

PROBLEMS AND PROSPECTS OF OILSEEDS AND OIL PALM PRODUCTION IN ANDHRA PRADESH

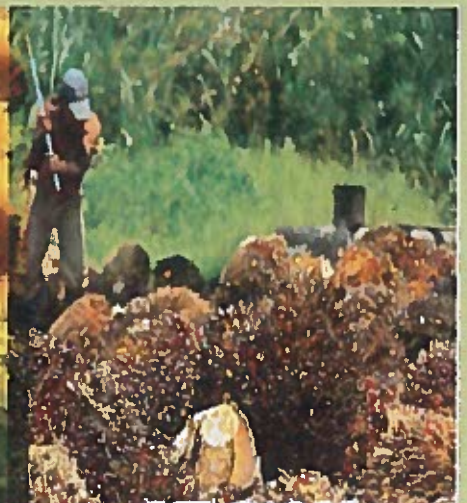
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GROUND NUT



SUN-FLOWER



OIL PALM



**Agro - Economic Research Centre
Andhra University, Visakhapatnam.**

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PROBLEMS AND PROSPECTS OF OILSEEDS AND OIL PALM PRODUCTION IN ANDHRA PRADESH

Special Reference to Groundnut, Sunflower and Oil palm

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Preface

India is traditionally deficit in edible oils with a wide gap between supply and demand. Edible oilseed crops in Andhra Pradesh had covered 8.51 per cent area and 6.68 per cent of production in the country's total oilseed crops during TE 2010-11. Groundnut, Sunflower, Soyabean, Oilpalm and Castor (Non-edible oil) are major oilseed crops in Andhra Pradesh constituted 17.10 per cent of area and 10.05 per cent of production against the total agricultural crops (2009-10) and obtained the second largest area and production after cereals mainly concentrated in Rayalaseema region in the state. Groundnut crop is the major oilseed crop cultivated during Kharif and Rabi seasons and Ananthapur is the major district constituted 40 per cent of Groundnut area in the state, followed by Kurnool, Chittoor, Kadapa district from Rayalaseema region, Mahabubnagar from Telangana region accounting about 80 per cent of area and 70 percent of production under groundnut against total groundnut in the state during 2009-10.

Sunflower is another important oilseed crop and the oil is considered as premium compared to other edible oilseed crops. The districts of Kurnool, Ananthapur, Kadapa, Mahabubnagar and Prakasam districts cultivated 84 per cent of area and 80 per cent of production against total Sunflower crop in the state during 2009-10. In the case of Oil palm 95 per cent of area and 97 per cent of production reported from the districts of West Godavari, East Godavari, Krishna, Vizianagaram, from Coastal Andhra and Khammam from Telangana region. These oilseed crops (Groundnut and Sunflower) cultivated from marginal and small farmers group under rain fed conditions. Whereas oil palm crop grown mostly on coastal Andhra region under irrigated conditions in the state.

Government of India was taken a decision to self-sufficiency in edible oil and launched several centrally sponsored schemes to overcome this problem. In spite of all efforts by the government, large quantity of imports of edible oil imported from Malaysia and Thailand. Andhra Pradesh is one of the important state farming edible oil seed crops contributing a major share in Oilseed production in the state. Whereas oilseed crops area, production and yield have been changing annually in the other competing crops, such as maize, cotton and other horticultural crops due to low cost of cultivation and provide better income to the farmers.

The present study problems and prospects of oilseed production in Andhra Pradesh is a part of national level coordinated study which was coordinated by Centre for Management in Agriculture, IIM Ahmadabad. The report analyses the trends and pattern of growth of edible oilseeds in Andhra Pradesh and identifies the major constraints facing the oilseed sector in the state, On the basis of findings, relevant policy suggestions have been made. I hope this report will be useful for those who are interested in understanding the problems and prospects of oilseeds sector in Andhra Pradesh. I thankful to Dr. M. Nageswara Rao and his research for putting in a lot of efforts to complete the report.

We are grateful to Executive Directors of Agriculture and Horticulture, Government of Andhra Pradesh and I am also thankful to Joint Directors of Agriculture of selected districts of Ananthapur, Kurnool, Prakasam, Srikakulam, West Godavari, Mahabubnagar and Additional directors of Horticulture, Vizianagaram, West Godavari and Nellore districts and staff members to select the villages and extend the help to conduct the field survey of selected districts.

I appreciate the research team for their sincere effort and keen interest in undertaking the study. I thank to Dr. M. Nageswara Rao, Research Officer for preparing the draft report. I appreciate the services of Dr. K.V. Giri Babu, Sr. Research Investigator, Dr. K. Rambabu, Sr. Research Investigator, Dr. P. Ramu, Sr. Research Investigator and B. Krishna, Research Fellow for collection of data, data entry and tabulation and Smt. P. Malathi, Sr. Assistant for neat word processing.

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EXECUTIVE SUMMARY

PROBLEMS AND PROSPECTS OF OIL SEEDS AND OIL PALM PRODUCTION IN ANDHRA PRADESH

INTRODUCTION:

India is blessed with diverse Agro-ecological conditions ideally suited for growing nine oilseeds crops. Viz Groundnut, Rapeseed, Mustard, Sunflower, Sesame, Soyabean, Castor, Linseed. Niger and two perennial oilseed crops (Coconut and Oil palm) besides secondary oilseed crops such as Maize and Cotton. India occupies a prominent position and 4th largest edible oil economy in the world. The area under oilseeds was 272.24 lakh ha. and 324.71 lakh tonne of production in India (2010-11). Among Indian states major share in area reported from Madhya Pradesh 25.82% followed by Rajasthan 20.15%, Maharashtra 13.29%, Gujarat 10.63%, Andhra Pradesh 9.52% and Karnataka 5.96% remaining 14% of area covered by rest of Indian states. On the other hand highest share of production reported from Madhya Pradesh 26.62% top of the list followed by Rajasthan 19.15%, Gujarat 13.41%, Maharashtra 13.32%, Andhra Pradesh 6.68% and Karnataka 4.04% respectively during TE 2010-11. Major oilseed crops are Soya bean, Rape seed, Mustard and Groundnut and the production accounting for about 90% of total oilseeds production in the country. The states of Karnataka, Andhra Pradesh and Maharashtra are major Sunflower producing states while Rajasthan, west Bengal, Madhya Pradesh and Gujarat states are reported the sesame was the major oil seed crop (TE 2010-11). There was a significant increase in the edible oilseeds production. Whereas the per capita edible oil demand is raising more than the supply. So there is a big gap between domestic production and consumption and this gap filled by liberal imports mainly from the countries of Malaysia and Indonesia.

1.2 Role of Agriculture in State Economy:

Andhra Pradesh is agrarian character considered as one of the most progressive state with respect of agriculture development. The state maintaining high levels of crop production compared to several other Indian states. Andhra Pradesh is the 4th largest of Indian states in geographical area and 5th in population 84.6 millions (2011 provisional census). The total geographical area of the state is 275.04 lakh ha. And 22.7% area covered with forests. Total cropped area and net sown area is 146.14 lakh ha and 112.88 lakh ha and the role of agricultural sector in the state economy is very significant and the largest provider of

employment having 29.9 million work force as much as 19.5 million (65%) are agricultural workers and the State Domestic Product for the year 2010-11 is 20.37%. So agriculture is the chief source of income and back bone of overall development in state economy. Two important rivers of India the Godavari and Krishna flow through in Andhra Pradesh providing irrigation. The main sources of irrigation are canals, tanks, tube wells and dug wells. The Gross and Net area irrigated by all sources covered 71.53 lakh ha and 50.34 lakh ha. in the state (2010-11). Tube wells and canals had covered the largest irrigation constituted 49% and 34% of total irrigated area. Rice is a major food crop and staple food of the state and other important food crops are Jowar, Maize, Ragi and Pulses. Moreover commercial crops are also shown the recorded growth of production namely Oilseeds, Tobacco, cotton, Sugarcane and horticultural crops. So agriculture is the bed rock of states economy. Green Revolution is the base to increase the production and productivity levels of food grains in the state exclusively Rice cultivation, which is also reflected at the national level, the state which is ranked 3rd in food grain production continuously reported during 2005-06, 2006-07, 2007-08, 2008-09.

1.3. Importance of Oilseeds in State Agriculture:

Andhra Pradesh is one of the most important state in the country growing oilseed crops, the area and production have been magnificently increased over a period of 50 years. The major oilseed crops grown in the state are Groundnut, Sunflower and Oil palm. The area under edible oil seed crops was found to be 13.41 lakh ha. And has reached to 24.72 lakh ha. On the other hand the production has gone up from 7.92 lakh tones to 30.74 lakh tones between 1960-61 to 2010-11 in Andhra Pradesh. Geographically Andhra Pradesh state consisting three regions, namely Telangana, Rayalaseema and Coastal Andhra. Rayalaseema region constituting four districts Kadapa, Kurnool, Ananthapur and chittoor from these four districts large number of farmers are grown largest area cultivated under oilseed crops. Firstly the study crop of Groundnut is the major oil seed crop grown during Kharif season which is rainfed mainly concentrated in Rayalaseema region.

Table 1.1
Major Oil Seed Crops in Andhra Pradesh with their Concentration 2009-10

(Area in lakh ha. And Production in Tonnes)

S.No.	Crop	Area	Total area	%	Production	T. Prod	%	Predominant districts
1	Groundnut	11.09	13.01	85	7.10	10.06	70	Anathapur, Kurnool, Chittoor, Kadapa, Mahaboobnagar,
2	Sunflower	2.97	3.50	84	2.17	2.70	80	Kurnool, Ananthapur, Kadapa, Prakasam, Mahaboobnagar,
3	Palmoil	0.42	0.44	95	8.93	9.17	97	West Godavari,, East Godavari, Krishna, Vizianagaram, Khammam

Source: Season and Crop Report, Andhra Pradesh 2009-10, Directorate of Economics and Statistics, Government of Andhra Pradesh, Hyderabad.

Sunflower is another important edible oilseed crop, selected as a one of the study crop and the oil is considered as premium than other edible oils. 84% of area and 80 per cent production concentrated in the districts of Kurnool, Ananthapur, Kadapa from Rayaseema region besides Mahabubnagar and Prakasam from Telangana and Andhra region. Further Oilpalm crop also considered as a study crop, 95% of area and 97 per cent of production reported from the districts of West Godavari, East Godavari, Krishna and Vizianagaram from Coastal Andhra and Khammam district from Telangana region in Andhra Pradesh state.

1.4 Problems in Oilseeds Production:

1. In adequate supply of quality or improved seed.
2. Input subsidy like fertilizers, micro nutrients and plant protection chemicals are not sufficient, sub standards and delayed.
3. Extension services are poor, namely disease management, post harvest care besides field demonstrations, propagate new technology, HYV, new practices etc.
4. Inadequate Procurement facilities by the government agencies in Andhra Pradesh
5. In sufficient storage and processing infrastructure.
6. Oilseed crops grown in rain fed and poor soils except oil palm crop in the state. So the production is low and fluctuating every year.

1.5 Objectives of the study:

1. To examine trends and pattern of growth of different edible oilseeds over time and across states/districts and identify the sources of growth in edible oilseeds output in the state
2. To determine the impact of price and non-price factors influencing the supply response behavior and demand for edible oilseeds and oil palm in the state.
3. To identify major constraints in the edible oilseeds and oil palm cultivation and suggest policy options to increase oilseeds production and productivity in the state.

2. COVERAGE, SAMPLING DESIGN AND METHODOLOGY:

In order to meet the first three objectives of the study firstly an attempt was made to collect large quantity of data and analysed from secondary source related to Area, Production and productivity of oilseeds. The study identified the competing crops against the study crops rainfall data, farm harvest price and market Support Price. Examine trends and pattern of growth rates of major edible oilseeds of the state and districts in different periods, cropping pattern, impact of price and price factors and marketing facilities have been analysed. The study identify the major constraints in edible oilseeds in the state. Household survey has conducted the study crops of (Ground nut, Sunflower and Oil palm) farmers through structured questionnaire and analysed.

Multi stage purposive sampling method used for Selection of districts based on acreage and yield the study covered three edible oilseed crops (Groundnut, Sunflower and Oil palm and each selected crop three districts were selected. According to study design the study crop of Groundnut found the district of Mahabubnagar (HH), Ananthapur (HL) and Srikakulam (LH). In the case of Sunflower Prakasam district (HH), Kurnool (HL) and West Godavari reported (LH) where as Oil palm crop we found West Godavari district (HH), Vizianagaram (HL) and Nellore (LH). Further Major oilseed producing mandals were selected through these districts and appropriate number of villages are also selected for household survey. From each selected village an appropriate number of farmers representing different farm categories such as marginal 0-1 ha, small 1-2 ha, medium 2-10 ha and large more than >10. With minimum of 20 households in each category. 475 sample households have been selected for the study from different farm size categories in 9 selected districts in the state.

2.1 Overview of Oilseed Sector: Current Status and Growth Behaviour:

Rice, Coarse Cereals, Pulses, Groundnut, Soyabean, Sunflower, Oilpalm, Cotton and Sugarcane are major agricultural crops in Andhra Pradesh and the Food crops grown area had declined drastically from 9.70 mil.ha to 6.72 mil.ha (TE 1973-74 to TE 1993-94) further it had slightly increased to 7.17 mil ha. (TE 2009-10). Rice is a major food crop and the area had increased up to TE 1983-84. Further it had declined to 3.7 and 3.2million hectares during the periods TE 1993-94 and TE 2003-04. After that it had slightly increased 3.94 million ha. Another major food crop is Pulses area has significantly increased 1.36 mil. ha to 1.94 mil. ha (TE 1973-74 to TE 2009-10). The cropped area under Coarse Cereals) have been declined continuously of all estimated periods in the state. Andhra Pradesh is contributing second largest area and production of oilseeds in India and Major oil seed crops are Groundnut, Sunflower, Soyabean and Oilpalm. Sunflower and Soyabean crops area have been increasing between the estimated periods (TE 1973-74 to TE 2009-10) whereas Groundnut crop area have been fluctuating among study periods in the state. On the other hand area under cotton crop has been significantly increased in the same period. The state Gross Cropped Area (GCA) and Net Cropped Area (NCA) have marginally increased except TE 1993-94 and TE 2003-04. Gross Irrigated Area (GIA) and Net Irrigated Area (NIA) have been continuously increased over all estimated periods of the study except TE 2003-04 in the state.

2.2 Factors underlying Changes in Cropping Pattern:

The study found over last few decades in the state significant changes have been observed in grown area under specific crops namely Rice, Maize, Cotton, fruits and vegetable crops and oilseed crops of Soybean, sunflower and Oil palm crops in the state due to extend the irrigation facilities, government policies and schemes, marketing facilities change in tastes and preferences are the major factors responsible for frequent changes in cropping pattern in the study period of the state.

3.1. Growth Trend in Area, Production and Yield of Major oil seeds:

The study found that the growth rates have been fluctuating in different periods. Annual average area and production of oilseeds had increased in **1970's, 1980's and 1990's** but declined in **2000's**. The Compound Annual Growth Rate (CAGR) of area and production of oilseeds have exhibited negative growth (-3.10) and (-2.10) in **1970's and 1980's** and **positive**

growth rate (5.20) and (0.10) per cent in 1980's and 2000's. The similar fall and rise in growth of production and yield of oilseeds is also noticed the production growth (--3.20%) in 1970's (8.7%) in 1980's (-2.50%) 1990's and (5.90%) in 2000's. The yield growth rate is reported the highest in the period 2000's. Across the districts Ananthapur, Kadapa and Kurnool districts from Rayalaseema region and Nizamabad and Adilabad from Telangana region percentage share of area under oilseeds to total oilseeds, had increased between the periods TE1993-94 to TE 2009-10. On the other hand production had marginally increased from 23.56 lakh tones to 27.47 lakh tones and the districts of Ananthapur, Mahabubnagar, West Godavari, East Godavari and Nizamabad revealed the share of oilseeds production increased marginally between TE 1993-94 to TE 2009-10 in the state due to extend the oil palm production in coastal Andhra region. The Groundnut crop area and production reported the highest which accounts for about 66 per cent and 57 per cent of total oilseed crops (Kharif and Rabi) (TE 2009-10) and similar trend was noticed regarding oil production in the state.

3.2 Variability in Area, Production and Yield of Major Oilseed Crops, Groundnut vis-à-vis Competing Crop (Maize) and Sunflower vis-à-vis Competing crop (Cotton):

Groundnut is the major edible oil seed crop, while 'Maize' was found to be its major competing crop. Average Annual Compound Growth rate in area and production of Groundnut crop have been fluctuating exhibited negative trend in 1950's, 1970's, 1990's and 2000's except 1960's and 1980's in the state. In the case of Sunflower crop the average area and production growth declined in 1990's further it has increased 1.0 and 3.0 per cent in 2000's. Whereas the competing crop (cotton) area and production continuously increased during 1970's to 2000's and the Cotton crop shown the highest CAGR than Sunflower crop in the state during the period 1951-52 to 2009-10.

3.3 Inter district Variation in Irrigated Area under Ground nut Crop:

The study found out of 22 districts 6 districts achieved significant positive growth in area under Groundnut crop. The districts of Prakasam, Nellore, Karimnagar, Cuddaph and Medak in 1980's and the period 1990's Nizamabad district in 2000's West Godavari, Prakasam, Ranga Reddy, Mahabubnagar and Adilabad districts achieved significant growth registered in Andhra Pradesh. Whereas across the districts only two districts reported significant positive growth in area under Groundnut crop (1981-82 to 2009-2010). In the case of production Adilabad,

Prakasam, Kadapa, Karimnagar and Nellore districts obtained the highest CAGR, in 1990's Nizamabad, Adilabad and Medak obtained significant positive CAGR. During 2000's Mahabubnagar, West Godavari and Prakasam districts had highest CAGR whereas total period (1981-82 to 2009-10) only Adilabad district achieved significant CAGR in Groundnut production of the state. Out of 22 districts from period to period growth rate had been fluctuated across the districts in the case of area production and yield. Finally only Adilabad district registered significant positive growth in area, production and yield of all estimated periods in Andhra Pradesh (1980's, 1990's, 2000's and 1981-82 to 2009-10).

3.4. Sources of Growth in Output of Oilseeds in the State:

With the help of decomposition analysis, the relative contribution of area, yield and interaction towards the change in total production of oilseeds and competing crop has been assessed (Groundnut and Maize). The assessment helped us to know the growth in production related into three effects i.e. area effect, yield effect and interaction effect. The study found that the area and production reported a positive relation of total oilseeds in the state. The study districts Ananthapur and Srikakulam revealed the area effect is the cause to change the production, but in Mahabubnagar yield effect played vital role to increase production of total oilseeds. In the case of period – I TE 1983-84 to 1993-94 study districts and the state, area effect was found to be the highest except Mahabubnagar (yield effect) under Groundnut crop. Whereas period II (TE 1993-94 to 2009-10) yield effect was dominant factor to change in production of Groundnut under Ananthapur and Mahabubnagar districts. In the case of total period (TE 1983-84 to 2009-10) yield effect was dominant in Mahabubnagar district and other two districts Srikakulam and Ananthapur area is the major source of growth of Groundnut production in the state.

On the other hand the study crop of Groundnut major competing crop is (Maize) area played a major role in three study districts and the interaction played a vital role to total output of Maize in TE 1993-94 to TE 2009-10. Period I change in Maize output mainly influenced the yield effect in Srikakulam and Ananthapur but Mahabubnagar district reported the area effect. On the other hand period II (TE 1993-94 to 2009-10) Srikakulam and Ananthapur district interaction effect was found to play a key role to change the output of Maize in the state. On

the whole overall area effect played a key role to change the total oilseeds as well as Groundnut production in the state except Mahabubnagar district (yield effect).

3.5 Variability in Monthly/Annual Prices of Major Oil seeds in the State:

The study recognized the Price is the major factor influence the growth in area and production of oilseed crops in the state. The growth in Farm Harvest Prices (FHP) under groundnut increased of all three estimated periods TE 1998-99 to TE 2000-01 and TE 2009-10. Similar trend revealed in the case of MSP of all three estimated periods. The annual wholesale price and co-efficient of variation of wholesale price of Groundnut is more than the Maize (competing crop). Whereas, the average monthly price per quintal of maize was relatively more in November and December of the reference year (2012). In the case of Sunflower crop price interms of C.V. was higher than the Competing crop Cotton. So the price also major factor to change area and production of edible oilseeds in the state.

4.1 PROBLEMS AND PROSPECTS OF OILSEEDS PRODUCTION AN EMPIRICAL ANALYSIS

Socio-Economic Status of Sample Households:

The household survey was conducted in three selected crops Groundnut (250), Sunflower (150) and Oilpalm (75) from 26 villages covered all farmer groups. Approximately average size of entire sample was 4.2 to 4.8 members and average level of education 8 years. Area under irrigation to GCA was found to be good (96.94%) followed by groundnut (37.25%) and Sunflower crop (41.9%) respectively. Small extent of area was found to be leasing in land and payment of rent also fixed in cash and Tube well was the major source of irrigation. The study crop of Groundnut cultivated mostly in unirrigated and the average yield under Kharif and Rabi seasons estimations were 11.72 quintals and 16.5 quintals per hectare whereas under irrigated area the average yield was 21.56 quintal per ha. Respectively. In the case of Oil palm mostly irrigated (96%) and the average yield was 15.85 quintal per ha. So it may conclude the dryland groundnut production is less than the irrigated land of our sample districts.

4.2 Production, Retention and Marketed Surplus Pattern of Oilseeds:

Significant variations in both Kharif and Rabi regarding market prices and retention on groundnut crop among farmer groups in the state. Price have been changing between the seasons, nearly 6 to 7 per cent of production retained for use of seed and household

consumption. The main competing crop for Groundnut was found to be Maize per HH average production, retention and sale of price of sample HH under sunflower crop experienced the same trend. The main competing crop of Sunflower was found to be Cotton. About the oil palm total production sent to collection centres by the farmers for sale, no retention was reported and the market price depends on International Oil palm Prices. Majority of farmers expressed that there is no competing crop of Oilpalm sofar.

4.2.1 Comparative Economics/Profitability of Oilseeds Vis-à-vis Competing Crops:

The study estimated the income of the sample farmers, per hectare Groundnut net income was found to be Rs.28,971, whereas the competing crop Maize was Rs.37,710 per hectare. In the case of Sunflower crop the average net income per household to be 23,973, whereas the competing crop Cotton net income Rs.35,262 per hectare in the study area. Highest net income under Groundnut crop as well as competing crop (Maize) received from marginal farmers whereas the Sunflower crop highest net income derived from medium farmers and in the case of competing crop cotton from marginal farmers. So the competing crop of Maize and cotton obtained the highest income than Groundnut and Sunflower crop.

4.2.2 Yield and Technology Gap Analysis:

The sample crop of groundnut the average HH actual yield was found to be lowest 17.21 quintal per hectare. The average potential yield (36.00) and average experimental yield 30.00 quintal per hectare. Thus the yield gap – I , potential yield – experimental yield (36.00-30.00) = (6.00 q/ha). Whereas, yield gap II potential yield – Actual farm yield 36.00 – 17.21 = 18.79 Q/ha. The yield gap III experimental farm yield – Actual yield 30.00-17.21 = 12.79 P/Q. The yield gap II was found to be the highest in the study regions. The technology index is same in all farmers groups under groundnut crop. In the case of Sunflower the average farm yield gap 1.50 q/ha whereas yield gap II was highest 5.30 Q/ha and the yield gap III was found to be 3.80 Q/ha. So the yield gap II was found to be highest and lowest in yield gap I of the study period. So there is a need to enhancing the level of actual yield of both the above sample crops through adequate supply of quality or improved seed in time. Irrigation facilities, supply of subsidy inputs and reduce the price fluctuations in the market are necessary.

The study found out of 250 groundnut farmers 94% expressed of sample farmers used HYV seeds and 62% seed supplied by the agricultural department. 81 per cent of farmer expressed marketing in the major problem and 68 per cent reported unaware about MSP under groundnut crop. Regarding sunflower crop, all sample farmers used HYV seeds and availability of major source of seeds as market. Inadequate market facilities and unaware about MSP expressed by major sample farmers. In the case of Oilpalm crop total area covered by HYV plants and 97% of farmers followed recommended doses of fertilizers and pesticides and very less problems about marketing.

4.2.3 Marketing pattern of oil seeds:

Groundnut farmers were positively and responded about 64% of production sale to commission agents and village traders because they pay higher prices than existing MSP. Maize crop is the competing crop 49 per cent of production sale to local traders and 27% share to commission agents. NAFED is the only government agency to purchase the production of above two oilseeds at low quantity reported by the sample farmers. In the case of Sunflower, largest output sold (49%) to private companies (Contract agreement) and remaining 66% sold to local village traders. Government agency and commission agents. Private companies are only paid the highest price than other agencies. Cotton is the major competing crop and 57% of output sold Government agency APMC and 43% sold to commission agents and price is more or less same, regarding oil palm production 67% of output sold to private companies and 33% sold at government agency (AP OILFED) these two agencies procure total oil palm production and the price more or less same per quintal.

4.2.4 Sources of Technology and Market Information:

About technology State Agriculture department played a key role, the study crop of groundnut farmers (63%) expressed. The department only provide the extension services. 87% of farmers answered that the market information known through fellow farmers followed by commission agents and print and electronic media. In the case of sunflower sample farmers expressed about market information mixed response was observed. Agriculture department is the major source to provide extension services. In the case of Oilpalm total farmers said that the seed supplied by the State Horticulture department, extension services are provided through A.P. Oilfed and Private factories and information about market and price of

the product are also known through Horticulture department from time to time, print media and T.V.

4.2.5 Perceived Constraints in cultivation of Oilseeds:

Groundnut farmers have expressed major constraints firstly agro-climatic factors like variation in temperature, low and inconsistent rainfall low level of irrigation facilities and unfertile lands are the major cause for uncertain production. Secondly institutional and economic constraints are high input costs like fertilizer and pesticides, shortage of human labour, inadequate seed supply, irregular and low supply of electricity in day time. Inadequate government agencies to purchase the output, exploitation of market intermediaries like commission agents and village traders. Inadequate storage facilities and processing industries at nearest place and poor knowledge about crop insurance. On the other hand the study found major constraints under sunflower cultivation mainly inadequate supply of seed, extreme variations in temperature, irregular power supply, price variations, lack of processing industries exploitation of village level traders, unaware about MSP, post harvest problems like birds infestation, shortage of human labour, lack of processing facilities. In the case of oil palm cultivation, major constraints mainly extreme variation in temperature, high input costs, shortage of labour, irregular power supply, unaware about new technologies, lack of grading in oilpalm output at the sale point in sufficient oilpalm companies near by the production.

4.2.6 Policy Implications:

The major thrust of strategies should be mentioned below for the expansion of area and enhancement of yield under groundnut, Sunflower and oil palm crops in the state

Groundnut:

1. Quality seed production chain may have to be strengthened, so that farmers get sufficient quantities of certified seed in time.
2. Farmers have to be ensured remunerative price by procuring groundnut from the farmers in the event of prices falling below the minimum support price.
3. Promote soil test based fertilizer recommendations and application of Gypsum in irrigated groundnut crop for Ca and Sulphur requirement.
4. Implement the weather based or crop insurance of ground nut crop of all farmers.

5. In adequate seed supply by the department to the groundnut farmers at subsidy rates. So there is need to increase the seed supply according to their requirement.
6. Regular power supply at least 10 hours a day essential for good yield and essential to functioning of drip irrigation system also required to increase the yield by 10 to 20 per cent.
7. Improve the cultivation technologies through trainings and field surveys by the experts from agricultural department like adoption of farm mechanization seed treatment and post harvest technologies should be improved the production, resulting in quality of production and also reduce the cost of cultivation.
8. Extend the storage and marketing facilities.

Sunflower:

1. Supply of quality seeds of improved varieties and hybrids which are capable of boosting the productivity to a significant extent.
2. Government should supply Baron and Nutrition at subsidy price to the farmers at the time of ray floret opening stage increases the seed set and seed yield of sun flower crop.
3. In new areas of sun flower cultivation while grown in small areas, protect the crop against bird damage of manual scaring during flowering to harvest.
4. Sunflower is an exhaustive crop and responds well to application of fertilizers. The fertilizer recommendation specific to farming situation shall be adopted.
5. Linkage of NREGS and Sunflower crop cultivation is need to reduce the cost of cultivation.
6. To supply seed at 50 per cent subsidy of market price to the farmers.
7. Implement the crossing technology at flowering stage.
8. Harvesting technology must be invented.

Oil Palm:

1. The Central government should impose levying duties on import of palm oil from other nations so as to justice to the local cultivators.
2. Linkage of NREGA and oil palm cultivation.
3. Regular power supply at least 10 hours a day is essential for good crop.

4. At the time of harvesting the skilled labours are not available. So the horticulture department needs to invent the suitable harvesting tools to supply at subsidy prices to oil palm farmers. It leads to reduce the cost of cultivation of oil palm crop also.

PROBLEMS AND PROSPECTS OF OIL SEEDS AND OIL PALM PRODUCTION IN ANDHRA PRADESH

CHAPTER – I

INTRODUCTION:

On the oil seeds map of the world, India occupies a prominent position, both in regard to acreage and production. India constitutes about 10 per cent of the world oilseeds production, 6.7 per cent of the global production of vegetable oil and protein meal and the 4th largest edible oil economy in the world. This sector has also an important position in Indian agricultural sector. Oil seeds occupy a distinct position with about 272.24 lakh hectares of area and 324.71 lakh tonnes of production (2010-11). This constitutes about 14.9 per cent of the gross cropped area in total area of the country. India is blessed with diverse Agro-ecological conditions ideally suited for growing nine annual oilseed crops. Viz. Groundnut, Rape seed, Mustard, Sunflower, Sesame, Soybean, Safflower, Castor, Linseed, Niger and two perennial Oil seed crops (Coconut and Oil palm) besides secondary oilseed crops such as Maize and Cotton. In addition to the above, more than 100 tree spices of forest origin, which have the potential to yield about one million tonnes of vegetable oil are grown in the country. The major Oil seed crops significantly growing states in India, contributed about 83 per cent area as well as production, of which the highest percentage share in area reported from Madhya Pradesh 25.82% followed by Rajasthan 20.15%, Maharashtra 13.29%, Gujarat 10.63%, Andhra Pradesh 8.51% and Karnataka 5.96%. The remaining 14% area is covered by rest of the Indian states. On the other hand the highest share of Oil seeds production among the Indian states are Madhya Pradesh 26.62% top of the list, followed by Rajasthan 19.15%, Gujarat 13.41%, Maharashtra 13.32%, Andhra Pradesh 6.68% and Karnataka 4.04% respectively during TE 2010.11.

India is a domestic agricultural sector, groundnut crop was the most important oilseed crop among oil seed crops in India. Table 1.1 depicts the major oil seed, producing states in India during TE 1992-93 and TE 2010-11. The table reveals groundnut crop occupied the prime position. Followed by Rape seed/mustard and soyabean constituted second and third position of total Indian oilseeds production in India during 1992-93.

Table -1.1
Major Oil Seeds Producing states in India TE 1992-93

(Lakh tonnes)

States	Soya been	Rap/ Mustard	Groundnut	Sun flower	Safflower	Sea sum	Oilpalm&other oil seeds	Total oil seeds
	1992-93	1992-93	1992-93	1992-93	1992-93	1992-93	1992-93	1992-93
Madhya Pradesh	22.92 (81.07)	5.02 (9.47)	2.48 (3.21)	0.08 (0.73)	0.01 (0.34)	0.47 (6.13)	1.53 (10.90)	32.51 (16.76)
Rajasthan	2.08 (7.35)	19.26 (36.35)	2.29 (2.96)	0.02 (0.18)	0.00 (0.00)	1.36 (17.75)	0.35 (2.49)	25.36 (13.07)
Maharashtra	2.47 (8.74)	0.02 (0.03)	7.64 (9.89)	2.29 (21.14)	2.09 (72.06)	0.80 (10.44)	0.55 (3.92)	15.86 (8.17)
Gujarat	0.14 (0.49)	4.42 (8.34)	12.73 (16.48)	0.00 (0.00)	0.00 (0.00)	0.91 (11.87)	4.92 (35.06)	23.12 (11.92)
Andhra Pradesh	0.01 (0.03)	0.01 (0.01)	21.28 (27.55)	1.82 (16.80)	0.07 (2.41)	0.26 (3.39)	1.03 (7.34)	24.48 (12.62)
Karnataka	0.19 (0.67)	0.01 ()	10.27 (13.29)	4.37 (40.35)	0.72 (24.82)	0.48 (6.26)	1.5 (10.69)	17.54 (9.04)
Tamil Nadu	0.00 (0.00)	0.00 (0.01)	14.88 (19.26)	0.16 (1.47)	0.00 (0.00)	0.57 (7.44)	0.08 (0.57)	15.69 (8.09)
Haryana	0.00 (0.00)	6.06 (11.43)	0.02 (0.02)	0.78 (7.20)	0.00 (0.00)	0.01 (0.13)	0.00 (0.00)	6.87 (3.54)
West Bengal	0.19 (0.67)	3.11 (5.87)	0.26 (0.33)	0.00 (0.00)	0.00 (0.00)	0.95 (12.40)	0.12 (0.85)	4.39 (2.26)
Kerala	0.00 (0.00)	0.00 (0.00)	0.09 (0.11)	0.00 (0.00)	0.00 (0.00)	0.02 (0.26)	0.00 (0.00)	0.11 (0.05)
India	28.27 (100.00)	52.98 (100.00)	77.25 (100.00)	10.83 (100.00)	2.90 (100.00)	7.66 (100.00)	14.03 (100.00)	193.92 (100.00)

Source: Ministry of agriculture, Directorate of Oil seeds development Hyderabad, Andhrapradesh.

.....Contd....

Table -1.1 Contd.....
Major Oil Seeds Producing states in India TE 2010-11

(Lakh tonnes)

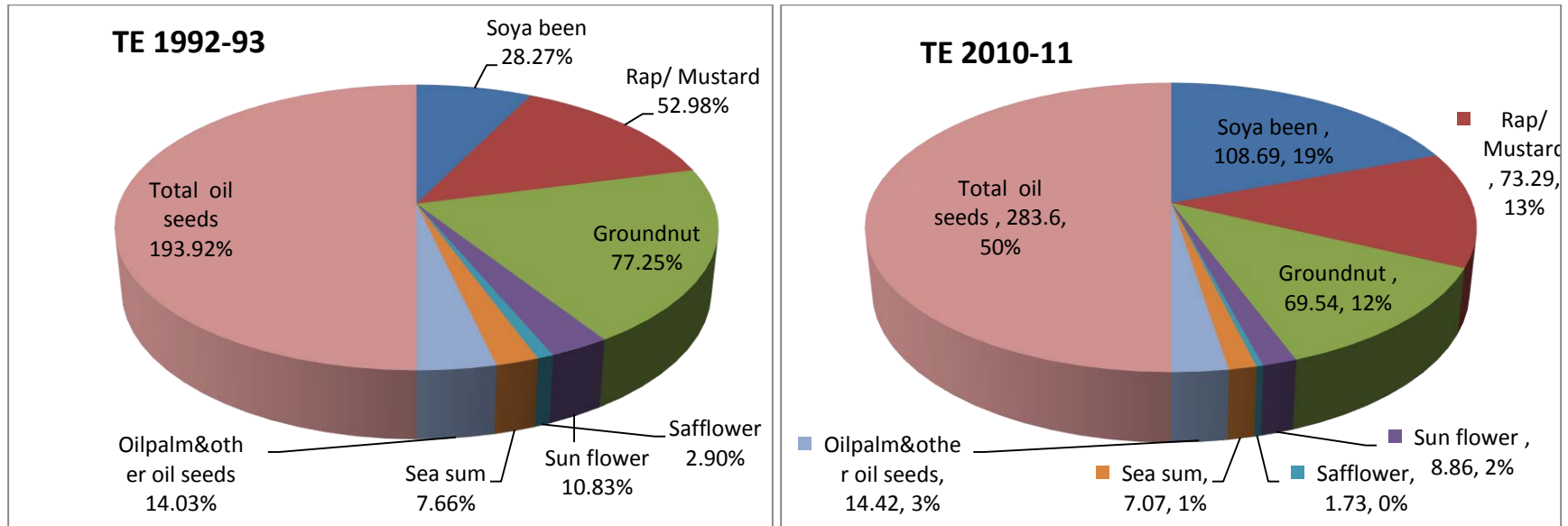
States	Soya been	Rap/ Mustard	Groundnut	Sun flower	Safflower	Sea sum	Oilpalm&other oil seeds	Total oil seeds
	2010-11	2010-11	2010-11	2010-11	2010-11	2010-11	2010-11	2010-11
Madhya Pradesh	63.09 (58.05)	7.14 (9.74)	2.49 (3.58)	0.00 (0.00)	0.00 (0.00)	1.06 (14.99)	1.71 (11.86)	75.49 (26.62)
Rajasthan	9.46 (8.70)	36.07 (49.21)	5.24 (7.54)	0.00 (0.00)	0.00 (0.00)	1.57 (22.21)	1.96 (13.59)	54.30 (19.15)
Maharashtra	30.90 (28.43)	0.02 (0.03)	3.91 (5.62)	1.31 (14.79)	1.08 (62.43)	0.56 (7.92)	0.00 (0.00)	37.77 (13.32)
Gujarat	0.65 (0.60)	3.41 (4.65)	25.95 (37.32)	0.00 (0.00)	0.00 (0.00)	0.97 (13.72)	7.05 (48.89)	38.03 (13.41)
Andhra Pradesh	1.80 (1.66)	0.03 (0.04)	13.39 (19.26)	2.51 (28.33)	0.07 (4.05)	0.22 (3.11)	0.93 (6.45)	18.95 (6.68)
Karnataka	1.07 (0.98)	0.02 (0.03)	5.85 (8.41)	3.51 (39.62)	0.51 (29.48)	0.38 (5.37)	0.13 (0.90)	11.47 (4.04)
Tamil Nadu	0.00 (0.00)	0.00 (0.00)	9.20 (13.23)	0.21 (2.37)	0.00 (0.00)	0.29 (4.10)	0.02 (0.14)	9.72 (3.43)
Haryana	0.00 (0.00)	8.95 (12.21)	0.02 (0.03)	0.25 (2.82)	0.00 (0.00)	0.03 (0.42)	0.01 (0.06)	9.25 (3.26)
West Bengal	0.00 (0.00)	3.92 (5.35)	1.11 (1.60)	0.10 (1.13)	0.00 (0.00)	1.52 (21.50)	0.08 (0.55)	6.73 (2.37)
Kerala	0.00 (0.00)	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.02 (0.01)
India	108.69 (100.00)	73.29 (100.00)	69.54 (100.00)	8.86 (100.00)	1.73 (100.00)	7.07 (100.00)	14.42 (100.00)	283.60 (100.00)

Source: Ministry of agriculture, Directorate of Oil seeds development Hyderabad, Andhrapradesh.

Figures I brackets indicates the percentages of major states oil seed crops area and production to total Oilseed crops in India

Major Oil Seeds Producing states in India TE 1992-93 and TE 2010-11

Figure - 1



On the other hand the share of Groundnut crop production has lost its prime position to soyabean. The second most important oilseed production is Rape seed/mustard and the groundnut production placed in third. These three crops production accounting for about 90% of total oil seeds production in the country. The other edible oil seeds are sun flower, sesame and safflower. The states of Karnataka, Andhra Pradesh and Maharashtra are major sunflower producing states, while Rajasthan, West Bengal, Madhya Pradesh and Gujarat states are reported that the crop sesame is the major producing states in India during TE 2010-11. The table 1.1 revealed that there was a significant increase in the production of oilseeds but the per capita vegetable oil demand is raising continuously and has created a big gap between domestic production and consumption and this gap filled by liberal imports mainly from Malaysia and Indonesia to the tune of 9.94 lakh tonnes. Recently the state and central governments are trying to bring down the quantum of edible oil imports through the expansion of area and productivity of oilseed crops cultivation by providing through subsidies and incentives to farmers.

1.1. Review of Literature:

E.K. Vasudevam (1990) stated that 85 per cent of India's Oil Seed production from rainfed areas and hence there were wide fluctuations in production owing to monsoon vagaries and oil seeds are grown in poor soils. The introduction of high yielding hybrid varieties are poor compared to other agricultural crops. Owing to these factors, the yield per hectare is very low. During the year 1989-90 the production of oil seeds may declined to 16 million tonnes in India, as a result, the supply and demand have assessed at between 48 and 58 lakh tonnes of oils respectively and it leads to a deficit of 10 lakh tonnes. In the circumstances, oil seeds production has to be stepped up and self sufficiency achieved as early as possible to overcome the problem expressed by him.

P.V. Shenoi – Assistant Director General, International crops Research Institution published a paper titled on 'quality oil seeds, benefits of technology mission 1991. The root problem was the fragmented policy on oil seeds, which did not rationally reconcile the interests of the farmer, the consumer, the processor and the marketer, with that of economy as a whole. Imported oil was sold at prices much below the domestic cost of production because the support price abroad was much higher than in India. It was the large export support given by the several

developed countries, which had brought down the international prices artificially. Though there was a reasonably good technology which could double the yields. Indian farmers did not get the quality seeds and other support and even if they did they could not make an adequate profit due to market imperfections. So the government of India was launched the programme in 1988 Technology Mission on Oil seeds (TMO) can help step up production and exports and also reduce imports on the cost effective basis.

T. Damodaram and D.M. Hedge mentioned in their report oilseeds situation in India" **Till total** oilseeds production was only 9.2 mil. tonnes obtained from 16.8 mil. hectares with the productivity of 548 kg/ha which was increased by 133%, 52% and 53% respectively by 1995-96. In 1996-97, the total oilseeds production was 24.9 mil tonnes with the productivity of 931 kg/ha from 26.8 mil hectares of area. But the indigenous production of vegetable oil which was less than the demand the early nineties. From a chronic importer of vegetable oils, the central government has taken a decision to self sufficiency in India.

MVR Prasad, Project Director, Directorate of Oil seeds Research, Rajendra Nagar published a paper on Oil seeds growth should accelerate (1994). According to him the rapid growth of Indian population will exert considerable pressure on oil seed economy, from the demand estimates of various study groups like IFPRI, NCA, Department of Civil Supplies, NCAER and VMA projected the presented growth rate in Indian Oil Seeds demand supply gap unlikely to be narrowed down by 2000 A.D. and many pose a serious threat to the oil seed economy. The directorate of oil seeds Research on the field have shown that there is an immense potential to enhance productivity from the present level of 600 to 800 kg/ha to an average of 1500 kg/ha by the adoption of recommended technologies, this may lead to a perceptible enhancement in the overall production.

Prof. H. Sulochana (2008) eminent professor Osmania University, Hyderabad highlighted in her article that the consumers must care about the use of edible oil to avoid the health problems. In India 60 per cent of health problems are raised by not using the quality edible oil in their regular diet. Therefore edible oil is important in regular human diet. So the government may take necessary steps to meet the scarcity of edible oil supply in the market.

Prof. Purushothama Rao (2008) Dean faculty of Commerce and Head of the Department of Commerce, Osmania University, Hyderabad highlighted his research paper that, edible oil is the most important part of food for human being. The Government must prevent the oil mixing practices by the wholesalers and local retailers which was occurred due to inadequate supply of edible oil and the Government should control the selling loose oils to the consumers. So the scarcity of edible oil is the cause to make oil adulteration and mixing the contaminated oils in the market, which will create health problems to the consumer. Therefore the government needs to supply quality edible oils in the country.

As per the projection by DAC – Rabo-Bank the per capita consumption of vegetable oil is likely to be 14.57 and 16.38 kg/year by 2015 and 2020 respectively. This amount to vegetable oil requirements of 18.3 and 21.8 million tonnes respectively by 2015 and 2020. Assuming an average oil recovery of about 30 per cent from major oil seeds and production of different oilseeds constant in the coming years, the country needs to produce at least 55.5 and 66.0 million tonnes of oil seeds by 2015 and 2020 respectively. The country needs to more oil seeds production in the next 10 years.

Indian Council of Medicinal Research has prescribed 14 kg oils and fats per capita per annum as the minimum nutritional requirement, but the per capita availability in India is around 6.4 kg. per annum against 11 kg for world average and 27 kg in developed countries. To bridge the yawning short falls, we had been importing huge quantities of edible oil at the cost of valuable foreign exchange. This touched a staggering level of Rs. 1300 crores in 1983-84. Then the government of India had launched **"Technology Mission on Oil seeds" in 1986** to achieving self reliance in Oilseeds by 1990. The initial strategy to overcome stagnant oilseed production and processing through centrally sponsored schemes.

The Technology Mission on Oilseeds (TMO) was launched in May 1986 as a Central Scheme by the department of agriculture and co-operation with a view to increase the production and productivity of Oilseeds to make the country self reliant in this vital sector. It was a major breakthrough to increasing oilseeds production and achieved through an integrated approach by introducing new crop technologies, better supply of inputs, post harvest technologies and excellent coordination and cooperation between various organizations/departments and ministries. The TMO covered 183 districts in major Oilseed

growing states, subsequently in 1991 this scheme was extended to few more potential districts. As a result, the oilseed production that was only 10.83 Million tonnes in 1985-86 and increased to 24.35 million tonnes in 1996-97 further it had reached to 32.47 million tonnes in 2010-11. This was achieved through area expansion of oilseed crops as well as increase in productivity from 684 kg/ha in 1985-86 to 1298 kg/ha in 2010-11. As a result, the dependence on import of edible oil was reduced to the extent of hardly 5 per cent in 1995-96. The National Dairy Development Board (NDDB) established a large net work of Oilseed co-operatives with storage and processing capabilities. This kind of support was crucial for the success of TMO till mid-nineties. However, after 1996 the production of oil seeds lagged behind to meet the domestic requirements through indigenous sources. The oil seed growers heavily suffered when the price of oil seed crops was at very low level and there was no effective market intervention by NAFED to give support price to oil seeds. In **the late 1990's oil seed prices** declined relatively to that of other crops, mainly in response to the earlier increase in domestic oil seed supplies and subsequently due to liberalization of edible oil imports initiated in 1994. The Minimum Support Price (MSP) level of food grains has also been raised more than that of oil seed since mid **1990's. Although the government had regularly supported Rice and Wheat MSPs in several** states through direct procurement, price support operations for oilseeds have usually not been funded. As a result, increasingly favourable returns from rice and wheat have grabbed area away from oilseeds and it leads to lowering oilseed production.

