



**EVALUATION STUDY
ON
OIL PALM DEVELOPMENT PROGRAMME IN KARNATAKA**



External
Evaluation
Report No. 3 of 2014



Study Conducted for
**KARNATAKA EVALUATION AUTHORITY (KEA)
AND
DEPARTMENT OF HORTICULTURE,
GOVERNMENT OF KARNATAKA**

Study Conducted by



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Sept 2014

PREFACE

The use of Palm Oil (oil of *Elaeis guineensis*) in food dates back to about 3000 BC, in West Africa. In recent history, the oil became quite a well sought for trading commodity as it became useful as an industrial lubricant. Palm Oil was also used to make many brands of soap too; one of them being “Palmolive,” which advertises the oil it uses and is a well-known brand name in toiletry industry even today.

The demand for edible oil in India is nearly double of its production. The balance is met by importing edible oil. Oil palm cultivation was promoted in the country (and Karnataka where irrigation potential is good) to narrow this supply-demand gap and because, it was the highest edible oil yielding crop. Cultivation does not require much labour too.

With the twin objective of studying as to how was the oil palm cultivation programme was functioning in Karnataka, and also to know as to what improvements may be made to the programme so us to have better results, the Planning, Programme Monitoring and Statistics Ministry of Government of Karnataka entrusted the evaluation of the Oil Palm cultivation Programme to Karnataka Evaluation authority. This was outsourced to Center for Symbiosis of Technology, Bangalore.

The evaluation report finds that the returns from oil palm cultivation seems to have been either exaggerated, or the ideal conditions under which the projected returns will result have not been revealed to farmers. It is because of this that many oil palm cultivating farmers have been uprooting the plants they had planted in their lands. The issue of how subsidy given should be dealt with when a subsidy taking beneficiary uproots the oil palm plants after availing subsidy has also been highlighted. It is found that oil palm cultivation suits the big farmer with large land holdings than the small and marginal farmers. A better and stable buy back rate of oil palm produce (Fresh Fruit Bunches-FFBs) is recommended in the report.

The study has received constant support and encouragement from the Principal Secretary, Planning, Programme Monitoring, and Statistics Department of the Government of Karnataka. The study could not have been possible without the continuous help and support of the officers of the Department of Horticulture of Karnataka. The study has had the benefit of being improved and improvised by the academic and contextual inputs of the members of the Technical Committee of KEA.

I hope that the evaluation study will provide all the required inputs to the Department of Horticulture in Karnataka, and that they will, taking cues from the findings and recommendations of the evaluation report, take suitable action to popularise the cultivation of oil palm and modify the programme, so that its desired objectives are better achieved.

22nd September, 2014
Bangalore

Chief Evaluation Officer
Karnataka Evaluation Authority

ACKNOWLEDGEMENTS

First, we would like to express our sincere thanks to all the oil palm growers who spared their valuable time answering our questions and all the group leaders and the representatives from all the taluks for their help in coordination in the field.

Also, we would like to thank all the officials of Department of Horticulture, Karnataka especially, the Additional Director, Oil Palm Development and Mr. Mahesh at the Directorate of Horticulture, Bangalore and all the Nodal Officers - Assistant Directors of Horticulture - at all the Districts for their warm support and coordination in the field. A special thanks to all the officials of the Private Entrepreneurs for their warm support and facilitation in conducting the field study.

Many thanks to our survey team Mr. Basil Lions, Mr. Hanumantha Gowda, Mr. Praveen and Mr. Prakash for their assistances and patience throughout the data collection and field survey process.

Last but not the least, we would like to express our sincere thanks to CEO, KEA for his valuable guidance and other officials at KEA for their support.

Bangalore

24th July, 2014

Mr. V. M. Hegde

Managing Director

ABBREVIATIONS

ISOPOM	:	Integrated Scheme for Oilseeds, Pulses, Oil palm and Maize
RKVY	:	Rashtriya Krishi Vikas Yojana
CEO	:	Chief Evaluation Officer
KEA	:	Karnataka Evaluation Authority
GoK	:	Government of Karnataka
GoI	:	Government of India
OBC	:	Other Backward Class
FFB	:	Fresh Fruit Bunches
SC&ST	:	Scheduled Caste and Scheduled Tribe
MGNREGA	:	Mahatma Gandhi National Rural Employment Guarantee Act
NABARD	:	National Bank for agriculture and Rural Development
Ha	:	Hectare
PG	:	Post-Graduate
ITI	:	Industrial Training Institute
ToR	:	Terms of Reference

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EXECUTIVE SUMMARY

The Study

Oil Palm Development is being implemented under GoI programme 'Integrated Scheme for Oilseeds, Pulses, Oil Palm and Maize (ISOPOM)' since 1990. Thereafter, Oil palm cultivation and related activities were taken up and implemented under Rastriya Krishi Vikas Yojana (RKVY) since 2011-12. The GoI is in the process of starting a new programme Oilseeds & Oil Palm Mission by incorporating all the earlier programmes ISOPM-OPDP & RKVY.

The current assignment is to assess the oil palm development programme in the State of Karnataka and provide an independent feedback to the Government.

STEM has been assigned the study and signed a contract with KEA – Karnataka Evaluation Authority for Rapid Assessment of Oil Palm Development in Karnataka State.

Scope & Objectives of the Assignment

As both GoI and GoK intend to expand Oil Palm Development Activities through increased investment, time and effort, it was felt necessary to understand the impact of the past efforts. In view of this, it has been decided to undertake a Rapid Assessment of the experience gained in Karnataka State in the last two years under RKVY.

The following are the issues to be addressed by the rapid assessment:

- I. Assess the area under Oil Palm cultivation at present in Karnataka and assess the scope for further expansion.
- II. Furnish the economics of Oil Palm cultivation in Karnataka based on real life situation and compare it with other tree based oil seed crops.
- III. Assess the efficiency of Promotion of Oil Palm scheme implemented under RKVV by Horticulture Department in the last two years
- IV. Identify the risks in promoting Oil Palm, identify the promotional needs of farmers and entrepreneurs and recommend better ways and means to popularise Oil Palm Cultivation in *the State of Karnataka*.

Sample Size/Criteria for Selection of Sample

A survey was carried out using a multi-stage sampling method, based on the selection of the sample on a combination of two or more sampling methods. The first stage was to represent by all the FIVE command areas and a lone Non-command area where the oil palm cultivation is being promoted in the State. The taluks under each Nodal Officer from each command area was selected in consultation with the Nodal Officers of Horticulture Department stationed at district Head Quarters covering a few districts in order to get a representative sample of oil palm farmers.

Secondly, the oil palm farmers were stratified on the basis of age of the oil palm, that is, up to 4 years, 5 to 8 years and above 8 years old oil palm gardens. The third stage of the multistage sampling method was a random sampling of the respondents available under the above stratification and also ensured that social group such as SC and ST was also represented in addition to OBC and General Categories to understand the target group for promoting oil palm cultivation.

Structured questionnaires were administered to 588 oil palm farmers from the selected 12 taluks covering all the five command areas and five private entrepreneurs operating in the State of Karnataka to elicit information on the palm oil production with the help of trained investigators under close supervision. The data collected were analyzed using simple statistical method.

The final sample consisted of 8 districts, 12 taluks and 588 participating farmers spread over 5 command areas, one non-command area covering all the five entrepreneurs in the State. The taluks were selected in consultation with the Nodal Officers of Horticulture Department. From each taluk at least 50 farmers were selected.

Research Methodology

The study combined a review of secondary materials, interviews with key stakeholders, primary research through surveys and individual interviews and personal discussions. Both primary and secondary data were collected for this study. The primary data were collected from the selected oil palm growers using a structured questionnaire designed to obtain relevant information regarding oil palm production, issues and their needs and with the aid of semi-structured questionnaire to collect qualitative data from private entrepreneurs and officials of Horticulture Department.

Main Findings

- i. Oil Palm is a hassle free crop in terms of pests and diseases, labour requirements, marketing the produce, and provides regular monthly income from yielding stage.
- ii. The area under oil palm is shrinking in Karnataka. The potential area in the State of Karnataka for oil palm development is 2,60,000 hectares. Under various schemes implemented by Govt of Karnataka, about 36,000 ha were developed, which is only 14% of the potential area available. At present, only 11,983 ha (about one-third of the developed area) under oil palm is existing in the State. About 67 percent fall can be observed from the area developed under oil palm. This means, about 24,000 ha area under oil palm has been converted to grow other crops.
- iii. Though certain food crops, commercial and plantation crops occupied important place in the cropping pattern in all the selected taluks, it was observed that oil palm cultivation and production in the State could considerably be enhanced by their

- intensive cultivation, offering quality based better price for FFBs, effective awareness campaign about the oil palm and its economics and extending technical guidance to manage oil palm gardens effectively.
- iv. Extension efforts like field demonstrations, group meetings etc. were conspicuously lacking.
 - v. Continuous drought conditions & improper and inadequate technical guidance for new plantations forcing oil palm growers to take hasty decisions.
 - vi. Oil palm is being cultivated mainly by medium and large farmers who have sufficient land holdings and other resources such as capital and water for irrigation.
 - vii. Only about 10 percent of marginalized such as SC & ST community has taken up oil palm cultivation as their main source of income.
 - viii. Extension efforts in general is lacking in the absence of field staff at the district and taluk level at the office of the Nodal Officers of Horticulture Department(Oil Palm Development) where they don't have any support in implementing the schemes, and wholly depending on the field staff recruited by the entrepreneurs.
 - ix. There is an assured market for FFBs produced and the farmers need not look for market to sell their produce. Only glitch is the price offered and none of the oil palm grower is satisfied with the current price of Rs.7, 000/- for a ton of FFBs. Majority of them expect a minimum price of Rs.12, 000/- per ton of FFBs.
 - x. The yields are not up to the expectation though resource rich farmers are obtaining good FFB yield. There is not much difference in the FFB yield across the command area.
 - xi. Factors causing constraints in obtaining optimum yields include improper intercropping practices, inadequate and untimely distribution and application of fertilizers and insufficient irrigation, lack of technical knowledge etc.
 - xii. Irrigation has been found to be a critical factor for getting optimum yields and instability in production as oil palm is a water loving crop.
 - xiii. Competition: Sharp spurt in the prices of traditional crops like Arecanut, and sugarcane in Karnataka prompting oil palm farmers to convert their oil palm gardens.
 - xiv. Returns from Oil Palm are not being maximized through diversification. There is lack of utilization of bio products by processing industries.

