of seed, the four kinds of farmers are receive same cash.

The amount of subsidy are Rs. 10,420. The medium farmers are receive the highest subsidy of Rs. 10, 620 as compared with Rs. 9,873 for marginal farmers. It implies that the all the farmers irrespective of size are receive more or less same kind of cash subsidy. It is gathered that farmers, particularly marginal and small farmers are not get properly the subsidies by the government. The farmers are not known the subsidies amount for different incentives. There is a need to scale up the incentives in a big way to accelerate area expansion.

About 42 percent and 40 percent precept that they are motivated by the way of high yielding and earning more profit from oil palm growing. The Department of Agriculture, Government of Tamil Nadu, Godrej Agrovet Ltd and Fellow farmers are providing technical support to the farmers. 64 percent, 19 percent and 17 percent reported that they have receive the technical support from Godrej Agrovet Ltd, Fellow farmers and Department of Agriculture, Government of Tamil Nadu. It implies that the Godrej Agrovet Ltd are providing technical support to the farmers. Two-third of the technical support provide by the Godrej Agrovet Ltd and Fellow farmers.

The farmer’s knowledge about the existing oil palm varieties are very poor conditions. About 25 percent viewed that they are known about the existing varieties is very lack. They are using the varieties without knowing about the features. The main motive of the oil palm growers are preferring the varieties due to the good yielding for the long-period of time. 63 percent viewed that the growers prefer particular variety due to good yielding. Two-thirds of growers are prefer due to good yielding from oil palm cultivation.

Financial assistance and subsidy are received 51 percent and 49 percent. It implies that the financial assistance and subsidy are provide with equal share. Godrej Agrovet Ltd also provides supports nursery and planting material and procurement facilities to the farmers. It implies that the all the farmers are receiving nursery and planting and procurement facilities. The company have establishing nursery for the oil palm plantation in 11 districts of Tamil Nadu.

The cent percent reported that the making provision for buy back of FFB through a company. All the farmers are selling their fruits to the Godrej Agrovet Private Ltd, Ariyalur. It implies that the quality of seed is normal conditions. The intercropping facilities like fertilizers, seeds are available to the farmers with short supply. The integrated nutrient management or integrated pest management are available with meagre level.

Cent percent reported that they are providing seeds to the farmers for growing palm oil cultivation. The seeds nursery are provide by the Godrej Agrovet Private Ltd, Ariyalur. Cent percent percept that the providing pre-harvest contract though buy back by a company. The Godrej Agrovet Private Ltd is arrange to buy the fruits from the farmers. The seeds garden are maintained by the concerned company. Input is another important subsidy and 56.5 percent viewed that the government are providing material inputs.

Financial assistance is provide by the banks and cooperative institutions. 46 percent reported that they receive the adequate financial assistance from banking sector. It implies that the special subsidy and financial assistance are provide to the farmers for palm oil growers.

More than 64 percent had increased their income 20 percent after engagement in oil palm cultivation. About 24 percent who engaged in oil palm cultivation had increased their income 20 to 40 percent. Oil palm cultivation contribute 88.5 percent. The proportion of income varied from oil palm ranging from 64 percent to 88 percent in Cuddalore and Thanjavur Districts of Tamil Nadu. The structure of the relationship between farmers and the plantation company that buy their fruits is a major determinant of farmer’s income. Farmers have access to support through access to credit, technical assistance, FFB transport or other means from the Godrej Agrovet Ltd. The average income from oil palm cultivation is significantly higher than income from other crops.