The four Erstwhile schemes of the Oilseed Development Programme (ODP), Oil palm Development Programme (OPDP), National Pulses Development Programme (NPDP) and Accelerated Maize Development Programme (AMDP) have been merged into a Centrally Sponsored Integrated Scheme of Oil seeds, Pulses, Oil palm and Maize (ISOPOM) during the 10th Five Year Plan, which was being implemented from 1st April 2004, to meet the challenges posed through huge demand for vegetable oil production. The scheme is implemented mainly to provide flexibility to the states in implementation of oilseed development scheme, on a regionally differential approach, to promote crop diversification and to provide focused to the oilseed development programmes. Under ISOPOM, the programme for development of oilseeds is being implemented mainly in potential states viz. Andhra Pradesh, Bihar, Chattishgarh, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamilnadu, Uttarpradesh and West Bengal. These programmes benefitted to small and marginal oilseed crop growers, as most of the oilseed crop area in the country is with these

categories of farmers. Under this scheme, assistance is given for purchase of breeder seeds, distribution of seed minikits, distribution of inputs and machinery etc. In India while the area coverage and production under oilseeds has increased. The area increased at about 226.36 lakh hectares to 272.24 lakh hectares and on the other hand production has magnificently increased from 206.62 lakh tonnes to 324.79 lakh tonnes due to significant increase in productivity from 913 kg/ha to 1193 kg/ha during the period 2001-02 to 2010-11 in India.

Apart from these Oilseed crops, a wide range of other minor Oilseeds of horticultural crops of coconut and oil palm in particular also contributing to the vegetable oil requirement of the country. In addition, substantial quantity of oil is obtained from non-cultivable fields from rice bran and Cotton seed and other minor oilseeds such as Sal, Rubber seed, Mahua, Neem, Kavanya, Kokum, Watermelon seeds and Mango seeds for the use in the manufacture of the Vanaspathi and Soaps.

Oil Seed crops raised mostly under rainfed conditions and are important for the livelihood. Oils and Fats constitute one of the five essential ingredients of human diet, the other being protein, Carbohydrates, minerals and vitamins, and the main source of vegetable fat. Even though edible oils are important consumer items next to food grain in Indian diet. Oil seed provide the basic raw material for several processing industries and oil is an ingredient in a number of items such as soaps and paints. It also provides employment to many persons in various activities such as production, assembling, procurement and processing. The importance of oils and fats in human diet as a source of warmth and nourishment was accepted long back. Oil seed crops are a part of agricultural crop divided into three major categories. 1. Food grains includes, cereals, millets, pulses, vegetables 2) Non-Food grains includes oilseeds, sugarcane and 3) Fiber crops Cotton, Jute etc., Oil is one of the important factors in balanced food and it provides fats necessary for human being. Edible oil is produced by crushing the oilseeds. Groundnut, Sesame, Linseed, Sunflower, Safflower etc. are the sources of edible oil.

TABLE – 1.2
CROPWISE AREA AND PRODUCTON OF OILSEEDS IN INDIA AND ANDHRA PRADESH 2010-11
(Area in lack hectares, production in lakh tones)

S.No.	CROP		INDIA	%	ANDHRA PRADESH	%
1	Groundnut	A	58.56	21.51	16.22	69.46
		P	82.65	25.44	14.58	47.43
2	Sunflower	A	9.29	3.41	2.25	9.63
		P	6.51	2.00	1.56	5.07
3	Castor	A	8.80	3.23	1.88	8.05
		P	13.50	4.15	1.21	3.93
4	Soyabean	A	96.01	35.26	1.28	5.48
		P	127.36	39.21	2.18	7.09
5	Sesamum	A	20.83	7.65	1.25	5.35
		P	8.93	2.72	0.26	1.18
6	Saff-Flower	A	2.44	0.89	0.13	0.56
		P	1.51	0.46	0.09	0.29
7	Niger	A	3.71	1.36	0.10	0.43
		P	1.07	0.32	0.04	0.13
8	Rape Seed/Mustard	A	69.01	25.34	0.07	0.30
		P	81.79	25.18	0.17	0.55
9	Linseed	A	3.59	1.31	0.01	0.04
		P	1.47	0.45	0.00	0.00
10	Palm Oil	A	--	--	0.48	2.05
		P	--	--	10.66	34.67
11	Oilseeds Grand Total	A	272.24	100.00	23.35	100.00
		P	324.79	100.00	30.74	100.00

Source: 1. Ministry of Agriculture, Directorate of Oilseeds Development Corporation, Hyderabad, A.P
2. Agricultural Statistics at a Glance, Andhra Pradesh 2010-2011, Directorate of Economics and Statistics, Govt. of A.P. Hyderabad

Crop wise percentage share in total oilseeds area and production in India and Andhra Pradesh is presented in Table 1.2. The table indicates that among nine oil seeds in India looking at its ranking vis-à-vis other oilseeds Soyabean enjoys a dominant position in total oilseeds economy of the country during 2010-11. Soyabean crop area and production share stood first rank which constituted 35.26 per cent and 39.21 per cent of total oilseeds in India, followed by other Oilseed crops namely Rape seed/Mustard and Groundnut crop during 2010-11. The state of Andhra Pradesh Groundnut crop revealed to be a very significant crop and highest percentage share of area and production accounting for about 69.46 per cent and 47.43 per cent stood first rank than other oilseeds in the state. There is no doubt that Groundnut crop area and production has the distinction of being the prominent oilseed crop followed by sunflower constituted 9.70 per cent of area and 8.05 per cent of production against total area

of oilseeds in the state. In the case of production Oil palm and Soyabean secured second and third rank 34.67 per cent and 7.09 per cent of total production of oilseed crops in the state during 2010-11. The coastal belt of Andhra Pradesh horticultural crop of Oil palm cultivation has been increasing due to the feasibility of Oil palm cultivation under irrigated conditions besides Central government assistance pumping the huge subsidies and incentives for area expansion constituted about 2.05 percent whereas production has reported at 34.67 per cent in total oilseeds in the state during 2010-11.

1.2 Role of Agriculture in State Economy:

Andhra Pradesh is agrarian in character and it is considered as one of the most progressive states with respect of agriculture development, maintaining high levels of crop production compared to several other Indian states. Agriculture is major sector of Andhra Pradesh and the fourth largest of Indian states in geographical area and fifth in population 84.6 million i.e. **6.99% of India's total population of 1210 million (2011 provisional census)**. The total geographical area of the state is 275.04 lakh hectares and 22.7% area covered with forests. Net area Sown including fish culture was 112.88 lakh hectares and total cropped area is 146.14 lakh hectares giving the state. The role of agricultural sector in the state economy is very significant and the largest provider of employment, out of 29.9 million work force in the state as much as 19.5 million (65%) are agricultural workers. The state domestic product for the year 2010-11 is 20.37%. Agriculture is the chief source of income and back bone of overall development in the state economy. Thus, a high priority to agriculture was given to achieve the goals of reducing poverty, unemployment and mal-nutrition. Two important rivers of India the Godavari and Krishna flow through the state providing irrigation. The proportion of total area under agriculture is 41.04% and the share of Gross irrigated Area to total gross area reported to be 49.29% in the State. Rice is the major food crop and staple food of the state, the other important food crops are Jowar, Bajra, Maize, Ragi, Pulses, Oilseeds, Tobacco, Cotton, Sugar cane and horticultural crops. So the agriculture is the bed rock of the states economy.

The main sources of irrigation are canals, tanks, tube wells and dug wells. The Gross and Net area irrigated by all sources covered 71.53 lakh hectares and 50.34 lakh hectares in the state during 2010-11. Tube wells and canals had covered the largest irrigation

constituted 49 per cent and 34 per cent of total area followed by tanks 13 percent and other sources accounted a share of 4 per cent. Significant increase has been recorded under irrigated area than previous years during 2010-11 due to favourable seasonal conditions prevailed in the state. Across the districts Guntur is the top with 4.01 lakh hectares of Net Area irrigated in Andhra Pradesh.

The year 1970 Government of India had launched Green Revolution in Rice Cultivation and has been significant changes occurred in the structure and performance of the agrarian economy in Andhra Pradesh state. So production and productivity levels of food grains is also reflected at the national level, with a fact that the state which ranked 3rd in the food grain production continuously reported during 2005-06, 2006-07, 2007-08 and 2008-09 despite of recurring floods and drought conditions prevailed during the above periods in the State. Where as in the year 2009-10, food grain production shows a fluctuating trend due to natural calamities production may not reach to the normal production even though the state obtained 6th position in India.

The total cropped area and production may be classified in to two categories namely Food and non-food crops. Table 1.3 analysed the crop wise area and production of food and non-food crops in Andhra Pradesh in 2010-11. The total Gross Cropped Area (GCA) shown with crops and orchards was 146.14 lakh hectares. Out of it one third of area grown under food crops 96.73 lakh hectares (66.91%), remaining 47.79 lakh hectares of area constituted 33.09% covered under non-food crops in the state. Food crops consisting cereals, millets and pulses and the production reported to be 233.22 lakh tonnes (76.29%) of the total production reported by the state of Andhra Pradesh during 2010-11. Among food crops largest area and production constituted 40.81% of area and 61.74% production covered only cereal and millets against other food crops in the State. On the other hand non-food crops constitute fibers, oil seeds, horticultural crops, sugarcane, cotton and Tobacco etc. Oil seed crops area and production occupied a prominent place against total cropped area in the state which constituted 17.10 per cent and 10.05 per cent in the state during 2010-11. Groundnut, Sunflower, Castor and oil palm are major oil seed crops in Andhra Pradesh, more over Horticultural crops are also significant contributor to the state economy.

Table 1.3
Food and Non-Food Crops in Andhra Pradesh 2010-11

S.No.	Crops	Area in lakh hectares	%	Production in lakh tonnes	%
1	Cereals and Millets	58.98	40.81	188.74	61.74
2	Pulses	21.31	14.74	14.40	4.71
3	Sugarcane	3.00	2.07	15.09	4.93
4	Chillies	1.96	1.35	6.38	2.08
5	Onion	0.43	0.30	8.61	2.81
6	Other Food crops	11.05	7.64	--	--
	Total Food crops	96.73	66.91	233.22	76.29
7	Total Oilseed crops	24.72	17.10	30.74	10.05
8	Cotton	17.84	12.34	38.90*lints	
9	Tobacco	1.57	1.08	2.81	0.09
10	Fodder crops	0.85	0.58	--	--
11	Other Non-food crops	2.81	1.94	--	--
12	Total Non-food crops	47.79	33.09	74.45	23.70
13	Total Cropped Area	144.52	100.00	305.67	100.00

* Production in lakh bales of 170 kg (lint)

Source: Season and crop report, Directorate of Economics and Statistics. Government of Andhra Pradesh, Hyderabad – 2009-10.

1.3 Importance of Oilseeds in State Agriculture:

Andhra Pradesh is one of the most important state in the country growing oilseed crops covered 8.51 per cent area and 6.68 per cent of production in the country's total oil seed crops during TE 2010-11. Oilseeds are the raw material for vegetable oils and they are energy for rich food and Edible oils are next to foodgrains in Indian diet. Oil seed crops are the most important commercial crop and area and production have been magnificently increased over a period of 50 years in the state. The area of edible oilseeds crop was found to be 13.41 lakh hectares and has reached to 24.72 lakh hectares. In the case of production has gone up from 7.92 lakh tonnes to 30.74 lakh tonnes during 1960-61 to 2010-11 in the state. Andhra Pradesh is the significant contributor of oilseed crops and obtained the second largest area and production after cereals in the state during 2010-11.

Geographically Andhra Pradesh classified into three regions namely Telangana, Rayalaseema and Coastal Andhra. Rayalaseema region constituting four districts Kadapa,

Kurnool, Ananthapur and Chittoor, the farmers from these districts are grown largest area of oilseed crops followed by Telangana and Coastal Andhra regions in the State. The major oil seed crops grown in the state are Groundnut, Sunflower, Castor and Oil palm. Table 1.4 depicted major oil seed crops in Andhra Pradesh with their concentration of area and production of the major districts during 2009-10. Major extent of Groundnut crop is cultivated during Kharif season in the State which is being rainfed. Though the crop is grown in most of the districts, mainly concentrated in Rayalaseema region and also some part of Telangana region.

Table 1.4
Major Oil Seed Crops in Andhra Pradesh with their Concentration 2009-10

S.No.	Crop	Area	Total area	%	Production	T. Prod	%	Predominant districts
1	Groundnut	11.09	13.01	85	7.10	10.06	70	Anathapur, Kurnool, Chittoor, Kadapa, Mahaboobnagar,
2	Sunflower	2.97	3.50	84	2.17	2.70	80	Kurnool, Ananthapur, Kadapa, Prakasam, Mahaboobnagar,
3	Cstor	1.42	1.47	96	0.60	0.63	94	Mahaboobnagar, Kurnool, Prakasam, Nalgonda, Rangareddy
4	Palmoil	0.42	0.44	95	8.93	9.17	97	West Godavari,, East Godavari, Krishna, Vizianagaram, Khammam

Source: Season and Crop Report, Andhra Pradesh 2009-10, Directorate of Economics and Statistics, Government of Andhra Pradesh, Hyderabad.

Ananthapur district covered above 40 per cent of area grown under groundnut crop to the total groundnut crop area in the state followed by Kurnool, Chittoor, Kadapa from Rayalaseema region and highest production and productivity reported from Mahaboobnagar district from Telangana region in the state. Out of 22 agricultural districts the above five districts covered 85 per cent of area grown and 70 per cent of production received against total Groundnut crop area and out turn of the state during 2009-10.

Sunflower is another important edible oilseed crop and the oil is considered as premium compared to other vegetable oilseed crops. The districts of Rayalaseema and Telangana region farmers cultivated 84 per cent of area and 80 per cent production concentrated from Kurnool, Ananthapur, Kadapa from Rayalaseema region and Mahaboobnagar and Prakasam

districts from Telangana and Andhra region in the state. More over castor also a major oilseed crop but it is a non-edible oilseed crop. The crop is grown 96 percent of area and 94 per cent of production received mainly from five districts Mahaboobnagar, Prakasam, Nalgonda and Ranga Reddy from Telangana region and also Kurnool district from Rayalaseema region. Further the table analyzed another important edible oil seed crop is oil palm and it was introduced in Andhra Pradesh in 1986. The government of Andhra Pradesh identified ten districts and majority of districts from coastal Andhra Pradesh. 95 per cent of area and 97 per cent production reported from the districts of West Godavari, East Godavari, Krishna, Vizianagaram from Coastal Andhra and Khammam from Telangana region in the state. Therefore the state of Andhra Pradesh reported that the oilseed crops namely Groundnut, sunflower and Castor crops area and production concentrated in the rainfed districts of Rayalaseema and Telangana districts. These crops cultivated from marginal and small farmers group under rainfed conditions. Whereas Oil palm cultivation was grown from Coastal Andhra region under irrigated conditions in the State.

Frequently area, production and yield have been fluctuating due to many reasons. Mostly diversification from oil seed crops to other competing crops of maize, cotton, banana and coconut etc. due to high market prices and market support price fixed by the Government besides low cost of cultivation. Therefore the study has analyzed the trends of oilseeds crops in area and production in India and the major states. Price factors are identified and analyzed major problems and prospects of oilseed crops in Andhra Pradesh.

1.4. Problems in Oilseeds Production:

Major constraints in increasing oilseeds production and productivity in Andhra Pradesh.

1. Non-availability of quality seed or improved varieties. The supply of seed is grossly inadequate both interms of the members covered and qualities supplied per hectare of the recipient members.
2. The supply of inputs like fertilizer and micro nutrients such as urea, Gypsum, DAP, SSP are not sufficient, sub-standard and delayed. The farmers may not have found it necessary to the production.
3. Supply of plant protection chemicals are important for the production but the availability of these chemicals are inadequate and substandard.

4. Extension services are poor, farmers unaware about uses of pests and disease management, post harvest care besides field demonstrations, propagate new technology, HYV, new practices etc.
5. Procurement facilities are inadequate to purchase of total oilseeds produce by the government agencies.
6. Groundnut farmers are exploited by the middlemen and merchants at the time of purchase of their product through weighment and prices in the State.
7. In sufficient storage and processing infrastructure.
8. 85 per cent of oilseed crops are grown as rainfed crops without irrigation on mostly poor soils.

1.5 Problem:

In India rapid growth of population and changing consumption habits of the consumers has been created more demand of edible oils on the other hand oilseed crops grown under dry and un irrigated area cultivated by marginal and small farmers besides unfavourable climate conditions are also leads to low productivity of oil seeds. So demand for edible oil is more than the supply and create a big gap between demand and supply in India. Therefore the Government of India imported large quantities of edible oil from Malaysia and Thailand and have been paid lot of foreign exchange for these imports. To overcome this situation the government of India had been launching several schemes to improve the oilseeds production since 1984. Inspite of all efforts by the government the production and supply of edible oil could not meet the demand in India. Andhra Pradesh is one of the important states, farming edible oilseed crops contributing major share in agriculture in the state. Therefore we study the problems and factors of low production of edible oilseeds and also give suggestions to improve the production and productivity in the State.

1.6. Objectives:

The specific objectives of the study are

1. To examine trends and pattern of growth of different edible oilseeds over time and across states/districts and identify the sources of growth in edible oilseeds output in Andhra Pradesh.
2. To determine the impact of price and non-price factors influencing the supply response behavior and demand for edible oilseeds and oil palm in the state.

3. To identify major constraints in the edible oilseeds and oil palm cultivation and suggest policy options to increase oilseeds production and productivity in Andhra Pradesh.

1.7. Organization of the Report:

The report is organized into five chapters, chapter – 1 discusses the over view of oil seed crops area and production I n India and states. Role of agriculture in economy of the state of Andhra Pradesh. The oilseeds importance in the state agriculture and problems in production of oilseeds in the state has been discussed. Then the major objectives have also stated in this chapter. Chapter II presents the methodology used for data collection and data analysis. The coverage, sampling design and conceptual framework of the study have been discussed in this chapter. Chapter III presents an overview of oilseeds sector in the state of Andhra Pradesh discussed the current status and growth behavior of area production and productivity under oilseeds, changes in cropping pattern and the nature of variability in area, production and yield of major oilseeds via-a-vis competing crops during the periods **1970's, 1980's, 1990's and 2000's have been examined.** The nature of variability in monthly/annually prices of major oilseeds and edible oils in the state has also been discussed in this chapter.

Chapter IV gives the findings of the field survey relating to socio-economic conditions of sample farmers including land ownership, irrigation, cropping pattern have been analyzed. The production retention and marketed surplus pattern of oilseeds and the comparative economics of cultivation of oilseeds vis-à-vis competing crops have been analyzed. The yield gap and technology gap has been analyzed in this chapter. This chapter also discusses the extent of accesses to improved technology and markets for oilseeds. The determinants of oilseed production and acerage allocation have been examined by the use of appropriate regression models. The perceived constraints in cultivation of oilseeds have also been discussed in this chapter. Suggestions for improving production and productivity of oilseeds from the farmers in the study region have also been presented in this chapter.

The Vth chapter presents the summary and conclusions and policy implementations of the study in Andhra Pradesh.

CHAPTER – II

COVERAGE AND SAMPLING DESIGN AND METHODOLOGY

2.1 INTRODUCTION:

The present study attempts a comprehensive in depth analysis of edible oilseed crops in India and Andhra Pradesh. The study was based on both primary and secondary data pertaining to edible oil seeds and competing crops in the state. In order to meet the first two objectives of the study, the analysis of secondary data related to area production and productivity of oil seed has been undertaken. The study examine trends and pattern of growth of different edible oilseeds of state and districts in different periods. The study covers cropping pattern, the growth of area, production and yield of edible oil seeds across the districts and the state. Moreover, impact of price and non-price factors and marketing facilities of edible oils have analyzed. The study found major constraints and made suggestions and policy implications to increase oilseeds production and productivity in Andhra Pradesh.

The role of agricultural sector in state economy is very significant and contributed 20 per cent of GDP in the state economy, besides 65 per cent of population depending on this sector. Geographically the state of Andhra Pradesh consisting three regions with 23 districts namely Telangana (10), Rayalaseema (4) and Coastal Andhra (9). Hyderabad district is capital city of the state and non-farming district in the state. Among agricultural crops oilseed crops area and production obtained first place, after cereal crops, major oilseed crops are grown namely Groundnut, Sunflower, Soyabean, Sesamum and oil palm crops from edible oils and castor from non-edible oilseed crop in the state.

Present study was a part of larger coordinated study on problems and prospect of oilseeds and oil palm production in India. The multi state, purposive sampling method was used to select in states, districts, mandals, villages and farm households. At first stage, the states growing considerable quantities (area/production) of oilseeds and having potential for further growth were selected. In total seven major oilseed producing states were selected for the study. Table 2.1 presents the major oilseeds producing states and the major oilseed crops they grow. It was decided to include those crops and states whose share is significant in total acreage and production of edible oilseeds. Accordingly, Andhra Pradesh along with, Gujarat and Maharashtra were chosen for the detailed study on Groundnut, since these states were found to be the major producers of this crop. Similarly Sunflower and oil palm crops were also

selected for detailed study along with groundnut crop in the state. Table 2.2 revealed the details of coverage of states, crops and the allocation of sample size. This study was undertaken to generate better understanding of the specific problems and prospects of oil seeds cultivation in the state of Andhra Pradesh.

The Ministry of Agriculture, Government of India has entrusted the study i.e. ***"The problems and prospects of oilseeds and oil palm production in India"***. Out of nine oil seed crops, three edible oilseed crops were selected namely Groundnut, sunflower and oil palm crops for household survey. So the Agro-Economic Research Centre, Visakhapatnam has undertaken the study and nine districts were selected for household survey in the state through structured questionnaires given by the coordinator.

The study is broadly in two parts. The first part attempts were made to analysed time series data, available from published data collected from Directorate of Economics and Statistics, Government of Andhra Pradesh, Hyderabad, Directorates of Agriculture and Horticulture, Government of Andhra Pradesh. Apart from other sources like joint directors and additional directors from agriculture and Horticulture departments from sample districts in the State. The data related mainly on area, production and productivity of oilseed crops and competing crops, rainfall, farm harvest price, market support prices data were analyzed. The factors for frequent **changing's** in cropping pattern of oilseeds are also examined. Area and production of annual compound growth rates, absolute and relative growth rates were estimated in different periods of major oil seeds and competing crops across the districts in the state.

Selection of Districts/Mandals/Villages:

In the second stage the study selected the districts for household survey based on guidelines given by the coordinator. The study estimated above 10 per cent acerage and yield of oilseed producing districts of total oilseed crops in the state. The selection of districts was based on acerage and yield as per the classification presented in the Table 2.3. Crop wise districts selection were categorized into four groups such as high area and high yield (HH), High area and low yield (HL), low area and high yield (LH) and low area and low yield (LL). Since HH, HL, LH, categories of districts have the potential for further increase in production. The study has given three edible oil seed crops namely 1. Groundnut, 2. Sunflower and 3. Oil Palm

crops and from each selected crop three districts were selected for household survey. The selection of districts, mandals and villages for household survey had selected with the coordination of Government officials from agricultural and horticultural departments in state of Andhra Pradesh.

Table 2.1
Major Oil seeds producing States in the Country TE 2007-08

Crop	Major Producers
Groundnut	Gujarat (37.1%), Andhra Pradesh (21.7%), Tamilnadu (13.6%), Rajasthan (7.5%), Karnataka (7.0%)
Rapeseed & Mustard	Rajasthan (48.6%), Uttar Pradesh (13.8%), Haryana (12.4%), Madhya Pradesh (10.2%), Gujarat (4.6%)
Soybean	Madhya Pradesh (59.1%), Maharashtra (27.8%), Rajasthan (8.1%),
Sunflower	Karnataka (42.8%), Andhra Pradesh (28.2%), Maharashtra (13.4%),
Safflower	Maharashtra (68.5%), Karnataka (25.7%), Andhra Pradesh (4.2%)
Sesame	West Bengal (24.6%), Gujarat (17.6%), Rajasthan (13.8%), Madhya Pradesh (10.5%), Karnataka (9.1%), Uttar Pradesh (5.2%), Tamilnadu (4.2%), Andhra Pradesh (4.2%)
Oil Palm	Andhra Pradesh (85.7%), Kerala(10.7%), Karnataka(2.0%)

Source: Sharma 2012

Table 2.2
Selected Crops, States and Sample Size

Crop	States	Sample Size (HHs)	Total Sample Size
Groundnut	1. Andhra Pradesh	250	500
	2. Gujarat	250	
Soybean	1. Madhya Pradesh	250	500
	2. Maharashtra	250	
Rapeseed & Mustard	1. Madhya Pradesh	100	500
	2. Rajasthan	200	
	3. Uttar Pradesh	200	
Sunflower	1. Karnataka	250	400
	2. Andhra Pradesh	150	
Sesamum	1. West Bengal	250	250
Oilpalm	1. Andhra Pradesh	75	75
Grand Total		2225	2225

Source: Sharma 2012

1. Groundnut: The state of Andhra Pradesh consisting 23 districts and Ananthapur district cultivating largest area grown under groundnut crop in the state, where as yield per hectare is low comparatively other districts. So we selected Ananthapur district (HL). The district Mahaboobnagar also farming high area of Groundnut crop as well as high yield. So we consider this district is (HH) and finally Srikakulam district having low area and high yield of Groundnut crop (LH) among Groundnut producing districts in Andhra Pradesh state.

Sunflower: Sunflower is another important Oilseed crop in the state. This is the second largest area and third largest production after Groundnut and oil palm crop among edible oilseed crops in the state. In Rayalaseema region majority of farmers have been cultivating Sunflower crop compared to other two regions in the state. Across the districts Kurnool district reported that the Sunflower crop area having high area and low yield (HL). On the other hand Prakasam district also covered high area and high yield (HH). But the West Godavari reported low area and high yield (LH) in the state of Andhra Pradesh.

3. Oil Palm: Oil palm is another important edible oil seed crop was introduced in the state in 1986 and stands first in area and production in the country. The total oil palm crop grown in 10 districts in coastal Andhra region. Across the districts we found that the Vizianagaram district covered high area and low yield (HL), West Godavari high area and high yield (HH) and Nellore district (LH) has identified low area and high yield in the State. Therefore the study has selected the above districts for household survey in the State.

Different farm household sizes and socio-economic groups cultivating oilseeds were selected to ensure adequate heterogeneity. Table 2.3 presents the details of the households selected from various study villages from nine selected districts of Andhra Pradesh. About 26 villages covered from 17 mandals of nine study districts to get the information from selected sample households (475) through the given questionnaire. From each selected village an appropriate number of farmers representing different farm categories such marginal 0-1 ha, small 1-2 ha, medium 2-10 ha and large more than > 10 ha have taken for household survey and with a condition that in each district we get a minimum of 20 households in each category. The reference year of the study for the household survey was 2011-12 in Andhra Pradesh state.

Table 2.3
Details of the sample size Distribution across Caste and Villages in Study districts of Andhra Pradesh

S.no	District	Mandal	Village	Sample households				
				SC	ST	OBC	GEN	TOTAL
Groundnut								
1	Mahaboobnagar	Koilkonda	Kesavapuram	3	12	23	2	40
		Hanwada	Gudimalkapur	3	16	4	12	35
2	Srikakulam	Ponduru	Ponduru	2	0	38	0	40
		Rajam	Rajayyapeta	0	4	27	4	35
3	Anatapur	C.k.palli	Pallannagaripalli	6	0	0	39	45
			Pullatipalli	0	0	0	5	5
		Rapthadu	Bommaparthi	0	0	16	25	41
			Lingannapalli	0	0	0	9	9
		Sub-Total		14	32	108	96	250(100.00)
Sunflower								
4	Kurnool	Kurnool	R.kontalapadu	2	0	23	0	25
		Kalluru	Peddapadu	1	0	22	2	25
5	Prakasam	Cumbham	Errubelam	0	0	0	25	25
		Bestavaripeta	Khajipalem	2	0	2	21	25
6	West godavari	T.narsapur	Bandamcharla	1	0	0	24	25
		Pedavegi	Koppaka	9	0	15	1	25
		Sub-Total		15	0	62	73	150(100.00)
Oilpalm								
7	West godavari	Denduluru	Gangannagudem	0	0	0	12	12
			Challachintalapudi	0	0	0	2	2
		Pedavegi	Tallagavaram	1	0	2	8	11
8	Vizianagaram	Pachipenta	Tuduru	0	0	4	3	7
			Garellavalasa	0	0	0	4	4
			Gogadavalasa	0	0	0	2	2
		Saluru	Tonam	0	0	0	6	6
			Neliparty	0	0	0	3	3
			Kurmarajupeta	0	0	0	3	3
9	Nelluru	Vinjamuru	Vinjamuru	0	0	1	9	10
			Chandrapadia	0	0	0	3	3
			Kavali	0	0	0	12	12
		Sub-Total		1	0	7	67	75
		Total		30	32	177	236	475(100.00)

Source: Statistical Abstract of Andhra Pradesh, Directorate of Economics and Statistics, Govt. of Andhra Pradesh, Hyderabad

2.2 Conceptual Frame work and Theoretical model of the study:

As discussed earlier, the major objectives of the study were 1. To examine the trends and pattern of growth of different edible oilseeds overtime and across districts and identify the sources of growth in edible oilseeds output in Andhra Pradesh. 2. To determine the impact of price and non-price factors influencing the supply response behavior and demand for edible oilseeds and oil in the state. 3. To identify major constraints in edible oilseed cultivation and suggest policy options to increase oilseeds production and productivity in the state. As far as the first two objectives of the study are concerned, secondary data on district wise area, production and yield of major crops/ crop groups and irrigated area under oilseeds, farm harvest prices of selected oilseeds and competing crops, Annual rainfall (2009-10) were analysed using the average, percentages, co-efficient of variations and compound annual growth rates.

The analysis on trends and pattern of growth of different edible oilseeds over time and **across districts has been carried out in a phased manner during 1980's, 1990's and 2000's.** The Triennium average of various data points have been used to draw some meaningful conclusions on trends and patterns during different periods. Mostly the data during TE 1983-84, TE 1993-94, TE 2003-04 and TE 2009-10 have been used for analysis of area, production and yield of oilseeds and competing crops. Appropriate graphs and diagrams have been presented at some places for better understanding of the data.

2.2.1 Estimation of Growth in Area, Production and Yield:

The estimations of growth rate is mostly done by employing two common methods of growth rate including Linear Growth Rate and Compound Growth Rate (CGR), since the linear growth rate has inherent limitations to perform the comparison of growth rates between periods and crops. It was more appropriate to use the compound Growth Rate for analyzing the growth trend of agricultural crops between two periods. The Compound Annual Growth Rate (CAGR) was estimated by fitting semi-tag trend equation (1) of the following form.

$$\ln Y = a + \beta T \text{ ----- (1)}$$

Where , Y defines the time series data of production, area and yield of selected crops. T is the trend term and 'a' is the constant co-efficeint. The slope co-efficient 'β' measures the

relative change in Y for a given absolute change in the value of explanatory variable 'T' is we multiply the relative change in Y by 100, we will get percentage change or growth rate in Y for an absolute change in variable 'T'. If we can calculate the compound Growth rate using the following equation.

$$\text{CAGR} = [\text{Anti log } \beta - 1] * 100 \text{ ----- (2)}$$

2.2.2 Decomposition of Output Growth of selected crops:

The decomposition analysis was performed to measure the relative contribution of area and yield towards the change in total production of individual crops. Several researchers have used the decomposition model to study growth performance of the crops (Bhatnagar and Nandal, 1994, Gupta and Saraswat, 1997, Singh and Ashokan, 2000, Siju and Kombair raju 2001, Kalamkar, 2003, Kakali and Basu, 2006). With the help of decomposition analysis, the relative contribution of area and yield, towards the total change in production of major oilseeds and competing crops has been assessed. The analysis helped in identifying the sources of growth of output by workout the change in production into three effects. I.e. Area effect, Yield effect and interaction effect.

$$(P_n - P_o) = A_o (Y_n - Y_o) + Y_o (A_n - A_o) + (A_n - A_o) (Y_n - Y_o) \text{ ----- (3)}$$

$$\Delta p = A_o \Delta y + Y_o \Delta A + \Delta A \Delta y \text{ ----- 4}$$

Where,

P_n = Production in the current year

P_o = Production in the base year

A_n = Area in the production year

A_o = Area in the base year

Y_n = Yield in the current year

Y_o = Yield in the base year

Δp = Change in production ($P_n - P_o$)

Δy = Change in yield ($Y_n - Y_o$)

ΔA = Change in Area ($A_n - A_o$)

The equation – 4 states that,

Change in production = yield effect + Area effect + Interaction effect

Thus the total production change is attributed due to area and yield that can be decomposed into three effects viz yield, area and interaction effect. The decomposition analysis was made on the major oilseed crops and competing crops mainly on three periods i.e. period I TE 1983-84 – TE 1993-94). Period II TE 1993-94 to TE 2009-10) and overall period of TE 1983-84 to 2009-10.

2.2.3 Log-Linear Models for estimating Oilseeds Production Function and Acreage Allocation Response Function:

As attempt has been made to examine the effects of variation in major agricultural inputs on crop yield with the help of log-linear Regression model. The model has been used to estimate the main crop (Groundnut crop) and competing crop (maize crop) separately. The relative contribution and significance of major inputs such as the crop area, seed cost, Fertilizer cost, pesticide/insecticide cost, human labour cost, machine labour cost, irrigation charges and working capital to change in yield of major oilseed and competing crop for sample farmers have been examined. The interest on working capital has been taken as the proxy of total capital, used for cultivation of the main oilseed and the competing crop since higher the amount of working capital, the higher amount of interest on working capital.

We have stated our regression model with log-linear function from due to the fact the Agricultural production function is usually assumed to follow a cobb-douglas type that requires a log-linear transformation for estimation of input co-efficient. Thus the estimable equation is as follows:

$$\ln Y_1 = A + \beta_1 \ln AR_1 + \beta_2 \ln LS_1 + \beta_3 \ln SC_1 + \beta_4 \ln FC_1 + \beta_5 \ln PC_1 + \beta_6 \ln H L_1 + \beta_7 \ln M L_1 + \beta_8 \ln IC_1 + \beta_9 \ln WC_1 + e_1.$$

Where	Y	= Crop yield
	AR	= Area under the crop
	LS	= Size of operational holdings
	SC	= Seed cost
	FC	= Total cost of fertilizer and manures
	PC	= Total cost of Pesticide and insecticide
	HL	= Total cost of Human Labour (Family plus hired)

ML	= Total cost of machine labour cost
IC	= irrigation charges
A	= Constant term

The sample farmers between groundnut crop and competing crop acreage allocation is concerned, another similar log-linear regression model was fitted. Some major factors that actually influence the farmers decision to allocate the available cultivation area for different crops have been taken into account as an explanatory variables and the area allocated for main oilseed crop (Groundnut) has been considered as the dependent variable. Some price and non-price factors were selected as the explanatory variables for the fitted regression model, which were, one year lagged area of groundnut crop (A_{t-1}) relative yield of groundnut (Y_{t-1}), relative price of groundnut (P_{t-1}), lagged area of maize (AC_{t-1}), lagged yield of maize (YC_{t-1}) and the logged price of maize (PC_{t-1}), the fitted model was as follows:

$$\ln A_t = \alpha + \beta_1 \ln LS_t + \beta_2 \ln A_{t-1} + \beta_3 \ln Y_{t-1} + \beta_4 \ln P_{t-1} + \beta_5 \ln AC_{t-1} + \beta_6 \ln YC_{t-1} + \beta_7 \ln PC_{t-1} + e_1.$$

Where	A_t	= Area under Groundnut crop
	LS_t	= The average size of land holdings
	A_{t-1}	= One year lagged area of groundnut
	Y_{t-1}	= Relative yield of groundnut
	P_{t-1}	= Relative price of groundnut
	AC_{t-1}	= lagged area of competing crop (maize)
	YC_{t-1}	= Relative yield of maize
	PC_{t-1}	= Relative price of maize

2.2.4 Yield and Technology Gap Analysis:

The yield gap analysis was conducted for the main oil seed crops (Groundnut, sunflower and Oil palm) to ascertain the gap between the potential yield and actual yield and between the experimental yield and actual yield. The three types of yield gaps were calculated. The yield gap measures the gap between the experimental yield and potential yield (often known as

technology gap), where the yield gap –II measures the gap between the actual yield and potential yield. The yield gap – III measures the gap between the experimental yield and actual yield which is also known as extension gap. An Index for measuring the feasibility of **the evolved technology at the farmer's fields was developed**. The index is stated as follows:

$$\text{Technology Index} = (\text{Potential Yield} - \text{Experimental yield}) / \text{Potential Yield} \times 100$$

The lower the value of technology index, the more is the feasibility of technology. A detailed analysis on technology gap has been carried out by comparing the **farmers'** practices with recommended technology for different activities of farm operations which has been presented in tabular form.

CHAPTER – III

OVER VIEW OF OIL SEED SECTOR: CURRENT STATUS AND GROWTH BEHAVIOUR

3.1 Cropping Pattern Changes in the State: Area shifts in major crops and crop groups TE 1973-74, TE 1983-84, TE 1993-94, TE 2003-04 and TE 2009-10.

Cropping pattern means the proportionate area under different crops during an agricultural year. In Andhra Pradesh state total cropped area have been changing among the estimated periods of our study between the periods of TE 1973-74 to TE 2009-10. The Gross Cropped Area (GCA) of major agricultural crops had increased from 12.73 mil.ha to 13.32 mil.ha of the total period (TE 1973-74 to TE 2009-10). Table 3.1 depicts the area under major agricultural crops and the percentages to Gross Cropped area was estimated in different periods of the State. The largest area under major agricultural crops namely Rice, Wheat, Coarse Cereals, Pulses, Groundnut, Soyabean, Sunflower, Cotton and Sugarcane. Area under agricultural crops to total food crops area and their percentages to GCA reported relatively higher than non-food crops. But the food crops area had declined drastically from 9.70 million ha. to 6.72 million ha. between the periods TE 1973-74 to TE 2003-04, beyond the period it had slightly increased to 7.17 mil ha. (TE 2009-10). Whereas the percentage share of food grain crops area to GCA has been declined in all estimated periods in the State. Among agricultural crops, Rice is a major cereal crop and principal crop of the state, the crop area have been increased upto TE1983-84 and it has slightly declined to 3.7 and 3.2million hectares of the periods in TE 1993-94 and TE 2003-04 respectively in the state. The period TE 2009-10 reported that significantly increased 3.94 million ha. On the other hand the share of GCA significantly increased from 24.51 to 29.58 per cent except the periods TE 1993-94 and period TE 2003-04 in the state. Another major food crop is Pulses and the area under total pulses crop has also significantly increased 1.36 mil. ha to 1.94 mil. ha and its share in total GCA constituted an increasing trend 10.68 to 14.56 per cent of the periods of TE 1973-74 to TE 2009-10 in Andhra Pradesh. Area under Coarse Cereals and the percentage to total Gross Cropped Area (GCA) had declined of all estimated periods between TE 1973-74 to TE 2009-10 in the State.

Andhra Pradesh is the major state contributing both area and production of oilseeds in India. Major edible oil seed crops in the state are Groundnut, Sunflower, Soyabean and Oilpalm. Oilseed crops area increased from 2.20mil ha. to 2.44 mil.ha between TE 1973-74 to TE 2009-10. Particularly there was an impressive improvement in area 3.24 mil.ha shown in

the period TE 1993-94 in the State. Among oilseed crops, Groundnut crop is the major oil seed crop cultivated during the Kharif and Rabi seasons. The area under Groundnut crop had slightly increased 1.48 mil ha to 1.62 mil ha. and the share of GCA had also increased 11.63 to 12.16 percent between the periods TE 1973-74 to TE 2009-10. The Cotton crop area and the share in total cropped area has increased significantly of all estimated periods in Andhra Pradesh from 2.67 to 9.98 per cent and the Sugarcane crop area rose by about 0.14 mil ha to 0.20 mil ha and the share reported to be 1.10 to 1.50 per cent against Gross Cropped Area in the state between the periods TE 1973-74 to TE 2009-10.

Table – 3.1

Total cropped area under selected crops in the state: TE1973-74 to TE2009-10

Crops	Area (million ha.)				
	TE1973-74	TE1983-84	TE1993-94	TE2003-04	TE2009-10
Rice	3.115.00	3.874.67	3.695.33	3.206.67	3.937.33
Wheat	0.020.67	0.018.33	0.009.67	0.012.00	0.010.67
Total Coarse Cereals	4.446.33	3.716.00	1.831.67	1.430.33	1.279.00
Total Cereals	7.603.00	7.609.00	5.536.67	4.649.00	5.226.33
Total Pulses	1.363.67	1.461.67	1.598.33	2.067.33	1.938.67
Total Food Grains	9.702.00	9.070.67	8.313.33	6.716.33	7.165.00
Groundnut	1.483.00	1.540.00	2.401.67	1.551.67	1.620.67
Rapeseed and Mustard	0.00	0.001.00	0.004.67	0.002.67	0.005.33
Soybean	0.00	0.00	0.002.67	0.042.67	0.128.67
Sunflower	0.00	0.014.33	0.327.33	0.391.33	0.398.33
Other Oilseeds	0.715.67	0.582.33	0.504.67	0.446.33	0.289.67
Total Oilseeds	2.198.67	2.141.00	3.241.00	2.434.33	2.442.67
Cotton	0.340.67	0.464.33	0.480.67	0.915.33	1.333.00
Sugarcane	0.143.33	0.199.00	0.263.33	0.219.33	0.200.00
Total Cropped Area	12.734.00	13.069.33	12.877.67	12.226.67	13.318.67
Crops	Percent to Total/Gross Cropped Area				
	TE1973-74	TE1983-84	TE1993-94	TE2003-04	TE2009-10
Rice	24.51	29.61	28.73	26.25	29.58
Wheat	0.16	0.15	0.08	0.08	0.08
Total Coarse Cereals	34.96	28.46	14.21	11.69	9.61
Total Cereals	59.70	58.22	43.01	38.02	39.26
Total Pulses	10.68	11.17	12.42	16.93	14.56
Total Food Grains	76.20	69.40	64.52	54.95	53.83
Groundnut	11.63	11.78	18.63	12.67	12.16
Rapeseed and Mustard	0.00	0.00	0.00	0.00	0.08
Soybean	0.00	0.00	0.00	0.33	0.98
Sunflower	0.00	0.08	2.56	3.19	3.00
Other Oilseeds	5.66	4.44	3.88	3.68	2.18
Total Oilseeds	17.28	16.37	25.16	19.87	18.32
Cotton	2.67	3.52	3.73	7.52	9.98
Sugarcane	1.10	1.53	2.02	1.80	1.5
Total Cropped Area	100.00	100.00	100.00	100.00	100.00

Source: Various issues of Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt. of Andhra Pradesh, Hyderabad.

On the whole area under agricultural crops Rice and Pulse crops and other non-food crops of Oilseeds, cotton and sugarcane crops area expansion have taken place and fluctuations were also observed in some estimated periods. On the whole the total cropped area extended mainly due to expansion of irrigation facilities, free power supply issued to farm sector, loans issued by the nationalized banks at low interest rate to the farm sector, extension of agricultural technology and marketing facilities are also influenced the expansion of area encouraged the above mentioned crops in the state during TE 1973-74 to TE 2009-10.

The GCA in the state has marginally increased from 12.73 million ha. in TE1973-74 to 13.32 million ha. in TE 2009-10. The gross cropped area in the state has fluctuated a lot, particularly in two periods during TE 1993-94 and TE 2003-04, there has been steep decline in GCA. It may be seen that GCA had declined 12.88 million ha. during TE 1993-94 and 12.23 million ha. in 2003-04 from 13.10 million ha. in TE 1983-84 (Table 3.2). Similarly the Net Sown Area (NSA) has been declined continuously upto TE 2003-04. Later it slightly increased to 10.54 mil. ha. in the period TE 2009-10. The Gross Irrigated Area (GIA) and Net Irrigated Area (NIA) have increased successively over the years except the period TE 2003-04 in Andhra Pradesh. The estimated period TE 2003-04 the Growth in GCA, NSA, GIA and NIA had declined compared to other estimated periods in TE 1983-84, TE 1993-94 and TE 2009-10 in the State.

Table 3.2
Cultivated Area and Irrigated Area in Andhra Pradesh (TE 1973-74 to TE 2009-10)
(Area in million ha.)

Indicators	TE-1973-74	TE-1983-84	TE-1993-94	TE-2003-04	TE-2009-10
GCA	12.74	13.06	12.88	12.23	13.32
GIA	3.84	4.75	5.17	4.96	6.26
NSA	11.33	11.26	10.62	10.05	10.54
NIA	3.08	3.70	4.09	3.83	4.56

Note: GCA: Gross Cropped Area, NSA: Net Sown Area, GIA: Gross Irrigated Area, NIA: Net Irrigated Area

Source: Various issues of Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt .of Andhra Pradesh, Hyderabad.