- xv. Implementation of National Rural Employment Guarantee Scheme, though it is an useful scheme in providing employment, it has its impact on availability of agricultural labour, which has increased the cost of production of agricultural produces including FFBs of oil palm.

Reasons for Uprooting

- Recently, reports from oil palm growing areas of Karnataka said that growers were uprooting oil palm trees. This is because they are unhappy with the price they are being offered. For the current quarter, Karnataka Govt has fixed Rs. 7/- for a kg of fresh fruit bunch. The price is revised periodically 3 to 4 times a year.
- The problem with growing oil palm is that it has a gestation period of 4-5 years. Further, it takes another 2-3 years before the production starts peaking.
- Though the Government oil palm cultivation through various subsidies, farmers seem to be running out of patience after switching over to the oil palm crop.
- Also, a sense of negligence in taking care of the crop during the initial stages and lack of technical guidance results in poor yield, causing some farmers uprooting their plants.
- Economics of oil palm cultivation is much better than other tree based oil seed crops such as Neem and Pongamia in terms of investment, cost of operations, income and profit from an hectare of plantation (Pl see the annexure)

Major Constraints

- a) **Resource Poor Farmers:** According to the survey results, the proportion of resource poor farmers having marginal landholdings who have taken up oil palm cultivation is quite small. This is because; such farmers are usually not adequately equipped to bear the initial investments for taking up oil palm. On account of such a sizeable chunk of farmers being left out of the ambit of the scheme due to their being unable to afford even their own share of the costs after the subsidies, the development of oil palm cultivation remains largely limited to those few who have the resources such as large land holdings with multiple cropping to afford them.
- b) **Delay in the Release of Central & State share of Subsidy Funds :** The mismatch of timings in the release of Central and the State shares has also been cited as one of the major constraints that results in delay in the disbursement of subsidies by the district level officials in Karnataka.
- c) **Lack of Qualified/Trained Field Staff:** The lack of qualified and adequately trained field staff has been cited as a major constraint by the official stakeholders and oil palm farmers in almost all the areas where the oil palm is being promoted.

- d) **Price Offered for FFB:** The major glitch is the price offered by Govt, Rs.7.00 per kg of FFB.
- e) **Sudden increase in the price of competitive crops:** There is a sharp increase in the price of crops such as arecanut, sugarcane etc., which made oil palm farmers to get agitated compared to the current price offered for FFB.
- f) **Increase in cost of Harvesting FFBs from tall trees:** There is a sharp demand for labourers due to MGNREGA scheme being implemented by GoI. In addition, difficulties are being faced by farmers in harvesting FFBs from old and tall trees in the absence of appropriate tools for harvesting also made the cost of labourers dearer as the FFBs has to be harvested in time.

Suggestions/ Recommendations

Short Term Recommendations

The incentives through subsidies should be regulated and develop a system to ensure these incentives are reaching the right people at the right time.

Ensure adequate and timely supply of quality planting material , fertilisers and enhance subsidy limit for area expansion.

Decentralizing the planning process to local levels to undertake effective extension work through demonstrations, group meetings, supply of technical literature in local language, regular field visit by the field staff to provide technical advice to reduce the risk and increasing the productivity.

The view of the farmers, officials from Department and Company is that growers should be given a fixed price for a term of at least five years. Another view is that the Government has to find a way to sustain the growers' interest through some additional payment.

Enhance the price of FFBs and ensure a minimum price of Rs. 12/- per ton of FFBs will help the existing oil palm farmers to continue and encourage others to take up oil palm cultivation.

Improved harvesting machinery: at present crop height is a serious problem for harvesting in adult plantations of more than 10 years old trees. Harvesting is done either by climbing the tree or through an aluminum pole attached to a sickle.

Long Term Recommendations

The most important suggestion is to avoid adhoc approach and framing of a long term strategy with full involvement of State Department of Horticulture. It is emphasized the need for strengthening the organizational set-up at the district level by recruiting full staff required for the field work.

Oil palm requires constant irrigation at constant intervals through protective watering. Concerted efforts must be made to bring larger irrigated area under the Oil Palm Development Programme.

Evolving high-yielding dwarf varieties of oil palm is of utmost importance for increasing the area under oil palm cultivation and yield. Research Centres should be activated and infrastructural facilities should be strengthened to this effect.

Implementation of crop insurance scheme should be considered and sensitize commercial banks and NABARD for promotion of Oil Palm cultivation.

Policy Level Recommendations

Unstable import policy should be addressed seriously. Domestic prices of Oil Palm are significantly affected by cheaper imports from Malaysia and Indonesia hence fluctuates considerably. The policy of allowing duty-free import of crude vegetable oils is affecting oil palm growers.

Inadequate financial support by Government, resource and security related issues viz. credit from commercial Banks and NABARD, implementation of crop insurance schemes, enactment of legislation should be looked into seriously.

Formulate some legal provisions to recover govt. assistance/subsidy provided if oil palm is up-rooted/diverted without justification.

The Centre can utilise the duty collected from imports of vegetable oils for subsidising oil palm and other oilseed growers.

1. BACKGROUND AND CONTEXT

1.1 Introduction

Oil Palm Development is being implemented under GoI programme ‘Integrated Scheme for Oilseeds, Pulses, Oil Palm and Maize (ISOPOM)’ since 1990. Thereafter, Oil palm cultivation and related activities were taken up and implemented under Rastriya Krishi Vikas Yojana (RKVY) since 2011-12. The GoI is in the process of starting a new programme Oilseeds & Oil Palm Mission by incorporating all the earlier programmes ISOPM-OPDP & RKVY.

The current assignment is to assess the oil palm development programme in the State of Karnataka and provide an independent feedback to the Government.

STEM has been assigned the study and signed a contract with KEA – Karnataka Evaluation Authority for Rapid Assessment of Oil Palm Development in Karnataka State. The study covered all the 5 command areas and a lone non-command area. STEM has already got all the required staff in place. The team leader and social assessment expert visited the Associate Director of Horticulture-Oil Palm Development Programme at the Directorate of Horticulture and collected the required secondary data information and discussed the same with the Additional Director-Oil Palm the modalities of the filed data collection.

1.2 Scope & Objectives of the Assignment

As both GoI and GoK intend to expand Oil Palm Development Activities through increased investment, time and effort, it was felt necessary to understand the impact of the past efforts. In view of this, it has been decided to undertake a Rapid Assessment of the experience gained in Karnataka State in the last two years under RKVY.

The following are the issues to be addressed by the rapid assessment:

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2. AREA UNDER OIL PALM CULTIVATION AT PRESENT IN KARNATAKA & SCOPE FOR EXPANSION

2.1 Current Status: Area and Number of Farmers Under Oil Palm Cultivation in Karnataka State

Table 1: Area under oil palm and number of farmers

Command Area	Districts	Ptoential (ha)	Area Develop ed till March 2013 (ha)	Area Existing (ha)	No. of Farmers	Yielding area under oil palm (ha)	Production of FFBS during 2012-13 (tons)	Av yiel d/ha
Cauvery	Mysore	5000	2700	819	518	313	1095	3.5
	Mandya	2500	1098	331	252	141	581	4.1
	Chamraj nagar	7500	1608	465	293	280	405	1.4
	Hassan	2500	1668	865	608	168	343	2.0
	Kodagu	7500	2761	1170	856	711	1425	2.0
Total		25000	9835	3650	2527	1613	3849	2.38
				14.6% of potential 62% ↓				
Bhadra	Shimoga	7500	4301	1131	1360	413	1389	3.3
	Chickma galur	5000	2256	483	552	189	648	3.4
	Davange re	7500	2369	1028	943	293	1242	4.2
	Haveri	5000	1599	679	528	168	341	2.0
Total		25000	10525	3321	3383	1063	3620	3.4
				13% of potential 68% ↓				
Thunga Bhadra	Bellary	30000	4501	647	557	212	747	3.5
	Raichur	12000	1222	229	49	48	101	2.1
	Koppal	12000	1467	257	45	44	146	3.3
	Gadag	6000	1079	264	51	71	254	3.6
Total		60000	8269	1397	702	375	1248	3.3
				2.3 % of potential 83% ↓				
Mala Prabha	Belgaum	35000	3263	1562	1538	336	1082	3.2
	Uttar	5000	42	40	24	3	28	9.3

Command Area	Districts	Ptoential (ha)	Area Develop ed till March 2013 (ha)	Area Existing (ha)	No. of Farmers	Yielding area under oil palm (ha)	Production of FFBS during 2012-13 (tons)	Av yiel d/ha
Ghata prabha	kannada							
Total		40000	3305	1602	1562	339	1110	3.3
				4% of potential 51% ↓				
Upper Krishna	Bagalkot	50000	2095	1148	837	142	227	1.6
	Bijapur	25000	1208	497	373	41	56	1.4
	Gulbarga	5000	144	55	48	0	0	0
	Yadgiri	20000	518	234	146	25	4	0.16
Total		100000	3965	1934	1404	208	287	1.38
				1.9% of potential 51% ↓				
Non Comman d Area	Dakshin Kannada	3000	52	48	60	0	0	0
	Udupi	3000	15	17	18	0	0	0
	Bidar	3500	0	0	0	0	0	0
	Dharwar	500	14	14	2	0	0	0
	Total		10000	81	79	80	0	0
				0.8% of potential 2.5% ↓				
Grand Total		2,60,000	35,980	11,983	9,658	3,598	10114	2.81
				4.6% of potential 66.7% ↓				

The above table indicates that the potential area in the State of Karnataka for oil palm development is 2,60,000 hectares. Under various schemes implemented by Govt of Karnataka, about 36,000 ha were developed, which is about 14% of the potential area available. About 67 percent fall can be observed from the area developed under oil palm. At present, only 11,983 ha (about one-third of the developed area) under oil palm is existing in the State. This means, about 24,000 ha area under oil palm has been converted to grow other crops.