**5.2. Policy Suggestions**

* The price of oil palm FFB is the prime factor in determining the oil palm development in Tamil Nadu as farmers expect price stability and a decent income from oil palm cultivation at least on par with other traditional crops for which implementation of a suitable Market Intervention Scheme (MIS) is most required during the initial stages of development.
* In Tamil Nadu, 75 percent of FFB procured and processed are from juvenile plantations leading to low OER percentage, as the FFB price for fixed based on OER percentage the Tamil Nadu FFB price much lesser than the FFB price in Andre Pradesh.
* In Tamil Nadu the market intervention is not implemented in any part of time. Now, that there is an acute need to consider and implement a suitable Market Intervention Scheme to comfort the oil palm growers during fall in CPO price leading to FFB price roll back. The situation is alarming and worse as number of de motivated growers had resorted to uprooting of oil palm crop as a result we had lost huge area of oil palm crop, considerable yielding plots are being uprooted which is creating a huge negative impact among oil palm growers.
* Market Support Price (MSP)/ Market Intervention Scheme (MIS) is much required to develop and expand oil palm area in the State, as potential wise the country recognizes that, only in Tamil Nadu oil palm could be developed in a big way next to Andre Pradesh.
* It is well known fact that the yield levels in Juvenile plantations will be low and gradually progress and get stabilized in the seventh year only. According to Indian Standards the expected yield level would be in the range of3rd to 4th year- 3-5 MT/Ha., 4th to 5th year-5-12 MT/Ha., 5th to 6th year-12-25 MT/Ha. and 7th year and above 25-30 MT/Ha.
* At present on farm subsidy is available for first four years only and the level has to be enhanced as the cost of inputs have considerably increased besides increases in labour cost.
* Besides the yield levels are low in the fifth and sixth year, hence the on farm subsidy may be made available for these two years also.
* Installation of drip system is much required for effective usage of water. The cost of drip system is high to the tune of Rs. 40,000/- per ha. At present the assistance for micro irrigation system is 50 percent for oil palm and the farmers are not affordable to bear the balance 50 percent cost, hence oil palm should also be considered for at least 90 percent assistance for installation of drip irrigations system for improving productivity and judicial usage of water.
* Providing Assistance from Agricultural Department for Farm equipment like motorized harvesting tools, Palm Leaf shredder, harvesting tools is much required.
* Follow hub and spoke model with a processing unit as the hub for area expansion and ensure simultaneous allotment of area to a Company.
* Convey area expansion targets at least 2 years in advance. Enhance subsidy limit for area expansion from 15 ha. to 25 ha.
* Relaxation of land ceiling norms: treat Oil Palm as a commercial plantation crop. Simplify procedures of area allocation. Ensure adequate and timely supply of quality planting material.
* New seed gardens need to be established on war footing; seed production will commence only after 10 years. Private entrepreneurs should be encouraged to establish seed gardens.
* Procure good quality material through import: Joint venture with reputed foreign companies and diversification of import sources need to import other than material.
* Aim for average productivity of 5 tonnes Oil per ha. or 20 tonns/ ha. of FFB.
* Integrated approach to crop production like planting material, fertilizers, inter-crop and drip irrigation are provide with effective manner.
* Provide production based incentive to farmers. Also consider special incentive on yield of more than 25 tonns ha. of FFB after year.
* Promote value addition through diversification and effective utilization of field and factory wastes.
* Palm trunk for furniture, shredded fronds for vermi composting and mulching, empty fruit bunches for making coir fiber, Palm Kernel shells and Palm press fiber as boiler fuel.
* Adopt integrated and remunerative farming system on account of long gestation period and perennial nature of growth. Government schemes should support inter-cropping particularly during gestation period.
* Ensure capacity utilization of existing processing units, priority should be given to expand area under existing mills to achieve capacity utilization and reduce production costs.
* Improve Oil extraction by harvesting at right maturity, minimum stalk length, improving pollination, avoiding long harvesting intervals and avoiding exposure to rain. Improve efficiency of processing.
* Assess Malaysian techniques for direct extraction of refined Oil instead of producing CPO at the intermediate stage.
* Insulate and secure Oil Palm cultivation from fluctuations.
* Implement Market Intervention Scheme as an effective interventionist instrument.
* Revision of FFB from existing 12 percent of the CPO plus 1/3 of Kernel value to 16 percent of CPO plus ½ of value of Oil by-products.
* Maintain uniform price fixing formula in entire country by carrying out cost of cultivation analysis in respective States.
* Creation of price stabilization fund for Oil Palm growers; suggestions include collecting certain percentage of money from FFB sale.
* Implementation of crop insurance scheme. Sensitize commercial banks and NABARD for promotion of Oil Palm cultivation.
* Law should provide for provisions to recover govt. assistance if Oil Palm is up-rooted/diverted without justification.
* Improved harvesting machinery at present crop height is a serious problem for harvesting in adult plantations of more than 10 years age. Harvesting is done either by climbing the tree or through an aluminum pole attached to a sickle. Incidental charges at the time of harvesting time is to be provide by the company.
* Enhance cultivation subsidy of Rs. 15,500 per ha. to Rs.40,000 per ha. Cultivation cost of Rs.15500 per ha. for 4 years is admissible up to 15 ha. for individual farmer.
* Develop a mechanism to enable farmer to obtain and sell carbon credits (at fixed price) as carbon can be sequestered and credited for Oil Palm.
* Establish Oil Palm Board to consider planting, expansion and development of Oil Palm production, processing and strengthen contractual system of Oil Palm cultivation.
* Government or company are provide technical support during harvesting of FFB by the farmers. Both provide machinery for harvesting tools.
* Separate state, district and block level officers to be appointed for maintain the oil palm expansion.
* The banking sector and cooperative societies are provide the adequate loan facilities for oil palm growers.
* Transport cost may be incurred by the concerned company.

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