Table 3.3 depicts the overall changes in GCA, NSA, GIA and NIA have been assessed in different periods between TE 1973-74 to TE 2009-10 in the state. The state GCA had increased 3.35 lakh ha. between the periods TE 1973-74 to 1983-84 and 10.92 lakh. ha. in the periods TE 2003-04 to TE 2009-10 and the change in GIA had marginally increased 9.13 lakh

ha. 4.09 and to 13.07 lakh ha. of the period TE 1973-74 to TE 1983-84, TE 1994-95 and TE 2003-04 to TE 2009-10 among sub periods TE 2003-04 to TE 2009-10 reported that there was a significant change to increased in area both GIA and NIA in the state, due to priority being **given to completion of irrigation projects through "JALAYAGNAM" scheme** by the Government of Andhra Pradesh. Net shown area had declined one to other -0.62, -6.41 and -5.75 lakh ha. during the periods TE 1973-74 to TE 1983-84, TE1983-84 to TE 1993-94 and TE 2003-04 respectively in the State. Further the period TE 2003-04 to TE 2009-10 change in Net Shown Area (NSA) had increased to 4.91 lakh ha. On the other hand Net Irrigated Area (NIA) had increased 6.21 lakh ha. and 3.91 lakh ha. of the periods TE1973-74 to TE1983-84 to TE 1993-94 and the period TE 2003-04 the NIA had declined -2.61 lakh ha. and finally the change had increased to 7.3 lakh ha. between the periods TE 2003-04 to TE 2009-10. On the whole, NIA increased which is around about more than doubled between the periods TE 1973-74 to TE 2009-10 comparatively the period TE 1973-74 to TE 1983-84 in the State.

Table 3.3
Changes in gross cropped area: area expansion and crop intensification effects:
TE 1973-74 to TE 2009-10

Indicators	Area (lakh ha.)				
	TE 1973-74 to 1983-84	TE 1983-84 to 1993-94	TE 1993-94 to 2003-04	TE 2003-04 to 2009-10	TE 1973-74 to 2009-10
Change in GCA	3.35.15	-1.91.59	-6.50.99	10.92.07	5.84.63
Change in GIA	9.13.32	4.09.59	-2.05.70	13.07.93	24.25.15
Area Expansion					
Net Sown Area (NSA)	-0.63	-6.41	-5.75	4.91	-7.89
Net Irrigated Area (NIA)	6.21	3.91	-2.61	7.31	14.82
Crop Intensification					
	TE 1973-74	TE 1983-84	TE 1993-94	TE 2003-04	TE 2009-10
GCA-NSA	14.07	18.05	22.55	21.80	27.81
GIA-NIA	7.60	10.52	10.71	11.27	17.04

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt. of Andhra Pradesh, Hyderabad.

Further the Table revealed the crop intensification of the state. The difference between GCA and NSA has been increased in all estimated periods. On the other hand, the difference between GIA and Net Irrigated Area (NIA) significantly increased from 7.60 lakh ha. to 17.27 lakh ha. between the period TE 1973-74 to TE 1983-84 and TE 2003-04 to TE 2009-10 besides the overall change the period of NIA reported highest than the sub periods 17.04 lakh ha. (TE 1973.74 to TE 2009-10) in the State.

3.2. Factors underlying Changes in Cropping Pattern:

Absolute and relative changes for major food grain crops in districts of the state have been examined the periods between TE 1993-94 and TE 2009-10.

Net changes in the cropping pattern from TE 1993-94 to TE 2009-10 in absolute and relative terms in the GCA has increased 0.50 mil.ha in the state between the two periods of the State. In absolute terms the area under all major crops has declined in eight districts out of 23 districts between the two periods in various districts of Andhra Pradesh presented in Table 3.4. The number of districts that showed declined in area under cultivation of total cereals, total pulses, total oilseeds and total food grains was 17, 11, 12, and 16 districts respectively. Area under Rice crop had increased by about 0.242 million ha and 6.54 lakh ha. between TE 1993-94 and TE 2009-10 and most of this increase from predominantly came from the districts of Nellore, Kurnool, Kadapah, Nizamabad, Medak, Nalgond, Khammam, Warangal and Mahabubnagar. Paddy has gained significantly as a result of expansion in irrigated area. Area under wheat crop reported meager extent from few districts in Andhra Pradesh. Maize is another important crop under Coarse Cereals whose acreage expanded over the last three decades in Andhra Pradesh. Area under Maize crop increased by about 0.492 million ha and this increase was concentrated in the districts of Medak and Mahabubnagar. But the area under total Coarse Cereals decreased by about -0.274 million ha. Therefore, decline in area under other Coarse Cereals due to low importance of Jowar, Bajra and Ragi crops production.

The under pulse crops are namely Bengalgram, Red gram, Black gram and Green gram and the area witnessed a significance increase 0.340 million ha. during the period TE1993—94 to TE 2009-10. Across the districts Kurnool, Ananthapur, Cuddapah and Prakasam reported that Pulse crops area increased marginally than other districts in the state. On the other hand most of the Pulse crops are grown under rainfed conditions and low cost of cultivation. The state government had launched several schemes to increase the area and yield of pulse production (ISOPOM) in the state. Therefore the area under Pulse crops increased during the period TE 1993-94 and TE 2009-10 in the state.

The area under total food grains increased almost .062 million ha between TE 1993-94 and TE 2009-10 and main beneficiaries crop area Maize and Rice crops among cereals and Pulse crops of all total food grain crops in the State. The food crop area extended mainly Kurnool, Karimnagar, Chittoor, and Nellore districts in the state between TE 1993-94 to TE 2009-10.

Table 3.4
Net Changes in absolute and relative terms for major food grains crops in the State: TE 1993-94 and TE 2009-10
(Absolute change (A) in '000 ha, Relative change (R) in percentage)

District	Rice		Wheat		Maize		Other coarse cereals		Total cereals		Total Pulses		Total Food Grain	
	A	R	A	R	A	R	A	R	A	R	A	R	A	R
Srikakulam	-10.44	-5.05	0.00	0.00	3.72	2838.17	-16.38	-75.41	-23.11	-10.11	-9.35	-9.51	-32.46	-9.93
Vizianagaram	-4.29	-3.40	0.00	0.00	13.94	2942.01	-19.71	-70.03	-10.40	-6.72	-7.31	-12.23	-17.70	-8.26
Visakhapatnam	-17.66	-16.42	0.00	0.00	-0.70	-8.37	-51.39	-50.47	-69.75	-32.03	-11.18	-35.42	-80.93	-32.46
East Godavari	-0.21	-0.06	0.00	0.00	4.94	143.79	-11.62	-81.04	-6.88	-1.75	-37.18	-30.23	-44.06	-8.53
West Godavari	-12.35	-2.94	0.00	0.00	40.58	1328.03	-3.07	-90.60	25.16	5.89	-6.65	-25.70	18.51	4.09
Krishna	-21.32	-5.56	0.00	0.00	20.25	970.99	-3.68	-75.65	-4.75	-1.22	-40.50	-24.13	-45.25	-8.11
Guntur	-16.20	-5.45	0.00	0.00	70.86	1767.71	1.66	71.95	89.65	29.54	-107.23	-48.87	-17.58	-3.36
Prakasam	-7.50	-5.48	0.00	0.00	-4.37	-43.12	-66.48	-77.20	-78.35	-33.60	120.71	172.75	42.36	13.98
Nellore	31.96	14.47	0.00	0.00	0.54	522.04	-10.73	-92.47	-178.22	-41.20	24.47	143.85	46.25	18.53
Kurnool	40.44	53.80	0.12	23.39	18.84	3573.39	-123.43	-59.52	-63.84	-22.53	227.04	450.89	163.19	48.90
Anantapur	-1.45	-2.91	-0.28	-57.46	11.16	1056.64	-34.08	-50.06	-26.57	-21.91	70.91	156.92	44.34	26.64
Cuddapah	2.36	3.81	-0.02	-21.19	1.11	1163.64	-13.07	-52.40	-9.59	-11.01	71.99	510.78	62.41	61.69
Chittoor	-46.35	-46.05	-0.01	-100.00	1.38	618.56	-16.76	-55.79	-61.74	-47.16	0.96	5.43	-27.64	-18.57
Ranga Reddy	-14.92	-31.38	-0.76	-41.75	24.23	635.16	-85.68	-75.80	-76.60	-46.24	3.73	6.71	-72.87	-32.93
Hyderabad	-0.15	-100.00	0.00	0.00	0.00	-100.00	0.00	-100.00	-0.04	-100.00	0.00	0.00	-0.04	-100.00
Nizamabad	28.92	24.65	0.26	19.73	10.16	17.40	-18.33	-52.34	21.54	10.18	37.70	127.90	59.24	24.58
Medak	1.99	2.03	0.84	36.55	306.03	557.81	-75.23	-65.54	-5.59	-2.24	68.01	93.96	62.48	19.44
Mahabubnagar	47.09	44.83	-0.26	-81.84	123.79	4796.36	-199.30	-73.86	-28.54	-7.56	57.67	72.12	29.13	6.37
Nalgonda	71.71	29.43	-0.01	-100.00	-2.62	-47.73	-64.90	-83.10	8.34	2.58	-1.05	-1.38	7.29	1.83
Warangal	55.47	44.30	-0.09	-98.09	45.01	146.46	-25.24	-75.38	75.18	39.67	-18.82	-25.50	56.36	21.41
Khammam	6.58	4.35	0.00	0.00	21.99	177.27	-39.75	-88.82	-11.18	-5.36	-60.21	-55.56	-71.39	-22.52
Karimnagar	133.09	104.82	-0.21	-83.60	53.02	68.12	-11.24	-93.92	123.95	46.30	-47.58	-61.11	76.37	22.10
Adilabad	-3.29	-5.26	1.23	47.35	0.36	1.46	-132.26	-71.37	-132.78	-48.53	-249.79	-73.65	-128.60	-35.84
Andhra Pradesh	241.61	6.54	0.67	6.84	492.35	156.58	473.43	31.82	-274.20	-4.98	340.36	21.29	62.81	0.88

Source: Various issues of Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

Table 3.4 continued....
Net Changes in absolute and relative terms for major food grains crops in the State: TE 1993-94 and TE 2009-10

(Absolute change (A) in '000 ha, Relative change (R) in percentage)

District	Ground nut		R&M		sesam		soybean		total oil seed		cotton		Sugarcane		fruit&veg		GCA	
	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R
Srikakulam	-22.95	-43.73	0.00	0.00	1.30	19.41	0.00	0.00	-14.13	-20.23	1.54	2544.51	0.31	4.57	9.31	44.07	-22.07	-4.85
Vizianagaram	-52.17	-59.57	-0.01	-87.23	6.39	36.55	0.00	0.00	-43.23	-40.26	4.82	4199.42	1.97	13.44	35.54	147.71	-19.20	-4.55
Visakhapatnam	-27.72	-86.58	-0.04	-100.00	-11.96	-65.13	0.00	0.00	-44.49	-59.50	0.21	97.83	-9.31	-18.83	1.77	3.98	-80.37	-18.25
East Godavari	-6.61	-92.46	-0.02	-100.00	-9.85	-83.82	0.11	0.00	2.52	4.49	1.95	35.87	-3.84	-21.81	16.64	26.66	4.62	0.65
West Godavari	-2.36	-26.46	0.02	3150.00	-3.23	-75.57	0.00	0.00	20.72	79.06	1.72	95.67	-6.58	-18.92	-24.54	-33.72	71.38	11.25
Krishna	-25.46	-77.58	-0.48	-99.79	-4.61	-89.38	0.00	0.00	-31.87	-70.83	25.93	191.87	-13.54	-52.30	17.88	29.35	16.32	2.20
Guntur	-11.54	-68.05	-2.41	-74.18	-13.09	-89.10	0.03	0.00	-33.05	-75.45	-22.04	-12.39	-2.19	-71.19	14.52	89.02	-36.22	-4.21
Prakasam	-63.06	-88.28	-0.17	-98.50	-5.12	-32.06	0.01	0.00	-57.56	-47.38	-21.76	-40.02	-0.50	-72.42	29.55	200.19	16.80	2.60
Nellore	-28.74	-71.83	0.00	0.00	-2.28	-45.50	0.00	0.00	-23.53	-49.56	1.96	55.81	-1.34	-14.97	30.27	149.53	54.53	14.78
Kurnool	-112.49	-33.35	3.48	848.58	-0.25	-33.70	0.09	0.00	-98.08	-19.72	-52.80	-64.19	0.48	57.92	33.57	129.02	4.73	0.47
Anantapur	34.32	4.69	-0.02	-86.67	-0.24	-100.00	0.20	0.00	49.60	6.48	-10.57	-81.56	-2.03	-93.13	77.13	345.42	75.32	7.49
Cuddapah	-107.96	-42.18	-0.01	-88.89	1.85	51.58	0.01	0.00	-59.73	-20.91	4.80	76.95	-0.53	-59.85	30.13	122.39	41.58	9.42
Chittoor	-121.90	-42.50	0.00	-100.00	-0.47	-45.35	0.00	0.00	-118.06	-40.42	0.03	900.00	-9.84	-26.01	50.85	146.56	-117.79	-22.12
Ranga Reddy	-1.12	-13.48	0.01	0.00	-1.32	-65.22	0.01	0.00	-25.83	-58.60	3.47	20.26	-1.34	-52.75	15.55	90.69	-88.70	-27.76
Hyderabad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-100.00	0.00	0.00	0.00	0.00	-0.08	-100.00	-0.45	-100.00
Nizamabad	-5.03	-63.82	0.56	4333.33	0.62	46.49	43.16	0.00	59.26	308.83	-2.01	-14.46	-16.63	-58.48	6.08	246.81	122.22	38.21
Medak	-5.87	-73.91	0.02	160.00	-1.47	-57.01	2.07	0.00	89.43	282.96	38.49	402.93	-6.78	-21.08	31.60	544.66	-14.04	-2.51
Mahabubnagar	-53.35	-33.58	-0.02	-100.00	-0.78	-60.26	0.00	0.00	-80.04	-25.94	60.79	191.41	0.05	58.65	41.33	506.54	29.02	3.53
Nalgonda	-39.70	-59.06	0.00	0.00	-0.09	-2.47	0.00	0.00	-127.17	-68.59	106.41	371.45	-0.44	-59.29	87.87	853.66	26.89	4.25
Warangal	-52.38	-59.66	0.00	0.00	-12.33	-53.86	0.01	0.00	-39.47	-44.87	113.90	192.89	-0.01	-100.00	19.28	371.84	99.85	20.10
Khammam	-29.37	-83.86	0.00	-100.00	-3.75	-43.53	0.00	0.00	-32.72	-68.23	86.26	222.84	-0.15	-4.72	20.44	54.52	1.96	0.40
Karimnagar	-39.30	-71.78	0.00	-100.00	-0.39	-10.41	0.66	0.00	-51.26	-70.70	142.02	468.06	-2.46	-60.26	18.03	167.28	172.99	34.84
Adilabad	1.33	45.33	-0.07	-100.00	-18.38	-76.97	82.28	0.00	31.54	71.95	96.73	60.33	-0.21	-74.67	47.89	691.21	33.17	5.67
Andhra Pradesh	-780.49	-32.50	0.84	18.51	-80.44	-45.92	127.43	0.00	-739.14	-22.28	586.81	78.61	-74.89	-27.22	672.70	122.63	500.16	3.88

Source: Various issues of Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

The number of districts that shown declined in area under cultivation of main oilseed crops in the state. Soyabean crop relatively new crop whereas area has gained 0.127 mil.ha. from Nizamabad and Adilabad districts, whereas the area under Groundnut crop had declined in 20 districts except Ananthapur and Adilabad districts in the state between the two estimated periods (TE 1993-94 and TE 2009-10). The total oilseeds crops area had declined both in absolute and relative terms of the state except the districts of Ananthapur, Nizamabad, Medak, Adilabad, East Godavari and West Godavari. Area under Rape seed and Mustard crop had also slightly increased between the periods TE 1993-94 and TE 2009-10.

The area under Cotton crop increased by about 0.672 mil.ha in Andhra Pradesh. The districts of Nalgonda, Warangal, Khammam, Karimnagar, Adilabad and Mahabubnagar Cotton grown area increased significantly. On the other hand Sugarcane area decreased in acreage by about -0.075 mil.ha in the state. Fruits and vegetables area arose drastically by 0.673 mil.ha and most of the districts witnessed expansion in the acreage of majority of districts except West Godavari district in the state during the period TE 1993-94 and TE 2009-10.

The results of changes in the cropping pattern in Andhra Pradesh shown that there has been shift the area to rice and maize during the period TE 1993-94 and TE 2009-10. Total area under oilseeds shows highly declined in absolute terms -0.739 mil.ha. Significant rise in area had shown under the crops of Rice, Maize, Cotton and Fruit and Vegetable crops in Andhra Pradesh. Among the oilseed crops Soyabean crop area has been increased and it has observed in Nizamabad and Adilabad districts, found a new oilseed crop grown in the State. The number of districts that showed and the main competing crop is Maize and Cotton due to better market prices, which had helped the more production and profits. Therefore the Cotton crop area have been increased magnificently both interms of absolute and relative terms. On the other hand the fruits and vegetables crops area had also increased due to the Government have been providing the subsidies and incentives through ISOPOM, NHM and APMIP schemes. Besides the higher demand for fruits and vegetables are the reasons to extend the area during the period TE 1993-94 to TE 2009-10 in the state. Across the districts Kurnool, Cuddapah and Chittoor districts have declined the Groundnut crop grown area drastically due to poor post harvest prices and poor marketing facilities in Andhra Pradesh TE 1993-94 and TE 2009-10.

Among various factors responsible for changes in cropping pattern such as profitability, change in tastes and preferences availability of irrigation facilities, climate conditions,

Government policies and inadequate marketing facilities are the major factors responsible for frequent changes in cropping pattern in Andhra Pradesh. Since both Central and State governments have been taking necessary steps to invent farm machinery and equipment to reduce the cost of cultivation and adopting HYV's for better production and income.

3.3. Growth Trend in Area, Production and Yield of Major oil seeds:

In Andhra Pradesh major oilseed crops growth area and production have been increased significantly upto the period 1991-92 to 2000-01 further the average area had declined in the period 2001-02 to 2009-10. The average annual area under oilseeds had increased from 19.21 lakh hectares in 1970's to 24.97 lakh ha in 1980's and 29.56 lakh ha. in 1990's, further it declined 25.95 lakh ha, in 2000's (Table 3.5). Similar trend has been observed in the case of production of oilseeds. There has been steep increase in average area and production between 1970's, 1980's and 1990's but the average yield of oilseeds has increased from 707.96 kg/ha during 1970's to 843.79 kg/ha during 1980's. Further it had declined 773.57 kg/ha. in 1990's beyond the period yield has slightly increased 799 kg/ha during the period 2001-02 to 2009-10 in Andhra Pradesh. But the average area and production have also declined 29.56 lakh ha to 25.95 lakh ha, and 23.02 lakh ton to 20.77 lakh tonnes between the period 1991-92 to 2000-2001 and 2001-02 to 2009-10 in the state.

Table 3.5
Trends in Average Area, Production and Yield of Oilseeds in the State

Particulars	1951-52 to 1960-61	1961-62 to 1970-71	1971-72 to 1980-81	1981-82 to 1990-91	1991-92 to 2000-01	2001-02 to 2009-10
Area (Lakh ha.)	-	-	19.21.57 (-3.10)	24.97.05 (5.20)	29.56.93 (-2.10)	25.95.22 (0.10)
Production (Lakh tonnes)	-	-	13.63.3 (-3.20)	21.48.34 (8.70)	23.02.47 (-2.50)	20.77.74 (5.90)
Yield (kg/ha)	-	-	707.96 (-2.10)	843.79 (3.30)	773.57 (-0.40)	799 (5.80)

Note: Figures in parentheses are the CAGR in per cent

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

Further the table analyzed the variations in Compound Annual Growth Rate (CAGR) across the the last four decades in Andhra Pradesh. Particularly the Annual Growth Rate of Area, production and yield of oilseeds have exhibited negative growth during 1970's and 1990's in the state. The annual growth area under oilseed crops steadily increased from -3.10 percent to 5.20 per cent from 1970's to 1980's further it declined to -2.10 per cent during 1990's and slightly increased to 0.10 per cent in 2000's. The similar fall and rise in growth in production and yield of oilseeds is also noticed that the production growth -3.20 per cent in 1970 to 8.70

per cent in 1980's and declined -2.50 per cent in 1990s further increased to 5.90 per cent during the period 2001-02 to 2009-10. On the other hand yield growth reported negative - **2.10 per cent in 1970's and it increased to 3.30 percent in 1980's and declined** -0.40 per cent in 1990. Further abnormally **increased to 5.80 per cent yield in the year 2000's.** Thus the oilseed crops yield growth rate is steadily increased between the period 2001-02 to 2009-10 period compared to other periods in the state.

Table 3.6 analyzed the district wise share of Kharif and Rabi Oilseeds in the State. The district level analysis of area and production of oilseeds reveal that the highest share among the districts reported in Ananthapur district 23.15 per cent, followed by Kurnool 14.99 per cent, Mahaboobnagar 9.30 per cent, Chittoor 8.81 per cent, Cuddapah 8.61 per cent and Nalgonda 5.59 per cent accounted for major share of area under oilseeds in Andhra Pradesh during TE 1993-94. The share of all these six districts reported the highest share (70%) of total oilseeds in the State during TE 1993-94. But these six districts three districts reported increasing trend namely Ananthapur 32.98%, Kurnool 16.14% and Kadapah 9.16%. But Mahabubnagar district reported that the area oilseed decreased whereas the percentage area reported is constant (9.30%) of total oilseed crop area in the state from TE 1993-94 to TE 2009-10. The other two districts the oilseed grown area has declined marginally from TE 1993-94 to TE 2009-10. The share of Chittoor and Nalgonda districts have declined from 8.8 to 6.87% and 5.6 to 2.36% of total area under oilseeds in Andhra Pradesh state respectively between TE 1993-94 and TE 2009-10. Some of the districts where the share of area has increased during TE 2009-10 over TE 1993-94 were Nizamabad 3.18%, Adilabad 3.96% and Medak 1.23%. The Rayalaseema region from Andhra Pradesh found the major share of oilseeds than other two regions of Telangana and Coastal Andhra in Andhra Pradesh. The districts of Rayalaseema region Ananthapur, Kadapah, Kurnool and Chittoor districts obtained highest share and increased the share 55.56 percent to 65.15 per cent area under total oilseeds in the state between the periods TE 1993-94 to TE 2009-10. But the total Oilseed crop area has declined from 33.17 lakh hectares to 24.72 lakh hectares in the State (TE 1993-94 to TE 2009-10).

As far as the oilseeds production in the state is concerned (Table 3.7) out of 22 oilseeds producing districts major share of oilseeds production reported from Ananthapur, Kurnool, Kadapah and Chittoor from Rayalaseema region. But the production share has declined from 60% to 45% from these districts in the State between the periods TE 1993-94 to TE 2009-10. The districts of West Godavari (11.26%) and Mahaboobnagar (9.61%) production of oilseeds

and the percentages to total oil seed production have increased abnormally compared to other 22 districts in the state between the periods of TE 1993-94 and TE 2009-10 due to irrigated area increased to grown under rabi oilseed crop in Mahabubnagar district and East Godavari district cultivated in oil palm crop therefore these two districts

Table 3.6
Changing shares of Kharif and Rabi Oilseeds Area in District Wise in Andhra Pradesh:
TE 1993-94 and TE 2009-10

District	Kharif		Rabi		Total	
	TE 1993-94	TE 2009-10	TE 1993-94	TE 2009-10	TE 1993-94	TE 2009-10
Srikakulam	-	25.44 (1.42)	-	15.95 (2.35)	69.82 (2.10)	41.39 (1.67)
Vizianagaram	-	51.80 (2.89)	-	9.28 (1.37)	107.38 (3.24)	61.09 (2.47)
Visakhapatnam	-	10.54 (0.59)	-	12.05 (1.77)	74.78 (2.25)	22.58 (0.91)
East Godavari	-	5.36 (0.30)	-	1.83 (0.27)	56.22 (1.69)	7.19 (0.29)
West Godavari	-	15.11 (0.84)	-	9.67 (1.42)	26.21 (0.79)	24.78 (1.00)
Krishna	-	6.48 (0.36)	-	4.53 (0.67)	44.99 (1.36)	11.00 (0.45)
Guntur	-	3.32 (0.19)	-	6.42 (0.94)	43.81 (1.32)	9.74 (0.39)
Prakasam	-	23.94 (1.34)	-	39.57 (5.82)	121.49 (3.66)	63.51 (2.57)
Nellore	-	11.00 (0.61)	-	12.35 (1.82)	47.48 (1.43)	23.35 (0.94)
Kurnool	-	260.59 (14.54)	-	138.52 (20.37)	497.29 (14.99)	399.10 (16.14)
Ananathapur	-	761.41 (42.49)	-	53.95 (7.93)	767.91 (23.15)	815.36 (32.98)
Cuddappa	-	131.81 (7.36)	-	94.67 (13.92)	285.73 (8.61)	226.48 (9.16)
Chittoor	-	147.84 (8.25)	-	22.06 (3.24)	292.08 (8.81)	169.90 (6.87)
Rangareddy	-	7.39 (0.41)	-	11.05 (1.63)	44.08 (1.33)	18.44 (0.75)
Nizamabad	-	43.30 (2.42)	-	35.42 (5.21)	19.19 (0.58)	78.72 (3.18)
Medak	-	5.25 (0.29)	-	25.12 (3.69)	31.61 (0.95)	30.37 (1.23)
Mahabubnagar	-	132.19 (7.38)	-	97.61 (14.35)	308.52 (9.30)	229.79 (9.30)
Nalgonda	-	38.98 (2.18)	-	19.36 (2.85)	185.41 (5.59)	58.34 (2.36)
Warangal	-	20.73 (1.16)	-	27.43 (4.03)	128.80 (3.88)	48.16 (1.95)
Khammam	-	4.04 (0.23)	-	9.90 (1.46)	47.95 (1.45)	13.94 (0.56)
Karimnagar	-	1.85 (0.10)	-	19.05 (2.80)	72.50 (2.19)	20.89 (0.85)
Adilabad	-	83.72 (4.67)	-	14.20 (2.09)	43.84 (1.32)	97.92 (3.96)
Andhra Pradesh	-	1792.08 (100)	-	679.94 (100)	3317.09 (100)	2472.02 (100)

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

Note: District wise details of area under kharif and rabi season of oilseeds are not available in the period 1993-94

Table 3.7
Changing shares of Kharif and Rabi Oilseeds District Wise Production in Andhra Pradesh:
TE 1993-94 and TE 2009-10

District	Kharif		Rabi		Total	
	TE 1993-94	TE 2009-10	TE 1993-94	TE 2009-10	TE 1993-94	TE 2009-10
Srikakulam	-	22.81 (1.23)	-	19.67 (2.20)	57.22 (2.43)	42.48 (1.55)
Vizianagaram	-	54.52 (2.94)	-	9.06 (1.01)	93.21 (3.96)	63.58 (2.31)
Visakhapatnam	-	32.82 (1.77)	-	7.37 (0.82)	39.90 (1.69)	40.19 (1.46)
East Godavari	-	116.53 (6.29)	-	1.64 (0.18)	12.58 (0.53)	118.17 (4.30)
West Godavari	-	292.51 (15.79)	-	16.75 (1.87)	14.69 (0.62)	309.26 (11.26)
Krishna	-	80.23 (4.33)	-	9.37 (1.05)	43.28 (1.84)	89.59 (3.26)
Guntur	-	1.79 (0.10)	-	10.99 (1.23)	33.48 (1.42)	12.78 (0.47)
Prakasam	-	13.22 (0.71)	-	55.00 (6.15)	96.93 (4.11)	68.22 (2.48)
Nellore	-	22.08 (1.19)	-	20.56 (2.30)	72.68 (3.08)	42.64 (1.55)
Kurnool	-	192.42 (10.39)	-	147.14 (16.44)	300.94 (12.77)	339.56 (12.36)
Ananathapur	-	437.62 (23.63)	-	50.86 (5.68)	208.02 (8.83)	488.48 (17.78)
Cuddapha	-	118.18 (6.38)	-	99.62 (11.13)	582.49 (24.72)	217.80 (7.93)
Chittoor	-	134.02 (7.24)	-	57.89 (6.47)	306.92 (13.03)	191.91 (6.99)
Rangareddy	-	3.10 (0.17)	-	15.88 (1.77)	134.34 (5.70)	18.99 (0.69)
Nizamabad	-	68.85 (3.72)	-	43.37 (4.85)	17.71 (0.75)	112.22 (4.08)
Medak	-	3.10 (0.17)	-	32.30 (3.61)	10.36 (0.44)	35.40 (1.29)
Mahabubnagar	-	85.76 (4.63)	-	178.37 (19.94)	11.97 (0.51)	264.13 (9.61)
Nalgonda	-	19.05 (1.03)	-	24.94 (2.79)	8.07 (0.34)	43.99 (1.60)
Warangal	-	13.87 (0.75)	-	43.42 (4.85)	66.63 (2.83)	57.29 (2.09)
Khammam	-	43.59 (2.35)	-	10.58 (1.18)	86.57 (3.67)	54.17 (1.97)
Karimnagar	-	1.39 (0.08)	-	27.80 (3.11)	40.58 (1.72)	29.20 (1.06)
Adilabad	-	94.98 (5.13)	-	12.14 (1.36)	93.14 (3.95)	107.12 (3.90)
Andhra Pradesh	-	1852.35 (100.00)	-	894.77 (100.00)	2355.96 (100.00)	2747.12 (100.00)

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

Note: District wise details of area under kharif and rabi season of oilseeds are not available in the period 1993-94

revealed more production of oilseeds. On the whole, the total oilseed production in the State marginally increased from 23.56 lakh tonnes to 27.47 lakh tonnes during TE1993-94 to TE2009-

10. Oil palm crop production added in total oilseed production mainly from Coastal Andhra districts of East Godavari and West Godavari districts of Andhra Pradesh state.

Table 3.8 shows that the share of major oilseeds area, production, oil and percentage of oil content of oilseeds in the state during TE 2009-10. Groundnut crop area was the major oilseed crop and obtained 54% share under Kharif oilseed crops in the state. On the other hand, under Rabi oilseeds crops Sunflower and Groundnut were the major Rabi oilseed crops and accounted for 23.59 per cent area under total oilseed crops in the state during TE 2009-10. Therefore, the Groundnut crop area revealed the largest area which accounts for 66 per cent of total oilseeds under both Kharif and Rabi oilseed crop in the state. Total oilseeds area between Kharif and Rabi season Kharif oilseed crop area was highest which accounts for 74.4 per cent whereas Rabi oilseeds 24.4 per cent and 1 per cent of area reported from oil palm cultivation of total oilseed crops area in the State. The oil palm crop cultivation has been growing mostly the coastal Andhra districts.

Further the table analyzed that the selected three oilseed crops of Groundnut, Sunflower and Oil palm production constituted the major portion 87.3 per cent of total oilseeds production in the state during TE 2009-10. Out of 27.47 lakh tonnes of total oilseed production major share accounts for 55.6 per cent obtained from Groundnut crop followed by 21.14, 12.53 per cent share secured from oil palm and sunflower crop from both Kharif and Rabi seasons in the state during TE 2009-10.

Similarly total oil and percentage of oil from total oil seed crops production analyzed in Table 3.8. Regarding oil and percentage of oil from major oilseeds reported the similar trend same as production. Total oil production from both Kharif and Rabi seasons constituted 554.4 (51.25%), 335.04 (31.54%) thousand metric tonnes besides palm oil total production was 1062.27 thousand metric tonnes respectively in the State during TE 2009-10. So major part of area, production and oil obtained from Kharif oil seed crops due to South-West monsoon provide adequate rainfall in the state. It is evident from the total that the highest oil content drawn from the Groundnut crop compared to other oilseed crops. The oil palm production and oil share obtained the second place after Groundnut. Therefore the Government of Andhra Pradesh has given importance to extend oil palm crop cultivation of Coastal districts of Andhra Pradesh and major schemes were introduced like ISOPOM, APMIP, NHM in the state.

Table 3.8
Share of selected Oilseeds: TE 2009-10

(Area in 000' hectare, Production and Oil in 000' tones)

Oilseeds	Area		Production				Oil content of Seeds (%)
	Area	%	Oilseeds	%	Oil	%	
Kharif Oil Seeds							
Groundnut	1337.00	54.10	958.18	34.88	459.93	43.30	48.00
Soybean	128.67	5.21	165.33	6.02	46.29	4.36	28.00
Sunflower	99.00	4.01	55.00	2.00	23.10	2.17	42.00
Castor	168.67	6.83	91.33	3.32	40.19	3.78	44.00
Sesamum	94.33	3.82	22.00	0.80	11.00	1.04	50.00
Niger Seed	11.33	0.46	4.33	0.16	1.65	0.15	38.00
Kharif Total	1839.00	74.42	1296.17	47.18	544.39	51.25	42.00
Rabi Oil Seeds							
Groundnut	283.67	11.48	569.69	20.74	256.36	24.13	45.00
Rapid& Mustard	5.33	0.22	3.00	0.11	1.02	0.10	34.00
Sunflower	299.33	12.11	289.33	10.53	127.31	11.98	44.00
Safflower	14.33	0.58	8.00	0.29	2.40	0.23	30.00
Line Seed	1.00	0.04	0.22	0.01	0.08	0.01	35.00
Rabi Total	603.67	24.43	870.24	31.68	335.04	31.54	38.50
Palm Oil	28.58	1.16	580.6	21.14	150.96	14.21	26.00
Total oilseeds	2471.25	100.00	2747.01	100.00	1062.27	100.00	38.67

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

Major changes have been found in the districts share with respect of area and production of oilseeds between the two reference periods i.e. TE 1993-94 and TE 2009-10. We may look at the ranks of some major districts growing oilseeds acreage and production from tables 3.9 and 3.10. Table 3.9 shown the majority of oil seed crops area and share of the total oilseeds and cropwise area shown of major growing districts in Andhra Pradesh between the periods of TE 1993-94 and TE 2009-10. The districts of Ananthapur, Kurnool, Mahaboobnagar, Chittoor and Kadapah have occupied first five positions in terms of area of major oil seeds in the state and constituted for about 65 per cent of area of total oilseed crops during TE 1993-94. Whereas during TE 2009-10 the share of oilseeds area increased marginally all of these mentioned districts and secured the first five ranks constituted 74.45 per cent of total oilseeds acreage in the State. But the actual oilseed crop area had declined from 21.51 lakh ha. to 18.14 lakh ha. of these five districts in the state from TE 1993-94 to TE 2009-10.

Further, the table analyzed the crop wise acreage and its share of total oilseed crops among major districts in the State. In Andhra Pradesh Groundnut crop is the major oilseed crop and the districts of Ananthapur, Kurnool, Chittoor and Kadapah districts from Rayalaseema region reported the highest share of Groundnut acreage against the total oil seeds in the State.

Table 3.9
Share of major districts in oilseeds acreage in the state: TE 1993-94 and TE 2009-10
 (Area in 000' hectare)

S.NO	Major districts	TE 1993-94		TE 2009-10		
1	Groundnut					
Ananathapur		731.57	30.46	Ananathapur	765.89	47.25
Kurnool		337.32	14.04	Kurnool	224.82	13.87
Chittoor		286.84	11.94	Chittoor	164.94	10.18
Cuddapha		255.91	10.66	Cuddapha	147.96	9.13
Mahabubnagar		168.87	7.03	Mahabubnagar	105.52	6.51
Warangal		87.81	3.66	Warangal	35.42	2.19
Vizianagaram		87.57	3.65	Vizianagaram	35.40	2.18
Prakasham		71.43	2.97	Srikakulam	29.52	1.82
Nalgonda		67.21	2.80	Nalgonda	27.52	1.70
Karimnagar		54.75	2.28	Karimnagar	15.45	0.95
Srikakulam		52.47	2.18	Nellore	11.27	0.70
Andhra Pradesh		2401.77	100.00	Andhra Pradesh	1620.95	100.00
2	Sunflower					
Kurnool		0.00	0.00	Kurnool	147.42	37.02
Cuddapha		0.00	0.00	Cuddapha	70.87	17.80
Ananathapur		0.00	0.00	Ananathapur	47.33	11.89
Prakasham		0.00	0.00	Prakasham	34.17	8.58
Nizamabad		0.00	0.00	Nizamabad	27.22	6.83
Mahabubnagar		0.00	0.00	Mahabubnagar	25.07	6.30
Medak		0.00	0.00	Medak	16.37	4.11
Andhra Pradesh		0.00	0.00	Andhra Pradesh	398.24	100.00
3	Soya been					
Adilabad		0.00	0.00	Adilabad	82.28	63.97
Nizamabad		0.00	0.00	Nizamabad	43.16	33.55
Medak		0.00	0.00	Medak	2.07	1.61
Karimnagar		0.00	0.00	Karimnagar	0.64	0.50
Andhra Pradesh		0.00	0.00	Andhra Pradesh	128.63	100.00
4	Sesame					
Adilabad		23.88	13.63	Vizianagaram	22.85	24.12
Warangal		22.90	13.07	Prakasham	10.84	11.44
Visakhapatnam		18.36	10.48	Warangal	10.56	11.15
Vizianagaram		17.47	9.97	Srikakulam	8.03	8.48
Prakasham		15.96	9.11	Visakhapatnam	6.40	6.76
Guntur		14.69	8.39	Adilabad	5.50	5.81
East Godavari		11.75	6.71	Cuddapha	5.44	5.74
Khammam		8.61	4.92	Khammam	4.35	4.59
Srikakulam		6.72	3.84	Nalgonda	3.75	3.96
Krishna		5.16	2.95	Karimnagar	3.32	3.50
Nellore		5.00	2.86	Nellore	2.73	2.88
Andhra Pradesh		175.18	100.00	Andhra Pradesh	94.74	100.00
5	Castor					
Nalgonda		109.58	39.20	Mahabubnagar	96.72	57.47
Mahabubnagar		96.37	34.47	Nalgonda	25.20	14.97
Prakasham		26.89	9.62	Kurnool	21.85	12.98
Rangareddy		24.95	8.93	Prakasham	9.43	5.61
Warangal		5.88	2.10	Rangareddy	6.34	3.77
Andhra Pradesh		279.55	100.00	Andhra Pradesh	168.29	100.00
6	Palm Oil					
West Godavari		0.00	0.00	West Godavari	13.83	48.41
East Godavari		0.00	0.00	East Godavari	5.33	18.67
Krishna		0.00	0.00	Krishna	3.15	11.02
Vizianagaram		0.00	0.00	Vizianagaram	2.49	8.72
Khammam		0.00	0.00	Khammam	2.00	7.00
Andhra Pradesh		0.00	0.00	Andhra Pradesh	28.58	100.00
Total Oil Seeds						
Ananathapur		767.91	23.15	Ananathapur	815.36	32.98
Kurnool		497.29	14.99	Kurnool	399.1	16.14
Mahabubnagar		308.52	9.30	Mahabubnagar	229.79	9.30
Chittoor		292.08	8.81	Cuddapha	226.48	9.16
Cuddapha		285.73	8.61	Chittoor	169.9	6.87
Nalgonda		185.41	5.59	Adilabad	97.92	3.96
Warangal		128.8	3.88	Nizamabad	78.72	3.18
Prakasam		121.49	3.66	Prakasam	63.51	2.57
Vizianagaram		107.38	3.24	Vizianagaram	61.09	2.47
Andhra Pradesh		3317.09	100.00	Andhra Pradesh	2472.02	100.00

Figures in parentheses show the district's per cent share in A.P total oilseeds area.

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Hyderabad, Govt of Andhra Pradesh.

Table 3.10
Share of major districts in oilseeds Production in the state: TE 1993-94 and TE 2009-10
 (Production in 000' tonnes)

S.NO	Major districts	TE 1993-94		TE 2009-10		
1	Groundnut					
	Ananathapur	580.12	26.12	Ananathapur	457.37	29.94
	Kurnool	304.97	13.73	Kurnool	210.81	13.80
	Chittoor	300.51	13.53	Mahabubnagar	194.81	12.75
	Cuddapha	206.70	9.31	Chittoor	188.06	12.31
	Mahabubnagar	108.16	4.87	Cuddapha	156.82	10.27
	Vizianagaram	90.67	4.08	Warangal	54.72	3.58
	Prakasam	85.83	3.86	Vizianagaram	39.48	2.58
	Warangal	79.28	3.57	Srikakulam	34.71	2.27
	Nellore	71.36	3.21	Nalgonda	31.96	2.09
	Karimnagar	65.73	2.96	Nellore	30.51	2.00
	Nalgonda	62.10	2.80	Karimnagar	25.04	29.94
	Andhra Pradesh	2220.77	100.00	Andhra Pradesh	1527.58	100.00
2	Sunflower					
	Kurnool	0.00	0.00	Kurnool	110.57	32.08
	Cuddapha	0.00	0.00	Cuddapha	58.70	17.03
	Prakasham	0.00	0.00	Prakasham	38.82	11.26
	Nizamabad	0.00	0.00	Nizamabad	34.55	10.02
	Ananathapur	0.00	0.00	Ananathapur	29.68	8.61
	Medak	0.00	0.00	Medak	25.75	7.47
	Mahabubnagar	0.00	0.00	Mahabubnagar	17.55	5.09
	Andhra Pradesh	0.00	0.00	Andhra Pradesh	344.64	100.00
3	Soya been					
	Adilabad	0.00	0.00	Adilabad	94.62	57.24
	Nizamabad	0.00	0.00	Nizamabad	68.61	41.51
	Medak	0.00	0.00	Medak	1.07	0.65
	Karimnagar	0.00	0.00	Karimnagar	0.60	0.36
	Andhra Pradesh	0.00	0.00	Andhra Pradesh	165.30	100.00
4	Sesame					
	Guntur	6.94	17.58	Prakasham	4.17	18.89
	Warangal	5.12	12.98	Vizianagaram	3.33	15.10
	Prakasam	3.79	9.60	Cuddapha	2.14	9.67
	East Godavari	3.78	9.57	Warangal	2.08	9.40
	Adilabad	3.49	8.85	Visakhapatnam	1.46	6.62
	Visakhapatnam	3.04	7.70	Karimnagar	1.43	6.47
	Vizianagaram	2.41	6.09	Khammam	1.21	5.47
	Khammam	1.57	3.97	Adilabad	1.08	4.88
	West Godavari	1.54	3.90	Srikakulam	1.04	4.73
	Andhra Pradesh	39.46	100.00	Andhra Pradesh	22.08	100.00
5	Castor					
	Nalgonda	30.20	38.73	Mahabubnagar	54.13	59.06
	Mahabubnagar	25.14	32.24	Kurnool	13.24	14.44
	Rangareddy	7.83	10.05	Nalgonda	10.11	11.03
	Prakasham	7.23	9.27	Prakasham	5.92	6.46
	Guntur	2.74	3.51	Rangareddy	3.31	3.61
	Warangal	2.15	2.76	Guntur	1.04	1.13
	Andhra Pradesh	77.98	100.00	Andhra Pradesh	91.66	100.00
6	Palm Oil					
	West Godavari	0.00	0.00	West Godavari	290.61	50.05
	East Godavari	0.00	0.00	East Godavari	116.75	20.11
	Khammam	0.00	0.00	Khammam	43.26	7.45
	Krishna	0.00	0.00	Krishna	72.06	12.41
	Visakhapatnam	0.00	0.00	Visakhapatnam	27.47	4.73
	Vizianagaram	0.00	0.00	Vizianagaram	20.09	3.46
	Andhra Pradesh	0.00	0.00	Andhra Pradesh	580.60	100.00
	Total Oil seeds					
	Cuddapha	582.49	24.72	Ananathapur	488.48	17.78
	Chittoor	306.92	13.03	Kurnool	339.56	12.36
	Kurnool	300.94	12.77	West Godavari	309.26	11.26
	Ananathapur	208.02	8.83	Mahabubnagar	264.13	9.61
	Rangareddy	134.34	5.70	Cuddapha	217.8	7.93
	Prakasam	96.93	4.11	Chittoor	191.91	6.99
	Vizianagaram	93.21	3.96	East Godavari	118.17	4.30
	Adilabad	93.14	3.95	Nizamabad	112.22	4.09
	Khammam	86.57	3.67	Adilabad	107.12	3.90
	Andhra Pradesh	2355.96	100.00	Andhra Pradesh	2747.12	100.00

Figures in parentheses show the district's per cent share in A.P total oilseeds area.

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Hyderabad. Govt of Andhra Pradesh,

The Groundnut acreage from these four districts share have increased from 67 per cent to 80 per cent between the periods TE 1993-94 to TE 2009-10 where as these districts (Ananthapur, Kurnool, Chittoor and Kadapah) the actual Groundnut crop acreage declined from 16.12 lakh ha to 13.64 lakh ha. (TE 1993-94 to TE 2009-10) due to promoting horticultural crops by the Government of Andhra Pradesh. In the case of area under Sunflower crop was the second major oil seed crop in respect of area in the state and the districts of Kurnool, Cudapah and Ananthapur districts constituted the area was 2.65 lakh ha. and 67 percent of total area under sunflower crop in the state during TE 2009-10

Soybean is another important edible oil seed crop which is grown mostly Adilabad and Nizamabad districts from Telangana region in Andhra Pradesh from these two districts constituted the area 63.9 per cent and 33.55 per cent of total Soy bean crop during TE 2009-10. The acreage under Sesamam crop, major changes have been occurred among the districts between the periods (TE 1993-94 to TE 2009-10). The districts of Adilabad, Warangal, Visakhapatnam and Vizianagaram stood at first four position in TE 1993-94 and the period TE 2009-10 Vizianagaram, Prakasam, Warangal and Srikakulam districts secured first four positions in the State. Oil palm is another important oilseed crop and Coastal Andhra districts are suitable for cultivating oilpalm plants selected by the horticultural department, Government of India. The districts of West Godavari, East Godavari and Krishna cultivating highest share of acreage of total oil palm in the state during TE 2009-10. Castor is the important non-edible oil seed crop and the area had declined between the periods TE 1993-94 to TE 2009-10 and the major share revealed Mahabubnagar and Nalgonda districts in the State.