2.2 The reasons for this drastic reduction in the area under oil palm

2.2.1 Competition from other crops

Competition and a sharp spurt in the prices of traditional crops like arecanut and sugarcane in Karnataka was one of the prime reasons for a drastic decline in the area under oil palm cultivation. Arecanut prices have more than doubled in a year bringing cheer to arecanut growers. The prices of local varieties have gone up from Ra.130/ kg during the same period last year, is now Rs.320/- a kg. The Government of India decided on May 2013 to hike the minimum import price of arecanut from Rs. 75 to Rs.110 a kg. This decision triggered an upward movement in the prices of locally grown arecanut.

2.2.2 Import policy & price offered to Oil Palm Growers

Secondly, unstable import policy of Indian Government for oil palm is also another reason. Domestic prices of Fresh Fruit Bunches (FFB) of oil palm are severely affected by cheaper imports from Malaysia and Indonesia hence fluctuates considerably.

The oil palm growers are not happy with the price being offered by the Karnataka Government. At present the price is fixed at about Rs. 7/- kg of FFB and a support price of around Rs. 1.20/- per kg is paid to the farmers.

2.2.3 Increasing cost, longer gestation period and poor yield

Implementation of National Rural Employment Guarantee Scheme has increased the cost of labor which has increased the cost of production of oil palm for the farmers.

The farmers have lost patience due to long gestation period of at least 4 to 5 years and, it takes another 2-3 years before the steady production of good yield of FFBs. Poor yield due to improper management of oil palm crops in the beginning frustrate the farmers and uproot the oil palm crops.

3. RATIONALE FOR THE STUDY

As per the data available, the potential area for oil palm development in the state of Karnataka is 2.60 lakh Ha. Area developed under oil palm through various schemes was 35,518 ha, which is 14% of the potential area available. Of the total area developed, at present, only 9,658 ha area is existing under oil palm plantation, which means, there is a decrease of 66% of the area developed under oil palm.

A rapid assessment of the present status is proposed to provide independent feedback on the experience under -RKVY promotion of Oil palm - in Karnataka State.

4. RESEARCH METHODOLOGY

The study combined a review of secondary materials, interviews with key stakeholders, primary research through surveys and individual interviews and personal discussions. Both

primary and secondary data were collected for this study. The primary data were collected from all the selected oil palm growers using a structured questionnaire designed to obtain relevant information regarding oil palm production, and with the aid of semi-structured questionnaire to collect qualitative data from private entrepreneurs and officials of Horticulture Department.

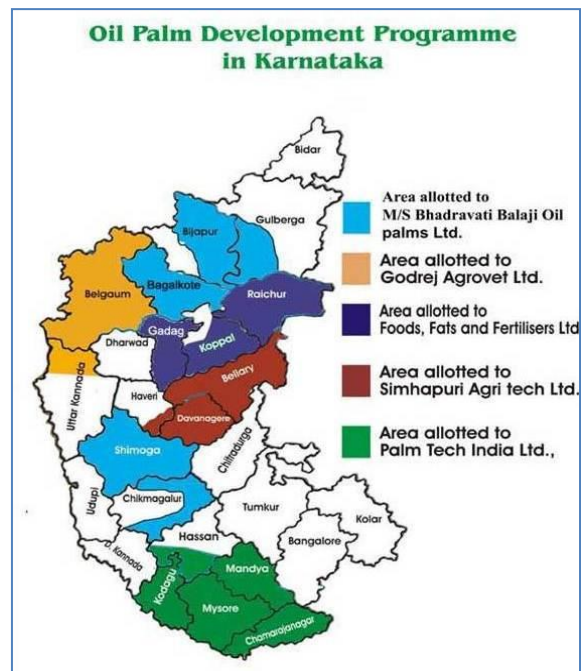
A survey was carried out using a multi-stage sampling method, based on the selection of the sample on a combination of two or more sampling methods. The first stage was to represent by all the 5 command areas and a lone Non-command area where the oil palm cultivation is being promoted in the State. The taluks from each command area was selected in consultation with the Nodal Officers of Horticulture in order to get a representative sample of oil palm farmers.

The second stage was a stratified sampling method. The oil palm farmers were stratified on the basis of age of the oil palm, that is, up to 4 years, 5 to 8 years and above 8 years old oil palm gardens. The third stage of the multistage sampling method was a random sampling of the respondents available under the above stratification and also ensured that social group such as SC and ST was also represented to understand the target group for promoting oil palm cultivation.

Structured questionnaires were administered to 588 oil palm farmers from the selected 12 taluks covering all the five command areas and five private entrepreneurs operating in the State of Karnataka to elicit information on the palm oil production with the help of trained investigators under close supervision. The data collected were analyzed using simple statistical method.

4.1 Sampling Strategy

There are 5 entrepreneurs operating in the State. Each entrepreneur/company is covering a few districts in order to promote oil palm cultivation to be taken up by the prospective farmers. As suggested in the ToR, the taluks were selected from these districts covering all the 5 command areas as well as the lone non-command area in the State of Karnataka. The districts covered by each company are presented below:



4.2 Selection of Farmers

As suggested in ToR, at least 10 taluks are to be selected. Instead, 12 taluks were selected in consultation with Nodal Officers and Entrepreneurs representing 5 command areas and a non-command area. The selection of taluks also represented each private entrepreneur who is operating in the State and responsible for promoting oil palm plantations through area expansion programme, raising oil palm nurseries, procurement of Fresh Fruit Bunches (FFBs) and processing. From the list of taluk wise existing area under oil palm cultivation, a minimum of one or two taluks were selected in consultation with the Assistant Director of Horticulture (the Nodal Officer) and the officials of Private Entrepreneurs.

From the list of oil palm farmers collected from the Entrepreneur and the Nodal officer, 50 participating farmers were selected from each selected taluk using the different age of oil palm crops, that is, the farmers having oil palm crops of 0-4 years, 5 to 8 years and >8 years old crops for individual interaction / interview using a structured questionnaire. Interaction and interview were conducted with 50 farmers from each selected taluk. The reason for using this method was to gain deeper knowledge of both the social structure of the village and also to discuss the different opinions of the impacts of the oil palm schemes on different groups in the village.

The assessment covered a total 588 participating farmers in the selected 12 taluks in 8 districts covering all the five command areas as well as the non-command area. The study also covered all the 5 entrepreneurs in the State and key officials of the Horticulture Department at district and taluk level.



a. Cauvery Command Area / Ruchi Soya Industries Ltd:

Under M/s. Ruchi Soya Industries Ltd., Mysore, a total area of 6440 ha of oil palm plantation is under cultivation in 25 taluks spreading over 5 districts of Chamrajnagar, Mysore, Mandya, Kodagu and Hassan. Based on the area under oil palm cultivation, 100 farmers were selected from 2 taluks, that is, HD Kote (189 ha) and Virajpet (874 ha) taluks of Mysore and Kodagu districts respectively.

b. Bhadra Command Area/ Bhadravati Balaji Oil Palms Ltd & Simhapuri Agri Tech Co., P. Ltd.,

Similarly, from the list of district wise and taluk wise existing area of oil palm plantation managed by M/s. Bhadravati Balaji Oil Palm Ltd., Hosnagara (346 ha) and Shimoga (280 ha) taluks in Shimoga district and Honnali taluk of Davangere district were considered and interviewed 150 participating farmers of oil palm from these 3 taluks @ 50 / taluk including farmers having 0 to 4 years old, 5 to 8 years and > 8 years old oil palm crop.

c. Tunga command Area :

Under this area, Yelburga and Ron taluks were selected from Koppal and Gadag districts respectively. A total of 100 participating farmers were interacted in these two districts at the rate of 50 per taluk.

d. Mala Prabha & Gata Prabha Command Area / 3F Oil Palm Agrotech Pvt. Ltd:

Similarly, under this command area, Belgaum (252 ha) and Bailhongal (251 ha) taluks in Belgaum district were considered and interacted with 100 participating farmers.

e. Upper Krishna Command Area / Bhadravati Balaji Oil Palms Ltd:

Under this command area, Sindhagi taluk (504 ha) and Badami taluk (220 ha) were selected from Bijapur and Bagalkote districts respectively and 100 participating farmers were selected and interviewed for collecting required information for the study.

f. Non-Command Area:

Under non-command area, Kundapura taluk in Udupi district was selected and interviewed 33 available farmers to understand the status of oil palm plantations.

Thus, the farmers were selected representing all the command areas as well as non-command area for the study and the same is presented below:

Table 2: Age of the Oil Palm – wise Selection of Farmers

Age of Oil Palm	No of Farmers	Percentage
Up to 4 years old	324	55.1
5 to 8 Years old	189	32.1
More than 8 years old	75	12.8
Total	588	100.0

As per the proceedings of CEO of KEA, the age of the oil palm was taken in to consideration for the assessment. Accordingly, the selection of the farmers and oil palm plantation was selected as follows:

- Less than 4 years old
- 5 to 8 years old
- More than 8 years old

Interaction with farmers having different years old oil palm plantation was planned to explore and identify the problems being faced, need requirements and perceptions category-wise towards oil palm development.

The table 3 indicates that among the oil palm farmers interviewed about 55 percent of the famers having oil palm of upto 4 years old, about 32 percent was 5 to 8 years old trees (yielding stage) and about 13 percent of the farmers having oil palm plantation of more than 8 years old. This status explains that oil palm cultivation is a recent phenomena and most of the farmers have oil palm of upto 4 years old trees.

4.3 Selection of Taluks – An Abstract

Table 3: Selected Taluks & Number of Interviewed Farmers for Field study

S.No.	Command Area/Entrepreneurs	Name of District	Name of Taluks	No. of Farmers Interviewed	Date of Field visit
1.	Cauvery Command Area/Ruchi Soya Industries	Mysore	1. H.D.Kote	50	06.05.14
2.		Kodagu	2. Virajpet	55	07.05.14 & 08.05.14
3.	Bhadra Command Area/BBOP Ltd Davangere	Shimoga	3. Shimoga	50	09.05.14
			4. Hosnagara	50	10.05.14
		Davangere	5. Honali	50	12.05.14
4.	Thunga Bhadra Command Area/ 3F Oil Palm Agro Tech Pvt. Ltd	Koppal	6. Yelburga	50	13.05.14
5.		Gadag	7. Ron	50	14.05.14
6.	Mala Prabha Ghata Prabha Command Area	Belgaum	8. Belgaum	50	15.05.14
			9. Bailhongal	50	15.05.14
7.	Non-Command Area	Udupi	10. Kundapura	33	17.05.14
8.	Upper Krishna Command Area	Bijapur	11. Sindhagi	50	19.05.14
9.		Bagalkote	12. Badami	50	20.05.14
			Total	588	

The above table explains the number of farmers interviewed from the selected taluks covering all the command areas and entrepreneurs operating in the State. One can understand from the table that at least 50 farmers were selected from each taluk except in Kundapura taluk of Udupi district, the lone non-command area where the team could meet only 33 farmers as there were no oil palm farmers available for interaction. A total of 588 oil palm growers were interviewed during the survey.

5. PRIVATE ENTREPRENEURS

With regard to Private Entrepreneurs, all the key officials and field staff of all the 5 Companies were interviewed using a checklist to understand the present status, issues in promoting oil palm cultivation, reasons for shortcomings and suggestions, if any to overcome the shortcomings.

Table 4: Entrepreneur – wise Selected Farmers

SL. No.	Name of Entrepreneur	No. of Farmers Interviewed	Percentage
1	Ruchi Soya Industries Ltd, Mysore	105	17.9
2	Bhadravati Balaji Oil Palms Ltd. - 1	98	16.7
3	3F Oil Palm Agro Tech	90	15.3
4	Godrej Agrovet Ltd. - 1	100	17.0
5	Godrej Agrovet Ltd. - 2	35	6.0
6	Bhadravati Balaji Oil Palms Ltd.- 2	108	18.4
7	Simhapuri Agro Tech Co. P. Ltd	52	8.8
	Total	588	100.0

Table 5: Selected Farmers: Command Area - wise

Sl. No.	Name of command Area	Frequency	Valid Percent
1	Cauvery Command Area	105	17.9
2	Bhadra Command Area	150	25.5
3	Thunga Bhadra Command Area	90	15.3
4	Mala Prabha Ghata Prabha Command Area	100	17.0
5	Upper Krishna Command Area	108	18.4
6	Non-Command Area	35	6.0
	Total	588	100.0

6. HORTICULTURE DEPARTMENT

With regard to the implementation of schemes by the Horticulture Department of Karnataka State, all the Nodal Officers at each zonal level were met and discussed the various schemes being implemented to promote oil palm cultivation in the State, problems faced in implementing the schemes, suggestions to overcome the problems were discussed. In addition, the nodal officers were interviewed to understand their views on oil palm farmers' expectations, various motivational factors for the farmers to take up oil palm cultivation. One important observation made was the Nodal Officers have not been provided with any extension staff (there are supposed to be 8 field staffs for each Nodal Officer) to implement the oil palm schemes effectively.

The above tables indicate entrepreneur wise and command area wise number of farmers interviewed during the filed study. In all, 588 farmers have been interviewed in selected 12 taluks from 10 districts of the State of Karnataka.

7. PROMOTION OF OIL PALM SCHEME IMPLEMENTED UNDER RKVY BY HORTICULTURE DEPARTMENT

7.1 Services Provided by Department under RKVY Scheme/Programme

In addition to planting material subsidy of Rs.10, 000/- per Hectare, on farm investment subsidy/input subsidy is being provided to farmers under RKVY programme. The details of components and subsidy being provided to farmers are as follows:

- a. Fertiliser subsidy for the first four years of plantation to a maximum of Rs.20,000/- per Ha
- b. For efficient utilisation of water under ISOPOM, subsidy is provided to farmers who have installed Drip irrigation:
 - Up to 2 ha : Max of Rs.13,950/- per ha
 - 2 to 4 ha : Max of Rs. 9,300/- per ha
- c. Diesel/Electrical Pump set subsidy in load shedding areas @ 50% of the cost, but to a maximum of Rs. 10,000/- per unit.
- d. Assistance for Harvesting tools @ 50% of the cost, but to a maximum of Rs.6,000/- per unit
- e. Assistance for drilling Bore well/Open well/Water harvesting structure @Rs.50% of the cost, but to a maximum of Rs. 50,000/- per unit
- f. Assistance for cultivating intercrop in oil palm plantation with a view to provide alternative source of income till the oil palm comes to yield:
- g. 1st year: @50% of the cost of planting material& inputs-maximum of Rs.10, 000/- per Ha.
- h. 2nd to 4th year: @ 50% of the cost of planting material and inputs- maximum of Rs.5, 000/- per Ha.
- i. Integrated Nutrition Management (INM) & Integrated Pest Management (IPM) - For 1st year plantation@50% of the cost, maximum of Rs. 5,000/- per ha; 2nd year onwards @50% of the cost, maximum of Rs.1250/- per ha.
- j. Inputs to the fruit yielding plantations in order to increase the productivity: @50% of the cost, but to a maximum of Rs.3, 500/- per ha.

7.2 Achievement during the last 3 years is as follows:

Year	Physical (Ha)		%	Financial (Rs.in lakhs)		%
	Target	Achievement		Target	Achievement	
2010-11	3850	2936	76.25	791.74	789.47	99.65
2011-12	6000	4312	71.86	3899.05	3828.85	98.19
2012-13	5183	2513	48.48	2063.64	1904.60	92.29
	15033	9761	64.90	6754.43	6522.92	96.57

The above table indicates that the three years average of financial achievement is about 97 percent whereas, the physical achievement stands at 65 percent. Despite the support, area under oil palm is declining in the State and it was evident during the study.

8. SOCIO-ECONOMIC CHARACTERS OF SELECTED OIL PALM GROWERS AND OTHER FACTORS IMPACTING OIL PALM

8.1 Socio-Economic Characteristics of Oil Palm Growers

This chapter presents overall results drawn from the primary data collected from 588 oil palm cultivating farmers in the study areas. The personal interviews revealed the following facts.

Socio-economic characteristics of the oil palm farmers interviewed are summarized in Table 6.0, 7.0 and 8.0. The survey indicates that about 79% of the oil palm growers are over 40 years of age, the average age being 50 to 55 years. About two-third (66%) of the respondents have obtained at most only secondary education. Only about 19% received a Bachelor's degree or higher. According to the farmers' age and education, it is likely that they would have a limited knowledge for oil palm management. Nearly ninety percent of the farmers are male. However, practically all housewives assist their husbands in some activities in the production of oil palm. Approximately one-half of the farmers have 4-5 household members. On an average, there are 4 people per household.

Table 6: Basic Socio-Economic Characters of Oil Palm Growers

Parameters	No of Farmers	Percentage
Age of oil palm (in years)		
Up to 4 years old oil palm	324	55
5 to 8 Years	189	32
More than 8 years	75	13
Total	588	100
Age of the Farmers		
Below 30 years	25	4.3
31 to 40 years	101	17.2
41 to 50 year	173	29.4
51 to 60 years	189	32.1
Above 60 years	100	17.0
Total	588	100.0
Educational level		
Illiterate	37	6.3
Literate w/o formal education	33	5.6
Primary (1 to 5)	71	12.1
Middle (6 to 7)	72	12.2
Secondary (8 to 10)	124	21.1
Higher secondary (PUC)	126	21.4
General graduate	117	19.9
Diploma	3	0.5
ITI	2	0.3
PG	3	0.5
Total	588	100.0

The Table below shows that among the interviewed about 10 percent of them are female farmers. About 10 percent of the farmers interviewed belong to SC and ST community and the remaining 90 percent are belong to OBC (31 %) and ‘GENERAL (59%)’ categories. The study also showed that about 90% of the farmers live in semi pucca or pucca houses. These attributes clearly shows that the oil palm cultivation is not a favorite or feasible one among the disadvantaged community such as SC and ST. This may be due to lack of resources such as excess land and water for irrigation as regular watering is a necessary condition for oil palm plants. The farmers are identified and selected for oil palm cultivation by the department/entrepreneurs based on their potential in terms of land holdings and availability of water sources for irrigation, which are pre condition.

Table 7: Gender, Social Group and Type of Houses

Gender	No. of Farmers interviewed	Percentage
Male	534	90.8
Female	54	9.2
Total	588	100

Social Group	No of Farmers	Percentage
SC	24	4.1
ST	30	5.1
<i>OBC</i>	<i>186</i>	<i>31.6</i>
<i>General</i>	<i>348</i>	<i>59.2</i>
Total	588	100

Type of Houses	No of Farmers	Percentage
Kutchu Houses	57	9.7
Semi Pucca Houses	461	78.4
Pucca Houses	70	11.9
Total	588	100.0

Among the interviewed farmers, just less than 50 percent of them are large farmers having land sizes of more than 4 hectares and 32 percent are holding medium size farms of 2 to 4 hectares. This is clearly indicating that oil palm cultivation is not preferred or not possible to take up by small and marginal farmers having small land holdings.