As far as total Oilseeds production is concerned Table 3.10 depicted the major oilseed crops production at state level and their share of total oil seed production as well as crop wise share of major districts in the state. This districts Rayalaseema region Cuddapah, Chittoor, Kurnool and Ananthapur occupied the first four positions in the state during TE 1993-94, Whereas the year TE 2009-10 Ananthapur and Kurnool districts stood at first two ranks, the other two districts Cuddapah and Chittoor the share of total oil seed production came down from TE 1993-94 to TE 2009-10. In the case of total oil seed production in the state has increased 23.56 lakh tonnes to 27.47 lakh tonnes between the two periods TE 1993-94 to TE 2009-10. Further the table revealed that the major changes in Oilseed production share across the districts in the state between the two reference periods (TE 1993-94 and TE 2009-10). We

may look at the ranks of some major districts growing under Groundnut crop production such as Ananthapur, Kurnool, Chittoor, Kuddapah and Mahabubnagar districts reported first five positions of the reference periods. Among these five districts four districts belong to Rayalaseema and one from Telangana region. The share of groundnut production increased 68 to 70 per cent between TE 1993-94 to TE 2009-10 in the State. Sunflower is another important Oilseed crop and 50 per cent of production reported from the two districts Kurnool and Kadapah from Rayalaseema region. More over the Soya bean oil seed crop assessed the production about 99 per cent of production obtained from Adilabad and Nizamabad districts

Table 3.11
Irrigated Area under Oilseeds in the state: TE 1993-94 and 2009-10

(Area in 000' hectare)

Districts	Kharif		Rabi		Total			
	TE 1993-94	TE 2009-10	TE 1993-94	TE 2009-10	TE 1993-94 %		TE 2009-10 %	
Srikakulam	N.A	N.A	N.A	N.A	10.32	1.73	10.48	1.84
Vizianagaram	N.A	N.A	N.A	N.A	9.03	1.52	6.55	1.15
Visakhapatnam	N.A	N.A	N.A	N.A	4.37	0.73	3.36	0.59
East Godavari	N.A	N.A	N.A	N.A	9.98	1.67	25.11	4.41
West Godavari	N.A	N.A	N.A	N.A	20.06	3.37	46.44	8.16
Krishna	N.A	N.A	N.A	N.A	11.51	1.93	7.75	1.36
Guntur	N.A	N.A	N.A	N.A	8.02	1.35	1.12	0.20
Prakasam	N.A	N.A	N.A	N.A	30.05	5.04	22.63	3.97
Nellore	N.A	N.A	N.A	N.A	38.21	6.41	13.25	2.33
Kurnool	N.A	N.A	N.A	N.A	72.01	12.08	55.92	9.82
Anantapur	N.A	N.A	N.A	N.A	57.60	9.67	43.88	7.71
Cuddapah	N.A	N.A	N.A	N.A	45.04	7.56	59.36	10.43
Chittoor	N.A	N.A	N.A	N.A	44.19	7.42	33.33	5.85
Rangareddy	N.A	N.A	N.A	N.A	5.98	1.00	7.42	1.30
Hyderabad	N.A	N.A	N.A	N.A	0.01	0.00	0.00	0.00
Nizamabad	N.A	N.A	N.A	N.A	13.14	2.20	41.10	7.22
Medak	N.A	N.A	N.A	N.A	8.22	1.38	16.35	2.87
Mahabubnagar	N.A	N.A	N.A	N.A	52.06	8.74	89.36	15.70
Nalgonda	N.A	N.A	N.A	N.A	24.24	4.07	19.01	3.34
Warangal	N.A	N.A	N.A	N.A	48.83	8.19	27.84	4.89
Khammam	N.A	N.A	N.A	N.A	19.18	3.22	9.02	1.58
Karimnagar	N.A	N.A	N.A	N.A	46.77	7.85	19.97	3.51
Adilabad	N.A	N.A	N.A	N.A	7.08	1.19	10.11	1.78
Andhra Pradesh	N.A	N.A	N.A	N.A	595.89	100.00	569.32	100.00

*Figures in parentheses shows the district's per cent share in the State acreage

Source: Season and crop reports Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

from Telangana region in the state during TE 2009-10. The oilseed crop of Sesame 40 per cent of production reported from Guntur, Warangal and Prakasam districts in TE1993-94 whereas in TE 2009-10 the Sesame production reported 44 per cent from Prakasam,

Vizianagaram and Kadapah, oil Palm crop is an important edible oil seed crop and Andhra Pradesh is the largest edible oil seed crop production in India. Among the districts West Godavari reported the highest production share at 50 per cent of total oil palm production in the state followed by East Godavari 20.11 per cent, Krishna 12.41 per cent from Coastal Andhra Pradesh during TE 2009-10.

Castor is non-edible oilseed crop, across the districts Nalgonda, Mahabubnagar and Ranga Reddy obtained first three ranks and the production constituted 80 per cent of total Castor Oilseed crop in TE 1993-94. On the other hand, Mahabubnagar, Kurnool and Nalgonda got the first three ranks and got 85 per cent of total Castor production in the state during TE 2009-10.

Seasonal rainfall and availability of irrigation facilities played a vital role for cultivating oilseed crops in the State. Table 3.11 shown the irrigated area under oilseeds cultivation in various districts in the state between TE 1993-94 and TE 2009-10. Season wise irrigated area under oilseed crops data (Kharif and Rabi) is not available in the state. Across the districts season wise irrigated area under groundnut crop is not found and the state irrigated area of oilseed crops had slightly declined from 5.95 lakh hectares in TE 1993-94 to 5.69 lakh ha in TE 2009-10 in Andhra Pradesh state. Among the districts the highest share of oilseeds irrigated area obtained from Kurnool (12.08%) district followed by Ananthapur (9.67%), Mahabubnagar (8.74%), Warangal (8.19%) and Karimnagar (7.85%) in TE 1993-94. Whereas the irrigated area under oilseeds share increased marginally the districts of Mahabubnagar (15.70%), Cuddapah (10.43%), West Godavari (8.16%), Nizamabad (7.22%) and East Godavari (4.41%) during the period TE 1993-94 to TE 2009-10. The districts of Kurnool, Warangal, Karimnagar, Nellore, Khammam, Nalgonda, Chittoor, Ananthapur, Prakasam and Guntur districts irrigated oilseed crop area had declined drastically from TE 1993-94 to TE 2009-10 in the State. Therefore irrigated area under total oilseed crops in the state slightly declined between the two periods. So the study might be observed that the major reasons for transformation of irrigated land from oilseed crops to other commercial crops of maize, cotton and other horticultural crops.

3.4 Variability in Area, Production and Yield of Major Oilseed Crops, Groundnut vis-à-vis Competing Crop (Maize) and Sunflower vis-à-vis Competing crop (Cotton):

3.4.1. Overall Growth and Variability in main Oilseed and Competing Crop in the State:

Among the oilseed crops Groundnut and Sunflower were the major oilseed crops in Andhra Pradesh. Table 3.12 depicts that the Groundnut crop had shown the largest area and production while the maize was found to be its major competing crop during TE 2009-10. The growth in area and production of Groundnut was considerably high constituting 12 per cent and 8 per cent during 1960's. However, it has exhibited negative trend in 1950's, 1970's, 1990's and 2000's. In absolute term, the annual average area, production and yield under Groundnut crop have been fluctuating in all estimated periods in the state. On the other hand the annual average area under main competing crop (maize) had increased marginally in 1960's later it had declined 314.88 lakh ha. to 296.70 lakh ha. during 1970's and there after continued to increase in 1980's, 1990's and 2000's. Whereas the production and yield under competing crop (maize) in absolute term about the production and yield have been continuously increased in all estimated periods. Overall the growth in area, production and yield of competing crop (maize) had shown the larger than that of Groundnut crop during the period 1950-51 to 2009-10 in the state.

In the case of Sunflower crop area and production has exhibited negative growth rate - 3.0 per cent and -4.0 per cent during 1990s, further it had increased to 1.0 per cent and 3.0 per cent in 2000's. The yield CAGR increased in both estimated periods of 1990's and 2000's in the state. On the other hand, the growth in area and production of the main competing crop of Cotton area and production has not been quite impressive in 1950's and 1960's thereafter the growth rate is positive and highest growth rate was reported 7.0 per cent and 5.0 per cent in area and production during 2000's. But the yield growth rate was negative in the corresponding period. In absolute terms the cotton crop area, production and yield have been continuously increased from 1970's to 2000's in the state. The CAGR of area, production and yield of competing crop (cotton) during the entire period of 1950-51 to 2009-10 was 2.2, 6.0 and 4.0 per cent respectively. While the sunflower crop was 1.7, 3.0 and 1.1 per cent respectively. Therefore about the area, production and yield of competing crop of cotton has shown the highest CAGR than sunflower crop in the state during the period 1951-52 to 2009-10.

Table 3.12
INDIVIDUAL OILSEEDS CROPS (Similar analysis for major Oilseeds)
Average Area, Production, and Yield of Groundnut & Sunflower in the State: 1951-52 to 2009-10

Particulars	1951-52 to 1960-61		1961-62 to 1970-71		1971-72 to 1980-81		1981-82 to 1990-91		1991-92 to 2000-01		2001-02 to 2009-10		1951-52 to 2009-10	
	Mean	CAGR	Mean	CAGR	Mean	CAGR	Mean	CAGR	Mean	CAGR	Mean	CAGR	Mean	CAGR
Ground nut														
Area (000 hectares)	1093 (18.29)	-3.00	2236 (49.61)	12.00	1333 (12.89)	-2.00	1843 (19.43)	6.00	2130 (11.40)	-4.00	1619 (13.70)	-1.00	1710 (37.44)	0.80
Production (000 tonnes)	949 (18.52)	-2.00	1031 (31.62)	8.00	1096 (22.82)	-3.00	1662 (30.17)	7.00	1955 (26.36)	-4.00	1265 (45.41)	1.00	1327 (40.82)	1.10
Yield (kg/ha)	870 (8.24)	2.00	520 (32.50)	-3.00	818 (17.27)	-1.00	890 (15.81)	1.00	912 (22.75)	0.00	767 (36.55)	2.00	797 (27.24)	0.30
Maize (Competing crop)														
Area (000 hectares)	184.41 (7.29)	1.00	314.88 (44.16)	-3.00	296.70 (5.15)	1.00	312.26 (5.57)	-2.00	373.18 (19.22)	6.00	678.49 (21.58)	8.00	354.59 (48.32)	2.00
Production (000 tonnes)	122.83 (31.22)	4.00	229.48 (23.74)	6.00	423.95 (31.25)	6.00	554.21 (20.20)	-1.00	1071.24 (30.16)	10.00	2624.95 (39.65)	13.00	807.03 (115.47)	5.90
Yield (kg/ha)	644 (30.27)	4.00	836 (44.98)	9.00	1420 (27.13)	4.00	1772 (18.52)	1.00	2870 (17.42)	5.00	3771 (21.53)	5.00	1853 (64.07)	3.90
Sunflower														
Area (000 hectares)	-	-	-	-	-	-	-	-	326 (20.00)	-3.00	415 (16.45)	1.00	368 (21.74)	1.70
Production (000 tonnes)	-	-	-	-	-	-	-	-	210 (19.00)	-4.00	309 (19.48)	3.00	257 (25.45)	3.00
Yield (kg/ha)	-	-	-	-	-	-	-	-	676 (13.00)	1.00	751 (16.47)	2.00	711 (15.60)	1.10
Cotton (Competing crop)														
Area (000 hectares)	351.65 (13.88)	-3.00	336.06 (12.67)	-2.00	361.27 (16.75)	3.00	548.48 (16.59)	4.00	856.44 (19.06)	3.00	880 (17.51)	7.00	550.15 (45.92)	2.20
Production (000 lnits)	115.01 (12.90)	-1.00	117.51 (22.88)	-4.00	311.89 (42.44)	11.00	778.74 (27.21)	1.00	1290.80 (18.03)	1.00	1337.63 (14.24)	5.00	647.09 (82.96)	6.00
Yield (lint/ha)	52 (10.29)	2.00	59 (23.88)	1.00	144 (32.57)	7.00	244 (26.06)	-3.00	270 (8.29)	-2.00	275 (6.54)	-2.00	172 (58.33)	4.00

Source: Statistical Abstract from 1951 to 2010, Directorate of Economics & Statistics, Govt. of Andhra Pradesh, Hyderabad.

Note: Figures in parentheses are the C.V. in per cent.

TABLE 3.13
Share of Major District in Area under Groundnut in the state: TE 1983-84 and TE2009-10
(Area in '000 hectares)

Districts	Share of districts groundnut area in state's total area under groundnut				Share in Edible Oilseed acreage in the district			
	TE 1983-84	TE 1993-94	TE 2003-04	TE 2009-10	TE 1983-84	TE 1993-94	TE 2003-04	TE 2009-10
Srikakulam	40.24 (2.61)	52.47 (2.18)	34.27 (2.21)	29.52 (1.82)	86.11	84.79	74.81	73.65
Vizianagaram	58.43 (3.79)	87.57 (3.65)	46.03 (2.97)	35.40 (2.18)	98.99	97.83	93.98	90.91
Visakhapatnam	24.59 (1.60)	32.01 (1.33)	12.37 (0.80)	4.30 (0.27)	81.63	67.41	49.51	37.34
East Godavari	11.22 (0.73)	7.15 (0.30)	0.64 (0.04)	0.54 (0.03)	52.15	33.66	6.74	5.41
West Godavari	7.47 (0.48)	8.92 (0.37)	3.07 (0.20)	7.56 (0.47)	76.88	50.37	18.56	24.19
Krishna	30.44 (1.98)	32.82 (1.37)	6.17 (0.40)	7.36 (0.45)	98.36	85.52	74.58	61.24
Guntur	28.72 (1.86)	16.95 (0.71)	5.89 (0.38)	5.42 (0.33)	89.23	79.63	74.02	81.64
Prakasam	27.28 (1.77)	71.43 (2.97)	6.77 (0.44)	8.98 (0.55)	66.37	72.09	67.74	84.48
Nellore	16.54 (1.07)	40.02 (1.67)	11.20 (0.72)	11.27 (0.70)	98.23	94.64	92.87	94.35
Kurnool	187.82 (12.20)	337.32 (14.04)	195.21 (12.58)	224.82 (13.87)	94.86	68.79	97.96	94.51
Ananathapur	413.17 (26.83)	731.57 (30.46)	737.75 (47.56)	765.89 (47.25)	98.45	95.85	99.59	99.75
Cuddapha	106.33 (6.90)	255.91 (10.66)	125.19 (8.07)	147.96 (9.13)	99.33	90.90	98.70	99.25
Chittoor	223.93 (14.54)	286.84 (11.94)	157.59 (10.16)	164.94 (10.18)	99.11	98.56	97.22	97.48
Ranga Reddy	7.62 (0.49)	8.35 (0.35)	6.14 (0.40)	7.22 (0.45)	44.26	32.70	46.38	64.34
Nizamabad	10.79 (0.70)	7.88 (0.33)	4.50 (0.29)	2.85 (0.18)	85.16	57.30	91.78	99.79
Medak	3.71 (0.24)	7.95 (0.33)	4.48 (0.29)	2.07 (0.13)	62.86	51.86	79.86	94.31
Mahabubnagar	174.20 (11.31)	168.87 (7.03)	91.43 (5.89)	105.52 (6.51)	69.61	55.64	44.95	57.67
Nalgonda	49.41 (3.21)	67.21 (2.80)	33.08 (2.13)	27.52 (1.70)	27.93	38.56	38.94	56.72
Warangal	59.27 (3.85)	87.81 (3.66)	43.57 (2.81)	35.42 (2.18)	84.16	86.00	93.58	95.44
Khammam	28.50 (1.85)	35.02 (1.46)	5.72 (0.37)	6.65 (0.41)	99.88	91.00	91.36	78.99
Karimnagar	29.57 (1.92)	54.75 (2.28)	17.08 (1.10)	15.45 (0.95)	89.19	80.77	92.03	96.95
Adilabad	0.85 (0.06)	2.94 (0.12)	3.19 (0.21)	4.27 (0.26)	75.89	61.77	28.36	99.68
Andhra Pradesh	1540.12 (100.00)	2401.77 (100.00)	1551.33 (100.00)	1620.95 (100.00)	82.34	78.49	82.33	87.76

Source: Various issues of Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

Various issues of Season and Crop Reports, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

As discussed earlier Andhra Pradesh stands first in the cultivation of Groundnut crop. Table 3.13 reveals the district wise share of groundnut crop acreage in the state. The state total Groundnut crop acreage had increased upto TE 1993-94, and it had marginally declined to 15.51 lakh ha. in the period TE 2003-04 later it slightly increased to 16.20 lakh ha in TE 2009-10. Across the districts we found that Ananthapur, Kurnool Chittoor and kadapa districts got the first four ranks and obtained highest share in estimated periods TE 1983-84, TE 1993-94, TE 2003-04 and TE 2009-10 in the state.

These districts exclusively belong to Rayalaseema region in the state. All these four districts reported that the total of Groundnut crop area has been increased from period to **period accounting for about 60.47%, 67.1%, 78.4% and 80.0% from 80's, 90's and 2000's** respectively in the state. We found that share of Groundnut crop area of Adilabad district have been continuously increasing in all estimated periods. On the other hand, majority of districts the area of Groundnut crop share declining from one period to another period. These are Vizianagaram, Visakhapatnam, East Godavari and Guntur from Coastal Andhra region and Nalgona, Warangal, Khammam and Nizamabad districts from Telangana region in the state of Andhra Pradesh.

Further the table has depicted that the share of edible oil seed acreage in total oil seed of the district. Across the districts Ananthapur, Kadapah, Chittoor districts found that the share of edible oil seed acreage have reported above 97 per cent in total oil seed crop area of their districts in all estimated periods (TE 1983-84, TE 1993-94, TE 2003-04, TE 2009-10). Therefore, edible oil seed acreage was highest from Rayamaseema region (Ananthapur, Kadapah, Kurnool and Chittoor) than other regions in the state. Similarly Vizianagaram, Nellore districts edible oilseed grown area reported above 90 % of total oilseed acreage of all estimated periods from Coastal Andhra region. The percentage share of total edible oil seed crop area in total oil seed acreage revealed above 80 per cent in three estimated periods (TE 1983-84, TE 2003-04 and TE 2009-10) except the period TE 1993-94 in the state. It is evident from the table that the highest edible oil seed acreage is 87.76 per cent of total oilseed area in the state during TE 2009-10.

Table 3.14 clearly shows that the district level share of Groundnut production and share of edible oil seed production of state edible oilseed production. Among the districts Kurnool, Ananthapur, Cuddapah and Chittoor from Rayalaseema region and Mahabubnagar from

TABLE 3.14
Share of Major District in Groundnut production in the state: TE 1983-84 and TE2009-10

(Production in '000 Tonnes)

Districts	Share of districts groundnut production in state's total groundnut production				Share of edible oilseed production in state's total edible oilseed production			
	TE 1983-84	TE 1993-94	TE 2003-04	TE 2009-10	TE 1983-84	TE 1993-94	TE 2003-04	TE 2009-10
Srikakulam	40.83 (2.86)	55.87 (2.52)	29.05 (2.85)	34.71 (2.27)	2.83	2.52	2.30	1.92
Vizianagaram	53.52 (3.75)	90.67 (4.08)	38.88 (3.82)	39.48 (2.58)	3.77	4.10	3.18	2.07
Visakhapatnam	26.96 (1.89)	28.90 (1.30)	14.20 (1.39)	5.84 (0.38)	2.12	1.41	1.19	0.39
East Godavari	13.71 (0.96)	8.79 (0.40)	1.04 (0.10)	1.15 (0.08)	1.19	0.55	0.14	0.11
West Godavari	9.37 (0.66)	13.15 (0.59)	6.17 (0.61)	15.66 (1.02)	0.85	0.65	0.63	0.92
Krishna	32.29 (2.26)	41.84 (1.88)	10.51 (1.03)	17.00 (1.11)	2.22	1.91	0.86	0.83
Guntur	34.78 (2.43)	21.02 (0.95)	10.82 (1.06)	10.71 (0.70)	2.52	1.27	1.02	0.55
Prakasam	30.34 (2.12)	85.83 (3.86)	10.16 (1.00)	19.27 (1.26)	2.17	3.95	2.21	3.01
Nellore	26.49 (1.85)	71.36 (3.21)	23.96 (2.35)	30.51 (2.00)	1.89	3.20	2.35	1.80
Kurnool	156.80 (10.97)	271.64 (12.23)	179.30 (17.60)	210.81 (13.80)	10.92	12.05	23.58	15.67
Ananathapur	366.90 (25.68)	580.12 (26.12)	283.10 (27.79)	457.37 (29.94)	25.05	25.65	23.43	23.53
Cuddapha	92.20 (6.45)	206.70 (9.31)	56.74 (5.57)	156.82 (10.27)	6.52	9.16	8.12	10.51
Chittoor	236.81 (16.57)	324.78 (14.62)	143.67 (14.10)	188.06 (12.31)	16.09	14.33	10.91	9.26
Ranga Reddy	7.04 (0.49)	8.54 (0.38)	7.23 (0.71)	13.30 (0.87)	0.74	0.43	0.73	0.78
Nizamabad	13.25 (0.93)	11.12 (0.50)	7.35 (0.72)	5.58 (0.37)	0.92	0.52	1.17	5.37
Medak	2.99 (0.21)	7.79 (0.35)	6.51 (0.64)	3.83 (0.25)	0.44	0.43	1.31	1.69
Mahabubnagar	119.43 (8.36)	108.16 (4.87)	74.95 (7.36)	191.79 (12.56)	8.20	4.79	7.05	10.12
Nalgonda	44.99 (3.15)	62.10 (2.80)	27.05 (2.66)	30.49 (2.00)	3.08	2.78	2.18	1.60
Warangal	61.18 (4.28)	79.28 (3.57)	48.23 (4.73)	54.34 (3.56)	4.26	3.72	4.17	2.74
Khammam	28.31 (1.98)	39.00 (1.76)	7.91 (0.78)	9.89 (0.65)	1.95	1.79	0.73	0.57
Karimnagar	30.30 (2.12)	65.73 (2.96)	27.93 (2.74)	25.05 (1.64)	2.08	2.93	2.19	1.41
Adilabad	0.55 (0.04)	3.04 (0.14)	4.16 (0.41)	5.93 (0.39)	0.19	0.29	0.56	5.15
Andhra Pradesh	1428.95 (100.00)	2220.77 (100.00)	1018.90 (100.00)	1527.58 (100.00)	100.00	100.00	100.00	100.00

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

Telangana Region have been shown highest share of Groundnut production in all estimated periods in the state. On the other hand the share of edible oil production in state edible oil production reported these five districts revealed highest percentage share in all estimated periods in the state. Ananthapur and Kurnool districts obtained the first two ranks among the districts in the state of all estimated periods. Therefore, we may conclude that the **Rayalaseema region obtained the major share of Groundnut area in state's groundnut area and the share of edible oil seed acreage also revealed the highest of their districts.** In the case of **Groundnut production the share also shown highest at state's and their district edible oilseed production in all estimated periods in the state.** The availability of dry land and low rainfall in the major cause for these four districts Ananthapur, Kurnool, Cuddapah and Chittoor have been cultivating groundnut crop was a major crop than other crops from Rayalaseema region in the state evident in the Table 3.14.

3.4.2 Inter district Variation in Irrigated Area under Ground nut Crop:

The change in area and production of Groundnut crop is largely depend on availability of irrigation facilities. The share of irrigated area under Groundnut to total groundnut crop area has declined from 19.28 per cent in TE 1983-84 to 15.98 per cent in TE 2003-04. It has slightly increased to 19.04 per cent in TE 2009-10 (Table 3.15). Similarly the share of irrigated groundnut area to total irrigated area of the state has slightly increased from 6.25 per cent to 8.83 per cent in TE 1983-84 to TE 1993-94, later the share has been declined from 8.83 per cent to 5.00 per cent to 4.93 per cent of the two estimated periods TE 2003-04 and TE 2009-10.

Majority of districts the share of irrigated groundnut area have been increasing in the total groundnut area of the district from TE1983-84 to TE 2009-10. The following districts like West Godavari, Nellore, Nizamabad, Rangareddy, Medak, Kirimnagar and Adilabad having more than 90 percent of ground crop under irrigated of their district groundnut crop area in the state during TE 2009-10. The districts from Rayalaseema region (Kurnool, Ananthapur Cuddapah and Chittoor) having less than 20per cent of irrigated area under groundnut to district groundnut crop area of all estimated periods except Kurnool district TE 1983-84 in the state. Among the districts the share of irrigated groundnut area Adilabad have been gradually increasing from 20.86 per cent in TE 1983-84 to 70.39 per cent in TE 1993-94 further increased to 80.87 per cent in TE 2003-04 and 99.35 per cent in TE 2009-10.

Table 3.15
Share of Groundnut Irrigated Area to Area under Groundnut and Gross Irrigated Area of the State

(In Percentage)

Districts	Share of irrigated groundnut to groundnut area of the district				Share of irrigated groundnut to gross irrigated area of the district			
	TE 1983-84	TE 1993-94	TE 2003-04	TE 2009-10	TE 1983-84	TE 1993-94	TE 2003-04	TE 2009-10
Srikakulam	10.39	19.52	16.07	26.06	2.16	5.06	3.14	3.73
Vizianagaram	3.27	7.80	8.52	10.99	1.50	4.51	2.83	2.28
Visakhapatnam	4.46	9.93	12.62	22.22	0.92	2.19	1.33	0.75
East Godavari	11.13	23.71	28.51	22.42	0.30	0.41	0.04	0.03
West Godavari	50.50	65.77	89.61	98.87	0.73	1.12	0.51	1.23
Krishna	28.22	31.22	44.43	44.06	1.97	2.32	0.81	0.72
Guntur	44.79	44.50	11.52	18.69	3.72	2.13	0.22	0.21
Prakasam	35.33	38.85	55.14	57.06	5.03	12.42	2.42	2.33
Nellore	86.32	91.30	93.63	98.00	5.37	12.01	3.98	3.50
Kurnool	23.45	13.37	13.71	12.61	28.66	24.26	15.23	10.93
Anantapur	8.22	5.84	3.03	3.26	18.37	24.78	14.11	16.41
Cuddapah	15.25	16.85	20.93	18.36	12.08	28.38	16.07	14.43
Chittoor	12.85	14.23	18.25	15.38	15.31	19.83	15.04	13.45
Rangareddy	42.39	61.71	88.69	97.51	4.73	6.79	6.98	9.37
Hyderabad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nizamabad	61.14	84.83	98.26	99.60	3.08	4.11	1.99	1.00
Medak	25.87	52.04	79.05	91.95	0.65	2.85	2.09	0.96
Mahabubnagar	21.66	27.52	44.87	76.44	21.22	27.67	22.05	28.42
Nalgonda	30.91	33.73	39.71	64.78	6.19	7.86	6.22	4.55
Warangal	49.01	43.33	56.15	77.54	13.98	15.62	7.39	7.01
Khammam	48.32	46.36	62.30	76.75	10.08	8.59	2.25	2.25
Karimnagar	41.95	59.88	82.66	98.18	5.04	10.50	3.99	3.12
Adilabad	20.86	70.39	80.97	99.35	0.31	2.93	2.69	4.53
Andhra Pradesh	19.28	18.98	15.98	19.04	6.25	8.83	5.00	4.93

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

Further the table analyzed the district level share of irrigated groundnut to gross irrigated area of the district. Mahabubnagar district reported maximum above 20 per cent of irrigated groundnut area grown to total gross irrigated area of the district in all estimated periods. In the case of Rayalaseema region (Kurnool, Ananthapur, Cuddapah and Chittoor) and Mahabubnagar from Telangana region groundnut crop was cultivating the highest percentage of irrigated area to gross irrigated area of the state in all estimated periods TE 1983-84, TE 1993-94, TE 2003-04 and TE 2009-10 respectively.

3.4.3 Inter-district Variation in Growth Rates in Area, Production and Productivity of Groundnut Crop:

There has been wide variations in the positions of the districts in terms of growth in area, production and productivity of Groundnut crop during last few decades in the state.

Table 3.16 shows across the districts sixteen districts achieved the significant positive growth in area under Groundnut crop in the state during 1980's. The districts Prakasam (13.80%), Nellore (11.92%), Karimnagar (11.16%), Cuddapah (10.70%) and Medak (10.50%) occupied first six positions and obtained above 10 per cent of growth in area, achieved a significant positive growth during 1981-82 to 1990-91 in the state. The period 1990's Nizamabad district only reported the significant positive growth in Groundnut crop area, during 2000's the first five positions were occupied by West Godavari (13.20%), Prakasam (3.50%), Ranga Reddy (2.20%) and Mahabubnagar and Adilabad (2.10%). About the total period 1981-82 to 2009-10, out of 22 districts only two districts of Ananthapur (2.20%) and Adilabad (5.30%) have achieved significant positive growth in area under Groundnut crop. The state has experienced some adverse conditions for which about 19 districts have suffered with significant negative growth in area, afterwards only 10 districts reported significant negative growth in 2000's and total period 1980-81 to 2009-10 15 districts experienced negative growth in area under Groundnut crop in the state.

Table 3.16

Classification of Districts according to Growth in Area under Groundnut

(CAGR in per cent)

Degree of growth#	1980s (1981-82 to 1990-91)	1990s (1991-92 to 2000-01)	2000s (2001-02 to 2009-10)	Total period (1981-82 to 2009-10)
Significant Positive growth in Area	Srikakulam 2.89* (3.62)	Nizamabad 7.40** (2.94)	West Godavari 13.20* (4.62)	Ananthapur 2.20* (5.17)
	Vizianagaram 5.20* (6.32)		Prakasam 3.50 (1.85)	Adilabad 5.30* (6.94)
	Visakhapatnam 4.91* (6.66)		Ranga Reddy 2.20 (0.65)	
	West Godavari 2.58* (3.58)		Mahabubnagar 2.10 (1.06)	
	Prakasam 13.80* (6.67)		Adilabad 2.10 (0.52)	
	Nellore 11.92* (4.59)			
	Kurnool 6.00* (4.25)			
	Ananthapur 8.93* (6.06)			
	Cuddapha 10.70* (13.28)			
	Chittoor 2.79* (3.94)			
	Medak 10.50* (5.40)			
	Nalgonda 3.20** (2.72)			
	Warangal 7.01* (7.56)			
	Khammam 3.70*** (2.12)			
	Karimnagar 11.16* (7.09)			
	Adilabad 10.66** (2.79)			

Significant Negative growth in Area	Guntur	-3.80 (-1.08)	Srikakulam	-2.80* (-4.57)	Srikakulam	-2.60*** (-2.34)	Vizianagaram	-2.50 (0.01)
			Vizianagaram	-3.70* (-5.13)	Vizianagaram	-4.60* (-3.78)	Visakhapatnam	-6.80 (0.01)
			Visakhapatnam	-6.00* (-6.57)	Visakhapatnam	-17.70* (-19.91)	East Godavari	-14.10 (0.008)
			East Godavari	-21.80* (-11.13)	East Godavari	-2.20 (-1.51)	West Godavari	-2.40* (-3.44)
			West Godavari	-10.80* (-7.66)	Nizamabad	-7.30 (-1.47)	Krishna	-7.10* (-10.12)
			Krishna	-15.80* (-10.46)	Medak	-12.00* (-5.03)	Guntur	-8.00* (-9.90)
			Guntur	-18.30* (-7.01)	Nalgonda	-3.60*** (-2.34)	Prakasam	-7.50* (-5.78)
			Prakasam	-22.10* (-11.96)	Warangal	-3.50* (-4.68)	Nellore	-4.00* (-4.42)
			Nellore	-13.80* (-9.56)	Khammam	-2.30 (-1.63)	Nizamabad	-4.80* (-4.16)
			Kurnool	-5.10* (-5.93)	Karimnagar	-2.30 (-1.69)	Medak	-2.00*** (-1.91)
			Cuddapha	-6.30* (-3.96)			Mahabubnagar	-2.50* (-5.99)
			Chittoor	-3.10** (-3.25)			Nalgonda	-2.60* (-5.43)
			Mahabubnagar	-4.60* (-4.05)			Warangal	-2.70* (-5.20)
			Nalgonda	-4.10* (-6.26)			Khammam	-8.00* (-9.38)
			Warangal	-7.10* (-11.35)			Karimnagar	-4.20* (-4.97)
			Khammam	-18.10* (-10.39)				
			Karimnagar	-11.00* (-14.81)				
			Adilabad	-2.60** (-2.94)				
			Ranga Reddy	-2.70 (-1.31)				
	Positive Stagnant Area	Krishna	1.00 (0.09)	Ananthapur	0.60 (1.10)	Krishna	1.60 (0.50)	Kurnool
Ranga Reddy		1.20 (0.57)	Medak	0.10 (0.08)	Nellore	0.30 (0.18)		
Nizamabad		1.01 (0.21)			Kurnool	1.60 (1.03)		
Negative Stagnant Area	East Godavari	-1.40 (-1.03)	-		Guntur	-1.40 (-0.37)	Srikakulam	-1.50 (0.003)
	Mahabubnagar	-0.40 (-0.18)			Ananthapur	-1.30 (-0.57)	Cuddapha	-0.10 (-0.221)
					Cuddapha	-0.10 (-0.04)	Chittoor	-1.80* (-3.70)
					Chittoor	-0.30 (-0.29)	Rangareddy	-1.00 (-2.11)

Notes: (1) *, **, *** represent the significant level at 1%, 5% and 10% level of significance, respectively

(2) # Significant Positive growth implies annual growth rate up to +2; significant negative growth rate implies annual growth rate less than -2.0; positive stagnant growth implies annual growth rate between 0 to +1.0; and negative stagnant growth implies annual growth rate between 0 to -1.0.

(3) Figures in parentheses are 't' Values.

Further the table revealed that the districts of Krishna, Rangareddy and Nizamabad districts positive significant growth in area under Groundnut crop in 1980's and Ananthapur and Medak districts in 1990's, further Krishna, Nellore and Kurnool districts in 2000's. Only Kurnool district reported positive stagnant area in the longer period of 1980-81 to 2009-10 in the State.

We found that the negative stagnant growth area under Groundnut crop of East Godavari and Mahabubnagar districts in 1980's, Rangareddy in 1990's and Guntur, Ananthapur, Kadapah and Chittoor reported negative stagnant growth in area and Srikakulam, Kadapa, Chittoor and Ragareddy districts revealed the negative stagnant area under Groundnut during total period of 1980-81 to 2009-10 of the state

Table 3.17 shows that the district wise growth in Groundnut production in Andhra Pradesh. The growth in production of groundnut crop has been much **better during 1980's and 2000's**. More number of districts have exhibited considerable positive growth during 1980's and 2000's. The districts of Adilabad (20.50%), Prakasam (14.00%), Kadapah (13.80%), Karimnagar (12.70%) and Nellore (12.40%) occupied first five positions during 1980's in terms of significant positive growth in production of groundnut crop. However, during 1990's out of 23 districts only three districts groundnut production having significant increase in positive growth rate, which are Nizamabad (14.20%), Adilabad (10.10%) and Medak (2.30%) of the state. During 2000's the first three positions were occupied by Mahabubnagar (14.20%), West Godavari (13.60%) and Prakasam (10.60%) and the total period (1981-82 to 2009-10) the Adilabad district only achieving significant positive growth in groundnut production of the state.

Table 3.17
Classification of Districts according to Growth in Groundnut Production

(CAGR in per cent)

Degree of growth#	1980s (1981-82 to 1990-91)	1990s (1991-92 to 2000-01)	2000s (2001-02 to 2009-10)	Total period (1981-82 to 2009-10)
Significant Increase in Production	Vizianagaram 6.80** (3.33)	Nizamabad 14.20* (3.42)	Srikakulam 2.40 (1.26)	Adilabad 8.30* (8.02)
	Visakhapatnam 5.30* (4.08)	Medak 2.30 (0.80)	East Godavari 2.00 (1.36)	
	West Godavari 2.20*** (2.06)	Adilabad 10.10* (3.83)	West Godavari 13.60* (3.98)	
	Krishna 2.00 (1.65)		Krishna 5.40 (1.21)	
	Prakasam 14.00* (5.30)		Prakasam 10.60* (4.62)	
	Nellore 12.40* (5.05)		Nellore 3.70** (2.37)	
	Kurnool 6.80** (2.79)		Cuddapha 7.80 (0.91)	
	Ananthapur 7.10** (2.43)		Ranga Reddy 8.40** (2.78)	
	Cuddapha 13.80* (4.33)		Mahabubnagar 14.20* (3.88)	
	Chittoor 4.80 (1.69)		Warangal 2.20 (1.34)	
	Ranga Reddy 3.10 (0.90)		Khammam 3.50 (1.49)	
	Medak 12.00** (2.93)		Adilabad 2.50 (1.38)	
	Warangal 5.20 (1.71)			
	Khammam 6.20**			

	Karimnagar (3.07) 12.70** (2.90) Adilabad 20.50* (3.53)				
Significant Decline in Production	East Godavari -2.30 (-0.88) Nalgonda -5.70 (-0.79)	Srikakulam -5.00* (-5.16) Vizianagaram -4.60* (-2.99) Visakhapatnam -2.50 (-1.20) East Godavari -18.60* (-7.38) Nizamabad -9.00* (-4.27) Krishna -12.30* (-12.03) Guntur -13.70* (-5.79) Prakasam -22.70* (-8.04) Nellore -11.80* (-4.27) Kurnool -4.80 (-1.59) Cuddapha -4.30 (-0.83) Chittoor -5.00 (-1.52) Mahabubnagar -3.00 (-1.04) Nalgonda -8.20** (-3.28) Warangal -4.90* (-3.90) Khammam -15.10* (-13.19) Karimnagar -10.20* (-3.83)	Visakhapatnam -14.60* (-7.40) Ananthapur -9.70 (-0.79) Nizamabad -4.30 (-0.67) Medak -8.50* (-4.09)	Vizianagaram -2.10* (-3.29) Visakhapatnam -5.80* (-6.90) East Godavari -11.20* (-14.09) Krishna -3.80* (-5.41) Guntur -5.60* (-7.06) Prakasam -4.70* (-3.70) Nellore -2.20** (-2.50) Chittoor -2.10** (-2.61) Nizamabad -2.20 (-1.44) Khammam -6.30* (-7.46)	
Positive trend but Statistically not-significant	Srikakulam Nizamabad Mahabubnagar	Ananthapur	Chittoor Nalgonda	West Godavari Kurnool Ranga Reddy Medak Mahabubnagar	
Negative trend but Statistically not-significant	Guntur	Ranga Reddy	Vizianagaram Guntur Kurnool Karimnagar	Srikakulam Ananthapur Cuddapha Nalgonda Warangal Karimnagar	

- Notes: (1) *, **, *** represent the significant level at 1%, 5% and 10% level of significance, respectively
(2) # Significant Positive growth implies annual growth rate up to +2; significant negative growth rate implies annual growth rate less than -2.0.
(3) Figures in parentheses are 't' Values.

It may be observed that only two districts experienced significant decline in production of Groundnut in 1980's where as the period 1990's large number of districts (17 districts) reported negative growth in production further in 2000's period only four districts reported the negative growth. The total period (1981-82 to 2009-10) across the districts 10 districts shown

the negative growth in Groundnut production. Similarly three districts (1980's) one district in 1990's, two districts in 2000's and total period (1981-82 to 2009-10) five districts reported a positive trend but statistically not significant. On the other hand negative growth trend recorded across the districts Guntur district in 1980's, Rangareddy in 1990's, Vizianagaram, Guntur, Kurnool and Karimnagar in 2000's and Srikakulam, Ananthapur, Cuddapah, Nalgonda, Warangal and Karimnagar reported negative trend is not statistically not significant growth in production of Groundnut during the corresponding period 1981-82 to 2009-10 in the State.

Table 3.18**Classification of Districts according to Productivity Levels and Growth in Productivity of Groundnut in the State**

(CAGR in per cent)

	Significant increase in yield	Significant decline in yield	Stagnant yield with positive sign	Stagnant yield with negative sign
1981-82 to 1990-91				
High Productivity	Krishna 2.20** (2.31) Guntur 2.60* (3.46) Chittoor 2.00 (0.87) Khammam 2.50*** (1.97) Adilabad 11.30 (1.72)		Vizianagaram 1.60 (0.78) Visakhapatnam 0.30 (0.25) Prakasam 0.30 (0.25) Nellore 0.50 (0.57) Karimnagar 1.60 (0.51)	Srikakulam -1.30 (-0.59) East Godavari -1.00 (-0.58) West Godavari -0.20 (-0.33) Nizamabad -0.80 (-0.35)
Low Productivity	Cuddapha 3.00 (1.03) Medak 2.50 (1.30) Mahabubnagar 2.10 (0.63)		Kurnool 0.70 (0.48) Ranga Reddy 1.80 (0.94) Nalgonda 0.30 (0.18)	Ananthapur -0.50 (-0.22) Warangal -1.60 (-0.71)
1991-92 to 2000-01				
High Productivity	Visakhapatnam 3.40** (2.60) East Godavari 3.20** (2.76) Krishna 3.40** (3.17) Guntur 4.50 (1.60) Nellore 2.00 (1.16) Ranga Reddy 2.30 (1.18) Nizamabad 6.80** (3.07) Medak 2.10 (1.17) Warangal 2.10 (1.52) Khammam 2.90** (2.56) Adilabad 3.30*** (1.99)	Srikakulam -2.10*** (-2.09)	West Godavari 1.80 (1.45) Karimnagar 0.70 (0.44)	Vizianagaram -0.90 (-0.53) Prakasam -0.60 (-0.30) Chittoor -1.80 (-0.68)
Low Productivity	Cuddapha 2.00 (0.48)	Nalgonda -4.00 (-1.70)	Kurnool 0.20 (0.11) Mahabubnagar 1.50 (0.53)	Ananthapur -0.60 (-0.13)
2001-02 to 2009-10				
High Productivity	Srikakulam 5.20** (3.18) Vizianagaram 4.10**	Kurnool -2.20 (-0.61)	West Godavari 0.30 (0.14) Guntur 0.80	

	Visakhapatnam	3.00*** (3.35) (2.22)		Khammam	1.00 (0.21) (0.69)	
	East Godavari	4.20* (4.31)		Karimnagar	1.20 (0.45)	
	Krishna	3.80*** (2.05)				
	Prakasam	7.10** (3.38)				
	Nellore	3.30** (3.07)				
	Chittoor	13.30 (1.76)				
	Ranga Reddy	6.20** (2.97)				
	Nizamabad	2.90 (0.81)				
	Medak	3.50* (3.66)				
	Mahabubnagar	12.10* (5.25)				
	Nalgonda	5.50** (3.09)				
	Warangal	5.70* (5.01)				
	Adilabad	3.00 (1.63)				
Low Productivity	Cuddapha	8.00 (1.18)	Ananthapur	-8.40 (-0.76)		
1981-82 to 2009-10						
High Productivity	East Godavari	2.90* (9.34)		Srikakulam	0.20 (0.72)	
	West Godavari	2.50* (8.12)		Vizianagaram	0.40 (1.14)	
	Krishna	3.20* (13.86)		Visakhapatnam	0.90* (3.30)	
	Guntur	2.40* (4.92)		Nellore	1.80* (7.18)	
	Prakasam	2.80* (5.46)		Kurnool	0.40 (0.98)	
	Ranga Reddy	3.00* (7.56)		Nalgonda	0.10 (0.31)	
	Nizamabad	2.60* (4.66)		Khammam	1.60* (6.80)	
	Medak	3.60* (10.74)				
	Warangal	2.10* (5.54)				
	Karimnagar	2.80* (5.94)				
	Adilabad	3.50* (4.29)				
Low Productivity	Mahabubnagar	3.40* (5.22)	Ananthapur	-4.00* (-3.24)	Cuddapha	-1.10 (-1.28)

Notes: (1) *, **, *** represent the significant level at 1%, 5% and 10% level of significance, respectively

(2) # Significant Positive growth implies annual growth rate up to +2; significant negative growth rate implies annual growth rate less than -2.0.

(3) Figures in parentheses are 't' Values.

The growth trend in productivity of groundnut has been impressive in Andhra Pradesh. During last three decades, across the districts, a majority of districts have exhibited significant increase in productivity. As presented in Table 3.18, we found that the majority of districts with high productivity and significant increase in yield of all estimated periods in the state.

During 1980's across the districts significant growth in yield reported in five districts from the state. Adilabad (11.30%), Guntur (2.60%), Khammam (2.50%), Krishna (2.20%) and Chittoor (2.00%). The number of districts with high productivity and significant increase in yield during 1990's was still 11 districts.

On the **other hand the period 2000's** and the total period out of 22 districts revealed the significant increase in yield and highest yield growth reported from Mahabubnagar district (12.10%) in the state. Further the table shows that the total three decades yield growth from 1981-82 to 2009-10 in the state. Out of 22 districts 11 districts with high productivity and significant increase in yield of the state. Therefore the study has taken the sample districts for household survey Ananthapur district was considered as high area and low yield (HL), Mahabubnagar district high area and high yield (HH) and the Srikakulam low area and high yield (LH) under Groundnut crop in the state.