Table 8: Land size owned by interviewed farmers

Land holding Size	No of Farmers	Percentage
Marginal(below 1 ha)	25	4.3
Small (1-2 ha)	84	14.3
<i>Medium (2-4 ha)</i>	<i>191</i>	<i>32.5</i>
<i>Large (>4 ha)</i>	<i>288</i>	<i>49.0</i>
Total	588	100.0

The survey showed that about 95 % of the farmers have land holdings with size of more than 2 hectares (5 acres), which means only medium and large land holding farmers are capable of raising oil palm as they have sufficient land for food crops and other regular crops and still can spare some land for oil palm cultivation.

9. VARIETY OF OIL PALM AND SOURCE OF SEEDLINGS

The survey showed that nearly all oil palm farmers grow *tenera* (variety), because palm fruits of *tenera* contain the most oil and it is advocated by the Horticulture Department as well as private entrepreneurs. Generally, the *tenera* grown is called according to trademark name or its origin i.e. Compact, CIRAD, Costa Rica, Surat Thani, and so on.



In Karnataka, all the private entrepreneurs who are responsible for expansion of oil palm cultivation is supplying the required number of seedling to the prospective farmers to grow oil palm plantations. The company has their own nurseries where the seedlings are grown in a scientific manner and supplied to the selected farmers free of cost as per the schemes being implemented by the Horticulture Department in the State of Karnataka.

As for the age of the seedlings used and the number of saplings planted per acre, these are in line with the recommendations by the Department, that is, 57 plants per acre with spacing dimension of 9 x 9 x 9 meters.

10. USE OF LABOUR IN OIL PALM PRODUCTION

The above table summarizes the information on labour management in oil palm production. The results revealed that only 43 percent manage on their own, about 56 percent managing through hiring labourers and more than one-third of the farmers manage with both family and hired labourers. The most popular activities (excluding FFB harvesting) utilizing family labour were; general management, applying fertilizer and chemicals. The farmers hire labourers especially for pruning, weeding and harvesting FFBs and transporting them to the collection point/Company.

Table 9: Labour Usage/Sources

Sources of Labour	No Farmers	%
Household labour only	257	43.7
Hired labour only	331	56.3
Household & Hired Labour	214	36.4

The main reason for hiring labourers by the farmers was insufficient household labour and/or lack of time, lack of skill, especially harvesting FFBs from tall trees of above 10 years old. In Kodagu region where other plantation crops such as coffee, pepper etc is popular; availability of labourers for oil palm work is rare. The oil palm growers import labourers from bordering States of Kerala and Tamil Nadu to work in their oil palm plantations. These labourers were provided with fringe benefits such as food and shelter in addition to their daily wages.

11. YIELD OF FRESH FRUIT BERRIES – FFBS

The average yield of FFBS per acre of oil palm year-wise in all the command area is presented below:

Table 10: Average yield of FFBS per acre – Area wise

S.No.	Command Area	4yrs old	5 to 8 yrs old	➤ 8 yrs old
		Tons/ac	Tons/ac	Tons/ac
1.	Cauvery Command Area	0.50	4.46	5.10
2.	Bhadra Command area	2.90	3.22	4.80
3.	Thunga Bhadra Command Area	2.00	3.60	4.60
4.	Mala Prabha & Ghata Prabha	2.00	4.80	2.50
5.	Upper Krishna command Area	2.10	3.60	3.40

The above table indicates that the yield is higher in the older trees in all the areas, except in Mala Prabha and Ghata Prabha command area where there is a decline in the yield in the older trees. The farmers in this district facing a lot of power cut or single phase power, due to which they are not able to irrigate the plants. The yield from more than 5 years old trees are much better in Cauvery command area as this area receives good rainfall during monsoon season and ground water potential is also higher than the other command areas.

12. RISKS IN PROMOTING OIL PALM AND THE PROMOTIONAL NEEDS OF FARMERS AND ENTREPRENEURS

12.1 Problems Faced by Oil Palm Farmers

The table below shows the major problems being faced by the oil palm growers and they are: Untimely and insufficient quantity of distribution of fertilizers, fluctuation and low price of FFB, lack of knowledge in oil palm cultivation and management, harvesting of FFBS from the grown up tall trees, lack of knowledge in soil and fertilizer management, lack of support from the Horticulture Department and Entrepreneurs, lack of water for irrigation in the dry season, low soil fertility, tall variety of seedlings, lack of credit, and harvesting of unripe FFB, in this order. However, the problems vary among the study areas. Most of these problems were quite common in all command areas. Lack of knowledge in overall oil palm management and in soil and fertilizer management was more serious in the newly planted area. It is evident that certain problems the farmers are facing could be solved by specific interventions at a micro level, but other bottlenecks have to be solved by a proper macro policy.

Table 11: Problems Faced by Farmers in Oil Palm Cultivation

Problem Areas	Number of Farmers said 'YES'	%	Number of Farmers said 'NO'	%
Soil / Land	560	95.0	28	5.0
Fertilise availability and Placing	324	55.0	264	45.0
Chemicals/pesticides	586	99.6	2	0.4
Capital	585	99.4	3	0.6
Water for irrigation	339	58.0	249	42.0
Labour problems	333	57.0	255	43.0
Variety	529	90.0	29	10.0
Harvesting of FFBs	572	97.0	16	3.0
Transportation of FFBs	584	99.3	4	0.7
Low price and Fluctuation of FFB price/rate	588	100	0	100
Lack of knowledge in oil palm cultivation	569	97.0	19	3.0
Lack of support from Entrepreneurs	537	91.0	51	9.0
Lack of support from Hort. Dept	543	92.0	45	8.0
Lack of oil palm farmers group	564	96.0	24	4.0

About 70 percent of the farmers reported that they have received support from the Horticulture Department. As shown in the table below, majority, two-third of them have received support on fertiliser subsidy and about 29 percent on bore well and drip irrigation subsidy.

Table 12: Support Received from the Department under the schemes

Support received/ Not received	No of Farmers	Percentage
Support received	411	70.0
Support not received	177	30.0
Total	588	100.0

Table 13: Specific Benefits Received from Department

Benefits	No of Farmers	Percentage
Fertiliser subsidy	271	66 %
Bore well subsidy	68	17 %
Drip Irrigation	51	12 %
Intercrop	21	5 %
Total	411	

In general, the following were the kind of support received by the farmers:

- Technical guidance is provided by the field staff employed by the entrepreneurs to some extent, not up to a desired level
- Some exposure trip were organised by entrepreneurs to successful oil palm growers' field
- Visiting to oil palm gardens by field technical staff employed by the entrepreneurs is taking place only to nearby gardens and their service is not available to farmers far away from their head quarters
- Awareness about oil palm crop is being carried out by entrepreneurs, but it is not very effective.



12.2 Support and Training Needs

Just more than one-third of the interviewed farmers have undergone some training and/or exposure trip to Andhra Pradesh or Malaysia or within Karnataka in order to acquire knowledge and awareness about maintenance and management of oil palm plantations. The main training providers were the extension staff employed by the companies in different command areas of the State. For those who received the support, the main help was on oil palm management, placement of fertiliser application in the basin surrounding the plant, watering, care to be taken to protect oil palm plant while taking up inter crop cultivation.

However, now, the farmers very much need support in the following areas:

- Raising and stabilizing the FFB price
- Distribution of fertiliser in time and in sufficient quantity
- Technical guidance to develop and manage oil palm
- 'Dwarf' variety in oil palm to overcome harvesting problems of FFBs from older and taller trees
- Harvesting machineries/tools to harvest heavy FFBs from 8 years and above old trees

Table 14: Training/Exposure visit undergone related to Oil Palm Cultivation

Yes / No	No of Farmers	Percentage
Yes	210	35.7
No	378	64.3
Total	588	100.0

Table 15: Managing Harvesting of FFBs

Harvesting of FFBs By	No of Farmers	%
Own management	67	14.4
House hold labour	136	29.3
Hired labour	408	87.9
Contract labour	12	2.6
Total	464	

12.3 Harvesting Management and Selling of FFB

In order to harvest FFB, the farmers tend to depend on hired labourers. About 88 % of them hired the labourers, while the rest used family members. Harvesting cycles varied a lot, namely from 15-25 days. However, most of them harvested oil palm within the recommended period of 15-20 days. On an average, the harvesting cycle was 18 days. Since most farmers hired the contracted harvesters, the real harvesting cycle may be shorter or longer. The evidence of shorter harvesting cycles resulted in unripe FFB. Certain farmers did not pay attention to the quality of FFB because they do not have enough incentives to manage it, offered the same price for better quality. This problem is one of the most serious one and will result in wastage and affect the quality of the output, palm oil.

12.4 Source of investment for oil palm cultivation

- About 96 percent of the interviewed farmers use their own source of funding to take up oil palm cultivation.
- About 3 percent of them taken loan from banks.
- Less than 1 percent of the interviewed farmers have availed loan from money lenders.

Table 16: Source of investment for the oil palm cultivation

Sources	No. of Farmers	Percentage
Own	547	93.0
Bank	18	3.1
Money lender	3	.5
Total	568	96.6
Not responded	20	3.4
Total	588	100.0

12.5 Size of Land Holding

It is understood from the table that the oil palm cultivation and management can be taken up by farmers who have considerable size of land holdings. The table shows that about 81 percent of the interviewed farmers were medium and large farmers owning minimum 2 hectares of land with irrigation facilities. There are some marginal and small farmers (about 18 percent of them) have also taken up oil palm cultivation and FFB production.

Table 17: Size of Land Holdings of Oil Palm Farmers

Land Size	No of Farmers	Percentage
Marginal (below 1 ha)	25	4.3
Small (1-2 ha)	84	14.2
Medium (2-4 ha)	191	32.5
Large (>4 ha)	288	49
Total	588	100

13. SCOPE FOR EXPANSION

13.1 Influencing Factors to Take up Oil Palm Cultivation

The following table indicates the factors which influenced the farmers to take up oil palm cultivation. Of the interviewed farmers, about 53 percent were influenced by the entrepreneurs who are operating in the region and responsible for development of oil palm creating awareness among the farmers through various extension techniques. Other farmers who are in to oil palm cultivation and management also played a major role in influencing farmers to take up oil palm.

Table 18: Influencing Factors to Take up Oil Palm Cultivation

Influencing Factors	No of farmers	%
Other oil palm farmers	269	45.7
Horticultural Department	195	33.2
Private entrepreneurs	312	53.1
News paper	2	0.3
Total	588	100.0

13.2 Other Reasons to Take up Oil Palm Cultivation

In addition, the farmers reported that there are various other reasons such as low cost of cultivation compared to other crops, less labour requirement, assured market and regular monthly income from 4th year onwards when the tree starts bearing FFBs, encouragement by the government though providing subsidies for various components and utilisation of land are the motives behind the decision.

Table 19: Other Reasons to Take up Oil Palm Cultivation

Reasons	No of Farmers	% *
Easy maintenance	343	58.3
Low cost of cultivation	398	67.7
Subsidy	197	33.5
Regular monthly income (yielding)	289	49.1
Utilization of land by intercrops	71	12.1
Less labour compared to other crops	358	60.8
*Multiple answers by a respondent		

13.3 Expected Rate Per / Ton of FFB

The study clearly reveals that the price fixation process and the price offered is the major bottle neck for the farmers to take up oil palm cultivation in their fields. All most all the farmers interviewed showed their dissatisfaction in this aspect and in fact, they are very vehement about the current price of Rs.8,500/- per ton of FFBs. Though some of them wanted a price of Rs. 15,000/- and above per ton, majority of them wanted a minimum fixed price of Rs.12, 000/-. This, they said, will go a long way in extending the area under oil palm cultivation to a great extent.

13.4 Opinion on Government Subsidies for growing Oil palm

There are some differences of opinion on the subsidy offered by the government to promote oil palm. The farmers who intend to take up oil palm cultivation or extend the area under oil palm wanted more subsidies as the capital is the major hindrance. The farmers who have older gardens of more than 8 years old oil palm wanted to scrap subsidies, but wanted much better price for the produce (FFBs). Some of them expressed that the subsidy for fertilisers should be extended up to 5 years until they the trees start bearing FFBs.

13.5 Oil Palm as Main Source of Income

Table 20: Oil Palm as Main Source of Income

Oil Palm main source of Income	No of Farmers	Percentage
Yes	55	9.4
No	533	90.6
Total	588	100.0

The survey indicates that only about 10 percent of the interviewed farmers have taken up oil palm cultivation as their main source of income. Unless more farmers are coming forward to take up oil palm as their main source of income, the situation will remain same. Any such new schemes extending subsidies for various components will be taken as a mere monetary support from the Government but not as an incentive towards promoting or

extending oil palm cultivation in the State. This status once again reiterates that oil palm cultivation is preferred by fairly large farmers who have good water potential and other required resources and not depending solely on oil palm for their livelihood.

13.6 Willingness to Expand Area under Oil Palm

Table 21: Willing to Expand Area of Oil Palm

Willing to extend oil palm cultivation	No of Farmers	Percentage
Yes	359	61.1
No	229	38.9
Total	588	100.0

The table above shows that more than 60 percent of the farmers are willing to extend the area or brought in more land under oil palm. But all of them wanted to do that on certain conditions as explained above, which should be taken up seriously by the implementing agencies in order to expand the area under oil palm



13.7 Motivating Other Farmers

Table 22: Motivate others to take oil palm cultivation		
Wanted to Motivate other farmers	No of Farmers	Percentage
Yes	272	46.3
No	292	49.7
Total	564	95.9
No answer	24	4.1
Total	588	100.0

About 46 percent of the farmers reported that they will recommend to other farmers to take up oil palm. The major reasons expressed by all those who wanted to recommend to other farmers are as follows:

- Low investment
- Easy maintenance
- Profitable
- Assured and regular monthly income from yielding stage
- Less labour requirement

Table 23: Pattern of Labour sources

Sources of Labour	No Farmers	%
Household labour	257	43.7
Hired labour	543	92.3

The study shows that about 92 percent of the oil palm growers hire labourers for various cultivation operations in oil palm gardens, especially for harvesting FFBs from fully grown trees and transporting to the collection site. In fact, places like Kodagu, the farmers hire labourers from neighbouring States on a contract basis and provide some fringe benefits like shelter and food in addition to the daily wages during their stay in the farm.

13.8 Inter-cropping

Table 24: Inter-cropping by Oil Palm farmers

Inter-cropping	No of Farmers taken up inter-cropping	Percentage
Yes	298	92
No	26	8
Total	324	100.0

The survey clearly shows that about 93 percent of the oil palm farmers having upto 5 years old oil palm garden have taken up intercropping in their oil palm gardens. This may be mainly due to availability of subsidies for inter-cropping. This support, to some extent influenced farmers to go for oil palm cultivation. Though interested, some farmers did not take up inter-cropping due to shortage of capital, water and labourers as inter-crops need regular labour for various inter-cultivation practices.

Among those who are practicing inter-cropping, crops such as banana and vegetable (about 36 and 35 percent respectively) are the major crops taken up by majority of the oil palm growers. Arecanut, cotton, maize and coffee are some of the other crops grown as inter crops in oil palm gardens.

13.9 Average yield of Oil Palm - FFBS

Table 25: Average yield of FFBS per acre

S.No.	Command Area	4 yrs old	5 To 8 yrs old	> 8 yrs old
		Tons/ac	Tons/ac	Tons/ac
1.	Cauvery Command Area	0.50	4.46	5.10
2.	Bhadra Command area	2.90	3.22	4.80
3.	Thunga Bhadra Command Area	2.00	3.60	4.60
4.	Mala Prabha & Ghata Prabha	2.00	4.80	2.50
5.	Upper Krishna command Area	2.10	3.60	3.40

The above table indicates command area-wise and age-wise average yield of FFBS per acre of oil palm. The yield in Cauvery command area seems to be slightly better than the other command areas, particularly in the older trees. Otherwise, the yield seems to be similar in all the areas in the State. Wherever the yield is less, this may be due to water shortage where irrigation facilities are scarce, so the plants are not getting sufficient water and nutrients due to insufficient fertiliser application. In oil palm as water deficiency increases, stomata will remain closed and the development and opening of spear will be inhibited. Water deficiency adversely affects flower initiation, sex differentiation and therefore, results in low sex ratio due to production of more male inflorescence.



14. RECOMMENDATION FOR BETTER WAYS AND MEANS TO POPULARISE OIL PALM CULTIVATION IN THE STATE OF KARNATAKA

14.1 Main Findings

- Oil Palm is a hassle free crop in terms of pests and diseases, labour requirements, marketing the produce, and provides regular monthly income from yielding stage.
- The area under oil palm is shrinking in Karnataka. The potential area in the State of Karnataka for oil palm development is 2,60,000 hectares. Under various schemes implemented by Govt of Karnataka, about 36,000 ha were developed, which is only 14% of the potential area available. At present, only 11,983 ha (about one-third of the developed area) under oil palm is existing in the State. About 67 percent fall can be observed from the area developed under oil palm. This means, about 24,000 ha area under oil palm has been converted to grow other crops.

- Though certain food crops, commercial and plantation crops occupied important place in the cropping pattern in all the selected taluks, it was observed that oil palm cultivation and production in the State could considerably be enhanced by their intensive cultivation, offering quality based better price for FFBs, effective awareness campaign about the oil palm and its economics and extending technical guidance to manage oil palm gardens effectively.
- Extension efforts like field demonstrations, group meetings etc. were conspicuously lacking
- Continuous drought conditions & improper and inadequate technical guidance for new plantations.
- Oil palm is being cultivated mainly by medium and large farmers who have sufficient land holdings and other resources such as capital and water for irrigation.
- Only about 10 percent of marginalized such as SC & ST community has taken up oil palm cultivation as their main source of income.
- Extension efforts in general is lacking in the absence of field staff at the district and taluk level and wholly depending on the field staff recruited by the entrepreneurs.
- There is an assured market for FFBs produced and the farmers need not look for market to sell their produce. Only glitch is the price offered and none of the oil palm grower is satisfied with the current price of Rs.7, 500/ ton of FFBs. Majority of them expect a minimum price of Rs.12, 000/- per ton of FFBs.
- The yields are not up to the expectation though resource rich farmers are obtaining good FFB yield. There is no much difference in the FFB yield across the command area.
- Factors causing constraints in obtaining optimum yields include improper intercropping practices, inadequate and untimely distribution and application of fertilizers and insufficient irrigation, lack of technical knowledge etc.
- Irrigation has been found to be a critical factor for getting optimum yields and instability in production as oil palm is a water loving crop.
- Competition: Sharp spurt in the prices of traditional crops like Arecanut, and sugarcane in Karnataka prompting oil palm farmers to convert their oil palm gardens.
- Returns from Oil Palm are not being maximized through diversification. There is lack of utilization of bio products by processing industries.

- Implementation of National Rural Employment Guarantee Scheme has increased the cost of labor which has increased the cost of production of the farmer.