It may be observed that out of 22 districts of the state, across three decades and the total period (1981-82 to 2009-10), it is observed that the growth rate has been changing from period to period of all districts in the case of area, production and yield. Only Adilabad district got the significant positive growth in area, production and yield under four estimated periods **(1980's, 1990's, 2000's and 1981-82 to 2009-10) except the period 1990's the negative growth** is reported in the case of area only across the districts in the state.

3.5 Sources of Growth in Output of Oilseeds in the State:

The pattern of growth in area, production and yield of total oilseeds and major oilseed crop of Groundnut and competing crop (maize) of selected districts in Andhra Pradesh has been presented in Table 3.19. It is necessary to know about the major sources of growth in production of oilseeds and competing crop (maize) in the state. With the help of decomposition analysis, the relative contribution of area and yield towards the total change in production of major oilseeds and competing crop has been assessed. The assessment helped us to identifying the sources of growth in production and this change in production related into three effects i.e. area effect, yield effect and interaction effect.

About total oilseeds in the state, area effect was found to be more influence to change in production during the overall period of TE 1983-84 to TE 2009-10 and the study districts of Srikakulam and Ananthapur revealed the same that the area effect was dominant but in

Mahabubnagar district. Yield effect played a major role about was influenced the production of oilseeds in the state. On the other hand the area effect was dominant of estimated period I. (TE 1983-84 to TE 1993-94) but the period II (TE 1993-94 to TE 2009-10) revealed the same trend about the growth of output except the Ananthapur district. About Ananthapur district Yield effect (80.75) was only dominant factor to change in total oilseeds production. So the expansion of area under oilseeds was the major source of growth in oilseed production in the state due to introduction to Government schemes (Central and State) which were encourage the farmers to extend the area under oilseeds production. But in Ananthapur district un irrigated groundnut grown area converted into horticultural crops.

Among the study districts, Ananthapur was one of the major district growing under Groundnut crop in the state. The area effect was found to be the highest (99.8) in Andhra Pradesh state and the two study districts of Srikakulam (107.3) and Ananthapur (151.5) revealed the same trend. But in Mahabubnagar district yield effect was found to be the highest (1404.1) to change the Groundnut production in period I (TE 1983-84 to TE 1993-94) in the state. Whereas period II (TE 1993-94 to 2009-10). Andhra Pradesh state and Srikakulam district area effect was found to be highest to change in Groundnut production and the other two districts i.e. Ananthapur and Mahabubnagar yield effect for growth in Groundnut production during the same period. The yield effect was dominant during the period II in Ananthapur and Mahabubnagar districts in the state. In the case of total period (TE 1983-84 to TE 2009-10) of the state and two study districts of Srikakulam and Ananthapur the area as a source of growth of production whereas Mahabubnagar district yield in the source to change of Groundnut production.

In the case of major competing crop (maize) is concerned the interaction effect was found to play a major role (55.6) in the state of Andhra Pradesh as a whole and the study districts found that the area effect played a major role to change in output of maize during TE 1973-74 to TE 2009-10. About period I revealed the yield effect was major cause to change in output of maize of two study districts Srikakulam and Ananthapur but in Mahabubnagar district reported area is the major factor to change the output of maize. On the other hand period II (TE 1993-94 to TE 2009-10) area effect was found to play dominant role in Andhra Pradesh state as a whole and in Mahabubnagar district. The other two study districts Srikakulam and Ananthapur interaction effect played a vital role to change in out put in competing crop (maize) in the state.

Table 3.19
Decomposition of output growth of main oilseed crop (groundnut) and main competing crop
(maize) in the selected district of Andhra Pradesh

State/District	Crop	Effect	Period I (TE 1983-84 to TE1993-94)	Period II (TE 1993-94 to TE2009-10)	Total period (TE 1983-84 to TE2009-10)
Andhra Pradesh	Total oilseeds	Area	72.60	271.79	49.65
		Yield	12.35	-221.04	29.19
		Interaction	15.06	49.26	21.16
	Ground nut	Area	99.74	99.78	99.89
		Yield	0.11	0.33	0.07
		Interaction	0.14	-0.11	0.04
	Maize	Area	17.70	40.57	19.92
		Yield	64.57	23.16	24.49
		Interaction	17.73	36.27	55.60
Srikakulam	Total oilseeds	Area	57.80	262.29	247.37
		Yield	22.24	-1.26	-0.01
		Interaction	19.96	-161.02	-147.36
	Ground nut	Area	107.30	107.57	132.36
		Yield	-3.80	-18.42	-40.95
		Interaction	-3.50	10.85	8.60
	Maize	Area	9.04	37.14	55.99
		Yield	93.97	2.14	1.55
		Interaction	-3.01	60.72	42.46
Ananthapur	Total oilseeds	Area	73.89	14.25	50.01
		Yield	9.62	80.75	17.34
		Interaction	16.49	5.01	32.65
	Ground nut	Area	151.53	-16.92	342.65
		Yield	-19.10	111.68	-85.92
		Interaction	-32.43	5.24	-156.73
	Maize	Area	-27.08	36.59	54.23
		Yield	118.61	5.48	3.69
		Interaction	8.46	57.92	42.07
Mahabubnagar	Total oilseeds	Area	68.39	255.97	29.88
		Yield	19.06	-210.60	57.09
		Interaction	12.55	54.64	13.03
	Ground nut	Area	-1794.35	-50.59	-22.18
		Yield	1404.07	241.01	144.93
		Interaction	490.28	-90.42	-22.75
	Maize	Area	76.34	112.37	88.28
		Yield	3.10	-0.25	0.03
		Interaction	20.56	-12.12	11.69

Source: Various issues of statistical Abstracts in Andhra Pradesh

Overall the area effect played a key role for both total oilseeds and groundnut production in the state except Mahabubnagar district. In the case of major oilseed crop of groundnut competing crop (maize) the interaction effect played a vital role in the state and the study districts were found to be area effect plays a dominant role to change in output in the state. Particularly period I (TE 1983-94 to TE 1993-94) among the three study districts Srikakulam and Ananthapur area effect played a dominant role to change in Groundnut

production and yield effect in Mahabubnagar to output growth in the state. In the case of period II (TE 1993-94 to TE 2009-10) yield effect more in Ananthapur and Mahabubnagar and area effect in Srikakulam district influence the groundnut production. On the other hand about competing crop of (maize) interaction effect in Srikakulam and Ananthapur and the area effect in Mahabubnagar district affected more in output of maize in the study districts of the state.

Table 3.20
Growth in Input use for Oilseeds in the State

Input use	TE 1993-94	TE 2003-04	TE 2009-10	TE 1993-94 to TE 2009-10 (CAGR)
Andhra Pradesh				
Irrigated area under Groundnut (000'ha)	455.92	247.95	308.64	-2.03
Irrigated area under Oilseeds (000'ha)	595.89	423.91	569.32	-0.24
Total irrigated Area (000'ha)	5160.83	4955.17	6263.10	1.02
Annual rainfall	878	808	896	0.11
Fertilizer use	3047.5	2767	2395	-1.26
Srikakulam				
Irrigated area under Groundnut (000'ha)	10.26	5.62	8.53	-0.97
Irrigated area under Oilseeds (000'ha)	69.89	66.27	70.51	0.05
Total irrigated Area (000'ha)	140.50	112.66	143.26	0.10
Annual rainfall	783	616	726	-0.54
Fertilizer use	67	12	13	-8.27
Ananthapur				
Irrigated area under Groundnut (000'ha)	48.38	33.02	29.53	-2.56
Irrigated area under Oilseeds (000'ha)	94.98	79.46	82.27	-0.75
Total irrigated Area (000'ha)	115.65	111.38	99.22	-0.80
Annual rainfall	358	356	529	1.64
Fertilizer use	89	89	192	4.13
Mahabubnagar				
Irrigated area under Groundnut (000'ha)	48.35	44.31	83.82	2.94
Irrigated area under Oilseeds (000'ha)	80.19	88.27	159.24	3.68
Total irrigated Area (000'ha)	123.11	129.29	179.14	1.99
Annual rainfall	464	443	439	-0.73
Fertilizer use	121	137	28	-7.41

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

The growth in input use for oil seeds in Andhra Pradesh state as well as the study districts has presented in Table 3.20. The total irrigated area has slightly increased with a compound annual growth rate slightly increased with a compound annual growth rate was 1.02 per cent during the period TE 1993-94 to TE 2009-10. But total oilseeds and groundnut irrigated area growth had declined in the following period (TE 1993-94 to TE 2009-10) periods of the state. In the case of annual rainfall growth was 0.11 percent in the corresponding

period. Whereas the fertilizer use have been declined in all estimated periods and growth rate also revealed the negative growth of -1.26 per cent between TE 1993-94 to TE 2009-10 in the state. Among sample districts about Mahabubnagar district the growth in irrigated area under oilseeds has shown the highest 3.68 per cent. Moreover irrigated groundnut area and total irrigated area also revealed the positive growth constituting 2.94 per cent and 1.99 per cent comparatively other two sample districts (Srikakulam and Telangana) in the state during TE 1993-94 to TW 2009-10. On the other hand growth rate of fertilizer use and annual rain fall was better in Ananthapur district 4.13 per cent and 1.64 per cent during the corresponding period than other two districts in Andhra Pradesh.

3.6. Variability in Monthly/Annual Prices of Major Oil seeds in the State:

In this section an attempt in made to examine the nature of market risks in terms of growth and variability of farm farm harvest prices and Minimum Support Prices of major oil seed crops in the state. It is important to discuss about the change in price factors which are influenced the growth in area and production of oilseeds in the state. Farmers always desire to get remunerative prices of their output to sustain the agriculture risk. Table 3.20 revealed the Annual Farm Harvest Prices (FHP) and Market Support Prices (MSP) of oilseeds in the state. The growth in Farm Harvest Prices of groundnut in the state of Andhra Pradesh has been increased from TE 1998-99 to TE 2000-01 and TE 2009-10. Similarly the MSP also has been increased but the FHP always shown the higher price than the MSP of all three estimated periods under groundnut crop in the state. On the other hand Sunflower and other oilseed crops MSP has been increased in estimated periods but the FH prices were not available in the state.

Table 3.21
Variation in Annual Farm Harvest Price and Minimum Support Price in Andhra Pradesh

(Rs. in Quintal)

Oilseeds		TE 1998-99		TE 2000-01		TE 2009-10	
		FHP	MSP	FHP	MSP	FHP	MSP
Kharif oil seeds							
Ground nut		1212	980	1274	1138	2376	1917
Sunflower		NA	1007	NA	1128	NA	1980
Sesamum		NA	850	NA	1108	3295	2393
castor		NA	3025	NA	1750	2271	
Soya been	Black	NA	688	NA	745	NA	1203
	Yellow	NA	773	NA	835	NA	1277
Rabi oil seeds							
safflower		NA	NA	NA	1165	1990	NA
Rapeseed/Mustard		NA	915	NA	600	NA	NA

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

Table 3.21 shows the extent of variability in annual whole sale prices of groundnut was much higher than that of Maize in the state during 2012. The co-efficient of variation of annual wholesale prices of groundnut was 11.82 per cent, while the co-efficient of variable of annual whole sale prices of maize was 9.34 per cent in the state. The variability in price of maize interms of C.V. was found to be more during the months of February, August and September and December. The average month of price of Groundnut was maximum during October and December, whereas the average monthly price of maize was relatively better during the months of November and December. The average monthly market price of groundnut was Rs.4615 per quintal during the month of December of the reference year.

Table 3.22
Average Wholesale Price of Main Oilseed Crop (Groundnut) during 2012

(Rs. in Quintal)

District	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	CV % across months
Ananthapur	3072	3254	3317	3728	3581	4575	4307	3961	4220	4389	4580	4194	13.45
Chittoor	2200	NA	3950	NA	NA	NA	NA	NA	NA	2500	NA	5500	42.83
Cuddapha	2812	3819	2836	2825	2831	3097	3732	2855	2977	4511	3788	4006	17.78
Hyderabad	3200	2207	2193	2113	1460	2005	2665	2821	2800	2925	1887	1757	22.92
Karimnagar	3757	2146	3429	4406	3961	3668	4220	NA	NA	NA	4900	3990	20.01
Khammam	2200	3805	3626	2223	2291	2300	2300	2300	2300	NA	NA	NA	24.62
Kurnool	3636	4019	4371	4184	4166	4111	4115	4492	4937	4771	4728	4696	8.76
Mahabubnagar	3651	3925	4301	4132	4246	3717	3171	4239	3874	3389	3829	4149	9.19
Medak	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nalgonda	3511	3777	4143	4167	3528	3822	3957	4631	3729	3494	4697	4695	11.37
Ranga Reddy	4482	4334	4392	4260	3500	NA	NA	NA	NA	NA	NA	NA	9.45
Vijayanagaram	2300	2300	2300	2300	2300	2299	2300	2303	2300	2391	2300	2300	1.14
Warangal	NA	NA	4507	3841	NA	NA	NA	NA	NA	NA	NA	NA	11.28
Krishna	NA	NA	NA	3000	NA	NA	NA	NA	NA	NA	NA	NA	0.00
Nizamabad	NA	NA	NA	NA	3600	NA	NA	NA	NA	NA	NA	NA	0.00
Visakhapatnam	NA	NA	NA	2300		NA	NA	NA	NA	NA	NA	NA	0.00
Guntur	NA	NA	NA	NA	4500	NA	NA	NA	NA	NA	NA	NA	0.00
Andhra Pradesh	3632	3925	4250	4026	3952	3367	3147	4025	4501	4575	4478	4615	11.81
CV % across districts	23.23	24.76	22.56	26.89	27.75	27.59	24.11	28.47	28.03	26.07	30.16	30.10	

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

The maximum price of Groundnut was highest in Chittoor and Kurnool districts. On the other hand, the average monthly price per quintal of maize was relatively more in November (Rs.1242) and December (Rs.1313) of the reference year. Better price of maize was realized in Chittoor, Mahabubnagar districts.

Table 3.23
Average Wholesale Price of Main Competing Crop (Maize) during 2012

(Rs. in Quintal)

District	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	CV % across months
Ananthapur	1016	1050	NA	1034	1050	NA	1200	880	NA	1050	NA	NA	8.96
Chittoor	1000	2812	NA	870	1174	976		1004	964	1000	970	2040	49.55
Cuddapha	964	NA	NA	947	863	NA	NA	NA	NA	NA	NA	NA	5.85
East Godavari	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Guntur	975	960	977	1067	978	969	951	1010	1129	1170	1181	1239	9.78
Karimnagar	1067	1095	1145	1147	1058	1065	1074	1241	1273	1212	1258	1303	7.88
Khammam	984	943	1054	1004	1011	1049	1012	1152	1072	1156	1210	1245	8.85
Krishna	961	1031	NA	950	1000	NA	981	977	903	952	950	NA	3.73
Kurnool	851	977	954	1011	1008	1179	1009	1119	884	1013	1168	1238	11.50
Mahabubnagar	1091	1125	1136	1154	1086	1085	1154	1346	1236	1198	1256	1339	7.81
Medak	1028		1106	1163	933	1065	1214	1395	1323	1193	1223	1288	11.55
Nizamabad	991	986	1024	1052	1006	1000	996	989	1159	1220	1242	1228	9.78
Prakasam	1150	1144	1150	1122	1051	1150	1150	1149	1147	1184	1150	1154	2.77
Ranga Reddy	1006	995	992	1001	999	996	982	988	981	1114	1236	1343	11.24
Vijayanagaram	992	973	1043	1087	1160	1093	1165	1103	1033	1116	1176	1330	8.71
Visakhapatnam	NA	NA	NA	NA	NA	NA	900	938	963	1035	1000	980	4.88
Warangal	NA	NA	1120	1083	1047	1005	NA	NA	1311	1245	1254	NA	10.19
West Godavari	907	1082	1040	1129	1092	1038	1089	1111	1083	980	980	1085	6.22
Adilabad	NA	NA	NA	898	1200	NA	NA	NA	NA	NA	1175	NA	15.36
Nalgonda	NA	NA	NA	NA	950	NA	NA	NA	NA	1187	1279	1301	13.62
Srikakulam	NA	NA	NA	NA	1196	NA	NA	NA	NA	900	NA	NA	19.97
Andhra Pradesh	988	1018	1060	1062	1046	1032	1035	1025	1085	1199	1242	1313	9.34
CV % across districts	7.13	42.71	6.45	8.60	8.68	6.12	9.45	13.48	13.15	9.53	9.65	18.41	

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

Table 3.24
Average Wholesale Price of Main Oilseed Crop (Sunflower) during 2012

(Rs. in Quintal)

District	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	CV % across months
Ananthapur	2741	2735	2799	2742	2745	2837	2888	2984	3181	3352	3346	3387	8.88
Cuddapha	2870	2869	3053	2960	3012	2880	2881	2884	2924	2919	2748	2857	2.71
Kurnool	2949	2838	2842	2909	3039	3235	3446	3836	3723	3424	3527	3482	10.71
Mahabubnagar	2940	2528	2770	2822	2769	2170	NA	NA	3109	2992	2654	3147	10.46
Medak	2850	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2990	3.39
Andhra Pradesh	2948	2822	2832	2922	3029	3227	3408	3813	3690	3407	3513	3464	10.48
CV % across districts	2.92	5.62	4.47	3.37	5.39	15.98	10.55	16.17	10.62	7.98	14.10	8.27	

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

Table 3.25
Average Wholesale Price of Main Competing Crop (Cotton) during 2012

District	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	CV % across months
Adilabad	3912	3799	3620	3666	3807	3449	3500	NA	NA	3946	3915	3866	4.77
Ananthapur	3794	3750	NA	3609	NA	NA	NA	NA	NA	NA	NA	NA	2.60
Cuddapha	3526	3640	3661	3601	3636	3692	3428	3788	NA	3368	NA	3696	3.56
East Godavari	3500	3476	3104	3000	NA	NA	NA	NA	NA	NA	NA	NA	7.81
Guntur	3970	3683	3441	3387	3435	3450	3601	3765	3592	3823	3754	3695	4.99
Karimnagar	3838	3639	3561	3491	3675	3691	4279	4375	4344	3811	3852	3861	7.85
Khammam	3791	3736	3586	3480	3522	3747	4213	4388	4054	3698	3822	3787	7.15
Krishna	3723	3750	3750	3750	3750	NA	3300	3200	3300	3300	3620	3000	7.96
Kurnool	3985	3840	3783	3792	3807	3880	4481	4673	4241	4167	3916	3834	7.32
Mahabubnagar	3868	3687	3657	3667	3656	3758	4170	4176	NA	NA	3824	3779	5.17
Medak	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3899	3895	0.07
Nalgonda	NA	3700	NA	NA	NA	NA	NA	NA	NA	NA	3871	3890	2.74
Nizamabad	4092	3893	3739	3628	3769	3612	3500	3500	3586	3858	3935	3861	4.97
Prakasam	NA	NA	NA	NA	NA	NA	NA	NA	NA	3567	3575	3625	0.88
Ranga Reddy	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vijayanagaram	3483	3528	3396	3213	3373	NA	1742	NA	NA	NA	3419	3289	18.54
Visakhapatnam	3000	NA	NA	NA	NA	NA	NA	NA	NA	NA	3000	3100	1.90
Warangal	3845	3605	3512	3585	3656	3616	4059	NA	NA	3511	3811	3861	4.84
Srikakulam	NA	NA	NA	NA	NA	NA	3200	NA	NA	2400	3486	3600	17.06
Chittoor	NA	NA	NA	NA	NA	NA	NA	4500	NA	NA	NA	NA	4.77
Andhra Pradesh	3779	3918	3637	3632	3747	3755	4314	4559	4204	3909	3885	3848	7.23
CV % across districts	7.52	3.09	5.29	6.25	4.01	3.87	20.21	12.38	10.87	13.09	6.90	7.80	

Source: Statistical Abstracts of Andhra Pradesh, Directorate of Economics & Statistics, Govt of Andhra Pradesh, Hyderabad.

In the case of Sunflower crop the annual price was lower than that of cotton. The C.V. of annual wholesale price of Sunflower was 10.48 per cent in 2012, while the coefficient of variation of annual wholesale price of cotton was 7.23 per cent during the corresponding period in the state. The variability in price of Sunflower in terms of C.V. was found to be relatively more during June 15.98% and August 16.17%. On the other hand variability under cotton in terms of C.V. was found to be relatively more during July, August, September and October in 2012. The actual price per quintal Sunflower oilseed was reported less than the cotton crop in the state during 2012.

CHAPTER – IV

PROBLEMS AND PROSPECTS OF OILSEEDS PRODUCTION AN EMPIRICAL ANALYSIS

4.1 . Introduction:

Oil seeds cultivation involves higher cost of cultivation and provides higher returns to the farmers compared to the cultivation of other food crops like cereals and pulses. The oilseed crops are cash crops and socio-economic characteristics of the farmers are also an important bearing on decision to grow these cash crops. The farmers who have economically poor they cannot afford to cultivate the cash crops because scarcity of input resources. So they prefer to cultivate crops involving lower cost of production. On the other hand, the rich and large land holding group farmers usually prefer to cultivate oil seed crops like oil palm and sunflower crops etc., provided necessary provisions are available to them. Thus it is necessary to examine the characteristics of our sample farmers under groundnut, sunflower and oil palm crops and their level of involvement in cultivation of these oilseed crops. In addition to the socio-economic characteristics of sample households. This chapter discusses about the cropping pattern, production structure, problems and prospects of cultivation of oilseed crops in the state. The household survey was conducted in three selected crops i.e. Ground nut (250), Sunflower (150) and Oil palm (75). About 475 households were surveyed from 26 villages presented in table 4.1. Out of 26 villages, 8 have been taken for household survey from the districts of Mahabubnagar (HH), Ananthapur (HL) and Srikakulam (LH) under groundnut crop and 6 villages were covered for household survey under sunflower crop from Kurnool (HH), Prakasam (HL) and West Godavari (LH) districts. Regarding the oilpalm crop 12 villages were covered from West Godavari (HH), Vizianagaram (HL) and Nellore (LH) districts in the state of Andhra Pradesh. The selection of farmers covered all four farmer categories (Marginal, small, medium and large) and it would be made with coordination of district officers in the state.

4.2 Characteristics of Sample Households:

4.2.1: Socio-Economic Status of Sample Households:

CROP: GROUNDNUT

Out of 250 sample households under groundnut crop 31 were marginal farmers, 78 small farmers 130 were medium farmers and 11 were large farmers (Table 4.2). The average sample household (HH) size for entire sample was 4.8 persons and it was found the slight difference among four farmer sample household groups. The average off-farm income per farmer (Rs.84,283). It was highest in the case of large farmer (Rs.1,26,727) and lowest in the case of marginal farmer (Rs.61,821), above 95 per cent members had crop farming as the main source

Table 4.1
Distribution of Villages and Sample Households

S.No.	Name of the District	Category of district	Name of the Mandal	No. of Villages	Name of the Village	Total number of HH's
1	Mahabubnagar	HH	Kolikonda	1	Kesavapuram	40 (16.0)
			Hanwada	1	Gudimalrapur	35 (14.0)
2	Ananthapur	HL	C.K.Palli	2	Pallamnagari palli	50 (20)
					Pullati palli	
			Rapthadu	2	Bommaparthy	50 (20.0)
					Linganna palli	
3	Srikakulam	LH	Ponduru	1	Ponduru	40 (16)
			Rajam	1	Rajayyapeta	35 (14)
	Sub Total:					
Crop: SUNFLOWER						
4	Kurnool	HH	Kurnool	1	R. Kantalapadu	25 (16.76)
			Kolluru	1	Peddapadu	25 (16.66)
5	Prakasam	HL	Cumbham	1	Errubelam	25 (16.66)
			Besthavari peta	1	Khajipalem	25 (16.66)
6	West Godavari	LH	T. Narsapur	1	Bandam Charla	25 (16.66)
			Pedavegi	1	Kappaka	25 (16.66)
						150 (100)
Crop: OIL PALM						
7	West Godavari	HH	Denduluri	2	Gangannagudem	14 (18.67)
					Challachintalapudi	
8	Vizianagaram	HL	Pedavegi	1	Tallagavram	11 (14.67)
					Pachipenta	3
			Garellavalasa	13 (17.33)		
			Gogudavalasa			
			Saluru	3	Tanam	12 (16.00)
					Neliparthy	
9	Nellore	(LH)	Vinjamuru	3	Kurmaraju peta	
					Vinjamuru	
					Chandra padia	25 (33.33)
	Sub Total:					75
	Total					475

Source: Field Survey

Note: Districts have been chosen from category of 1. High area – High yield (HH), High area – Low yield (HL) and Low area – High Yield (LH).

Figures in brackets indicates the percentages.

of livelihood of all four farmer categories. About the percentage of social group, out of 250 HH highest 42.80 per cent from SC/ST categories followed by 39.2 per cent and 18.00 per cent from general and OBC category. The average number of years of schooling was 8.31 years for the sample households. The number of years of schooling was highest of 9.6 years for large farmers and was lowest 6.61 years for the marginal farmers. With regard to decision making majority of decisions were made by male farmers and the average household 94.80 cent

sample HH had males and 5.20 per cent females. In the case of large farmers group no female member is found as a decision maker under groundnut crop.

CROP: SUN FLOWER:

Sun flower is another important edible oil seed crop in the state out of 150 sample households highest sample farmers 91 were medium farmers group followed by 37 from small farmers 13 from large farmers and 9 households from marginal farmers (Table 4.2.A) The average HH sample size was 4.56 persons. However, it is highest from large farmers 5.46 person and lowest for small farmers 3.89 persons. The average off farm income of the HH Rs.62,100 per annum. It was highest in the case of small farmers Rs. 69,957 and lowest in the case of marginal farmers Rs.32,000. About 88.89 per cent of households which is highest percent of HH main occupation was crop farming under marginal farmers category. Out of 150 sample HH highest 49.33 per cent belonged to general category, followed by 42.00 and 8.67 per cent from OBC and SC/ST categories under the sun flower crop. The average number of schooling was 8.03 years for sample households. The number of years of schooling was highest 10.11 years for the large farmers and the lowest 6.89 years for the small farmers. The majority of decisions were taken by male farmers and that was observed in 97.33 per cent of total HH. The proportion of sex ratio was (60%) highest from marginal farm category of HH and was lowest in the small farm category of households.

Table -4.2
Socio-Economic Status of selected Ground Nut Farmer Households

Indicators	Marginal	Small	Medium	Large	All Farms
No. of Farmers	31	78	130	11	250
Age (Years)	47.61	49.05	46.31	52.18	47.58
Main Occupation (%)					
Crop farming	100	93.59	95.38	100	95.60
Service	0	1.28	4.61	0	2.80
Farm Labour	0	0	0	0	0
Others	0	5.13	0	0	1.60
Off Farm Income (Rs/Yr)	61821	95681	78973	126727	84283
Education (Years of Schooling)	6.61	7.56	8.61	9.6	8.31
Average Family Size (no)					
Male	2.35	2.77	2.41	3.73	2.57
Female	1.87	2.31	2.19	3.09	2.23
Social Groups %					
General	9.67	16.67	56.15	81.82	39.20
SC/ST	25.81	30.77	8.47	18.18	42.80
OBC	64.52	52.56	35.38	0	18.00
Head of households (%)					
Male	93.55	96.15	93.85	100	94.80
Female	6.45	3.85	6.15	0	5.20

Source: Field Survey

Table -4.2A
Socio-Economic Status of selected Sunflower Farmer Households

Indicators	Marginal	Small	Medium	Large	All Farms
No. of Farmers	9	37	91	13	150
Age (Years)	37.56	47.46	44.33	45.54	44.80
Main Occupation (%)					
Crop farming	88.89	86.49	75.82	76.92	79.34
Service	11.11	10.81	23.08	23.08	19.33
Farm Labour	0	0	0	0	0
Others	0	2.70	1.10	0	1.33
Off Farm Income (Rs/Yr)	32000	69957	60643	57000	62100
Education (Years of Schooling)	8.67	6.89	8.02	10.11	8.03
Average Family Size (no)	4.44	3.89	4.71	5.00	4.56
Male	2.67	1.78	2.56	2.69	2.41
Female	1.78	2.11	2.15	2.31	2.15
Social Groups %					
General	33.33	56.76	48.35	46.15	49.33
SC/ST	11.12	13.51	7.69	0	8.67
OBC	55.55	29.73	43.96	53.85	42.00
Head of households (%)					
Male	88.89	94.59	98.90	100	97.33
Female	11.11	5.41	1.10	0.00	2.67

Source: Field Survey

Table -4.2B
Socio-Economic Status of selected Oil Palm Farmer Households

Indicators	Marginal	Small	Medium	Large	All Farms
No. of Farmers	7	20	38	10	75
Age (Years)	43.86	48.30	47.63	47.80	47.85
Main Occupation (%)					
Crop farming	85.71	95.00	94.74	80.00	92.00
Service	0.00	0.00	0.00	0.00	0.00
Farm Labour	0.00	0.00	0.00	0.00	0.00
Others	14.29	5.00	5.26	20.00	8.00
Off Farm Income (Rs/Yr)	71429	63500	65000	69743	69867
Education (Years of Schooling)	8.5	7.81	8.59	12.40	8.0
Average Family Size (no)	4.43	3.95	4.03	4.80	4.15
Male	2.71	2.10	2.24	2.50	2.28
Female	1.71	1.85	1.79	2.30	1.87
Social Groups %					
General	57.14	85.00	94.74	100	89.34
SC/ST	14.29	0.00	0.00	0.00	1.33
OBC	28.57	15.00	5.26	0.00	9.33
Head of households (%)					
Male	100	100	100	90.00	97.33
Female	0	0	0	10.00	2.67

Source: Field Survey

CROP: OIL PALM:

Oil palm is another important oilseed crop, spread over 10 districts of the state and has identified 322 mandals as suitable for oil palm cultivation. Among 75 sample farmers 38 were

medium which is highest of all four farm categories followed by 20 small farmers, 10 large farmers and 7 were marginal farmers (Table 4.2.B). The average household (HH) size of total sample was 4.15 persons. Among the farmer groups the average household (HH) size more less similar (4.03 to 4.80 persons) and the proportion of male, female members male members was highest in all farm categories than females. Farming was the main source and among the farmer groups highest 95 percent from small farmer group followed by 94.7 per cent from medium and 85.71 and 80 per cent from marginal and large farmers group occupied under farming. The average off-farm income per sample HH was Rs.69,867 per annum. It was the highest in the case of marginal farmers (Rs.71429) and lowest income from small farmers group (Rs.63,500) per annum. Regarding the social group the average HH revealed the highest 89.34 per cent under general category followed by 9.33 and 1.33 per cent from, OBC and SC/ST category. Regarding caste composition among farmer groups 100 per cent of sample HH belonged to large farmer HH under general category followed by 94.74 per cent were medium and 85.00 and 57.14 per cent from small and marginal farmers group. The average number of schooling years was eight. The number of years of schooling was highest of 12.4 years of the large farmers and lowest 7.81 years for the medium farmers.

4.2.2 Land Ownership Pattern:

Crop: Ground nut:

Table 4.3 depicted that the land ownership pattern of selected HH under groundnut crop. The Net Sown Area (NSA) and Gross Cropped Area (GCA) of sample households was found to be 2.66 ha. and 3.29 ha respectively, which implies that the cropping intensity in the study area was 124 per cent. Thus the sample farmers have utilized the agricultural lands in an effective manner. Out of 2.67 ha of owned land, 2.58 ha. of land cultivated by all sample farmers. It may be noted that the proportion of leased-out land was very negligible extent reported 0.02 ha of our sample farmers. On the other hand leased in land and was 0.10 ha. Therefore the total operational holding of the average sample HH was 2.66 ha. It can be observed that 2.58 ha. out of a total 2.67 ha. Of owned land of sample farmers (96.6%) have been utilized under cultivation, i.e. the size of fallow land/waste land reported as negligible of marginal, small and medium farmers. In the case of large group farmers fallow or waste land was found to be highest 1.54 ha. Per household. The available own land area for cultivation

Table -4.3
Land Ownership pattern of selected Ground Nut farmer households

Indicators	Marginal		Small		Medium		Large		All Farms	
		%		%		%		%		%
1. Total Owned Land										
Irrigated	0.24	35.82	0.67	51.54	1.05	34.09	4.08	30.65	0.96	35.96
Un-Irrigated	0.43	64.18	0.63	48.46	2.03	65.91	9.23	69.35	1.71	64.04
Total	0.67	100.00	1.30	100.00	3.08	100.00	13.31	100.00	2.67	100.00
2. Area Under Cultivation										
Irrigated	0.24	35.82	0.67	51.54	1.05	34.54	4.08	34.66	0.96	37.21
Un-Irrigated	0.43	64.18	0.63	48.46	1.99	65.46	7.69	65.34	1.62	62.79
Total	0.67	100.00	1.30	100.00	3.04	100.00	11.77	100.00	2.58	100.00
3. Leased-in-land										
Irrigated	0.00	0.00	0.03	75.00	0.06	40.00	0	0.00	0.04	40.00
Un-Irrigated	0.00	0.00	0.01	25.00	0.09	60.00	0.22	100.00	0.06	60.00
Total	0.00	0.00	0.04	100.00	0.15	100.00	0.22	100.00	0.10	100.00
4. Leased-out-land										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.55	100.00	0.02	100.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.55	100.00	0.02	100.00
5. Total Operational holdings (2+3-4)										
Irrigated	0.24	35.82	0.70	52.24	1.11	34.80	4.08	35.66	1.00	37.59
Un-Irrigated	0.43	64.18	0.64	47.76	2.08	65.20	7.36	64.34	1.66	62.41
Total	0.67	100.00	1.34	100.00	3.19	100.00	11.44	100.00	2.66	100.00

Source: Field Survey

Note: Figures in parenthesis are the percentage of total

Table -4.3A
Land Ownership pattern of selected Sunflower farmer households

Indicators	Marginal		Small		Medium		Large		All Farms	
		%		%		%		%		%
1. Total Owned Land										
Irrigated	0.38	67.86	0.89	63.12	1.63	52.92	3.49	34.59	1.53	49.04
Un-Irrigated	0.18	32.14	0.52	36.88	1.45	47.08	6.60	65.41	1.59	50.96
Total	0.56	100.00	1.41	100.00	3.08	100.00	10.09	100.00	3.12	100.00
2. Area Under Cultivation										
Irrigated	0.38	67.86	0.89	64.03	1.63	53.27	3.49	35.25	1.53	49.51
Un-Irrigated	0.18	32.14	0.50	35.97	1.43	46.73	6.41	64.75	1.56	50.49
Total	0.56	100.00	1.39	100.00	3.06	100.00	9.90	100.00	3.09	100.00
3. Leased-in-land										
Irrigated	0.18	100.00	0.11	100.00	0.38	65.52	0.00	0.00	0.27	49.09
Un-Irrigated	0.00	0.00	0.00	0.00	0.20	34.48	1.87	100.00	0.29	50.91
Total	0.18	100.00	0.11	100.00	0.58	100.00	1.87	100.00	0.55	100.00
4. Leased-out-land										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5. Total Operational holdings (2+3-4)										
Irrigated	0.56	75.68	1.00	66.67	2.01	55.22	3.49	29.65	1.80	49.32
Un-Irrigated	0.18	24.32	0.50	33.33	1.63	44.78	8.28	70.35	1.85	50.68
Total	0.74	100.00	1.50	100.00	3.64	100.00	11.77	100.00	3.65	100.00

Source: Field Survey

Note: Figures in parenthesis are the percentage of total

Table -4.3B
Land Ownership pattern of selected Oil Palm farmer households

Indicators	Marginal		Small		Medium		Large		All Farms	
		%		%		%		%		%
1. Total Owned Land										
Irrigated	0.92	100.00	1.49	100.00	3.39	100.00	14.23	93.43	4.10	96.93
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	1.00	6.57	0.13	3.07
Total	0.92	100.00	1.49	100.00	3.39	100.00	15.23	100.00	4.23	100.00
2. Area Under Cultivation										
Irrigated	0.92	100.00	1.49	100.00	3.39	100.00	14.23	93.43	4.10	96.93
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	1.00	6.57	0.13	3.07
Total	0.92	100.00	1.49	100.00	3.39	100.00	15.23	100.00	4.23	100.00
3. Leased-in-land										
Irrigated	0.00	0.00	0.00	0.00	0.03	100.00	0.00	0.00	0.03	100.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.03	100.00	0.00	0.00	0.03	100.00
4. Leased-out-land										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5. Total Operational holdings (2+3-4)										
Irrigated	0.92	100.00	1.49	100.00	3.42	100.00	14.23	93.43	4.12	96.94
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	1.00	6.57	0.13	3.06
Total	0.92	100.00	1.49	100.00	3.42	100.00	15.23	100.00	4.25	100.00

Source: Field Survey

Note: Figures in parenthesis are the percentage of total

was 2.67 ha. Whereas the size of operational holding was 2.66 ha. The size of operational holding in the case of small, medium and large farmers was 1.34 ha, 3.19 ha. and 11.44 ha. respectively, besides the area under irrigation was 37.59 per cent, and un-irrigated operated area reported highest for categories of all farmers except small farmers category (47.76%) under groundnut crop. Therefore one third of groundnut crop area grown under un-irrigated area expressed by the sample households of both Kharif and Rabi seasons during the period 2011.12.

CROP: SUN FLOWER:

The Net Sown Area (NSA) and Gross Cropped Area (GCA) of a sample household was found to be 3.65 ha. and 4.00 ha. respectively. Which imply that the cropping intensity in the study area was 110 per cent. Table 4.3 A can be shown that out of 3.12 ha. the sample HH cultivated area was 3.09 ha (99%) have been put under sunflower cultivation. Therefore the extent of fallow land/waste land was low. In the case of large farmers, fallow/waste land was 0.19 ha per household was found. The size of operational holding was 0.74, 1.50, 3.64 and 11.77 ha. of marginal, small, medium and large farmers respectively. The average size of

leased in land was 0.55 ha and has not reported leased out land by the sample households under sun flower crop of the sample farmers. The area under irrigation was 50 per cent of total operational holding and large farmers reported the highest share (70.35%) the irrigated area comparatively other farmers groups under sun flower crop.

CROP: OIL PALM:

Table 4.3 B reveal that the land owner ship pattern of sample farmers (oil palm). The NSA and GCA of a sample HH was found to be 4.25 ha and 4.23 ha respectively which implies that the cropping intensity in the study area was 99.5 per cent. Thus the agricultural land of the sample HH used in effective manner. The total owned land have been put out under cultivation HH and the fallow/waste land, and leased - out land was absent besides the leased-in land was very less 0.03 ha reported by the medium farmers group only. The size of operational holding in the case of small, medium and large farmers was 1.49 ha, 3.42 ha and 15.23 ha respectively. It was noticed that the irrigated area was 96.94 per cent of total operated area. The irrigated area for the categories of marginal, small and medium farmers reported cent per cent (100%) and 93.43%) of irrigated area cultivated by the large farmers.

4.2.3 Nature of Tenancy:

CROP: GROUNDNUT:

The tenancy contract, particularly fixed money contract is the most popular form of tenancy, contract reported by the sample HH under groundnut crop in Andhra Pradesh. Table 4.4 shows the nature of tenancy in leased-in land in the study area. It may be noted that only about 8.00 per cent of sample HH were having leased-in-land constituting about 3.88 per cent of total operated area. It is surprising to note that, the medium and small farmers have major share of leased-in area. About 10.8 per cent medium farmers had 4.91 per cent of net operated area under leased-in category followed by 6.4% of small farmer households, about 3.21 per cent area and 9.1 per cent of large farmer households, 1.9 per cent reported area under leased in category. All the sample farmers expressed the fixed money term of lease. The fixed money paid for leasing in land was Rs.15,836 per hectare. Highest lease amount Rs.19,448 per ha paid from small farmers group. No farmer was found to have leased in land under marginal farmer category of groundnut sample HH in the state.

Table -4.4
Terms of lease of land of selected Oilseed farmer households

Farm Size	Incidence of lease (%)		Terms of Leasing (%)				Terms of Lease (Rent/amount)	
	% of area leased-in	% HHs leasing -in	For fixed money	For fixed produce	Share Cropping	Other	Fixed money (Rs/Ha)	Fixed produce
Ground Nut								
Marginal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Small	3.21	6.41	100.00	0.00	0.00	0.00	19448	0.00
Medium	4.91	10.77	100.00	0.00	0.00	0.00	15051	0.00
Large	1.88	9.09	100.00	0.00	0.00	0.00	17284	0.00
All farms	3.88	8.00	100.00	0.00	0.00	0.00	15836	0.00
Sunflower								
Marginal	24.23	22.22	0.00	0.00	100.00	0.00	0.00	50:50
Small	7.43	10.81	100.00	0.00	0.00	0.00	30509	0.00
Medium	16.05	21.98	90.00	0.00	10.00	0.00	26983	50:50
Large	15.87	23.08	100.00	0.00	0.00	0.00	24722	0.00
All farms	15.24	19.33	86.21	0.00	13.79	0.00	26233	50:50
Oil Palm								
Marginal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Small	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium	0.93	2.63	100.00	0.00	0.00	0.00	45041	0.00
Large	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All farms	0.25	1.33	100.00	0.00	0.00	0.00	45041	0.00

Source: Field Survey

CROP: SUN FLOWER:

Table 4.4 shows the tenancy contract, out of 150 sample HH 19.33 per cent of HHs were having leased in land constituting about 15.24 per cent of total operated area. Across farmers group highest share of 23.08 per cent of HH constituted 15.87 per cent of leased in total operated area from large farmer group followed by 22.22 and 22.0 per cent from marginal and medium farmers group reported 24.23 and 16.05 per cent of net operated area under leased-in category. In terms of lease cent per cent of small and large farmers and 90 per cent of medium farmers category expressed the fixed money term of lease. The terms of lease for about 13.79 per cent of HH with leased in lands were share cropping and for remaining 86.21 per cent HH reported fixed rent in the case of as lease amount. The fixed money paid for leasing in land was Rs. 26,233 per hectare. On the other hand, among the sample households with share cropping term of lease about 50 per cent of crop output was shared between the tenant and land lord as per the term of share cropping. So the majority farmers expressed the terms of lease paid in fixed money except the marginal farmers category of the sun flower crop.

CROP: OIL PALM:

Further Table 4.4 shows the tenancy contract of oil palm sample farmers. Out of 75 sample HH only about 1.33 (single farmer) per cent of sample HH was having leased in land constituting about 0.25 per cent of total operated area. It is surprisingly to note that, the only single farmer from medium group had 0.93 per cent of net operated area in leased-in land of total sample HH under oil palm crop. The only one farmer reported with 'fixed money' term of leased Rs.45,041. The table can be shown very negligible extent of area grown as leased in land under oil palm crop cultivation in the sample.

4.2.4. Sources of Irrigation:

Andhra Pradesh is called "A River State" as it is blessed with major rivers like Godavari, Krishna, Penna and Vamsadhara. The state government has launched (JALAYAGNAM) to complete the ongoing and new projects in record time, so as to provide immediate irrigation to water starved areas on top priority, besides the government of Andhra Pradesh is providing free power to agriculture and horticulture farmers in view of extreme hardships faced by the agriculture farmers w.e.f. 14.05.2004.

CROP: GROUND NUT:

Table 4.5 depicts the irrigated area and the sources of irrigation of selected groundnut farmer HH. 37.25 per cent of GCA was irrigated through different sources by a sample farmer on an average 0.96 HH. Among different farmer groups small farmers were found to be 51.55 per cent of net operated area irrigated followed by marginal farmers with 35.89 per cent, 34.69 per cent large farmers and 34.51 per cent with medium farmers of GCA as irrigated area. As far as different sources of irrigated area concerned as high as 94.16 per cent of total operated area of sample farmers was irrigated by bore well or tube wells followed by ponds/rivers (5.84%). Due to state government have been providing free power supply to the agriculture as well other schemes like ((APMIP). The area irrigated through canals, open wells and dug wells are nil in the study area.

CROP: SUN FLOWER:

Table 4.5 shows about 41.99 per cent of GCA was irrigated area through different sources by a sample farmer on an average. Among different farmer categories small farmers were found to be highest irrigated area 58.35 per cent followed by marginal (51.55%), medium (44.78%) and large farmers groups (29.63 %). With regard to different sources of irrigation

are concerned as high as 80.17 per cent of total operated area of sample farmers were irrigated by bore well/tube well, followed by canals (18.10%) and other irrigation (lift irrigation) has minor presence (1.73%) in the study area.

Table -4.5
Irrigated area by sources of selected Ground Nut farmer households

Indicators	Marginal	Small	Medium	Large	All Farms
Ground Nut					
Area under irrigation (Ha/HH)	0.24	0.67	1.05	4.08	0.96
Area under Irrigation (% to GCA)	35.89	51.55	34.51	34.69	37.25
Source of irrigation (%)					
Bore Well/Tube well	100	94.00	92.54	100	94.16
Open well/dug well	0.00	0.00	0.00	0.00	0.00
Ponds/rivers	0.00	6.00	7.46	0.00	5.84
Canals	0.00	0.00	0.00	0.00	0.00
Others	0.00	0.00	0.00	0.00	0.00
Sunflower					
Area under irrigation (Ha/HH)	0.38	0.89	1.63	3.49	1.53
Area under Irrigation (% to GCA)	51.55	58.35	44.78	29.63	41.97
Source of irrigation (%)					
Bore Well/Tube well	75.00	77.42	80.28	75.00	80.17
Open well/dug well	0.00	0.00	0.00	0.00	0.00
Ponds/rivers	0.00	0.00	0.00	0.00	0.00
Canals	0.00	16.13	19.72	25.00	18.10
Others (lift irrigation)	25.00	6.45	0.00	0.00	1.73
Oil Palm					
Area under irrigation (Ha/HH)	0.92	1.49	3.39	14.23	4.10
Area under Irrigation (% to GCA)	100.0	100.0	100.0	93.43	99.50
Source of irrigation (%)					
Bore Well/Tube well	100.0	100.0	100.0	100.0	100.0
Open well/dug well	0.00	0.00	0.00	0.00	0.00
Ponds/rivers	0.00	0.00	0.00	0.00	0.00
Canals	0.00	0.00	0.00	0.00	0.00
Others	0.00	0.00	0.00	0.00	0.00

Source: Field Survey

OIL PALM:

Irrigation is most important for oil palm cultivation. Further the table 4.5 shows that the average oil palm house hold cultivated 4.10 ha. of irrigated area and among the farmers group highest irrigated area 14.23 ha grown from large farmers category. Regarding the irrigation 99.5 per cent of GCA was irrigated through Bore well and it was the major source of irrigation of the average sample farmer.

4.2.5. Cropping Pattern of Sample Farmers:

GROUNDNUT:

The main objectives of the study is to analyse the problems and prospects in cultivation of oil seeds in the state, so as to increase the area and productivity of oil seed crops. Which leads to employment opportunities and enhancement of income of the farmers besides decrease the trade deficit through reduction of imports of oilseeds in India. It is pertinent to examine cropping pattern adopted by the sample households and particularly proportion of area utilized to different type of oilseeds and other crops. It is also necessary to examine and identify the differences in crop distribution during kharif and rabi season. Table 4.6 shows that the area under different crops in hectare and their percentage share of the selected Groundnut crop farmers in group wise total per HH. The GCA per HH was 3.29 ha of all farmers taken together where as the large farmer had highest GCA 13.72 ha. and the marginal farmer had minimum GCA of 1.25 ha. Medium and small farmers had 3.65 ha and 2.08 ha respectively.

On the whole, the per HH area under Kharif and Rabi crops cultivated by the sample farmers was 2.53 ha and 0.74 ha. respectively. In the case of marginal farmer category per HH area under Kharif and Rabi crops was 0.68 ha and 0.57 ha. The GCA under small farmer category under kharif and rabi crops was 1.30 ha and 0.78 ha. respectively. In the case of medium farmers per HH area under kharif and rabi crops was 3.05 ha and 0.60 ha and the large farmer category is concerned, the per HH area under kharif and rabi crops was 10.71 ha and 2.46 ha respectively. We found that the percentage share of unirrigated land cultivation highest except small farmers group under groundnut sample HH.

Among various kharif crops, the share of cereals and pulses grown area was about 32 per cent, where as the share of oilseed crop area was 62 per cent of total kharif crops. Thus the area under oil seed crop has occupied prominent position in the cropping pattern of sample farmers. Among kharif oil seed crops groundnut was the only oil seed crop, found to be 9.99 per cent of irrigated area and the highest 52.17 per cent of groundnut crop area grown under un irrigated. Therefore groundnut crop cultivated under dry lands depend on rainfall under kharif season. The area under Rabi oil seeds for the sample farmers groundnut crop and fruits and vegetables grown area reported to be 0.76 ha.per HH and 97 per cent of area grown under groundnut crop and 0.04 ha. per HH cultivated for fruits and vegetables of the sample HH in the cropping pattern under total cropped area.

11. Rice										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12. Coarse Cereals										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Total Rabi Cereals										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G. Total Rabi Pulses										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rabi Oil seeds										
13. Ground Nut										
Irrigated	0.19	33.33	0.54	69.23	0.28	46.67	0	0.00	0.34	45.95
Un-Irrigated	0.38	66.67	0.23	29.49	0.29	48.33	2.46	100.00	0.38	51.35
14. Rapeseed & Mustard										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15. Safflower										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16. Sunflower										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H. Total Rabi Oil Seeds										
Irrigated	0.19	33.33	0.54	69.23	0.28	46.67	0	0.00	0.34	45.95
Un-Irrigated	0.38	66.67	0.23	29.49	0.29	48.33	2.46	100.00	0.38	51.35
Total	0.57	100.00	0.77	98.72	0.57	95.00	2.46	100.00	0.72	97.30
17. Vegetables										
Irrigated	0	0.00	0.01	1.28	0.01	1.67	0	0.00	0.01	1.35
Un-Irrigated	0	0.00	0	0.00	0.02	3.33	0	0.00	0.01	1.35
Total	0	0.00	0.01	1.28	0.03	5.00	0	0.00	0.02	2.70
I. Total Rabi Crops (F+G+H+17)										
Irrigated	0.19	33.33	0.55	70.51	0.29	48.33	0	0.00	0.35	47.30
Un-Irrigated	0.38	66.67	0.23	29.49	0.31	51.67	2.46	100.00	0.39	52.70
Total	0.57	100.00	0.78	100.00	0.60	100.00	2.46	100.00	0.74	100.00
18. Sugarcane										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19. Fruits										
Irrigated	0	0.00	0	0.00	0	0.00	0	0.00	0.00	0.00
Un-Irrigated	0	0.00	0	0.00	0	0.00	0.55	4.01	0.02	0.61
Total	0	0.00	0	0.00	0	0.00	0.55	4.01	0.02	0.61
J. Gross Cropped Area (E+I+18+19)										
Irrigated	0.42	33.60	1.28	61.54	1.29	35.34	4.82	35.13	1.33	40.51
Un-Irrigated	0.83	66.40	0.8	38.46	2.36	64.66	8.9	64.87	1.96	59.49
Total	1.25	100.00	2.08	100.00	3.65	100.00	13.72	100.00	3.29	100.00

Source: Field Survey

SUN FLOWER

The cropping pattern of the Sun flower crop of sample households and their percentage share to the respective crop group area under different total crops per HH (Table 4.6 A). The GCA per household was 4.00 ha for all farmers taken together whereas the large farmer had

highest GCA of 10.47 ha and marginal farmer had minimum GCA of 1.49 ha. small and medium farmers had 2.15 ha and 4.02 ha of GCA respectively. Overall, the per HH area under kharif and rabi crops cultivated by the sample farmers was 2.22 ha and 1.59 ha. respectively. In the case of marginal farmer per HH both kharif and rabi crops were 0.93 ha and 0.56 ha. followed by sample farmers category was 1.15 ha. and 0.98 ha. medium farmers category was 2.38 ha. and 1.56 ha. respectively. The large farmer category is concerned, the per HH area under Kharif and Rabi crops was 5.17 ha and 3.84 ha respectively. Therefore the kharif crop per HH area reported highest than rabi crops in all category of HH under sun flower crop.

Among various Kharif crops, the share of cereals and pulses was 74.77 per cent of GCA. Whereas the share of oilseeds crops was 16 per cent of GCA (Kharif) thus cereals and pulses have occupied the prominent positions in the cropping pattern. Among kharif oil seed crops Sun flower crop was found to be the major oil seed crops cultivated by the sample farmers of all categories. Similarly on the whole the area under rabi oilseed crops for the sample farmers was 1.18 ha. and the Sun flower crop (Rabi) acreage was 1.16 ha. The other edible oil seed crop, such as rape seed and mustard reported negligible extent of area cultivated by the sample farmers.

OIL PALM:

The oil palm sample farmers HH cropping pattern of both Kharif and Rabi crops is presented in Table 4.6 B shows that the area under different crops in hectare and their percentage share to the total crop groups per HH. The GCA per HH was 4.23 ha. for all farmers together, where as large farmers had highest GCA 14.98 ha and marginal farmer had minimum 0.92 ha. On the whole, per HH area under kharif crops reported both Rice and maize crops cultivated by the sample farmers area was 0.22 ha. On the other hand among various rabi crops oil palm has the major oil seed crops whose share of total rabi crops was 95.74 percent. Coconut and vegetable crops were found to be lowest acreage under rabi crops. The area per HH under oilpalm crop cultivated by the sample farmers was 3.82 ha. In the case of marginal category per HH area was 0.92 ha followed by small 1.49 ha, medium 3.30 ha. and the large farmer category per HH was 12.48 ha. We found that 90 per cent of GCA cultivated under oil palm crop by the sample farmers and total crop area was irrigated.

Table -4.6A
Cropping pattern of selected Sunflower farmer households

Season/Crop	Marginal		Small		Medium		Large		All Farms	
		%		%		%		%		%
Kharif Crops										
1. Rice										
Irrigated	0.43	46.24	0.37	32.17	0.50	21.01	0.53	10.25	0.47	21.17
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2. Maize										
Irrigated	0.04	4.30	0.05	4.35	0.48	20.17	0.00	0.00	0.30	13.51
Un-Irrigated	0.00	0.00	0.00	0.00	0.32	13.45	1.09	21.08	0.29	13.06
3. Coarse Cereals										
Irrigated	0.00	0.00	0.07	6.09	0.03	1.26	0.00	0.00	0.03	1.35
Un-Irrigated	0.00	0.00	0.05	4.35	0.08	3.36	0.16	3.09	0.07	3.15
A. Total Cereals										
Irrigated	0.47	50.54	0.49	42.61	1.01	42.44	0.53	10.25	0.80	36.04
Un-Irrigated	0.00	0.00	0.05	4.35	0.40	16.81	1.25	24.18	0.36	16.22
Total	0.47	50.54	0.54	46.96	1.41	59.24	1.78	34.43	1.16	52.25
B. Pulses										
Irrigated	0.00	0.00	0.00	0.00	0.03	1.26	0.00	0.00	0.02	0.90
Un-Irrigated	0.00	0.00	0.04	3.48	0.46	19.33	2.21	42.75	0.48	21.62
Total	0.00	0.00	0.04	3.48	0.49	20.59	2.21	42.75	0.50	22.52
Oil Seeds										
4. Ground Nut										
Irrigated	0.00	0.00	0.04	3.48	0.00	0.00	0.00	0.00	0.01	0.45
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5. Sesame										
Irrigated	0.00	0.00	0.05	4.35	0.08	3.36	0.00	0.00	0.06	2.70
Un-Irrigated	0.00	0.00	0.10	8.70	0.00	0.00	0.00	0.00	0.03	1.35
6. Sunflower										
Irrigated	0.19	20.43	0.00	0.00	0.14	5.88	0.00	0.00	0.09	4.05
Un-Irrigated	0.04	4.30	0.16	13.91	0.10	4.20	0.47	9.09	0.14	6.31
7. Soya been										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8. Other Oil seeds										
Irrigated	0.00	0.00	0.00	0.00	0.03	1.26	0.00	0.00	0.02	0.90
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.09	1.74	0.01	0.45
C. Total Kharif Oilseeds (5+6+7+8)										
Irrigated	0.19	20.43	0.09	7.83	0.25	10.50	0.00	0.00	0.18	8.11
Un-Irrigated	0.04	4.30	0.26	22.61	0.10	4.20	0.56	10.83	0.18	8.11
Total	0.23	24.73	0.35	30.43	0.35	14.71	0.56	10.83	0.36	16.22
9. Cotton										
Irrigated	0.19	20.43	0.03	2.61	0.08	3.36	0.09	1.74	0.07	3.15
Un-Irrigated	0.04	4.30	0.00	0.00	0.01	0.42	0.47	9.09	0.05	2.25
10. Vegetables										
Irrigated	0.00	0.00	0.01	0.87	0.04	1.68	0.03	0.58	0.03	1.35
Un-Irrigated	0.00	0.00	0.18	15.65	0.00	0.00	0.03	0.58	0.05	2.25
D. Other Kharif Crops										
Irrigated	0.19	20.43	0.04	3.48	0.12	5.04	0.12	2.32	0.10	4.50
Un-Irrigated	0.04	4.30	0.18	15.65	0.01	0.42	0.50	9.67	0.10	4.50
Total	0.23	24.73	0.22	19.13	0.13	5.46	0.62	11.99	0.20	9.01
E. Total Kharif Crops (A+B+C+D)										
Irrigated	0.85	91.40	0.62	53.91	1.41	59.24	0.65	12.57	1.10	49.55
Un-Irrigated	0.08	8.60	0.53	46.09	0.97	40.76	4.52	87.43	1.12	50.45
Total	0.93	100.00	1.15	100.00	2.38	100.00	5.17	100.00	2.22	100.00
Rabi Crops										
11. Wheat										

Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12. Rice										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13. Coarse Cereals										
Irrigated	0.00	0.00	0.02	2.04	0.08	5.13	0.00	0.00	0.05	3.14
Un-Irrigated	0.00	0.00	0.00	0.00	0.02	1.28	0.28	7.29	0.04	2.52
F. Total Cereals										
Irrigated	0.00	0.00	0.02	2.04	0.08	5.13	0.00	0.00	0.05	3.14
Un-Irrigated	0.00	0.00	0.00	0.00	0.02	1.28	0.28	7.29	0.04	2.52
Total	0.00	0.00	0.02	2.04	0.10	6.41	0.28	7.29	0.09	5.66
G. Pulses										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.03	3.06	0.20	12.82	1.62	42.19	0.27	16.98
Total	0.00	0.00	0.03	3.06	0.20	12.82	1.62	42.19	0.27	16.98
Oil Seeds										
14. Ground Nut										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15. Rapeseed & Mustard										
Irrigated	0.00	0.00	0.01	1.02	0.03	1.92	0.00	0.00	0.02	1.26
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16. Safflower										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17. Sunflower										
Irrigated	0.43	76.79	0.35	35.71	0.61	39.10	0.59	15.36	0.53	33.33
Un-Irrigated	0.13	23.21	0.51	52.04	0.62	39.74	1.31	34.11	0.63	39.62
H. Total Rabi Oil Seeds										
Irrigated	0.43	76.79	0.36	36.73	0.64	41.03	0.59	15.36	0.55	34.59
Un-Irrigated	0.13	23.21	0.51	52.04	0.62	39.74	1.31	34.11	0.63	39.62
Total	0.56	100.00	0.87	88.78	1.26	80.77	1.90	49.48	1.18	74.21
18. Vegetables										
Irrigated	0.00	0.00	0.02	2.04	0.00	0.26	0.00	0.00	0.01	0.63
Un-Irrigated	0.00	0.00	0.04	4.08	0.00	0.00	0.00	0.00	0.01	0.63
19. Other Rabi Crops										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.04	1.04	0.03	1.89
I. Total Rabi Crops (F+G+H+18+19)										
Irrigated	0.43	76.79	0.40	40.82	0.72	46.15	0.59	15.36	0.61	38.36
Un-Irrigated	0.13	23.21	0.58	59.18	0.84	53.85	3.25	84.64	0.98	61.64
Total	0.56	100.00	0.98	100.00	1.56	100.00	3.84	100.00	1.59	100.00
20. Sugarcane										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21. Fruits										
Irrigated	0.00	0.00	0.02	0.93	0.07	1.74	1.46	13.94	0.18	4.50
Un-Irrigated	0.00	0.00	0.00	0.00	0.01	0.25	0.00	0.00	0.01	0.25
Total	0.00	0.00	0.02	0.93	0.08	1.99	1.46	13.94	0.19	4.75
J. Gross Cropped Area (E+I+20+21)										
Irrigated	1.28	85.91	1.04	48.37	2.20	54.83	2.70	25.79	1.89	47.25
Un-Irrigated	0.21	14.09	1.11	51.63	1.82	45.27	7.77	74.21	2.11	52.75
Total	1.49	100.00	2.15	100.00	4.02	100.10	10.47	100.00	4.00	100.00

Source: Field Survey

Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12. Coarse Cereals										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Total Cereals										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G. Pulses										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13. Ground Nut										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14. Rapeseed & Mustard										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15. Safflower										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16. Sunflower										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H. Total Rabi Oil Seeds(13+14+15+16)										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I. Oil Palm										
Irrigated	0.92	100.00	1.49	100.00	3.30	99.10	12.48	91.36	3.82	95.74
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.92	100.00	1.49	100.00	3.30	99.10	12.48	91.36	3.82	95.74
J. Coco Nut										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	1.15	8.42	0.15	3.76
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	1.15	8.42	0.15	3.76
17. Vegetables										
Irrigated	0.00	0.00	0.00	0.00	0.03	0.90	0.03	0.22	0.02	0.50
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18. Other Rabi Crops										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
K. Total Rabi Crops (F+G+H+I+j+17+18)										
Irrigated	0.92	100.00	1.49	100.00	3.33	100.00	13.66	100.00	3.99	100.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.92	100.00	1.49	100.00	3.33	100.00	13.66	100.00	3.99	100.00
19. Sugarcane										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20. Fruits										
Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.16	1.07	0.02	0.47
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.16	1.07	0.02	0.47
L. Gross Cropped Area (E+K+19+20)										
Irrigated	0.92	100.00	1.49	100.00	3.46	100.00	14.98	100.00	4.23	100.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.92	100.00	1.49	100.00	3.46	100.00	14.98	100.00	4.23	100.00

Source: Field Survey

4.2.6 Yield of Major Crops:

GROUNDNUT:

The farmer profitability depends on yield and farm harvest prices of the crop. The crop area depends on above two factors whether the farmer increase or decrease the crop area decide these two forces. The change in cropping pattern is likely linked to the extent of variation in yield and profitability. In the case of our sample farmers a wide variation in yield was found in rainfall conditions. The groundnut crop sample farmers reported that kharif groundnut crop cultivated in dry lands under rain fed conditions. (Table 4.7, 4.7 A and 4.7B)

Table -4.7
Average Yield of Major Crops of Ground Nut Farmers

(Yield in Quintals/ha)

Season/Crop	Marginal	Small	Medium	Large	All Farms
Kharif Crops					
1. Rice					
Irrigated	52.43	49.29	55.97	32.43	49.42
Un-irrigated	0.00	28.44	42.27	16.24	34.35
2. Maize					
Irrigated	0.00	13.78	8.64	0.00	11.91
Un-irrigated	25.95	18.27	16.05	0.00	19.05
3. Coarse Cereals					
Irrigated	0.00	0.00	6.18	0.00	6.18
Un-irrigated	0.00	0.00	34.16	0.00	34.16
A. Total Kharif Pulses					
Irrigated	0.00	64.25	5.87	0.00	17.54
Un-irrigated	0.00	0.00	0.00	0.00	0.00
4. Ground Nut					
Irrigated	22.22	16.12	15.50	19.95	16.50
Un-Irrigated	18.91	14.36	11.50	9.24	11.72
5. Sesame					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
6. Sunflower					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
7. Soya been					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
8. Other Oil seeds (Coco Nut)					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
9. Total Kharif Oilseeds (5+6+7+8+9)					
Irrigated	22.22	16.12	15.50	19.95	16.50
Un-Irrigated	18.91	14.36	11.50	9.24	11.72
11. Cotton					
Irrigated	19.75	16.46	14.88	0.00	20.68
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
12. Vegetables					
Irrigated	39.54	71.58	23.25	22.76	24.17

Un-Irrigated	0.00	0.00	36.04	0.00	36.04
13. Other Crops					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
Rabi Crops					
15. Wheat					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
16. Rice					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
17. Coarse Cereals					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
18. Pulses					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
19. Ground Nut					
Irrigated	25.92	21.07	21.43	0.00	21.56
Un-Irrigated	19.23	17.50	17.77	19.70	18.45
20. Rapeseed & Mustard					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
21. Safflower					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
22. Sunflower					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
23. Total Rabi Oil Seeds					
Irrigated	25.92	21.07	21.43	0.00	21.56
Un-Irrigated	19.23	17.50	17.77	19.70	18.45
24. Vegetables					
Irrigated	0.00	37.04	24.79	0.00	29.70
Un-Irrigated	0.00	0.00	34.98	0.00	34.98
25. Other Rabi Crops					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
27. Sugarcane					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
28. Fruits					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	7.41	7.41
29. Oil Palm					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00

Source: Field Survey

Table -4.7A
Cropping pattern of selected Sunflower farmer households

	(Yield in Quintals/ha)				
	Marginal	Small	Medium	Large	All Farms
Kharif					
1. Rice					
Irrigated	37.38	36.97	44.87	44.37	42.88
Un-Irrigated	.00	.00	.00	.00	.00
2. Maize					
Irrigated	49.42	24.70	22.91	0.00	23.22
Un-Irrigated	0.00	0.00	23.64	28.09	25.10
3. Coarse Cereals					
Irrigated	0.00	15.64	8.23	0.00	11.93
Un-Irrigated	0.00	14.82	11.18	12.38	12.08
A. Pulses					
Irrigated	0.00	0.00	7.41	0.00	7.41
Un-Irrigated	0.00	16.10	11.63	11.39	11.63
Oil Seeds					
4. Ground Nut					
Irrigated	.00	8.45	.00	.00	8.45
Un-Irrigated	.00	0.00	.00	.00	0.00
5. Sesame					
Irrigated	0.00	6.91	6.59	0.00	6.66
Un-Irrigated	0.00	4.42	0.00	0.00	4.42
6. Sunflower					
Irrigated	4.11	0.00	12.96	0.00	11.96
Un-Irrigated	6.18	8.16	10.38	5.77	8.33
7. Soya been					
Irrigated	0.00	.00	.00	.00	.00
Un-Irrigated	0.00	.00	.00	.00	.00
8. Other oil seeds					
Irrigated	0.00	0.00	6.79	0.00	2.75
Un-Irrigated	0.00	.00	.00	.00	.00
B. Total Kharif Oilseeds					
Irrigated	4.11	7.55	10.30	0.00	9.59
Un-Irrigated	6.18	6.68	10.38	6.04	7.70
9. Cotton					
Irrigated	0.00	15.77	10.74	19.83	12.36
Un-Irrigated	0.00	0.00	7.44	1.98	2.88
10. Vegetables					
Irrigated	0.00	9.88	124.75	9.88	103.85
Un-Irrigated	0.00	4.69	0.00	24.71	5.84
C. Other Kharif Crops					
Irrigated	0.00	.00	.00	.00	.00
Un-Irrigated	0.00	.00	.00	.00	.00
Rabi					
11. Wheat					
Irrigated	.00	.00	.00	.00	.00
Un-Irrigated	.00	.00	.00	.00	.00
12. Rice					
Irrigated	0.00	.00	.00	.00	.00
Un-Irrigated	0.00	.00	.00	.00	.00

13. Coarse Cereals					
Irrigated	0.00	16.05	19.94	0.00	19.53
Un-Irrigated	0.00	0.00	9.90	11.54	10.95
D. Pulses					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	5.42	10.96	8.37	9.48
14. Ground Nut					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
15. Rapeseed & Mustard					
Irrigated	0.00	24.71	1.00	0.00	3.82
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
16. Safflower					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
17. Sunflower					
Irrigated	10.13	9.99	11.92	13.93	11.71
Un-Irrigated	14.82	7.20	8.44	8.53	8.29
E. Total Rabi Oil Seeds					
Irrigated	10.13	10.44	11.36	13.93	11.39
Un-Irrigated	14.82	7.20	8.44	8.53	8.29
F. Oil Palm					
Irrigated	0.00	0.00	180.48	187.02	184.23
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
G. Coco Nut					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
18. Vegetables					
Irrigated	0.00	4.92	29.65	0.00	14.78
Un-Irrigated	0.00	29.63	0.00	0.00	29.63
19. Other Rabi Crops					
Irrigated	0.00	0.00	17.28	0.00	17.28
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
20. Sugarcane					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
21. Fruits					
Irrigated	0.00	0.00	138.79	3.94	38.17
Un-Irrigated	0.00	0.00	4.94	0.00	4.94

Source: Field Survey

Table -4.7B
Average Yield of Major Crops of Oil Palm Farmers

Season/Crop	Marginal	Small	Medium	Large	All Farms
(Yield in Quintals/ha)					
Kharif Crops					
1. Rice					
Irrigated	0.00	0.00	49.18	26.27	27.50
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
2. Maize					
Irrigated	0.00	0.00	99.01	74.07	91.87
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
3. Coarse Cereals					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
A. Total Kharif Pulses					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
4. Ground Nut					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
5. Sesame					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
6. Sunflower					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
7. Soya been					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
8. Coco nut					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
11. Cotton					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
12. Vegetables					
Irrigated	0.00	0.00	28.46	0.00	28.46
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
13. Other Crops					
Irrigated	0.00	0.00	13.96	0.00	13.96
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
Rabi Crops					
15. Wheat					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
16. Rice					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
17. Coarse Cereals					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
18. Pulses					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00

19. Ground Nut					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
20. Rapeseed & Mustard					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
21. Safflower					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
22. Sunflower					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
23. Total Rabi Oil Seeds					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
24. Oil Palm					
Irrigated	147.06	207.54	184.35	121.54	158.53
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
25. Vegetables					
Irrigated	0.00	0.00	70.31	0.00	70.31
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
26. Other Rabi Crops					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
27. Total Rabi Crops					
Irrigated	5.95	8.40	7.67	4.98	6.53
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
28. Sugarcane					
Irrigated	0.00	0.00	0.00	0.00	0.00
Un-Irrigated	0.00	0.00	0.00	0.00	0.00
29. Fruits					
Irrigated	0.00	0.00	0.00	23.46	23.46
Un-Irrigated	0.00	0.00	0.00	0.00	0.00

Source: Field Survey

4.3. Production, Retention and Sale pattern of Oil seeds:

Since Groundnut is the major oil seed crop and majority of farmers cultivated this crop in both kharif and rabi seasons. The study crop selected 250 sample household holds from three districts and the average groundnut production per ha. was 19.62 and 14.46 Q in kharif 20.0 and 14.5 Q and rabi seasons. (Table 4.8). Across the farmer groups, a large farmer group average HH produced as large as 66.11 quintals and 48.55 quintals in two seasons of kharif and rabi seasons. It was found that on the whole average HH sold 18.49 Q at the

Table -4.8
Total Oil Seeds Production, Retention and Sale Pattern (Ground Nut)

Farm Category	Kharif Ground Nut				Rabi Ground Nut			
	Production	Retention	Sold	Price (Rs/Q)	Production	Retention	Sold	Price (Rs/Q)
Marginal	9.45	0.72	8.73	4080	13.45	1.25	12.06	3918
Small	7.80	0.86	6.95	4031	15.50	1.25	14.25	3921
Medium	25.33	1.18	24.15	4431	11.19	1.08	10.11	3997
Large	66.11	1.61	64.51	4641	48.55	0.00	48.55	4060
All Farmers	19.62	1.13	18.49	4310	14.46	1.08	13.38	3954
Farm Category	Kharif Maize (Competing Crop)							
	Production	Retention	Sold	Price (Rs/Q)				
Marginal	47.16	0.00	47.16	846				
Small	66.92	0.00	66.92	1115				
Medium	66.70	0.00	66.70	1004				
Large	0.00	0.00	0.00	0.00				
All Farmers	61.28	0.00	61.28	1011				

Source: Field Survey

Table -4.8A
Total Oil Seeds Production, Retention and Sale Pattern (Sunflower)

Farm Category	Kharif Sunflower				Rabi Sunflower			
	Production	Retention	Sold	Price (Rs/Q)	Production	Retention	Sold	Price (Rs/Q)
Marginal	3.17	0.00	3.17	2333	8.14	0.79	7.36	6786
Small	8.00	0.00	8.00	3500	8.60	0.65	7.95	4590
Medium	3.58	0.00	3.58	3547	15.18	1.03	14.15	5220
Large	2.69	0.00	2.69	3500	21.00	1.21	19.79	4438
All Farmers	3.79	0.00	3.79	3487	13.69	0.93	12.76	5102
Farm Category	Cotton (Competing Crop)							
	Production	Retention	Sold	Price (Rs/Q)				
Marginal	24.00	0.00	24.00	2475				
Small	28.65	0.00	28.65	2979				
Medium	36.30	0.00	36.30	3068				
Large	53.00	0.00	53.00	2979				
All Farmers	35.34	0.00	35.34	2998				

Source: Field Survey

Table -4.8B
Total Oil Seeds Production, Retention and Sale Pattern (Oil Palm)

Farm Category	Oil Palm			
	Production	Retention	Sold	Price (Rs/Q)
Marginal	13.57	0.00	13.57	5714
Small	30.84	0.00	30.84	6070
Medium	60.76	0.00	60.76	5987
Large	151.70	0.00	151.7	6240
All Farmers	60.50	0.00	60.50	6017

Source: Field Survey

average price of Rs.4310 per quintal. About 1.13 quintals of groundnut was retained for use of seed and household consumption. On the other hand under Rabi groundnut crop cultivated under irrigated area and the production and retention per HH on an average 14.46 quintals and 1.08 quintals. The remaining 13.38 quintals were sold at Rs. 3954. The price per quintal was highest in kharif groundnut crop and with regard to market price there is a significant variations among the farmer groups compared to prices of groundnut crop in rabi season due to market fluctuations. Price variations between the traders and transport charges etc. The main competing crop for groundnut was found to be the maize which was grown by the majority of sample farmers due to lower costs and high yielding.

SUN FLOWER:

Table 4.8 A shows that the average per HH production, retention and sale pattern of sun flower crop. 150 sample households were selected from three districts and a majority of sample HH cultivated in Rabi season. The average per HH production was 13.69 quintals and retention for household consumption was 0.93 quintals. The remaining 12.76 quintals were sold at the average price of Rs.5102. The main competing crop of Sun flower was found to be cotton which was grown by the majority of the sample farmers and the average per HH production was 35.34 quintals all of which was sold at the average price of Rs. 2998. per quintal. There was a significant variations of sun flower oil seed prices among the farmers groups due to market fluctuations.

OIL PALM:

There was a considerable variations in the production among the farmer groups. (Table 4.8 B) A larger farmer group average per HH production was 151.70 quintals followed by medium 60.76 quintals, small 30.84 quintals and marginal 13.57 quintals. No retention of oil palm production and the total production sent to collection centers for sale arranged both by public and private oil palm companies. The price was fixed by the companies and there was no private market except oil palm companies. There was a slight variation in the prices these changed prices depends on international oil palm prices. Majority of farmers expressed that there is no competing crop because it takes long period for the production besides it involves lot of expenditure to the change the crop.

4.4 Comparative Economics/Profitability of Oilseeds Vis-à-vis Competing Crops:

4.4.1. Operational Costs, Yield and Net Returns from Cultivation of Oilseeds Vis-à-vis Competing Crops:

GROUNDNUT:

In this section discussed the comparative analysis on variable costs of cultivation, average yield, gross and net returns on cultivation of groundnut and major competing crops (maize) has been estimated. Table 4.9 revealed the average gross value of groundnut crop was found to be Rs. 49518 per hectare and the total variable cost of cultivation of the groundnut crop including material cost and labour cost was Rs 20548 per hectare. Thus the net income derived from cultivation of Groundnut was Rs.28,971 per hectare. Among the farmers groups the maximum annual net return from cultivation of groundnut crop was obtained by marginal farmers Rs.35,224 per hectare, followed by large farmers (Rs.30470), Small farmers (Rs.29327) and medium farmers (Rs.23369) respectively.

The similar analysis has made on per hectare value of output, cost of production and net income of main competing crop (maize), reveals that the cultivation of major competing crop (maize) was profitable over the main oilseed crop (groundnut). The average net income derived from the cultivation of maize was Rs.37,710 per hectare. Among maize crop reported highest than the groundnut crop. So the share of maize crop in the cropping pattern of the farmers is gradually increasing, whereas the area under groundnut crop declined the period from TE1993-94 to TE2003-04 later it slightly increased the period (TE 2009-10).

The gross value of the main competing crop (maize) was highest for marginal farmers (Rs.65184) followed by medium farmers (Rs.63720) and small farmers (Rs.61100). Whereas the total operational cost per hectare was highest under medium farmers Rs.26397 and minimum Rs.24318 from marginal farmers. So the annual net return from cultivation of maize crop was highest Rs.40866 from marginal farmers followed by medium (Rs.37323) and small farmers (Rs.34919) respectively.

Among the cost components under groundnut crop, major costs revealed that the seed cost and total human labour cost accounted for about 50 per cent of total operational costs fertilizer consumption cost and harvesting and threshing cost found to be 15 per cent and 12 per cent of total operational costs respectively. About the major competing crop (maize) cost

of cultivation. Human labour cost per hectare was highest (36 per cent) and harvesting and threshing was (18 per cent) of total operational costs followed by machine labour cost (13 per cent) fertilizer cost (13 per cent and seed cost (10 per cent) respectively.

SUNFLOWER:

The table 4.9 A depicted the Sunflower and major competing crop (cotton) of cultivation, per hectare average yield, price, value of the product and net income. The average total value of the Sunflower crop found to be 46,674 per hectare and the total variable costs of cultivation was Rs.22,700 per hectare. So the Net income derived from total value of output minus total variable cost was Rs.23974 per hectare. Among the farmers group medium maximum net income received by medium farmers under sunflower crop Rs.49,590 per hectare.

About major competing crop (cotton), the similar analysis was done on the estimation for total operation costs per hectare, price, average yield total value of the product and net income per hectare. The average net income of the main competing crop (cotton) was profitable than the main oil seed crop of sunflower. The average net income of the cotton crop was Rs.35262 per hectare. Among the farmers group the highest net income derived from marginal farmers Rs.38,499 followed by large (Rs.36192), medium Rs.35958 and small farmers group (Rs.30399). So the cotton crop in the cropping pattern the farmers have been increasing gradually of all estimated periods in the state.

Among the cost components under sunflower crop fertilizer and total human labour cost found to be highest 27 per cent and 24 per cent of total operational costs. In the case of competing crop (cotton) fertilizer and insecticides and pesticides costs were highest reported 22 per cent of total operational costs. Among all operational costs per hectare the fertilizer cost percentage reported highest than other costs.

Table 4.9
Profitability of Major Oilseeds and Competing Crops

(Rs/ha)

Cost Items	Main Oilseed (Groundnut)				
	Marginal	Small	Medium	Large	All Farms
Seed	6200	6740	6916	7200	6764
Fertilizer&manure	3200	3400	2900	3100	3150
Insecticides& pesticides	1120	1257	1284	1400	1265
Total Human Labour	3620	3460	3685	3260	3506
(a) Family	2221	2289	1870	1200	1895
(b) Hired	1399	1171	1815	2060	1611
Machine labour	1717	2807	2776	2128	2357
Bullock labour	0	0	0	0	0
Irrigation	319	541	1400	1700	990
Harvesting& threshing	2200	2400	2470	2992	2515
1. Total Operational Costs (TC)	18376	20605	21431	21780	20547
Yield (Qtl)	20	18	16	19	18
Price	2680	2774	2800	2750	2751
2. Value of main product	53600	49932	44800	52250	49518
3. value of by product	0	0	0	0	0
Net Income (2+3)-1	35224	29327	23369	30470	28971
Cost of production (TC/qtl)	919	1145	1339	1146	1142
Total cost of cultivation (TC/ha)	18376	20605	21431	21780	20547
Cost items	Major Competing Crop (Maize)				
Seed	2340	2477	2519	0	2445
Fertilizer&manure	3390	3420	3384	0	3398
Insecticides& pesticides	946	1184	824	0	985
Total Human Labour	8900	9400	9700	0	9333
(a) Family	5400	6200	3400	0	5000
(b) Hired	3500	3200	6300	0	4333
Machine labour	3200	3700	3800	0	3567
Bullock labour	0	0	0	0	0
Irrigation	1220	1350	1420	0	1330
Harvesting& threshing	4322	4650	4750	0	4574
1. Total Operational Costs (TC)	24318	26181	26397	0	25632
Yield (Qtl)	56	52	54	0	54
Price	1164	1175	1180	0	1173
2. Value of main product	65184	61100	63720	0	63342
3. value of by product	0	0	0	0	0
Net Income (2+3)-1	40866	34919	37323	0	37710
Cost of production (TC/qtl)	434	503	489	0	475
Total cost of cultivation (TC/ha)	24318	26181	26397	0	25632

Source: Primary Data

Table 4.9A
Profitability of Major Oilseeds and Competing Crops

(Rs/ha)

Cost Items	Main Oilseed (Sunflower)				
	Marginal	Small	Medium	Large	All Farms
Seed	2290	2320	2346	2380	2334
Fertilizer&manure	6120	5980	6200	6180	6120
Insecticides& pesticides	980	861	1110	1350	1075
Total Human Labour	5450	5550	5400	5200	5400
(a) Family	3420	3730	2840	2270	3065
(b) Hired	2030	1820	2560	2930	2335
Machine labour	3726	3850	3870	4135	3895
Bullock labour	0	0	0	0	0
Irrigation	1350	1373	1540	1620	1471
Harvesting& threshing	1890	2240	2650	2840	2405
1. Total Operational Costs (TC)	21806	22174	23116	23705	22700
Yield (Qtl)	8.00	9.00	9.50	9.00	8.88
Price	5786	4890	5220	5140	5259
2. Value of main product	46288	44010	49590	46260	46674
3. value of by product	0	0	0	0	0
Net Income (2+3)-1	24482	21836	26474	22555	23974
Cost of production (TC/qtl)	2726	2464	2433	2634	2558
Total cost of cultivation (TC/ha)	21806	22174	23116	23705	22700
Cost items	Major Competing Crop (Cotton)				
Seed	3802	3601	3776	4182	3840
Fertilizer&manure	6278	6666	6178	5138	6065
Insecticides& pesticides	5377	5381	4924	4876	5140
Total Human Labour	3875	4449	3918	3867	4027
(a) Family	1502	932	1006	1009	1112
(b) Hired	4373	4289	3317	3309	3822
Machine labour	6342	4643	3468	3307	4440
Bullock labour	0	0	0	0	0
Irrigation	2510	282	117	287	799
Harvesting& threshing	7909	5875	5387	4476	5912
1. Total Operational Costs (TC)	36093	30897	27768	26133	30223
Yield (Qtl)	28	24	26	25	26
Price	2664	2554	2451	2493	2541
2. Value of main product	74592	61296	63726	62325	65485
3. value of by product	0	0	0	0	0
Net Income (2+3)-1	38499	30399	35958	36192	35262
Cost of production (TC/qtl)	1289	1287	1068	1045	1172
Total cost of cultivation (TC/ha)	36093	30897	27768	26133	30223

Source: Primary Data

Table 4.9B
Profitability of Major Oilseeds and Competing Crops

Cost Items	Main Oilseed (Oil Palm)				
	Marginal	Small	Medium	Large	All Farms
Seed	-	-	-	-	-
Fertilizer&manure	16546	19695	15562	17890	17423
Insecticides& pesticides	1200	1899	1345	1064	1377
Total Human Labour	11783	12651	11235	13650	12330
(a) Family	3950	3950	2943	2519	3950
(b) Hired	7833	10565	8291	11131	8955
Machine labour	0	0	0	0	0
Bullock labour	0	0	0	0	0
Irrigation	10033	12545	13250	12900	12182
Harvesting& threshing	12292	12819	12340	14500	12988
1. Total Operational Costs (TC)	51854	59610	53731	60004	56300
Yield (tones)	18	19	17	19	18
Price	5700	5700	5700	5700	5700
2. Value of main product	102600	108300	96900	108300	104025
3. value of by product	0	0	0	0	0
Net Income (2+3)-1	50746	48690	43169	48296	47725
Cost of production (TC/(tones))	317	300	335	300	312
Total cost of cultivation (TC/ha)	51854	59610	53731	60004	56300

Source: Primary Data

4.4.2 Yield gap and Technology gap in cultivation of main Oilseed crops: (Groundnut and Sunflower)

The yield gap was conducted to know the groundnut and sunflower crop to find out the gap between the potential yield and actual yield and between the experimental yield and actual yield. Table 4.10 presented the average potential yield of groundnut was 36.00 quintal per hectare and the average experimental yield of groundnut crop was 30.00 quintal per hectare. However the average actual groundnut crop yield was found to be 17.21 quintal per hectare. Thus yield gap -I i.e. the gap between the potential yield and actual yield was as high as 6.00 Q/ha. whereas the yield gap -II i.e. the gap between the potential yield and actual yield was quite high 18.79 Q/ha. The yield gap - III i.e. the gap between the experimental yield and the actual yield was also found to be quite high of 12.79 q/ha. Among the three types of yield gap, the yield gap - II was found to be the highest. Thus the prevailing level of yield gap is considerably high in the study region mainly weather conditions and dry land cultivation in the study regions under groundnut crop in the study districts of Andhra Pradesh.

The table may be indicated that the yield gap -II and yield gap - III are the highest for the medium group farmers and lowest marginal farmers. Thus the large farmers have experienced the major fluctuations in yield of groundnut crop. Since the experimental yield

and potential yield are much higher than the actual yield. There is need for enhancing the level of actual yield through further expansion of irrigation facilities, adequate quality seed supply at reasonable prices and introduction micro irrigation systems. Supply of SSP and Gypsum by the agriculture departments to farmers at subsidized prices which are very important to improve productivity under groundnut crop.

Table 4.10

Yield Gap Analysis for Andhra Pradesh Groundnut Crop 2011-12 of Rabi

Yield	Marginal	Small	Medium	Large	All Farms
Ground Nut					
Experimental Farm Yield	30.00	30.00	30.00	30.00	30.00
Potential Farm Yield	36.00	36.00	36.00	36.00	36.00
Actual Farm Yield	20.57	17.91	15.17	15.19	17.21
Yield Gap-I (2-1)	6.00	6.00	6.00	6.00	6.00
Yield Gap-II (2-3)	15.43	18.09	20.83	20.81	18.79
Yield Gap-III (1-3)	9.43	12.09	14.83	14.81	12.79
Technology Index	16.67	16.67	16.67	16.67	16.67
Sunflower					
Experimental Farm Yield	13.50	13.50	13.50	13.50	13.50
Potential Farm Yield	15.00	15.00	15.00	15.00	15.00
Actual Farm Yield	9.68	8.62	10.47	10.05	9.70
Yield Gap-I (2-1)	1.50	1.50	1.50	1.50	1.50
Yield Gap-II (2-3)	5.32	6.38	4.53	4.95	5.30
Yield Gap-III (1-3)	3.82	4.88	3.03	3.45	3.80
Technology Index	10.00	10.00	10.00	10.00	10.00

- Notes: 1. Field Survey
 2. Technology Index = $\frac{\text{Potential Yield} - \text{Experimental Yield}}{\text{Potential Yield}}$
 3. Experimental yield and potential farm yields have been collected from DAATTC Srikakulam

Further the table revealed the yield gap of Sunflower crop to ascertain the gap between the potential yield and experimental yield, potential yield and actual farm yield and experimental yield and actual yield. The average potential yield of Sunflower was 15.00 Q/ha. and the average experimental farm yield of the Sunflower crop was 13.50 Q/ha. But the average actual farm yield of the crop was found to be 9.70 q/ha. Thus the yield gap – I i.e. the gap between the potential yield and experimental yield was the 1.50 Q/ha, whereas the yield gap – II i.e. the gap between the potential yield and actual yield was highest of 5.30 q/ha and the yield gap – III i.e. the gap between the experimental yield and actual yield was found to be 3.80 q/ha. Among the three types of yield gap, the yield gap – II was found to be the highest.

Table 4.11
Technology Gap (TG) in Oil seed crop Cultivation Prevailing at Farmers Level

S.No	Parameter	Farmers practices	Recommended technology`	Gap analysis
Ground Nut				
1	Varieties	JL-24	K-6, K-9 & Abhaya	New Varieties
2	Land preparation	2-3 Ploughings	2-3 Ploughings	-
3	Seed rate	45 kg	60-75kg	20-25kg
4	Fertilizers dose	Lower doses Not Applying SSP & Gypsum	30N:40P:50K 200kg Gypsum 50kg zinc	Need to educate
5	Weeding	2-3 Times	2-3 Times	We can recommend Herbicides to reduce cost of cultivation
6	Disease management	Little efforts	Disease wise recommendations	Need to educate
7	Insect-pest	Little efforts	Pest wise recommendations	Need to educate
8	Harvesting	Manual	Manual & Machines	Need to educate
9	Yield	17 Qtls/ha	27Qtls/ha	10Qtls/ha
Sunflower				
1	Varieties	Hybrids	Hybrids	-
2	Land preparation	2-3 Ploughings	2-3 Ploughings	-
3	Seed rate	3kg	2kg	Excess
4	Fertilizers dose	75N:90P:30K P as SSP S as SSP & Gypsum 150kg/ha Borax spray-2g/lt at Flowering	Applying fertilizers as their wish	Need to Educate
5	Weeding	Manual	Manual + Herbicides	We can recommend Herbicides to reduce cost of cultivation
6	Disease management	Little efforts	Disease wise recommendations	Need to educate
7	Insect-pest	Little efforts	Pest wise recommendations	Need to educate
8	Harvesting	Manual	Manual & Machines	Need to educate
9	Yield	9.70Qtls/ha	12.65 Qtls/ha	2.90Qtls/ha

Source: Field Survey

It may be noted that the yield gap – II and the yield gap – III are the highest for the small farmers group and the lowest for the medium farmers group under Sunflower crop. Thus the small farmers group has experienced the large fluctuations in yield of Sunflower crop. The experimental yield and potential yield are much higher than the actual yield. So there is a need of enhancing the level of actual yield by adequate supply of quality seed in time and expansion of irrigation facilities by the government schemes through micro irrigation systems

and input subsidies etc. Besides reduce the bird damage when grown in isolated pockets. Inadequate and imbalanced fertilization of micro nutrients.

The detailed analysis on technology gap in cultivation of groundnut and sunflower in Andhra Pradesh was presented in Table 4.11. The detailed analysis of technology gap in cultivation of groundnut in Andhra Pradesh revealed that there was a huge yield gap found that the high yielding improved varieties of seeds should be made available in time and SSP and Gypsum which are very important to improve productivity.

Besides technology gap also important constraint under groundnut mainly lack of seed treatment application of micro nutrients, weedicides and farm mechanization etc. In the case of technology gap in cultivation of Sunflower crop revealed that proper weed management.