14.2 Reasons for Uprooting

- Recently, reports from oil palm growing areas of Karnataka said that growers were uprooting oil palm trees. This is because they are unhappy with the price they are being offered. For the current quarter, Karnataka Govt has fixed Rs. 7/- for a kg of fresh fruit bunch. The price is revised periodically 3 to 4 times a year.
- The problem with growing oil palm is that it has a gestation period of 4-5 years. Further, it takes another 2-3 years before the production starts peaking.
- Though the Government oil palm cultivation through various subsidies, farmers seem to be running out of patience after switching over to the oil palm crop.
- Also, a sense of negligence in taking care of the crop during the initial stages and lack of technical guidance results in poor yield, causing some farmers uprooting their plants.

14.3 Major Constraints

- a) Resource Poor Farmers:** According to the survey results, the proportion of resource poor farmers having marginal landholdings who have taken up oil palm cultivation is quite small. This is because; such farmers are usually not adequately equipped to bear the initial investments for taking up oil palm. On account of such a sizeable chunk of farmers being left out of the ambit of the scheme due to their being unable to afford even their own share of the costs after the subsidies, the development of oil palm cultivation remains largely limited to those few who have the resources such as large land holdings with multiple cropping to afford them.
- b) Delay in the Release of Central & State share of Subsidy Funds :** The mismatch of timings in the release of Central and the State shares has also been cited as one of the major constraints that results in delay in the disbursement of subsidies by the district level officials in Karnataka.
- c) Lack of Qualified/Trained Field Staff:** The lack of qualified and adequately trained field staff has been cited as a major constraint by the official stakeholders and oil palm farmers in almost all the areas where the oil palm is being promoted.
- d) Price Offered for FFB:** The major glitch is the price offered by Govt, Rs.7.50 per kg of FFB.

- e) **Sudden increase in the price of competitive crops:** There is a sharp increase in the process of crops such as arecanut, sugarcane etc., which made oil palm farmers to get agitated more compared to the current price offered for FFB.
- f) **Increase in cost of Harvesting FFBs from tall trees:** There is a sharp demand for labourers due to MGNREGA scheme being implemented by GoI. In addition, difficulties are being faced by farmers in harvesting FFBs from old and tall trees in the absence of appropriate tools for harvesting also made the cost of labourers dearer as the FFBs has to be harvested in time.

15. SUGGESTIONS/RECOMMENDATIONS

15.1 Short Term Recommendations

Oil palm requires constant irrigation at constant intervals through protective watering. Concerted efforts must be made to bring larger irrigated area under the Oil Palm Development Programme.

The incentives through subsidies should be regulated and develop a system to ensure these incentives are reaching the right people at the right time.

Ensure adequate and timely supply of quality planting material and Enhance subsidy limit for area expansion.

Decentralizing the planning process to local levels to undertake effective extension work through demonstrations, group meetings, supply of technical literature in local language, regular field visit by the field staff to provide technical advice to reduce the risk and increasing the productivity.

The view of the farmers, officials from Department and Company is that growers should be given a fixed price for a term of at least five years. Another view is that the Government has to find a way to sustain the growers' interest through some additional payment.

Enhance the price of FFBs and ensure a minimum price of Rs. 12/- per ton of FFBs will help the existing oil palm farmers to continue and encourage others to take up oil palm cultivation.

Improved harvesting machinery: at present crop height is a serious problem for harvesting in adult plantations of more than 10 years old trees. Harvesting is done either by climbing the tree or through an aluminum pole attached to a sickle.

15.2 Long Term Recommendations

The most important suggestion is to avoid adhoc approach and framing of a long term strategy with full involvement of State Department of Horticulture. It is emphasized the need for strengthening the organizational set-up at the district level by recruiting full staff required for the filed work.

Evolving high-yielding dwarf varieties of oil palm is of utmost importance for increasing the area under oil palm cultivation and yield. Research Centres should be activated and infrastructural facilities should be strengthened to this effect.

Provide production based incentive to farmers. Also consider special incentive on yield of more than 25 Tons per hectare of FFB from 8 years old crops.

Implementation of crop insurance scheme should be considered and sensitize commercial banks and NABARD for promotion of Oil Palm cultivation.

15.3 Policy Level Recommendations

Unstable import policy should be addressed seriously. Domestic prices of Oil Palm are significantly affected by cheaper imports from Malaysia and Indonesia hence fluctuates considerably. The policy of allowing duty-free import of crude vegetable oils is affecting growers.

Inadequate financial support by Government, resource and security related issues viz. credit from commercial Banks and NABARD, implementation of crop insurance schemes, enactment of legislation should be looked into seriously.

Formulate some legal provisions to recover govt. assistance/subsidy provided if oil palm is up-rooted/diverted without justification.

In fact, the Centre can utilise the duty collected from imports of vegetable oils for subsidising oil palm and other oilseed growers.

16. ECONOMICS OF OIL PALM CULTIVATION BASED ON A REAL LIFE SITUATION AND COMPARE IT WITH OTHER TREE BASED OIL SEED CROPS

16.1 Yield of Oil palm

In a well maintained garden the yield of oil palm will be as furnished below:

Age of oil palm	Yield Ton/ha/year	Yield /ac/year in Ton
3-4 years	5	2.00
4-5 years	12	4.80
5-6 years	25	10.00
6-25 years	30	12.00

16.2 Economics

A detailed account of the economics of oil palm cultivation in India is as follows: The data furnished therein is modified using current labour charges and oil price and the details on various investments and returns from one acre plantation of 6 to 8 years old plants.

From the fourth year, the yield of bunches increases upto tenth year, and a stabilized bearing is attained thereafter. The investment during first year under irrigation will be almost three times of that under rainfed conditions mainly on account of the initial expenditure required to install the drip irrigation system. With irrigation the annual returns will exceed the annual expenses from the first harvest itself, i.e, during the fourth year after planting. By the end of sixth year the total returns will be more than total investments including all the expenditure for installing pump set and the drip irrigation system. A minimum of 8 to 10 FFBs per acre can be expected from the tenth year onwards.

16.3 Cost of Production Per Acre (in Rs.)

S.No.	Particulars	Cost of production
1	Labour cost for 40 Nos. @ Rs.400/- per day as casual labour	16,000
2	Fertilizer cost	2,000
3	Plant Protection cost	500
4	Miscellaneous	1,500
	Total cost of production	20,000

Income from Oil palm Garden Depending upon the No. of Bunches

S.No.	No. of Bunches/tree/year	FFB yield tons/ac/year	Gross Income Rs./ha/year	Net income (Gross income – cost) Rs./ac/year
1	10 bunches @ 17kg/tree/year	9.69	72,675	52,675
2	10bunches @ 18kgs/tree/year	10.26	76,950	56,950
3	10bunches @ 20kg/tree/year	11.40	85,500	60,500

Cost of one tonne of FFB is estimated at Rs.7,500/- Ton

A net profit of Rs. 50,000/- per acre / annum is assured.

ANNEXURE - 1

Oil Palm – Silviculture

The generic name comes from the Greek word ‘elaion’ (oil), referring to the oil extracted from the palm.

Elaeis guineensis is a handsome tree reaching a height of 20 m or more at maturity. The trunk is characterized by persistent, spirally arranged leaf bases and bears a crown of 20-40 massive leaves. The root system consists of primaries and secondary in the top 140 cm of soil.

Leaves numerous, erect, spreading to drooping, long, reaching 3-5 m in adult trees; leaf stalks short with a broad base. Spiny, fibrous projections exist along the leaf margins from the leaf sheath, wearing away on old leaves to jagged spines. Leaf blades have numerous (100-160 pairs), of long leaflets with prominent midribs, tapered to a point; arranged in groups or singly along the midrib, arising sometimes in different planes.

Male and female inflorescences occur on 1 plant; sometimes a single inflorescence contains both male and female flowers. Inflorescences arise among the leaf bases in large, very dense clusters, with innumerable small flowers, enclosed in the bud stage in 2 large fibrous bracts, which finally become deciduous. Male flowers single or in pairs in recesses on the branch lets, each with 3 sepals, 3 petals with edges touching in bud, 6 stamens, and a small, sterile pistil. Female flowers subtended by 2-3 small bracts, with 3 sepals, 3 petals overlapping in bud in a ring of small, sterile stamens, and a 3-celled ovary with 3 spreading stigmas.

Fruits borne in bunch. The average weight of each bunch is 23 kg, but a bunch may weigh up to 82 kg. A bunch contains between 200 and 2000 sessile ovoid drupes, 4 cm long and 2 cm broad, with pointed apex. The fruit coat colour varies from yellow to orange or nearly black. Four oil palm varieties have been distinguished on the basis of the fruit structure, especially the thickness of the endocarp: *E. g. var. macrocarpa* with 40- 60% shell, *E. guineensis var. dura* with 20-40% shell, *E. g. var. tenera* with 5-20% shell and *E. guineensis var. pisifera*, a shesless form.

Biology

Male and female flowers are borne on the same plant but open at different times, so that cross-pollination is necessary. A male inflorescence contains 700-1200 flowers and may yield 80 g of pollen over a 5-day period. The female flower is larger and receptive to pollen for 36-48 hours. Honeybees are attracted by the pollen scented like anise seed, which they collect as they gather nectar. It has not been established whether the bees contribute to pollination. However, The weevil *Elaeidobius kamerunicus* has been found to

be a successful pollinator. Fruit development commences immediately after fertilization. Black vultures (*Coragyps atratus*) feed avidly on *E. guineensis* and are involved in its dispersal.

Elaeis guineensis

Ecology

It is difficult to determine the natural habitat of the oil palm because, while it does not grow in primeval forest, it flourishes in habitats where forests have been cleared. It requires a relatively open area to grow and reproduce itself and thrives best when soil moisture is maintained. Normally, *E. guineensis* occurs in disturbed forests and along rivers and streams, both in its native range in West Africa and in some introduced areas. It is a succession species favoured by slash and burn, and its gene pool has expanded as farmers clear land and create more open habitat for the germination of its seeds.