Supply of mechanical collection and destruction of foliage feeders i.e. hairy caterpillars, green semiloopers and helioverpa is a very effective. Protect the crop against bird damage and need to educate disease management through technology to control insects, pests and weeding, which will be reduce the cost of cultivation and increase the yield under Sunflower cultivation in Andhra Pradesh.

4.5. Access to improved Technology and Markets for Oil seeds:

Better returns on cultivation of agricultural crops largely depends on better prices on agricultural produce that, in turn depends on the availability and access to modern technology and markets for oil seeds. Table 4.12 revealed the particulars about use of HYV sources of seed, utilization of fertilizers, awareness about MSP and marketing problems of the selected crops of Groundnut, Sunflower and Oil palm sample farmers. We found the out of 250 groundnut farmers were expressed 94 per cent used HYV seeds for getting better yield. The area under HYV was 96.13 per cent of total area under groundnut sample farmers. The major source of the seed was agriculture department (62.80%). Majority of farmers (62.40%) used recommended doses of fertilizers and pesticides. Most of the sample farmers were not aware (68.40%) about the minimum Support prices (MSP) of the groundnut produce and also 81.2 per cent of farmers expressed that there is a marketing problem. Local traders fix the price and purchased the total groundnut production of all sample farmers. So we can say that there were two problems mainly MSP and marketing problems.

Table-4.12
Access to Improved Technology and Markets of Ground Nut
 (% of Households agreed)

Particulars	Marginal	Small	Medium	Large	All Farms
Use of HYV					
Yes	80.64	91.03	98.46	100.0	94.00
No	19.36	8.97	1.54	0.0	6.00
Area Under HYV (% to total area under Oilseeds)	79.78	87.71	99.06	100.0	96.13
Source of seed					
Own	19.35	19.23	10.77	18.18	14.80
Agri Dept	64.53	62.82	63.08	54.55	62.80
Market purchased	16.12	17.95	26.15	27.27	22.40
Use of recommended doses of fertilizers					
Yes	61.29	64.10	60.77	72.72	62.40
No	38.71	35.90	39.23	27.28	37.60
Don't know	0.0	0.0	0.0	0.0	0.0
Awareness about MSP					
Yes	25.81	29.49	30.77	54.55	31.60
No	74.19	70.51	69.23	45.45	68.40
MSP for 2011-12 (Rs/q)					
>MSP	-	-	-	-	-
<MSP	-	-	-	-	-
Marketing problem					
Yes	83.87	88.46	76.92	75.39	81.20
No	16.13	11.54	23.08	24.61	18.80

Source: Field Survey

The table 4.12 A revealed the particular about the technology and markets. Regarding Sunflower crop 100 per cent of sample farmers have used HYV seeds and the total area covered under HYV seeds. The major source of seeds was market 75.33% and only 24.67 per cent of seeds supplied by the agriculture department. The majority farmers (64%) used the recommended doses of fertilizers and pesticides suggested by the agricultural department. 63.33 per cent of sample farmers were aware about the Minimum Support Price (MSP) and 55.33 per cent of farmers sale the product at greater than MSP. It may be noted that the 58 per cent of farmers expressed that there was no regulated market to purchase the sunflower oilseeds, only local traders and other mediators purchased in the farm yard. Oil palm introduced in Andhra Pradesh in 1986 and the GOI has taken up oil palm plantations in collaborations with state government on 50:50 sharing basis and 12 factories established their processing units both public and private. Total 75 oilpalm sample farmers unanimously expressed their opinion that the oil palm plants supplied by the agricultural department. So

the total area covered by HYV plants and 97.33 per cent of farmers used the recommended doses of fertilizers and pesticides supplied by horticulture department. All farmers informed

Table-4.12A
Access to Improved Technology and Markets of Sunflower

(% of Households agreed)

Particulars	Marginal	Small	Medium	Large	All Farms
Use of HYV					
Yes	100.0	100.0	100.0	100.0	100.0
No	0.0	0.0	0.0	0.0	0.0
Area Under HYV (% to total area under Oilseeds)	100.0	100.0	100.0	100.0	100.0
Source of seed					
Own	0.0	0.0	0.0	0.0	0.0
Agri Dept	0.0	32.43	24.18	23.08	24.67
Market purchased	100.0	67.57	75.82	76.92	75.33
Use of recommended doses of fertilizers					
Yes	44.44	56.76	54.96	46.15	64.00
No	22.22	40.54	34.05	46.16	26.00
Don't know	33.34	2.70	10.99	7.69	10.00
Awareness about MSP					
Yes	77.78	81.08	54.95	61.54	63.33
No	22.22	18.92	45.05	38.46	36.67
MSP for 2011-12 (Rs/q)					
>MSP	77.78	40.54	54.95	15.38	55.33
<MSP	22.22	59.46	45.05	84.61	44.67
Marketing problem					
Yes	77.78	62.16	56.04	46.15	58.00
No	22.22	37.84	43.96	53.85	42.00

Source: Field Survey

Table-4.12B
Access to Improved Technology and Markets of Oil Palm

(% of Households agreed)

Particulars	Marginal	Small	Medium	Large	All Farms
Use of HYV					
Yes	100.0	100.0	100.0	100.0	100.0
No	0.0	0.0	0.0	0.0	0.0
Area Under HYV (% to total area under Oilseeds)	100.0	100.0	100.0	100.0	100.0
Source of seed					
Own	-	-	-	-	-
Agri Dept	100.0	100.0	100.0	100.0	100.0
Market purchased	-	-	-	-	-
Use of recommended doses of fertilizers					
Yes	85.71	95.0	100.0	100.0	97.33
No	14.29	5.0	0.0	0.0	2.67
Don't know	0.0	0.0	0.0	0.0	0.0
Awareness about MSP					
Yes	100	100	100	100	100
No	-	-	-	-	-
MSP for 2011-12 (Rs/q)					
>MSP	-	-	-	-	-
<MSP	-	-	-	-	-
Marketing problem					
Yes	0.0	0.0	0.0	0.0	0.0
No	100.0	100.0	100.0	100.0	100.0

Source: Field Survey

that they were aware about MSP of the oil palm crop and the price shall be calculated on month wise through international oil palm prices. The factory is responsible to purchase the total oilpalm fresh fruit bunches. So there was no problem about MSP and marketing under oil palm crop in Andhra Pradesh. (Table 4.12 B)

4.6. Marketing pattern of oil seeds:

According the previous observations of both Groundnut and Sunflower crops more than 50 percent of farmers expressed that there is a marketing problems and unaware about the MSP determined by the government. As presented in table 4.13 about 64 percent and 36 per cent cultivating groundnut crop farming have sold their output to commission agents and local village traders respectively. The highest production sold 75.64% to commission agents from small farmers group followed by medium 60.77%, marginal 54.84% and large farmer group 45.45% under groundnut crop. The average price paid from local village traders was highest Rs.4307 per quintal on the other hand lowest average price of groundnut was paid from commission agents Rs.4169. Further the sale of main competing crop (Maize) exhibited slightly different pattern, the local village traders purchased more output (48.91%) at average price was Rs.1083 quintal from the sample farmers, particularly from small farmers group (60.47%) About 27.17 per cent of sample farmers sold to output commission agent at the average price of Rs.928 per quintal. Other important purchaser was Government agency (NAFED) at the price per quintal was Rs.1116, which was found to be the highest and 43 per cent sold from of medium farmers. The average distance to sale point was 2.32 KM from the field.

Further the table 4.13A and 4.13 B revealed the sale pattern of Sunflower oilseed crop and highest percentage (33.34%) of sample farers sold the product at private company (contract agreement) at the highest average price Rs.8500 followed by 31.33 per cent and 2 per cent of farmers cultivating sun flower crop have sold their output to local village traders and government agency at the average price per quintal was Rs.2677 and Rs.3640. The average distance of sale point of Sunflower crop between 4 to 6 kilometers. **"Cotton" is the main competing crop of sunflower and about 56.92 per cent and 43.08 per cent of farmers cultivating "Cotton" crop have sold their output to government agency (APML) and Commission agents respectively.** The average price of cotton was received from the government agency and commission agent more or less similar Rs.2,900. The average distance travelled by the cotton

farmers were 8.14 km. This is mainly because of the fact that the cotton growers sold their output at regulated market yards organized by the marketing department in the state.

Table- 4.13
Sale Pattern of Major Oilseeds (Ground Nut)

Particulars	Marginal	Small	Medium	Large	All Farms
Agency to whom sold (% Share)					
Local Village Traders	45.16	24.36	39.23	54.55	36.0
Processing mill	0.0	0.0	0.0	0.0	0.0
Government Agency (NAFED)	0.0	0.0	0.0	0.0	0.0
Commission agent	54.84	75.64	60.77	45.45	64.0
Private company (contract arrangement)	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0
Price received (Rs/q)					
Local Village Traders	4164	4032	4407	4654	4307
Processing mill	0.0	0.0	0.0	0.0	0.0
Government Agency (NAFED)	0.0	0.0	0.0	0.0	0.0
Commission agent	3906	3996	4353	4200	4169
Private company (contract arrangement)	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0
Average distance to sale point (KM)	5.16	9.01	4.07	4.00	5.74
Competing Crop (Maize)					
Agency to whom sold (% Share)					
Local Village Traders	46.15	60.47	30.43	0.00	48.91
Processing mill	0.0	0.0	0.0	0.0	0.0
Government Agency (NAFED)	11.54	20.93	43.48	0.00	23.91
Commission agent	42.31	18.60	26.09	0.00	27.17
Private company (contract arrangement)	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0
Price received (Rs/q)					
Local Village Traders	871	1453	1121	0.00	1083
Processing mill	0.0	0.0	0.0	0.0	0.0
Government Agency (NAFED)	850	1391	1005	0.00	1116
Commission agent	818	952	1075	0.00	928
Private company (contract arrangement)	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0
Average distance to sale point (KM)	2.77	1.81	2.71	0.00	2.32

Source: Field Survey

Table -4.13A
Sale Pattern of Major Oilseeds (Sunflower)

Particulars	Marginal	Small	Medium	Large	All Farms
Agency to whom sold (% Share)					
Local Village Traders	22.22	51.35	26.37	23.08	31.33
Processing mill	0.0	0.0	0.0	0.0	0.0
Government Agency (NAFED)	22.22	16.22	21.98	38.46	22.00
Commission agent	0.0	2.70	17.58	23.08	13.33
Private company (contract arrangement)	55.56	29.73	34.07	15.38	33.34
Others	0.0	0.0	0.0	0.0	0.0
Price received (Rs/q)					
Local Village Traders	2500	2678	2690	2700	2677
Processing mill	0.0	0.0	0.0	0.0	0.0
Government Agency (APMC)	3500	3400	3320	3270	3338
Commission agent	0.0	3500	3363	3517	3640
Private company (contract arrangement)	8500	8500	8500	8500	8500
Others	0.0	0.0	0.0	0.0	0.0
Average distance to sale point (KM)	5.89	4.16	5.15	4.85	4.93
Competing Crop (Cotton)					
Agency to whom sold (% Share)					
Local Village Traders	0.0	0.0	0.0	0.0	0.0
Processing mill	0.0	0.0	0.0	0.0	0.0
Government Agency (APMC)	50.00	47.06	70.27	14.29	56.92
Commission agent	50.00	52.94	29.73	85.71	43.08
Private company (contract arrangement)	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0
Price received (Rs/q)					
Local Village Traders	0.0	0.0	0.0	0.0	0.0
Processing mill	0.0	0.0	0.0	0.0	0.0
Government Agency (APMC)	2550	2981	2981	2950	2957
Commission agent	2400	2978	2995	2983	2986
Private company (contract arrangement)	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0
Average distance to sale point (KM)	9.00	7.28	8.89	5.57	8.14

Source: Field Survey

Table -4.13B
Sale Pattern of Major Oilseeds (Oil Palm)

Particulars	Marginal	Small	Medium	Large	All Farms
Agency to whom sold (% Share)					
Local Village Traders	0.0	0.0	0.0	0.0	0.0
Processing mill	0.0	0.0	0.0	0.0	0.0
Government Agency (AP Oil Fed)	42.86	45.00	21.00	50.00	33.33
Commission agent	0.0	0.0	0.0	0.0	0.0
Private company	57.14	55.00	79.00	50.00	66.67
Others	0.0	0.0	0.0	0.0	0.0
Price received (Rs/q)					
Local Village Traders	0.0	0.0	0.0	0.0	0.0
Processing mill	0.0	0.0	0.0	0.0	0.0
Government Agency (AP Oil Fed)	5400	6089	6013	6320	6039
Commission agent	0.0	0.0	0.0	0.0	0.0
Private company (contract arrangement)	5950	6055	5980	6160	6012
Others	0.0	0.0	0.0	0.0	0.0
Average distance to sale point (KM)	4.21	5.08	6.16	3.60	5.35

Source: Field Survey

With regard to oil palm crop Fresh Fruit Bunches (FFB) are purchased by the Government agencies (OILFED) and private oil palm factories. The private oil palm factories are liable to the government and oil palm commissioner. Regarding the sale pattern of oil palm sample farmers expressed 66.67 per cent and 33.33 per cent of farmers sold their output to private company government agency respectively. The two agencies procure the total oil palm production from the sale point and the average distance for sale point (collection centre) distance was 5.35 km. The price of the oil palm output (FFB) more or less same Rs.6000/- per quintal of both existing markets (AP Oil Fed and Private Company) during the period 2011-12.

4.7. Sources of Technology and Market Information:

Table 4.14 presented different sources of information on seeds, extension services and markets. Out of 250 sample farmers expressed under groundnut crop, about 56.40% of farmers reported that state agricultural department is the major source followed by market 28%, and 14% on own. On the other hand 62.56 per cent of farmers expressed the state Department of Agriculture played a vital role to provide information on extension services. Further market information about groundnut crop through fellow farmers (87 per cent), commission agents 68 per cent and print and electronic media (50 per cent). Therefore the state agriculture department specialized organized organizations Fellow farmers and print and electronic media have played a key role in dissemination of required information to the sample farmers.

Table -4.14
Sources of Technology and Market Information (Ground Nut)

(% of farmers agreed)

Particulars	Marginal	Small	Medium	Large	All Farms
(A) Sources of Information on Seeds					
Own	19.35	19.23	10.77	18.18	14.80
Fellow Farmer	3.23	0.00	0.00	0.00	0.40
State Dept. of. Agri	61.29	62.82	52.31	45.45	56.40
ICAR/SAU/KVK	0.00	0.00	0.00	0.00	0.00
Commission Agent/Ahrtiya	3.23	0.00	0.00	0.00	0.40
Market	12.90	17.95	36.92	36.36	28.0
Other	0.00	0.00	0.00	0.00	0.00
(B) Sources of Information on Extension Services					
State Dept. of. Agri	61.29	64.10	60.77	72.73	62.40
Private Company	0.00	0.00	0.00	0.00	0.00
Input Dealer	0.00	0.00	0.00	0.00	0.00
ICAR/SAU/KVK	21.00	26.50	34.00	45.00	29.60
Other	0.00	0.00	0.00	0.00	0.00
(C) Sources of Information on Market					
Radio/TV	22.58	21.79	29.23	9.09	25.20
Print Media	58.06	71.79	34.62	36.36	49.20
Fellow Farmer	87.10	85.90	88.46	81.82	87.20
APMC Mandi	41.94	57.69	30.00	27.27	40.00
Commission Agent/Ahrtiya	80.65	74.36	62.31	72.73	68.80
Private Company	0.00	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00	0.00

Source: Field Survey

In the case of sunflower (table 4.14 A) sample farmers said that out of 150 farmers, the major sources of information on seed aware from the market 39.33 per cent followed by 36 per cent and 24.67 per cent from other companies and state department of agriculture. On the other hand about information on extension services 33 per cent and 31 per cent of farmers received information through private companies and state department of agriculture. Further market information has known from fellow farmer, APMC, Commission agents and print media and T.V.

Table -4.14 A
Sources of Technology and Market Information (Sun Flower)

(% of farmers agreed)

Particulars	Marginal	Small	Medium	Large	All Farms
(A) Sources of Information on Seeds					
Own	0.00	0.00	0.00	0.00	0.00
Fellow Farmer	0.00	0.00	0.00	0.00	0.00
State Dept. of. Agri	0.00	32.43	24.18	23.08	24.67
ICAR/SAU/KVK	0.00	0.00	0.00	0.00	0.00
Commission Agent/Ahrtiya	0.00	0.00	0.00	0.00	0.00
Market	44.44	40.54	36.26	53.85	39.33
Other (Company)	55.56	27.03	39.56	23.08	36.00
(B) Sources of Information on Extension Services					
State Dept. of. Agri	44.44	29.73	28.57	46.15	31.33
Private Company	55.56	27.03	35.16	23.08	33.33
Input Dealer	0.00	0.00	0.00	0.00	0.00
ICAR/SAU/KVK	0.00	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00	0.00
(C) Sources of Information on Market					
Radio/TV	22.22	13.51	15.38	15.38	15.33
Print Media	0.00	32.43	21.98	61.54	26.67
Fellow Farmer	44.44	72.97	64.84	76.92	66.67
APMC Mandi	22.22	18.92	31.87	53.85	30.00
Commission Agent/Ahrtiya	0.00	21.62	29.67	30.77	26.00
Private Company	55.56	27.03	35.16	23.08	33.33
Other	0.00	0.00	0.00	0.00	0.00

Source: Field Survey

The table 4.14 B revealed about the sources of information on oil palm plants extension services and markets of oil palm sample farmers. Total oil palm farmers expressed that the State Horticulture Department had supplied the oil palm plants at a subsidized price under ISOPOM scheme, it may be found that the information regarding extension services provided through (AP Oil FED 100%) and private factories (68%) expressed by the sample farmers. Moreover market information also provides through horticulture department, private factories, print media and T.V. to the sample farmers. So the Horticulture department is the biggest source to get the information of the oil palm farmers.

Table -4.14 B
Sources of Technology and Market Information (Oil Palm)

(% of farmers agreed)

Particulars	Marginal	Small	Medium	Large	All Farms
(A) Sources of Information on Seeds					
Own	0.00	0.00	0.00	0.00	0.00
Fellow Farmer	0.00	0.00	0.00	0.00	0.00
State Dept. of. Agri (Horticulture)	100.0	100.0	100.0	100.0	100.0
ICAR/SAU/KVK	0.00	0.00	0.00	0.00	0.00
Commission Agent/Ahrtiya	0.00	0.00	0.00	0.00	0.00
Market	0.00	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00	0.00
(B) Sources of Information on Extension Services					
State Dept. of. Agri (Horticulture)	100.0	100.0	100.0	100.0	100.0
Private Company	71.43	55.00	78.95	50.00	68.00
Input Dealer	0.00	0.00	0.00	0.00	0.00
ICAR/SAU/KVK	0.00	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00	0.00
(C) Sources of Information on Market					
Radio/TV	28.57	25.00	34.21	60.00	34.67
Print Media	85.71	100.0	100.0	100.0	98.67
Fellow Farmer	42.86	55.0	57.89	50.00	54.67
APMC Mandi	0.00	0.00	0.00	0.00	0.00
Commission Agent/Ahrtiya	0.00	0.00	0.00	0.00	0.00
Private Company	100.00	100.00	100.00	100.00	100.00
Other (A.P Oil Fed)	100.00	100.00	100.00	100.00	100.00

Source: Field Survey

4.8 . Determinants of Oilseed Production and Acreage Allocation:

The factors affecting changes in crop output and yield in Andhra Pradesh is very numerous, they may be categorized into two groups:

- i. Change in amount and production of agricultural inputs such as labour, fertilizer, pesticides and irrigation and
- ii. The exposure to weather related risks and other exogenous risks, such as drought, floods, pest attack, etc.

In this section, an attempt has been made to analyse the effects of variation in major agricultural inputs on yield with the help of a log-linear regression model which has been estimated for firstly main oilseed crop (Groundnut) and main competing crop (maize) secondly main oilseed crop (sunflower) and competing crop (cotton) and lastly only the main oilseed crop of oil palm are separately. The relative contribution and significant of the inputs such as area under the crop (AR) (LS) seed cost(SC). Fertilizer cost(FC), pesticide/insecticide cost (PC), Human labour cost (HL) machine labour cost (ML) and Irrigation charges (IC) to change in yield

of major oilseed and competing crop of sample farmers have been examined. It has been started regression model with log-linear functional form due to the fact that the agricultural production function is usually assumed to follow a cob-duglus production function that type required a log-linear transformation for estimation of input co-efficient. The specification of the model is

$$L_n Y_i = A + \beta_1 L_n AR_i + \beta_2 L_n LS_i + \beta_3 L_n SC_i + \beta_4 L_n FC_i + \beta_5 L_n PC_i + \beta_6 L_n HL_i + \beta_7 L_n ML_i + \beta_8 L_n IC_i +$$

It can be seen from the table 4.15 that the regression results shoes that, some of the explanatory (Independent) variables have influencing the main oilseed crop of groundnut yield and the competing crop of maize yield in the study area. The R^2 value was better in the case of Groundnut (63.6%) compared to maize (31.6%), the reason behind is that the sample size in groundnut is more than two times of maize. However, the R^2 value is in acceptable limits because the data is a cross-section not a time series one. The larger F-value shows that unexplained variation is low in both the crops.

Out of eight independent variables in the case of groundnut AR, LS, SC, HL and IC are turned out to be statistically significant at 1% and 5% level respectively. In main competing crop of maize, LS, LS, FC and ML are turned out to be statistically significant at 1% level.

The co-efficient associated with LS is significantly effect on the yield of groundnut as well as maize, it indicates that the yield of groundnut and maize would increase by 0.196 percent and 0.319 per cent increase in a one per cent change in the size of land holding in the study area. The co-efficient of irrigation change (IC) variable is also to examine the yield of groundnut. The coefficient indicates that the yield of groundnut would increase 0.019 percent for every 1% increase in spending irrigation provisions similarly.

The magnitude of input variable for both main oil seed (groundnut) and main competing crop (maize) has been significantly little impact on yield of both crops due to the other extent factor may also influence in the study area. Table 4.15 A reveals that a few of the independent variable may influence on yield of sunflower, these are LS, FC & PC and IC are turned out to be statistically significant at 1% level with expected positive sign in the main oilseed crop of sunflower. While in case of main competing crop of cotton the SC and IC are statistically significant at !% level with unexpected negative sign and expected positive sign. It is interesting to observe from the table that the regression co-efficient of irrigation change (IC)

indicates that the yield of Sunflower and Cotton would increase by 0.009 per cent and 0.01 per cent for every 1 per cent increase in spending on irrigation provisions. The R^2 value is low in both cases. However, the R^2 value of cotton is better than Sunflower because of the sample size is less than half of the Sunflower crop.

Table 4.15B reveals that the regression results of main oil seed crop only (i.e. oil palm) out of the five independent variables four variables are turned out to be statistically significant at 1%, 5% and 10% level with expected positive and negative sign. The co-efficient associated with HL and IC would increase 0.355 percent and 0.172 per cent for every 1% spending on labour and irrigation provisions. The co-efficient of FC & PC is also to influence the yield of oil palm, it indicates that a one per cent spent on FC & PC, there may be 0.225% increase of yield of oil palm.

The other explanatory variable AR is also statistically significant at 10% level with unexpected negative sign. The R^2 value (44.3%) is quite reasonable and significantly high even the sample size is small (75) and the unexplained variation is very small.

Table 4.15: Description and Results of Estimation of Production Function for Main Oilseed (Ground Nut) and Main Competing Crop (Maize)

Variables	Description	Main Oilseed 1 (Ground Nut)			Main competing crop1 (Maize)		
		Coefficient	t-value	P value	Coefficient	t-value	P value
AR	Area under crop (Ha)	1.150315*	11.19	0.000	-0.0086227	-0.07	0.942
LS	Size of land holdings (Ha)	0.1965904*	2.74	0.007	0.3197513*	4.42	0.000
SC	Seed cost (Rs)	-0.26932*	-4.17	0.000	-0.0475225	-0.80	0.427
FC	Fertilizer and Manure cost (Rs)	0.0309381	0.44	0.660	0.1143473*	2.84	0.005
PC	Insecticides/pesticides cost (Rs)	0.0074332	0.36	0.718	-0.0370725	-1.42	0.156
HL	Total Human labour cost (Rs)	-0.282755*	-3.23	0.001	-0.0948796	-0.96	0.337
ML	Total Machine labour cost (Rs)	-0.111599	-1.21	0.226	-0.2796305	2.65	0.009
IC	Irrigation charges (Rs)	0.0191646**	2.04	0.042	0.010574*	0.95	0.343
A	Constant term	8.107118	8.54	0.000	1.228639	1.48	0.141
Dependant Variable (Y)		Ground Nut Yield			Maize Yield		
R2		0.6364			0.3159		
F observed		52.72			13.91		
No of Observations 'N'		250			91		

Note: *1% level of Significance, **5% level of Significance, *** 10% level of Significance

Source: Computed from field survey data

Table 4.15 A
Description and Results of Estimation of Production Function for Main Oilseed (Sunflower) and Main Competing Crop (Cotton)

Variables	Description	Main Oilseed (Sunflower)			Main competing crop (Cotton)		
		Coefficient	t-value	P value	Coefficient	t-value	P value
AR	Area under crop (Ha)	-0.7006712	-0.79	0.432	0.0519112	0.55	0.581
LS	Size of land holdings (Ha)	0.16009*	3.57	0.000	0.0293313	0.64	0.526
SC	Seed cost (Rs)	-0.0907046	-1.54	0.125	-0.1626196*	-3.32	0.001
FC&PC	Fertilizer and Manure cost (Rs)	0.1857617*	2.93	0.004	0.0957648	1.52	0.132
HL	Total Human labour cost (Rs)	-0.448492	-0.44	0.657	0.0044632	0.09	0.927
ML	Total Machine labour cost (Rs)	-0.040312*	-0.43	0.669	0.025640*	0.31	0.754
IC	Irrigation charges (Rs)	0.0096206	2.37	0.019	0.0100671	2.33	0.021
A	Constant term	1.781631	2.27	0.025	2.320343	3.40	0.001
Dependant Variable (Y)		Sunflower Yield			Cotton Yield		
R2		0.2538			0.1974		
F observed		6.90			4.99		
No of Observations 'N'		150			64		

Note: *1% level of Significance, **5% level of Significance, *** 10% level of Significance
Source: Computed from field survey data

Table 4.15 B
Description and Results of Estimation of Production Function for Main Oilseed (Oil Palm)

Variables	Description	Main Oilseed (Sunflower)		
		Coefficient	t-value	P value
AR	Area under crop (Ha)	-0.2856436***	-1.85	0.066
LS	Size of land holdings (Ha)	-0.0885327	-0.76	0.448
FC& PC	Fertilizer and Manure, Insecticides/pesticides cost (Rs)	0.2253112**	2.54	0.012
HL	Total Human labour cost (Rs)	0.3553051*	3.52	0.001
IC	Irrigation charges (Rs)	0.1727581*	5.46	0.000
A	Constant term	-2.694385	-3.41	0.001
Dependant Variable (Y)		Oil Palm Yield		
R2		0.4428		
F observed		38.79		
No of Observations 'N'		75		

Note: *1% level of Significance, **5% level of Significance, *** 10% level of Significance
Source: Computed from field survey data

As far as the acreage allocation between main oilseed crop (groundnut) and main competing crop (maize) during the time period 1991-91 to 2011-12 is concerned, another similar log-linear regression model was fitted.

The area allocated for main oilseed (groundnut) was considered as the dependent variable. The selected explanatory variables were lagged area (A_{t-1}), Relative Price (P_{t-1}), Relative Yield (Y_{t-1}), Price Risk (CP_{t-1}), Yield Risk (CY_{t-1}), Rainfall (AC_{t-1}), T (time) and area under competing crop (AC_t) were selected. On the basis of field experience. The fitted model as follows:

$$L_n A_t = \alpha + \beta_1 A_{t-1} + \beta_2 P_{t-1} + \beta_3 Y_{t-1} + \beta_4 CP_{t-1} + \beta_5 CY_{t-1} + \beta_6 R_t + \beta_7 R_t + \beta_8 AC_t + \beta_9 T + e_i$$

The description of the variables used and summary of regression results are presented Table 4.16. Out of nine independent variables, lagged area (A_{t-1}), Relative Price (P_{t-1}) and Relative Yield (Y_{t-1}) are statistically significant at 1% and 5 % level with expected positive sign. These three variables significantly influence on the area allocated for the main oilseed (Groundnut). The R^2 value of Area response function of groundnut and maize is very high (82.3%). The regression results of acreage allocation of main oil seed crop (Sunflower) and competing crop (Cotton) are presented in Table 4.16A. Out of nine independent variables only two explanatory variables lagged area (A_{t-1}). Area under competing crop (AC_t) are statistically significant at 1% level with expected positive sign. The coefficients of these two variables indicates that acreage response was high (0.91%) in competing crop (Cotton) than the main oil seed crop of sunflower (0.58%) and the R^2 value is significantly very high (80.5%).

Table 4.16
Description and Results of Estimation of Area Response Function for Main Oilseed (Ground Nut) and Main Competing Crop (Maize)

Variables	Description	Main Oilseed (Ground Nut)		
		Coefficient	t-value	p-value
A_{t-1}	Lagged area	0.0005177*	0.00	0.999
P_{t-1}	Relative price	0.0012895*	0.00	0.999
Y_{t-1}	Relative Yield	0.2143084***	1.78	0.101
CP_{t-1}	Price Risk	0.0231309	0.64	0.536
CY_{t-1}	Yield Risk	-0.012089	-0.20	0.845
R_t	Rainfall	0.1860039	1.45	0.173
AC_t	Area Under competing crop	0.019476	0.08	0.940
T	Time variable	-0.0193865	-0.98	0.347
A (Constant)		6.702104	2.42	0.032
Dependant variable (A_t)	Current area under Groundnut			
R^2	0.8233			
F	6.99			
No of Observation	21			

Source: Various issues of Statistical Abstracts of Andhra Pradesh, Govt. of Andhra Pradesh, Hyderabad.

Source: Secondary Data

Table 4.16A
Description and Results of Estimation of Area Response Function for Main Oilseed (Sunflower) and
Main Competing Crop (Cotton)

Variables	Description	Main Oilseed (Sunflower)		
		Coefficient	t-value	p-value
A_{t-1}	Lagged area	0.5776152*	3.47	0.005
P_{t-1}	Relative price	-0.3308771	-0.65	0.529
Y_{t-1}	Relative Yield	-0.1177599	-0.40	0.695
CP_{t-1}	Price Risk	0.0181717	0.36	0.724
CY_{t-1}	Yield Risk	0.0570782	0.64	0.533
R_t	Rainfall	0.175515	1.34	0.206
AC_t	Area Under competing crop	0.908949*	3.11	0.009
T	Time variable	0.022054	1.48	0.165
A (Constant)		7.435031	3.69	0.003
Dependant variable (A_t)		Current area under Groundnut		
R^2		0.8057		
F		6.22		
No of Observation		21		

Source: Various issues of Statistical Abstracts of Andhra Pradesh, Govt. of Andhra Pradesh, Hyderabad.

4.9. Perceived Constraints in Cultivation of Oilseeds:

Groundnut:

Table 4.17 revealed the major constraints faced by the groundnut sample farmers. Such as technological, climatic factors, economic, institutional and marketing and transport facilities etc., among the technological constraints, non availability of suitable varieties, poor crop germination lack of irrigation facilities, incidence of diseases and weeds infestation were the major ones of our sample farmers. Poor crop germination has effected more to all groups of farmers. The large farmers have effected more to lack of irrigation and incidence of diseases.

Among the agro-climatic factors, extreme variations in temperature, risk of crop failure/yield variability and poor pod/grain setting were found as a major constraints for the sample farmers besides the average annual rainfall is very less and inconsistent rainfall are the causes to increase the level of risk of crop failure and low level of yield under groundnut crop.

Table 4.17
Constraints in Cultivation of Ground Nut Crop

(Composite index Value)

Constraints	Marginal	Small	Medium	Large	All Farms
Technological					
Non-availability of suitable varieties	2.90	3.12	3.12	3.27	3.10
Poor crop germination	3.00	3.15	3.08	3.27	3.10
Lack of irrigation facilities	2.84	2.88	2.85	3.09	2.87
Incidence of diseases	2.58	3.01	2.92	3.09	2.92
Incidence of insect pests	2.71	2.78	2.67	2.55	2.70
Weeds infestation	2.77	2.99	2.81	2.82	2.86
Poor quality of soils	2.84	2.82	2.77	2.64	2.79
Agro-climatic factors					
Drought at critical stages of crop growth	2.52	2.31	2.58	2.73	2.50
Excessive rains	2.06	1.76	2.31	1.55	2.07
Extreme variations in temperature	2.71	2.78	2.67	2.55	2.70
Poor pod/grain setting	2.77	2.86	2.85	2.36	2.82
Risk of crop failure/yield variability due to biotic & a biotic stresses	3.19	3.45	2.93	2.55	3.11
Economic					
High-input costs (diesel, fertilizers, agrochemicals)	3.23	3.29	3.04	3.27	3.15
Shortage of human labour	3.10	3.41	3.08	3.18	3.19
Low and fluctuating prices	1.94	1.99	1.72	1.55	1.82
Price risks –fear of glut leading to low price	0	0	0	0	0
Oilseeds less profitable compared with other crops	2.97	3.10	2.98	3.09	3.02
Oilseeds less more risky compared with other crops	2.45	2.68	2.68	3.18	2.67
Institutional					
Problem of timely availability of seed	2.74	3.04	2.91	3.55	2.96
Non-availability of other inputs	2.84	2.99	2.92	3.36	2.95
Poor quality of inputs	2.61	2.60	2.74	2.82	2.68
Lack/poor extension services	2.65	2.54	2.61	2.82	2.60
Non-availability of institutional credit	2.74	2.72	2.71	2.55	2.71
Inadequate knowledge about disease and pest management	2.71	2.26	2.76	1.91	2.56
Irregular supply of power/electricity	3.19	3.45	2.93	2.55	3.11
Lack of awareness of improved oilseed technologies	3.10	3.41	3.08	3.18	3.19
Post-harvest, Marketing and Value-addition					
Poor marketing system and access to markets	3.10	3.41	3.08	3.18	3.19
Lack of information about prices and markets	2.65	2.99	2.86	3.27	2.89
Exploitation by market intermediaries	2.97	3.32	2.97	2.91	3.08
Lack of processing facilities in the area	3.23	3.29	3.04	3.27	3.15
Lack of appropriate transport means	2.32	2.27	2.50	2.82	2.42
Inadequate storage facilities	2.71	2.50	2.45	2.64	2.50
Poor road infrastructure	1.94	1.99	1.72	1.55	1.82
High transportation costs	1.35	1.08	1.05	1.00	1.09

Note: Composite index has been constructed based on weights (Severe=4, Moderate=3, Minor=2 and Not important=1) and number of households in each category.

Source: Field Survey

Table 4.17A
Constraints in Cultivation of Sunflower Crop

(Composite index Value)

Constraints	Marginal	Small	Medium	Large	All Farms
Technological					
Non-availability of suitable varieties	2.00	1.92	2.10	2.54	2.09
Poor crop germination	1.44	1.38	1.64	1.38	1.54
Lack of irrigation facilities	2.44	2.84	2.78	2.77	2.77
Incidence of diseases	2.78	3.05	3.19	3.46	3.15
Incidence of insect pests	2.11	2.00	2.21	2.44	2.20
Weeds infestation	2.89	3.11	3.24	3.23	3.19
Poor quality of soils	2.56	2.81	2.67	3.08	2.73
Agro-climatic factors					
Drought at critical stages of crop growth	3.67	3.46	3.67	3.92	3.64
Excessive rains	1.44	1.73	1.88	1.85	1.81
Extreme variations in temperature	3.22	3.22	3.40	3.54	3.35
Poor pod/grain setting	2.56	2.92	2.81	3.31	2.87
Risk of crop failure/yield variability due to biotic & a biotic stresses	3.11	2.89	2.87	3.23	2.92
Economic					
High-input costs (diesel, fertilizers, agrochemicals)	3.33	3.19	3.21	3.54	3.24
Shortage of human labour	2.67	2.92	2.55	2.62	2.65
Low and fluctuating prices	2.78	2.95	2.80	2.85	2.84
Price risks –fear of glut leading to low price	0	0	0	0	0
Oilseeds less profitable compared with other crops	1.11	1.19	1.40	1.31	1.32
Oilseeds less more risky compared with other crops	1.11	1.24	1.29	1.31	1.27
Institutional					
Problem of timely availability of seed	1.89	2.24	2.32	2.31	2.27
Non-availability of other inputs	1.56	2.22	2.15	2.15	2.13
Poor quality of inputs	2.00	2.32	2.13	2.31	2.19
Lack/poor extension services	3.33	3.19	3.21	3.54	3.24
Non-availability of institutional credit	1.11	1.24	1.29	1.31	1.27
Inadequate knowledge about disease and pest management	2.78	3.00	2.81	3.00	2.87
Irregular supply of power/electricity	3.78	3.54	3.49	3.46	3.52
Lack of awareness of improved oilseed technologies	3.22	3.00	3.15	3.23	3.13
Post-harvest, Marketing and Value-addition					
Poor marketing system and access to markets	1.89	2.43	2.46	2.38	2.41
Lack of information about prices and markets	3.33	3.19	3.21	3.54	3.24
Exploitation by market intermediaries	2.33	3.14	2.95	3.31	2.99
Lack of processing facilities in the area	2.78	3.30	3.10	3.46	3.16
Lack of appropriate transport means	1.11	1.24	1.29	1.31	1.27
Inadequate storage facilities	2.33	2.59	2.47	2.23	2.47
Poor road infrastructure	1.89	2.30	2.40	2.62	2.36
High transportation costs	1.67	1.62	2.02	2.38	1.93

Note: Composite index has been constructed based on weights (Severe=4, Moderate=3, Minor=2 and Not important=1) and number of households in each category.

Source: Field Survey

Table 4.17 B
Constraints in Cultivation of Oil Palm Crop

(Composite index Value)

Constraints	Marginal	Small	Medium	Large	All Farms
Technological					
Non-availability of suitable varieties	2.43	2.00	2.24	2.20	2.19
Poor crop germination	2.29	2.20	2.24	1.90	2.19
Lack of irrigation facilities	2.86	2.45	3.05	2.70	2.83
Incidence of diseases	2.71	3.10	2.66	2.80	2.80
Incidence of insect pests	2.86	2.75	2.39	2.40	2.53
Weeds infestation	2.86	2.55	2.39	2.50	2.49
Poor quality of soils	2.86	2.40	2.13	2.10	2.27
Agro-climatic factors					
Drought at critical stages of crop growth	2.43	2.65	2.53	2.50	2.55
Excessive rains	2.29	2.45	2.32	2.00	2.31
Extreme variations in temperature	3.29	3.25	3.03	3.30	3.15
Poor pod/grain setting	0	0	0	0	0
Risk of crop failure/yield variability due to biotic & a biotic stresses	2.43	2.20	2.21	2.60	2.28
Economic					
High-input costs (diesel, fertilizers, agrochemicals)	3.43	3.60	3.47	3.40	3.49
Shortage of human labour	3.86	3.55	3.34	3.80	3.51
Low and fluctuating prices	0	0	0	0	0
Price risks –fear of glut leading to low price	2.43	2.45	2.21	3.10	2.41
Oilseeds less profitable compared with other crops	2.00	2.20	2.34	2.30	2.27
Oilseeds less more risky compared with other crops	1.71	2.15	2.00	2.40	2.07
Institutional					
Problem of timely availability of seed	0	0	0	0	0
Non-availability of other inputs	3.43	3.05	2.97	2.80	3.01
Poor quality of inputs	2.57	2.65	2.87	2.90	2.79
Lack/poor extension services	2.57	2.90	2.55	2.60	2.65
Non-availability of institutional credit	2.43	2.40	2.58	2.10	2.45
Inadequate knowledge about disease and pest management	2.71	2.65	2.39	2.70	2.53
Irregular supply of power/electricity	3.00	3.20	3.45	3.50	3.35
Lack of awareness of improved oilseed technologies	2.86	2.75	2.68	3.10	2.77
Post-harvest, Marketing and Value-addition					
Poor marketing system and access to markets	2.71	2.40	2.37	2.50	2.43
Lack of information about prices and markets	2.00	2.40	2.55	2.70	2.48
Exploitation by market intermediaries	0	0	0	0	0
Lack of processing facilities in the area	1.11	1.24	1.29	1.31	1.27
Lack of appropriate transport means	2.57	2.50	2.58	2.30	2.52
Inadequate storage facilities	0	0	0	0	0
Poor road infrastructure	3.43	3.30	2.92	3.00	3.08
High transportation costs	3.43	3.45	3.42	3.40	3.43

Note: Composite index has been constructed based on weights (Severe=4, Moderate=3, Minor=2 and Not important=1) and number of households in each category.

Source: Field Survey

Among economic and institutional constraints, high input costs, shortage of human labour, irregular supply of electricity and problem of timely availability of seed and lack of awareness of improved oil seed technologies were found to be the major problems. As far as the issues of post-harvest, marketing and value addition, the groundnut sample farmers have faced problems due to exploitation by market intermediaries, poor marketing system and access to markets lack of processing facilities in the area, lack of information about prices and markets and inadequate storage facilities. All groups of farmers have expressed poor marketing system and access to markets and exploitation of market intermediaries besides irregular power supply, un aware new technologies and seeds are not available in time are the institutional problems.

Table 4.17A depicted major constraints faced by the sunflower sample farmers on various fronts such as technology, climate factors, economic, institutional and poor harvest and marketing problems. Among technological constraints incidence of diseases, lack of irrigation facilities and weed infestation were the major constraints of our sample farmers. Incidence of diseases and weeds infestation has affected more to large and medium farmers. Among the agro-climatic factors, extreme variations in temperature and drought at critical stage of crop growth were found major constraints for the sample farmers. Among economic and institutional constraints reveals such as high input costs, low and fluctuating prices irregular power supply, lack of awareness of improved oil seed technologies and shortage of human labour, and problem of timely non-availability of seed and poor extension services were the major institutional constraints. Regarding post harvest, marketing value addition, the sample farmers have faced problems due to lack of processing facilities in the area, exploitation of market intermediaries and lack of information about prices and markets.

Table 4.17B reveals the constraints faced by the sample farmers under oil palm crop. The major technological constraints expressed by the sample farmers such as lack of irrigation facilities incidence of diseases and weeds infestations. Medium and large farmers exclusively effected more above constraints under oil palm crop. On the other hand extreme variation in temperature one of the main problems among agro-climatic factors. Among economic and institutional constraints High-input costs and shortage of labour were major constraints under economic conditions. Poor quality of inputs, irregular power supply and lack of awareness of improved oil seed technologies were the major institutional constraints. The constraints about post-harvest, poor marketing system access to market poor road infrastructure and high

transport costs besides lack of grading of oil palm production (FFB) at the time sale at the collection centres were the major problems expressed by the farmers.

4.10 Suggestions for improving production and productivity of Oilseeds:

The sample farmers from three selected crops (Groundnut, Sunflower and Oil palm) have expressed their suggestions for improvement in area and yield of oilseed crops in the state. Different farmers have expressed different issues based on his experiences about the cultivation of oilseed crops and made some suggestions for improving production and productivity of oilseeds. As presented in Table 4.18. Among the 475 sample farmers highest 58 percent of farmers suggested that suitable good quality seeds/HYV seeds, fertilizers and pesticides should supply at subsidized prices by the government and regular power supply at least 10 hours a day is required for better production of oil seeds. About 53 per cent of respondents have suggested to expand the irrigation facilities through sanction of subsidized bore wells by the government sponsored schemes. Near about 52 per cent of farmers have also expressed that more subsidy on fertilizer, seeds and other inputs, 46 per cent of farmers opined that there is need for extension services and advises of agricultural officers for sorting out their farm related problems.

Table 4.18

Suggestions for Improving production and productivity if Oilseeds (% of farmers with YES in respective Farm Category)

S.No		M	S	M	L	All
1	Provide/need good quality seeds and improved variety seeds, fertilizers and pesticides	52	58	68	65	61
2	Reduce or stabilize the prices of chemicals fertilizers, seeds and other inputs	25	29	32	44	32.5
3	Timely availability of fertilizer, insecticide, herbicide, pesticide in proper quality at proper price	29	19	36	32	29
4	Need of crop infrastructure/weather insurance to deal with natural calamities	40	48	52	64	51
5	Electricity should be made available on regular basis for longer duration/low voltage problem should be solved	54	60	66	64	61
6	Largely specify MRP of insecticides and pesticides	0	0	0	0	0
7	Government should provide training to farmers	0	0	0	0	0
8	Good irrigation facilities should be provided	49	52	54	48	53
9	Requirement of irrigation facilities in Rabi and Summer	35	32	38	46	37
10	Subsidy requirement for irrigation in selected oilseed crops	0	0	0	0	0

11	Government should provide more subsidy on fertilizer, seeds and other inputs	54	34	58	64	52
12	Need for better godown and storage and green house facilities	34	32	48	55	42
13	Need of organic fertilizers for better production	0	0	0	0	0
14	Requirement of extension services/advise of agriculture supervisors	45	42	45	52	48
15	Need of laboratory for farm level testing of soil, seeds, land types, use of insecticide/pesticide	12	21	32	46	28
16	Need of raising awareness level about marketing facilities/ government schemes/crop diseases	20	34	42	56	38
17	Need of better infrastructure facilities like road and transport facilities with reasonable charges on the services	15	19	24	22	20
18	Outlets for sale of seeds/fertilizers/pesticides and other inputs should be opened by government to reduce efforts of private agents	25	24	42	51	35.5
19	Need of better prices of crop output/need to increase MSP	32	38	47	56	43
20	Need assistance for land development/improvement in soil fertility/reducing soil salinity	0	0	0	0	0
21	Need better pesticides/plant protection chemicals for crop diseases.	16	22	18	29	21
22	Need assistance for fencing so as to protect from animals and birds	19	22	21	25	22
23	Stabilize the prices of essential commodities	0	8	12	14	8
24	Steps should be taken to reduce the influence of middlemen/intermediaries.	35	31	62	46	44
25	The problem of shortage of agricultural labour should be addressed	25	29	36	42	33
26	Better provision of marketing facilities in nearby areas in required	36	42	35	58	43
27	Creating more WHS's like dugwells, pond, cross bund etc/expansion of irrigation from canal	21	24	18	14	19
28	Need of assistance to cope with increased occurrence of natural calamities like drought, rainfall variability and temperature variability due to climate change	45	26	48	54	43
29	Need of assistance to cope with extreme temperature variability	8	11	12	21	3
30	Need to assistance to reduce the transport cost	0	7	9	12	7
31	Drip irrigation technology should be promoted	12	20	25	28	21
32	Credit from commercial banks and cooperative	0	0	0	0	0
	Bank should be made available					
33	Need of processing units in nearby areas	32	48	41	54	44
34	Need better land refer measures	0	0	0	0	0

Source: Field Survey

About 44 per cent of farmers expressed that government should control the middleman/intermediaries and purchase the total output through government agencies. About 43 per cent of farmers expresses that crop insurance due to natural calamities like drought, floods, heavy rainfall, variability and temperature variability due to climate change and marketing facilities in nearby areas about 44 per cent of farmers suggested need for processing facilities nearby areas then only generate employment to the rural areas and also reduce the middlemen and village traders. About 28 per cent of sample farmers suggested need for soil testing laboratories at mandal level to promote the soil test based fertilizer recommendations. 22 per cent of farmers opined the problems of exclusively groundnut crop damage by forest pigs and sunflower crop by birds and other major problem repeatedly arose every year,

To summarize the above major problems bring faced by the sample farmers to overcome these constraints, mainly economic and institutional constraints namely in adequate seed supply, fertilizer and pesticides are not being supplied to the farmers at subsidized prices by the government. Irregular supply of high input costs, shortage of human labour farm mechanization and field staff were found to be the major problem. Lack of irrigation facilities, extreme variations in temperature, natural calamities. With regard to the issues of post harvest techniques, marketing facilities, in adequate storage facilities, exploitation of market intermediaries, lack of processing units. Enhancement of the MSP is required every year according the input market prices. Large proportion of sample farmers have suggested to overcome the major constraints through the government policy instruments to increase the production and productivity of oilseeds in Andhra Pradesh.

CHAPTER – V

CONCLUSIONS AND POLICY IMPLICATIONS

5.1 . Introduction:

This chapter separated in two sections. The first section highlights the summary of findings discussed in the preceding chapters of the study based on secondary data. The second section contains specific policy recommendations are suggested for the improvement in production and productivity of oilseeds in Andhra Pradesh and across the districts. The special focus was attempted on the study crops of Groundnut, Sunflower and oil palm of the sample districts of Andhra Pradesh state.

5.2 Summary of Findings:

5.2.1 Major Objectives of the study:

The study was a major part of coordinated study on problems and prospects of oilseeds and oil palm production in India. The major objectives of the study for the state of Andhra Pradesh were (1) To examine the trends and pattern of growth of different edible oil seeds over a period of time and across districts and identify the sources of growth in edible oilseeds output in Andhra Pradesh. (2) To determine the impact of price and non-price factors influencing the supply response behavior and demand for edible oilseeds in the state and (3) To identify and suggest policy options to increase oilseeds production and productivity in the state. Regarding the first two objectives of the study, secondary data on district-wise area, production and yield of major oilseed crops/crop groups, irrigated area under oilseeds, farm harvest prices of selected oilseeds and oils (Groundnut, Sunflower and oil palm) and competing crops, were used from 1971-72 to 2009-10 in the state. Detailed study made regarding growth patterns and sources of growth of edible oils, supply relations of major oilseeds in the state. The second section has been concentrated on major constraints in the state through primary data of sample households growing oilseed crops in selected districts were collected and analyzed.

5.2.2 Data and Sampling Design:

The multistate, purposive sampling method was used to select the states, districts, mandals and farm houses. At first stage, states growing considerable quantities of oilseeds (Area, Production) and having potential for further growth were selected. Seven major oilseeds producing states were selected for the study. Andhra Pradesh along with Gujarat and Maharashtra for Groundnut crop, Sun flower and oil palm crops have selected exclusively in Andhra Pradesh state for the detailed study. The study of these three major oil seed crops

(Groundnut, Sunflower and Oil palm) are found to be major oilseed producing districts in the state. So these crops have taken to generate better understanding of the specific problems and prospects of oilseeds cultivation in Andhra Pradesh and across the districts in the given period.

In the second stage, districts and mandals that grow significant quantities of area and production of oil seeds were selected in the state. Selection of district based on acreage and yield of the selected oilseed crops namely Groundnut, Sunflower and oil palm. In the next stage an appropriate number of households representing different farm sizes and socio-economic groups cultivating oil seeds have covered from each selected village from the selected mandals. From each selected crop three districts were selected. The selection of districts, mandals and villages for household survey were conducted with coordination of Government officers from Agricultural and horticultural departments of concerned districts in the state of Andhra Pradesh. The selection of districts in the state were categorized into four groups, such as High area and high yield (HH), High area and Low yield (HL), Low area and High Yield (LH) and Low area and Low Yield (LL).

Groundnut: The state of Andhra Pradesh consisting 23 districts and Ananthapur district cultivating largest area grown under groundnut crop but the yield per hectare is low in the state. So the Ananthapur district considered as high area and low yield (HL). Mahabubnagar also considered as one of the district farming high area and high yield (HH) under groundnut crop and the Srikakulam district having low area and high yield (LH) among groundnut producing districts in the state.

Sunflower: Sunflower is another important oilseed crop and second largest area and production after groundnut crop of total oilseed crops in the State. Across the districts Kurnool, Prakasam and West Godavari were selected from Andhra Pradesh state as HL, HH, LH category of districts respectively.

Oilpalm: Oil palm is another important oilseed crop was introduced in the state in 1986 and stands first in area and production of the country. Across the districts the selection was made Vizianagaram, West Godavari and Nellore districts considered as HL, HH and LH category for detailed study in the state. About 26 villages from 17 mandals were selected from nine districts were covered to get the required number of sample households (475) representing

different farm groups (marginal <1 ha, Small 1-2 ha, medium 2-10 ha and large > 10 ha). The reference year of the study for household survey was 2011-12 in Andhra Pradesh.

5.2.3. Data Analysis Methods and Tools:

Secondary data used for the estimations of average percentages, co-efficient of variations and compound annual growth rates. The compound annual growth rate was estimated by fitting semi-log trend equation which was estimated by applying ordinary Least Square (OLS) method and t' was performed to test the significance of ' β '. To measure the relative contribution of area and yield towards the change in total output of individual crops. The decomposition analysis was made for major oilseed crop of Groundnut and competing crop (maize). The estimation has helped in identifying the sources of growth in output by breaking the change in production into three effects i.e. area effect, yield effect and interaction effect.

The decomposition analysis was carried out on the major oilseed crop and competing crop in the state mainly for three periods i.e. period I (TE 1983-84 to TE 1993-94) period – II (TE 1993-94 to TE 2009-10) and overall period of TE 1983-84 to TE 2009-10. The first period (TE 1983-84 to TE 1993-94) the expansion of area under oilseeds was encouraged by introduction of Technology Mission on Oilseeds (TMO) in 1986 by Government of India.

To know the output growth, from different sources in different periods namely annual rainfall, High Yielding seeds supplied by the government at subsidy rates, fertilizer consumption, subsidy inputs supplied by the government, farm harvest prices and minimum support prices have also been analyzed. Besides log-linear regression model was used to examine the effects of variation in major agricultural inputs on crop yield of selected crops Groundnut, Sunflower and Oil palm and their competing crops (maize, cotton) separately. The relative contribution and significance of the major factors such as area under crop, seed cost, fertilizer cost, pesticide/insecticide cost, human labour, irrigation changes to change in yield of major oilseed and competing crop for sample farmers have been examined.

Semi log-linear regression model was used to assess the acreage allocation between main crops and competing crops of the sample farmers (Groundnut, Maize and Sunflower, cotton). Major price and non-price factors that actually influenced the farmers decision to allocate the available cultivable area for different crops were taken into account as explanatory variables and the area allocated for the sample crops of Groundnut and Sunflower was

considered as the dependent variable. The explanatory variables for the fitted regression model were, one year lagged area of Groundnut (A_{t-1}) relative yield of Groundnut (Y_{t-1}) relative price of Groundnut (P_{t-1}) lagged area of Maize (AC_{t-1}) relative yield of Maize (YC_{t-1}) and the relative price of maize (PC_{t-1}) and the same regression model used in other main oil seed crop of Sunflower and competing crop cotton.

5.2.4. Overview of Oilseed Sector: Current Status and Growth Behaviour:

5.2.4.1. Nature and Causes of Change in Cropping Pattern:

The state Gross Cropped Area (GCA) of major agricultural crops had increased from 12.73 million hectares to 13.32 million hectares of the period TE 1973-74 to TE 2009-10). The largest area under major agricultural crops namely Rice, Wheat, Coarse Cereals, Pulses, Groundnut, Soyabean, Sunflower, Oilpalm, Cotton and Sugarcane in the state. Food grain crops area had declined drastically from 9.70 mil.ha (TE1973-74) to 7.17 mil.ha (TE 2009-10) moreover the share of food grain crops area to GCA have declined contentiously in all estimated periods of the State. (TE 1973-74, 1983-84, 1993-94, 2003-04 and 2009-10). Among agricultural crops Rice is a major cereal crop and principal crop and the area had increased slightly from 3.12 mil.ha to 3.94 mil.ha and the share of GCA significantly increased from 24.51 to 29.58 per cent in the state during TE 1973-74 to TE 2009-10. Pulses is another major food crop and the area increased from 1.36 mil. ha to 1.94 mil.ha and its share in total GCA had constituted an increasing trend 10.68 to 14.56 per cent. Whereas the area under Coarse Cereals and the percentage to GCA had declined in all estimated periods between TE 1973-74 to Te 2009-10 in the state of Andhra Pradesh.

Groundnut, Sunflower, soyabean and oil palm are major edible oil seed crops in the state. The total oilseed crops area have been changing in all estimated periods in the state. But the total period reported the area had increased slightly from 2.20 mil.ha to 2.44 mil.ha and its share in GCA also increased 17.28 to 18.32 per cent between TE 1973-74 to TE 2009-10. Particularly there was impressive improvement in area 3.24 mil.ha in the period TE 1993-94 than other estimated periods in the state. Groundnut is the major oilseed crop and the area had slightly increased 1.48 mil.ha to 1.62 mil.ha and the share of GCA had also increased 11.65 per cent to 12.16 per cent in the state between the period TE 1973-74 to TE 2009-10. The overall oilseed crops area expansion have taken place due to HYV seeds irrigation facilities, Free power supply, loans issued at low interest by the nationalized banks to farm sector, extension

of agricultural technology expand the dissemination activity by the agricultural and horticultural departments besides the schemes introduced by the state and central government to support the farming sector.

The GCA had declined from 13.06 million ha. (TE 1983-84) To 12.88 and 12.23 mil.ha during the periods of TE 1993-94 and TE 2003-04. Similarly the Net Sown Area (NSA) reported the same trend was observed i.e. 10.62 and 10.05 mil. ha (TE1993-94 and TE 2003-04). On the other hand the Gross Irrigated Area (GIA) and Net Irrigated Area (NIA) have increased successfully of all estimated periods except the period TE 2003-04 in the state. Among all estimated periods TE 2003-04 the growth in GCA, NSA,GIA and NIA had declined compared to other estimated periods TE 1973-74, TE 1983-84, TE 1993-94 and TE 2009-10) in the state. On the other hand change in GCA had increased 5.85 lakh ha. and GIA had also increased marginally 24.25 lakh ha. in the state between TE 1973-74 to TE 2009-10. The period of TE 2003-04 to TE 2009-10 reported that there was a significant change in both GIA and NIA. Whereas NIA recorded highest change around more than doubled 14.82 lakh ha. from TE 1973-74 to TE 2009-10. Further crop intensification difference between (GCA-NSA) and (GIA-NIA) significantly increased in all estimated periods except TE 2003-04 period of the state.

5.2.4.2. Growth Trends in Area, Production and Yield of Major Oilseeds:

The average annual area under oilseed crops has been increasing from 19.21 lakh ha. in 1970's to 24.97 lakh ha. in 1980's and 29.56 lakh ha. in 1990's further it declined 25.95 lakh.ha in 2000's. On the other hand similar trend has been observed in the case of oilseed production but the average yield has increased from 707.96 kg/ha to 843.79 kg/ha in 1970's and 1980's further it declined 773.59 kg/ha in 1990's and in 2000's the average yield has slightly increased to 799 kg/ha in the state. But the period between 1990's to 2000's the average area and production have declined 29.56 lakh ha to 25.95 lakh.ha and 23.02 lakh tonne to 20.77 lakh tonnes in the state. The Annual Growth Rate of Area and production of oilseeds exhibited negative growth during 1970's and 1990's in the state. But annual growth in area increased 5.20 per cent in the period 1980 and it slightly increased 0.10 in 2000's. The similar fall and rise in growth of production and yield under oilseeds is also noticed that 8.70 per cent in 1980s and 5.90 per cent in 2000's more over the yield growth reported 3.30 per cent in 1980's and 5.80 per cent in 2000's. So the yield growth rate is highest in the period 2001-02 to 2009-10 compared to other estimated periods in the state.

The district level analysis of area and production of oilseeds revealed that the highest share in area to total area under oilseed crops in the state obtained mainly the district of Ananthapur, following Nizamabad and Adilabad had increased during TE 1993-94 to TE 2009-10. But the total oilseed crop area has declined from 33.17 lakh ha to 24.72 lakh ha. in the state. On the other hand production had marginally increased from 23.56 lakh tonnes to 27.47 lakh tonnes. Moreover the districts of Ananthapur, Mahabubnagar, West Godavari, East Godavari and Nizamabad revealed the share of oilseeds production increased marginally during the period TE 1993-94 to TE 2009-10 in the state due to oil palm crop production in coastal Andhra region.

5.2.4.3. Variability in Area, Production and Yield of Major Oilseed (Groundnut Vis-à-vis Competing crop Maize and Sunflower vis-à-vis competing crop Cotton):

Major changes have been found across the districts with respect to area and production of oilseeds between the two reference periods (TE 1993-94 and TE 2009-10). The districts of Ananthapur, Kurnool, Mahaboobnagar, Chittoor and Kadapa have occupied first five positions about area under oilseeds in the state constituted for about 65 per cent in TE 1993-94, further these districts share had increased marginally to 74.45 per cent in TE 2009-10. But the actual oilseed crop area of these five districts had declined from 21.51 lakh ha. to 18.14 lakh ha. from TE 1993-94 to TE 2009-10 in the state. In the case of production share to total oilseed production across the districts of Cuddapah, Chittoor, Kurnool and Ananthapur occupied the first four positions in the state (TE 1993-94). Whereas the year TE 2009-10 Ananthapur, Kurnool, West Godavari and Mahabubnagar obtained the first four positions in total oilseed production in the state. The districts of Cuddapah and Chittoor the share of oilseeds production share had declined drastically between TE 1993-94 to TE 2009-10 but the total oilseed production has increased 23.56 lakh tonnes to 27.47 lakh tonnes between TE 1993-94 to TE 2009-10 in the state.

With regard to crop wise, Groundnut crop is the major oilseed crop and the districts of Rayalaseema region (Ananthapur, Kurnool, Chittoor and Kadapa) share of Groundnut to total state Groundnut crop area has increased 67% to 80% but the actual state total acreage declined from 16.12 lakh ha. to 13.64 lakh ha. during TE 1993-94 to TE 2009-10 due to oil seed crop acreage has also come down during the period in Andhra Pradesh. On the other hand Ananthapur, Kurnool, Chittoor, Kadapa and Mahabubnagar districts the production of groundnut revealed the first five positions of the two reference periods and the percentage share to total

production increased from 67.5 to 79 per cent. The sunflower crop is attained the second important oilseed crop in the state and the districts of Kurnool, Kadapa and Ananthapur districts cultivated 66.7 per cent of total sunflower grown area and in respect of production, 60 per cent in these three districts of the state (TE 2009-10). Among oilseed crops Soyabean is another important oilseed crop and 98 per cent of area and 99 per cent of production contributed from two districts Adilabad and Nizamabad from Telangana region in Andhra Pradesh (TE 2009-10). About Oil palm crop area and production recorded the highest share of acreage and production constituted about 78.1% and 81.4% from the districts of West Godavari, East Godavari and Krishna in the state during TE 2009-10, besides castor is important non-edible oil seed crop in the state. The compound Annual Growth Rate (CAGR) in area and production was considerably high constituting 12 per cent and 8 per cent in 1960's compared to other estimated periods. On the other hand main competing crop maize area and production growth rate had increased during 1990's and 2000's periods. In the case of Sunflower crop, the overall CAGR (1991-92 to 2009-10) about area, production and yield growth rate was less than the major competing crop (Cotton) growth in the state.

The state irrigated area of oilseed crops have slightly declined from 5.95 lakh ha. to 5.69 lakh ha. Between TE 1993-94 to TE 2009-10). Across the districts the percentage of irrigated area under oilseed crops increased marginally from the districts of Mahabubangar (15.7%), Cuddapah (10.43%), West Godavari (8.16%), Nizamabad (7.22%) and East Godavari (4.41%). The districts of Kurnool, Warangal, Karimnagar, Nellore, Khammam, Nalgionda, Chittoor, Ananthapur, Prakasam and Guntur the percentage of irrigated oilseeds area declined between TE 1993-94 to TE 2009-10 in the state. The government of Andhra Pradesh have been launching several schemes to extend the irrigation facilities to the farm sector in the state. But the irrigated lands converted from oilseed crops into high income or commercial crops like Cotton horticultural crops and other cash crops.

In the case of area under groundnut crop Ananthapur, Kurnool, Kadapa, Chittoor and Mahabubagar shown the highest share of total Groundnut area and production in the state from TE 1983-84 to TE 2009-10 (exclude oil palm crop). Therefore Rayalaseema region obtained major share of Groundnut area and Production of the state total area and production more over share in edible oil seed acreage and production also revealed the highest share in states oilseed acreage and production. In the case of irrigated Groundnut area to total Groundnut crop area in the state has declined slightly from 19.28 to 19.04 per cent (TE 1983-84 to TE 2009-10) and

across the districts West Godavari, Nellore, Nizamabad, Rangareddy, Medak, Karimnagar, Adilabad have been increasing the share of irrigated Groundnut area to total Groundnut in all estimated periods. The districts of Rayalaseema region (Kurnool, Ananthapur, Kadapa, Chittoor) having less than 20 per cent of irrigated area to total Groundnut area in the estimated periods of TE 1993-94, TE 2003-04 and TE 2009-10 moreover among the districts Ananthapur district is the lowest irrigated groundnut to total groundnut crop area of all the districts in all estimated periods in the state. On the other hand the share of irrigated groundnut grown area to total irrigated area of the state has declined from 6.25 per cent to 4.93 per cent in the state (TE 1983-84 to 2009-10). Across the districts Mahabubnagar reported the highest above 20 per cent irrigated Groundnut area grown than other twenty two districts in the state of all estimated periods, besides Kurnool, Ananthapur, Chittoor and Kadapa from Rayalaseema region cultivating highest percentage of irrigated groundnut to the irrigated area of other districts in all estimated periods of TE 1973-74, TE 1983-84, TE 1993-94 and TE 2003-04 and TE 2009-10 respectively in the state.

There has been a wide variations in growth rate positions of the districts in terms of area, production and productivity of Groundnut crop of all estimated periods in 1980's, 1990's 2000's and the total period 1981-82 to 2009-10. The growth rate has been changing from period to period of all districts in case of area, production and yield. Only Adilabad district got significant positive growth in area, production and yield of all estimated periods (1980's, 1990's, 2000's and 1981-82 to 2009-10), except the period 1990's reported negative growth in the case of area from Adilabad district of the state.

5.2.4.4 Sources of Growth in output of Oilseeds in the State:

With the help of decomposition analysis the relative contribution of area, yield and interaction towards the total change in production of major oilseeds and competing crops was assessed. Among the three effects i.e. area effect, yield effect and interaction effect. The area effect was dominant to increase oilseed production in the state including sample districts during period I and period II and total period (TE 1983-84 to TE 2009-10), except period II Ananthapur and period III Mahabubagar districts in the state, which was encouraged by the centrally sponsored schemes and state plan schemes besides introduction of oil palm cultivation in the state are the cause to extend the oilseed grown area for the growth of oilseeds production.

Among the study districts Mahabubnagar yield effect influenced the groundnut production in period – I (TE1983-84 to TE 1993-94) Period II (TE 1993-94 to TE 2009-10) and total periods TE 1983-84 to TE 2009-10), area effect was dominant in the study districts of Ananthapur and Srikakulam to increase the groundnut production of three estimated periods except period II in Ananthapur district. Further the table shows that the main competing crop (maize) in period I (TE1983-84 to TE 1993-94) yield effect was dominant in Andhra Pradesh as well as Srikakulam and Ananthapur districts. Whereas the period II the area influenced the state and Mahabubnagar district and interaction effect had influenced the other two study districts of Srikakulam and Ananthapur to increase the maize production. In the case of area effect was dominant of three districts (Srikakulam, Ananthapur and Mahabubnagar) influenced the cause for growth in maize production in the total period (TE 1983-84 to TE 2009-10). So it can say that the area extend the maize crop grown area in three selected districts of the state.

5.2.4.5. Variability in Monthly/Annual Prices of Major Oilseeds in the State:

The growth in Farm Harvest Prices (FHP) and Minimum Support Price (MSP) of oilseed crops have been increased in three periods. About the FHP under groundnut crop in higher than MSP in the year TE 1988-89, TE 2000-01 and TE 2009-10 of the state. The FHP of Sunflower crop was not available but the MSP has been increased in all the periods. About the Sesasum and Saff-flower FHP also revealed more than the MSP during the period TE 2009-10 in Andhra Pradesh.

As far as the case of major oilseed and the major competing crop is concerned, the variability in price of groundnut interms of CV of annual wholesale price was found to be 11.82 per cent, while the coefficient of variable of annual wholesale price of main competing crop (maize) was 9.34 per cent in the state. The variability of maize interms of CV was found to be more during the months of February, August, September and December. On the other hand the groundnut record price was reported on November and December months. In the case of Sunflower the annual price was lower than the major competing crop (Cotton). The C.V of annual wholesale price of Sunflower was 10.48 per cent in 2012, while the coefficient of variation of annual wholesale price of cotton was 7.22 per cent. Whereas the variability in price of Sunflower interms of C.V. was found to be relatively more in the month of June 15.98 per cent and August 16.17. On the other hand variability of major competing crop Cotton interms of C.V was found to be relatively more during July, August, September and October in 2012. The actual price per quintal cotton crop was reported more than the Sunflower oilseed price

throughout the year in the state during 2012. On the other hand the variability in price of Groundnut and interms of C.V. was found to be relatively more than the major competing crop of maize in the state during 2012.

5.2.5. Problems and Prospects of Oilseeds Production:

5.2.5.1. Socio-Economic Status of Sample Households:

Total sample was 475 households (HH) taken from three oilseed crops namely Groundnut (250), Sunflower (150) and Oil palm (75) from nine districts in the state of Andhra Pradesh for household survey during 2011-12. Across the farmer groups highest number of HH selected from medium farmer 130 HH, from Groundnut 91 HH and 31 HH from sunflower and Oil palm crops. The average household size for entire sample was approximately 4.2 to 4.8 members and per annual off-farm income of average HH received the highest Rs.84,283 from Groundnut crop followed by Rs.62,100 and Rs. 69,867 from Sunflower and Oil palm. More over 95 and 97 percent of members expressed the crop farming as a main occupation under Groundnut and sunflower crops. On the other hand 69 per cent of members reported from oil palm crop. Further the study found average number of years of schooling more or less 8 years from the selected farmer groups. In the case of social groups all caste groups i.e. general, OBC and SC/ST considered for household survey from Groundnut, Sunflower and Oil palm crops.

The Net Sown Area (NSA) and Gross Cropped Area (GCA) of a groundnut and sunflower sample HH were found to be 2.66 ha. and 3.29 ha. and 3.65 ha and 4.00 ha whereas the oil palm HH NSA 4.25 ha and GCA 4.23 ha respectively. The size of operational holding under groundnut farmers revealed from small, medium and large farmers was 1.34 ha, 3.19 ha and 11.44 ha. And the Sunflower crop farmers was 1.5 ha, 3.64 ha and 11.77 ha. moreover Oil palm farmers own land was 1.49 ha. , 3.42 ha from small and medium and 15.23 ha from large farmers group respectively. On the other hand the area under irrigation shows less than 50 per cent of GCA under groundnut crop (37.25%) and Sunflower (41.9%) whereas oil palm crop area under irrigation to GCA was found to be good (96.94%) respectively.

As regards the land tenancy under groundnut crop about 8 per cent of HH of total operated area. The terms of leasing 100 percent HH reported fixed rent in terms of cash. On the other hand sunflower crop 19.3 per cent HH were having leasing in land constituted 15.24 percent of Sunflower total operated area. The terms of lease for about 86 per cent of HHs with

leased in lands was fixed money in cash and for remaining 13.8 per cent HH's it was share cropping expressed by the farmers. About oilpalm crop except one farmer from medium farming group was having leased-in-land constituting 0.25 per cent of total operated area and payment of lease was fixed rent in cash. So there was no problem about incidence of lease under oilpalm crop besides very small extent of leased-in land was found under groundnut and sunflower crops of total sample farmers.

Regarding the sources of irrigation are concerned 94.16 per cent and 5.84 per cent of total operated area of sample farmers was irrigated by tube wells, ponds and rivers under groundnut crop and 80.2 per cent of total operated area of sample farmers under sunflower crop was irrigated by tube wells followed by canals 18 per cent and 1.7 per cent other irrigation sources. About the Oil palm crop the total cropped area under oil palm crop farmers irrigated by tube wells. So tube well was the major source of irrigation of our sample HH because the government has been providing the free power supply to farm lands as well as subsidy bore wells were sanctioned to the marginal and small farmers through APMIP scheme in the state.

5.2.5.2 Cropping Pattern and Yield of Major Crops:

The GCA per HH under groundnut farmers was 3.29 ha. whereas the large farmers had highest GCA 13.72 ha. The per HH area under Kharif crops and Rabi crops cultivated by the sample farmers was 2.53 ha. and 0.74 ha respectively. Among various Kharif crops the share of oilseeds and among kharif oilseed crops found that the groundnut was the major oil seed crop cultivated by Groundnut crop sample farmers were about 62.05 per cent and mostly 52 per cent area un irrigated. Among Rabi oilseeds groundnut was the only oil seed crop and 97 per cent of area covered by this crop and 51 per cent of area grown under un-irrigated conditions. On the other hand the average yield of groundnut kharif and rabi crops under rainfed conditions was 11.72 quintal and 16.5 quintal in irrigated area whereas the average yield under rabi groundnut crop under irrigated conditions was 21.56 quintal per ha. respectively.

Sunflower:

The cropping pattern of Sunflower sample HH and their percentage share to the respective crop groups are presented in Table 4.6A. The GCA per HH was 4.00 ha. for all farmers taken together. Whereas the large farmer had highest GCA 10.47 ha, followed by 1.49 ha. 2.15 ha. and 4.02 ha. from marginal, small and medium farmers. About overall per HH area was 1.18 ha. under Rabi oilseeds and the Sunflower crop acreage was 1.16 ha. Whereas

the average per HH area under sunflower crop Rabi acreage was lowest 0.14 ha of the sample farmers. In the case of yield average per HH more or less equal in both Kharif and Rabi seasons of Sunflower crop.

Oil Palm:

Gross cropped area per HH under oil palm sample farmers was 4.23 ha. whereas the large group farmer had highest GCA of 14.98 ha. followed by 0.92 ha., 1.49 ha. and 3.4 ha. from marginal small and medium farmers group. The average per HH area under kharif and rabi crops were 0.22 ha. and 3.99 ha. respectively. Oil palm is the major oil seed crop area was irrigated 95.74 per cent and the average yield was 15.85 quintals per ha. and small farmer group yield per hectare was 14.7Q/ha.

5.2.5.3. Production, Retention and Marketed Surplus Pattern of Oilseeds:

Across the farmer groups, a large farmer group average HH produced as large as 66.11 quintals and 48.55 quintals in two seasons of kharif and rabi seasons. It was found that on the whole average HH sold 18.49 Q at the average price of Rs.4310 per quintal. About 1.13 quintals of groundnut was retained for use of seed and household consumption. On the other hand under Rabi groundnut crop cultivated under irrigated area and the production and retention per HH on an average 14.46 quintals and 1.08 quintals. The remaining 13.38 quintals were sold at Rs. 3954. The price per quintal was highest in kharif groundnut crop and with regard to market price there is a significant variations among the farmer groups compared to prices of groundnut crop in rabi season due to market fluctuations. The main competing crop for groundnut was found to be the maize which was grown by the majority of sample farmers due to lower costs and high yielding.

The average per HH production was 13.69 quintals and retention for household consumption was 0.93 quintals. The remaining 12.76 quintals were sold at the average price of Rs.5102. The main competing crop of Sun flower was found to be cotton which was grown by the majority of the sample farmers and the average per HH production was 35.34 quintals all of which was sold at the average price of Rs. 2998. per quintal. There was a significant variations of sun flower oil seed prices among the farmers groups due to market fluctuations.

A larger farmer group average per HH production was 151.70 quintals followed by medium 60.76 quintals, small 30.84 quintals and marginal 13.57 quintals. No retention of oil palm production and the total production sent to collection centers for sale arranged both by

public and private oil palm companies. There was a slight variation in the prices these changed prices depends on international oil palm prices. Majority of farmers expressed that there is no competing crop because it takes long period for the production besides it involves lot of expenditure to the change the crop.

5.2.5.4 Comparative Economics/Profitability of Oilseeds Vis-à-vis Competing Crops:

The cultivation of maize crop was much profitable than the major oilseed crop of Groundnut crop in the study area. The gross value of groundnut production across all groups of farmers was found to be Rs.49,518. The total variable cost of groundnut was Rs. 20,548 per hectare. Thus the average net income derived from the groundnut crop was Rs.28,971 per hectare. On the other hand net average income derived from the cultivation of major competing crop maize was Rs.37,710 per hectare. Among farmer group highest net income from cultivation of groundnut crop was obtained by marginal farmers Rs.35,224, where as the competing crop maize also received the highest net income from the marginal farmers per household Rs.40,886 per hectare in the study. Among cost components under groundnut, major costs revealed the seed and total human labour costs accounted for about 50 per cent and the major competing crop (maize), Human labour cost and harvesting and threshing cost was the major (above 50%) of total operational costs respectively.

In the case of Sunflower crop The average net income per household of Sunflower was Rs.23,974, whereas the competing crop (cotton) Rs.35,262 per hectare. So among the farmers group highest net income derived from medium farmers per hectare (Rs.26,474) under sunflower crop in the case of competing crop (Rs.38,499) from marginal farmers.

5.2.5.5. Yield and Technology Gap Analysis:

The yield gap analysis was conducted for Groundnut and Sunflower crop. About groundnut crop the average actual yield from groundnut was found to be lowest 17.21 quintal per hectare than the average potential yield (36.00) and average experimental yield 30.00 quintal per hectare. Thus the yield gap indicated potential yield – experimental farm yield was same (6.00 q/ha) of all the farmers groups. Whereas yield gap II i.e. the gap between potential yield and experimental yield was 18.79 q/ha and highest yield gap reported from medium farmers (20.83 q/ha). The yield gap III the difference between potential farm yield and actual farm yield was 12.79 q/ha and the highest yield gap reported from medium farmers

(14.83 q/ha). Among the types of yield gap, the yield gap II was found to be the largest and the technology index was found to be equal in all groups of farmers.

In the case of Sunflower oilseed crop the average experimental farm yield 13.50 q/ha and potential farm yield was 15.00 q/ha is same for all farmers groups. Whereas the actual farm yield has different among all farmer groups. Average actual farm yield was 9.70 q/ha and the largest yield per household received 10.47 q/ha received from medium farmers. Among the three types of yield gap, the yield gap II was found to be the largest 5.30 q/ha and the highest yield gap found to be 6.38 q/ha from small farmers under Sunflower crop. The technology index found to be same in all farmers group.

5.2.5.6 Access to improved Technology and Markets for Oil seeds:

Better returns on cultivation of agricultural crops largely depends on better prices on agricultural produce that, in turn depends on the availability and access to modern technology and markets for oil seeds. The particulars about use of HYV sources of seed, utilization of fertilizers, awareness about MSP and marketing problems of the selected crops of Groundnut, Sunflower and Oil palm sample farmers. We found the out of 250 groundnut farmers were expressed 94 per cent used HYV seeds for getting better yield. The area under HYV was 96.13 per cent of total area under groundnut sample farmers. The major source of the seed was agriculture department (62.80%). Majority of farmers (62.40%) used recommended doses of fertilizers and pesticides. Most of the sample farmers were not aware (68.40%) about the minimum Support prices (MSP) of the groundnut produce and also 81.2 per cent of farmers expressed that there is a marketing problem. Local traders fix the price and purchased the total groundnut production of all sample farmers. So we can say that there were two problems mainly MSP and marketing problems.

Regarding Sunflower crop 100 per cent of sample farmers have used HYV seeds and the total area covered under HYV seeds. The major source of seeds was market 75.33% and only 24.67 per cent of seeds supplied by the agriculture department. The majority farmers (64%) used the recommended doses of fertilizers and pesticides suggested by the agricultural department. 63.33 per cent of sample farmers were aware about the Minimum Support Price (MSP) and 55.33 per cent of farmers sale the product at greater than MSP. It may be noted that the 58 per cent of farmers expressed that there was no regulated market to purchase the sunflower oilseeds, only local traders and other mediators purchased in the farm yard. Total

75 oilpalm sample farmers unanimously expressed their opinion that the oil palm plants supplied by the agricultural department. So the total area covered by HYV plants and 97.33 per cent of farmers used the recommended doses of fertilizers and pesticides supplied by horticulture department. All farmers informed that they were aware about MSP of the oil palm crop and the price shall be calculated on month wise through international oil palm prices. The factory is responsible to purchase the total oilpalm fresh fruit bunches. So there was no problem about MSP and marketing under oil palm crop in Andhra Pradesh.

5.2.5.7 Marketing pattern of oil seeds:

According to the previous observations of both Groundnut and Sunflower crops more than 50 percent of farmers expressed that there is a marketing problem and unaware about the MSP determined by the government. 64 percent and 36 per cent cultivating groundnut crop sold to commission agents and local village traders respectively. The highest production sold 75.64% to commission agents from small farmers group followed by medium 60.77%, marginal 54.84% and large farmer group 45.45%. The average price paid from local village traders was highest Rs.4307 per quintal. Further the sale of main competing crop (Maize) exhibited slightly different pattern, the local village traders purchased more output (48.91%) at average price was Rs.1083 quintal from the sample farmers, particularly from small farmers group (60.47%) About 27.17 per cent of sample farmers sold to output commission agent at the average price of Rs.928 per quintal. Other important purchaser was Government agency (NAFED) at the price per quintal was Rs.1116, which was found to be the highest and 43 per cent sold from of medium farmers.

The sale pattern of Sunflower oilseed crop and highest percentage (33.34%) of sample farmers sold the product at private company (contract agreement) at the highest average price Rs.8500 followed by 31.33 per cent and 2 per cent of farmers cultivating sun flower crop have sold their output to local village traders and government agency at the average price per quintal was Rs.2677 and Rs.3640. "Cotton" is the main competing crop of sunflower and about 56.92 per cent and 43.08 per cent of farmers cultivating "Cotton" crop have sold their output to government agency (APML) and Commission agents respectively. The average price of cotton was received from the government agency and commission agent more or less similar Rs.2,900. This is mainly because of the fact that the cotton growers sold their output at regulated market yards organized by the marketing department in the state.

With regard to oil palm crop Fresh Fruit Bunches (FFB) are purchased by the Government agencies (OILFED) and private oil palm factories. Regarding the sale pattern of oil palm sample farmers expressed 66.67 per cent and 33.33 per cent of farmers sold their output to private company and government agency respectively. The price of the oil palm output (FFB) more or less same Rs.6000/- per quintal of both existing markets (AP Oil Fed and Private Company) during the period 2011-12.

5.2.5.8 Sources of Technology and Market Information:

Out of 250 sample farmers expressed under groundnut crop, about 56.40% of farmers reported that state agricultural department is the major source. On the other hand 62.56 per cent of farmers expressed the state Department of Agriculture played a vital role to provide information on extension services. Further market information about groundnut crop through fellow farmers (87 per cent), commission agents 68 per cent and print and electronic media (50 per cent).

the sunflower sample farmers said that out of 150 farmers, the major sources of information on seed aware from the market 39.33 per cent followed by 36 per cent and 24.67 per cent from other companies and state department of agriculture. On the other hand about information on extension services 33 per cent and 31 per cent of farmers received information through private companies and state department of agriculture. Further market information has known from fellow farmer, APMC, Commission agents and print media and T.V.

The State Horticulture Department had supplied the oil palm plants at a subsidized price under ISOPOM scheme, it may be found that the information regarding extension services provided through (AP Oil FED 100%) and private factories (68%) expressed by the sample farmers. Moreover market information also provides through horticulture department, private factories, print media and T.V. to the sample farmers. So the Horticulture department is the biggest source to get the information of the oil palm farmers.

5.2.5.9 Determinants of Oilseed Production and Acreage Allocation:

The relative contribution and significance of the major factors (such as area under the crop, seed cost, fertilizer cost, pesticide/insecticide cost, human labour cost, machine labour cost and irrigation charges) to change in yield of major oilseed (Groundnut) and competing crop (maize) and Sunflower, competing crop (cotton) for sample farmers were analysed with the help of a log-linear regression model. Out of eight independent variables in the cost of

Groundnut AR,LS,SC,HL and IC are turned to be statistically significant at 1% level respectively. In the main competing crop of maize LS,FC and ML are turned out to be statistically significant at 1% level. The coefficient associated with LS is significantly effect on the yield of groundnut as well as maize. It indicates that the yield of groundnut and maize would increase by 0.196% and 0.319 increase in a one per cent change in the size of land holding in the study area. The magnitude of input variable for both main oilseed (Groundnut) and main competing crop (maize) has been significantly little impact on yield due to other extent factors may also influence in the study area.

In the case of sunflower crop a few independent variables may influence on yield, there are LS,FC,PC and IC are turned out to be statistically significant at 1% level with expected positive sign in the main oilseed crop of sunflower. While in the case of main competing crop (cotton) the SC and IC are statistically significant at 1% level with unexpected negative sign and expected positive sign. The Regression co-efficient of irrigation charges (IC) indicates that the yield of Sunflower and cotton would increase by 0.009% and 0.01% for every 1% increase in irrigation expenditure. The R^2 value of cotton is better than sunflower because of the sample size is less than half of the sunflower crop.

About oil palm out of five independent variables four variables are turned out to be statistically significant at 1%, 5% and 10% level with expected positive sign. The coefficient HL and IC would increase 0.355% and 0.172% every 1% increase in labour and irrigation expenditure. The other explanatory variable AR is also statistically significant 10% level and the R^2 value 44.3%.

As far as the acreage allocation between main oilseed crop and competing crop by the sample farmers is concerned, another similar log-linear regression model was fitted. Out of nine independent variables, lagged area (A_{t-1}), Relative Price (P_{t-1}) and Relative yield (Y_{t-1}) are statistically significant at 1% and 5% level with expected positive sign. These three variables significantly influence on the area allocated for main oilseed (Groundnut). Further the regression results of acreage allocation of main oilseed crop (Sunflower) and competing crop (Cotton), out of nine independent variables only two explanatory variables lagged area (A_{t-1}) and area under competing crop (AC_{t-1}) are statistically significant at 1% level with expected positive sign. The coefficient of these two variables indicates that acreage response was high (0.91%) in competing crop (cotton) than the main oilseed crop of sunflower (0.58%).

5.2.5.10. Perceived Constraints in Cultivation of Oilseeds:

Among major constraints faced by the groundnut sample farmers, firstly agro-climatic factors are extreme variations in temperature and inconsistent rainfall and low level of irrigation facilities and climatic factors. Among institutional and economic constraints high input costs, seed costs, shortage of human labour, irregular supply of electricity and inadequate seed supply. Exploitation by market intermediaries, inadequate marketing of government agencies, lack of regular markets and inadequate storage facilities, processing industries crop and insurance.

Major constraints about sunflower lack of irrigation facilities and weed infestation extreme variation in temperature and drought high input costs, irregular power supply, price variations, non-availability of Government seed and poor extension services are major institutional constraints. Regarding post harvest problems, lack of processing industries, exploitation of village level traders and lack awareness of MSP, lack of regular markets and insurance.

About constraints in oilpalm crop extreme variations in temperature, high input costs and shortage of labour, irregular power supply and unaware about new technologies, lack of grading of oil palm production at the time of sale and extend the oil palm companies near by the production.

5.2.5.11 Suggestions for Improving Production and Productivity of Oil seeds:

Extension of irrigation facilities through sanction of subsidy bore wells by the government agencies, need for more subsidy on fertilizer seed cost and other inputs extension services and extend the number of agricultural and horticultural officers for sorting out the farm level problems. Regular Power supply ten hours a daytime to increase the yield. Extend the government agencies to purchase the oilseeds at village level then only control the village level traders and middleman. Introduce weather based insurance policies. Extend the regular markets and establish the processing units nearby. Extend the technological knowledge about the production through government agencies. Change the MSP according to the market price is required for every year.

5.3. Conclusion:

The oilseed crop sample farmers have made suggestions about the problems related to area expansion and improve the productivity level. The study also discussed and covered the issues related to the required provisions of oilseed crop farmers in the state. About Groundnut crop in Ananthapur district, the farmers expressed that 80 per cent of area under rainfed besides rock area, in fertile soils, swallow and marginal soils grown in groundnut crop. So low level of yield and marginal and small farmers are grown in this crop. They may not follow the practices of fertilizers and pesticides because groundnut grown fields are long distance from the village. Therefore farmers are unable to get the sufficient water for use of pesticides in their fields. So the government is necessary to reduce the difficulties through adopting suitable management practices like selection of suitable high yielding variety and adequate seed supply to the farmers in proper time besides optimum plant population, nutrient supplement of Ca, and Sulphar. The need based plant protection measures and irrigation facilities, should improve the productivity levels of oil seed crops. In the case of area expansion under oilseed crops, the government has to take measures like soil test based application of fertilizers, at subsidy prices, procurement and market facilities are important. Improved crop production technologies, storage facilities trainings programs are essential to increase the oilseeds production. Un irrigated lands are not suitable for implementation of technology to farmers. So there is necessary to facilitate regular power supply and protective irrigation system. These measures are favourable for further increase in area and yield of oilseed crops in the state.

5.4 Policy Implications:

The major thrust of strategies should be mentioned below for the expansion of area and enhancement of yield under groundnut, Sunflower and oil palm crops in the state

Groundnut:

1. Quality seed production chain may have to be strengthened, so that farmers get sufficient quantities of certified seed in time.
2. Farmers have to be ensured remunerative price by procuring groundnut from the farmers in the event of prices falling below the minimum support price.
3. Promote soil test based fertilizer recommendations and application of Gypsum in irrigated groundnut crop for Ca and Sulphur requirement.
4. Implement the weather based or crop insurance of ground nut crop of all farmers.
5. In adequate seed supply by the department to the groundnut farmers at subsidy rates. So there is need to increase the seed supply according to their requirement.

6. Regular power supply at least 10 hours a day essential for good yield and essential to functioning of drip irrigation system is required to increase the yield by 10 to 20 per cent.
7. Improve the cultivation technologies through trainings and field surveys by the experts from agricultural department like adoption of farm mechanization seed treatment and post harvest technologies should be improved the production, resulting in quality of production and also reduce the cost of cultivation.
8. Extend the storage and marketing facilities.

Sunflower:

1. Supply of quality seeds of improved varieties and hybrids which are capable of boosting the productivity to a significant extent.
2. Government should supply Baron Nutrition at subsidy price to the farmers at the time of ray floret opening stage increases the seed set and seed yield of sun flower crop.
3. In new areas of sun flower cultivation and when grown in small areas, protect the crop against bird damage of manual scaring during flowering to harvest.
4. Sunflower is an exhaustive crop and responds well to application of fertilizers. The fertilizer recommendation specific to farming situation shall be adopted.
5. Linkage of NREGS and Sunflower crop cultivation is need to reduce the cost of cultivation.
6. To supply seed at 50 per cent subsidy of market price to the farmers.
7. Implement the crossing technology at flowering stage.
8. Harvesting technology must be invented.

Oil Palm:

1. The Central government should impose levying duties on import of palm oil from other nations so as to justice to the local cultivators.
2. Linkage of NREGA and oil palm cultivation.
3. Regular power supply at least 10 hours a day is essential for good crop.
4. At the time of harvesting the skilled labours are not available. So the horticulture department needs to invent the suitable harvesting tools to supply at subsidy prices to oil palm farmers. It leads to reduce the cost of cultivation of oil palm crop also.

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