Biophysical Limits - Altitude: Up to 900 m, Mean annual temperature: 27-35 deg. C, Mean annual rainfall: 2000-3000 mm

Soil type: It has a fibrous root system and benefits from deep soils that are fertile, free from iron concretions and well drained. It also tolerates a fair range of soil pH (4-6), although neutral soils are favourable.

Exotic range

Native range

Cameroon, Cote d'Ivoire, Democratic Republic of Congo, Ghana, Guinea, Sierra Leone, Uganda, China, Colombia, Congo, Costa Rica, Ecuador, Honduras, India, Indonesia, Kenya, Madagascar, Malaysia, Nigeria, Papua New Guinea, Philippines, Singapore, Solomon Islands, Sri Lanka, Tanzania, Togo, Venezuela, Zanzibar

Native: Exotic:

PRODUCTS - Food: Palm oil is popular in West Africa and Malaysia for cooking. It is now imported by India to meet local shortages in edible oil, being cheaper than many other vegetable oils. In West Africa, palm oil is often added directly to bring richness to soups and sauces. Addition of oil to cereal preparations greatly increases their calorific density, which is particularly advantageous for young children. Palm oil is also used as frying oil in the preparation of snacks such as bean cakes and fried plantain. Its 10% linoleic acid content makes it an excellent source of carotene. This is important in reducing incidence of vitamin A deficiency and the occurrence of nutritional blindness. Oil palm also provides heart-of-palm.

Fodder: Pressed cake is used as cattle feed.

Apiculture: The juice from fermenting fruit is collected by bees. The honey is dark amber with an astringent flavour.

Fuel: It is technically possible to produce from palm oil either carbohydrates for conversion to alcohol or a methanolizable oil as a diesel substitute. In Togo, the pressed fruits are dried and fashioned into cakes for cooking fuel.

Lipids: Palm kernel oil contains about 50% oil. This oil is used in hard water soaps, the manufacture of glycerin, shampoos and candles. The better grades are used in manufacturing margarine.

Alcohol: Palm wine is the delicious wine obtained by tapping the base of the immature inflorescence of the oil palm. Freshly tapped, undiluted and chilled, palm wine is pleasant to drink and is very high in yeast content. The sale of palm wine is considered more profitable than the sale of the fruits and oil.

SERVICES Reclamation: Oil palm is a good crop for rehabilitating degraded areas. In Sumatra it has successfully been established on abandoned farmlands taken over by *Imperata cylindrica*.

Shade or shelter: *E. guineensis* shade is lighter than that of other plantation crops such as rubber or cocoa and is suitable for substantial quantities of undergrowth, attracting livestock. Attention has been given to raising livestock in oil palm plantations as a subsidiary source of income. Palm fronds are useful for thatch.

Soil improver: The potash-rich residue from boilers is routinely recycled onto plantations to help enrich the soils for instance in Malaysia. Labour and transportation costs may discourage such recycling.

Ornamental: *E. guineensis* has been planted as an ornamental on tobacco estates around Deli and Medan in Sumatra.

Intercropping: Coffee and cocoa are small trees that can be planted among *E. guineensis* trees. Shading with *E. guineensis* presents certain difficulties, because while cocoa benefits from greater shade when it is young, the shade that the palm provides becomes increasingly undesirable as the cocoa plantation matures.

TREE MANAGEMENT Initial spacing is normally 9 m in a triangular arrangement, giving 140 trees/ha. The individual trees are fenced with wire netting to protect them from attack by rodents and grass cutters that eat the heart of young palms during the first few years. Mulching to conserve moisture in the dry season is necessary. The lower senescent leaves should be removed and burnt.

PESTS AND DISEASES *E. guineensis* is attacked by nematodes, slugs, snails, mites, insects, birds and mammals. Mammals include rats, wild pigs, monkeys and elephants, which damage seedlings and fruits. Birds include the long-tailed parakeet, the American black vulture, the house crow and the large-billed crow. The birds carry away fruit from the bunch and scatter it half-eaten. Only 1 nematode, *Rhadinaphelenchus cocophilus*, has been responsible for a serious diseased condition, red-ring disease. Damaging insects include the oil palm bunch moth and the West African oil palm leaf miner.

Diseases have become prevalent in areas where *E. guineensis* is cultivated on a plantation scale. Diseases of particular concern include fusarium wilt (caused by *Fusarium oxysporum*) and bacterial bud rot (in Democratic Republic of Congo), dry basal rot, caused by *Ceratocystis paradoxa* (in Nigeria), ganoderma trunk rot and crown disease in Asia; and spear rot in the American tropics. Spear rot has emerged as a major threat to *E. guineensis* production in Latin America.

ANNEXURE – 2

Neem – A Brief and its Economics

Introduction

Neem (*Azadirachta indica*) belonging to meliaceae family is one of the most suitable and valuable tree species found in India. It can grow on wide range of soils upto *pH 10* which makes it one of the most versatile and important trees in Indian sub-continent. Due to its multifarious uses, it has been cultivated by Indian farmers since vedic period and it has now become part of Indian culture. In India, it occurs throughout the country and can grow well in every agro-climatic zones except in high and cold regions and dam sites. In fact in India, *Neem* trees are often found growing scattered in the farmers fields and on the boundaries of fields without affecting the crops. Farmers practice this system just to meet the local demand for timber, fodder, fuel wood and also for various medicinal properties. Due to its deep tap root system, it does not compete with annual crops for scarce soil moisture.

Neem tree can be labelled as wonder tree for its multipurpose uses in real sense. This has been used as a medicinal plant for long time and provides almost all the requirements of rural areas - be the *timber, fuel wood, fodder, oil, fertilizers, pest repellent or the ubiquitous 'datun'*.

Description of plant

A large evergreen tree, 12 to 18 meter in height and 1.8 to 2.4 meter in girth with a straight bole and long spreading branches forming a broad crown as much as 20 metres across, commonly found throughout greater parts of India.

Uses

Neem extracts are used as insecticides, pesticides and fungicides. Neem oil has antibacterial, antiviral properties and used in skin and dental problems. *Neem* products are being used for malaria, fever, pain and also as contraceptive. Neem is also being used in cosmetics, lubricants and fertilisers. Neem bark is used in villages for rope making. Neem oil is used in soap manufacture.

Agro-climatic Requirements

It generally performs well on areas with annual rainfall varying from 400 - 1200 mm. It thrives under the hottest conditions where maximum day temperature reaches 50°C. But it cannot withstand freezing or extended cold.

Neem can be easily raised through direct sowing, entire / polypot seedlings or root-shoot cuttings. For degraded areas direct sowing is more successful. Entire / polypot seedlings or root-shoot cuttings are more relevant for agro-forestry / silvi pasture and road side avenue plantations. Direct sowing is done either by dibbling in bushes, broadcast sowing, line sowing, sowing on mounds or ridges, sowing in trenches in sunken beds in circular saucers or by aerial sowing. The choice varies with edaphic, climatic, biotic and economic conditions of the site. Planting in pits is carried out by using 20 to 45 cms tall seedlings.

Taller ones promise better survival. Planting of stumps prepared from a year old seedlings in crowbar holes also gives good results.

Environment

Considering the versatile nature, uses & growing global importance of *neem* the United Nations declared it as the "Tree of the twenty first century". Its large scale production promises to help alleviate several global environmental problems : *deforestation, desertification, soil erosion* & perhaps even global warming (If planted on a truly large scale). Its extensive, deep root seems to be remarkably effective at extracting nutrients from poor soils. Large scale neem plantations can help in rehabilitation of degraded forest lands & vast tracts of wastelands & greening the environment.

Harvesting, Yield & Returns

Neem starts bearing fruits after 5 years and comes to full bearing at the age of 10-12 years. Fruit yield is 5-20 kg per tree per year in the initial years. A mature tree produces 35-50 kg fruit/year. Oil yield varies from 40-43% of seed on dry weight basis. Highest oil content has been reported from Banswara region of Rajasthan (43.2%), while the lowest oil yield of 32.4% has been reported from Jaisalmer region. It has been observed that as rainfall in an area increases oil content also increases. Among the International provenances tested, Bangladesh provenance has yielded maximum oil content (48.6%). However we presume a conservative yield of 5,6,10,15, 20 kg/tree respectively from 5th year onwards. Yield generally stabilises from 9th year. Sale price of the seed may be considered @ Rs.5/kg.

Irrigating the young stock, keeping the field clear from competing weeds & soil loosening have been reported to produce good results in neem.

Neem seed price is projected to be Rs.10000 / ton in the near future. So, it is high time to exploit the potential of this hitherto neglected tree & to manage neem for higher economic returns to farmers. It has been estimated that 10 yr old tree can yield a timber of 5-6 c.ft / tree.

NEEM - Economics of cultivation

The cost of cultivation will depend upon the extent of the area to be planted. The cost of cultivation for one hectare at spacing of 5mx5m i.e. 400 plants/ha has been worked out at Rs. 20700 / ha which is given in **Annexure – I**.

The yield and income from Neem cultivation are given in **Annexure – II** along with techno-economic parameters.

Financial Analysis

The financial analysis with the above parameters of the investment cost and techno-economic parameters, the IRR works out to 30.48 % which is given in **Annexure - III**.

Economics of Neem Cultivation:

Unit Cost of Neem cultivation in one hectare								
PARTICULARS OF WORKS	No of UNITS	UNIT RATE	Years					TOTAL
			1	2	3	4	5	
Site preparation	10 labour days	Rs.100 / ld	1000					1000
Initial ploughing	Lumpsum	Rs.1000	1000					1000
Alignment & staking	3 ld	Rs.200 / ld	600					600
Digging of pits (30 cm ³) and refilling of pits after mixing FYM & fertiliser (50 pits/ld & 100 pits/ld)								
digging	20 ld	Rs.100 / ld	2000					2000
refilling	4 ld	Rs.100 / ld	400					400
Cost of FYM @3 kg/pit	1.2 tonne	Rs. 500 / tonne	600					600
Cost of fertiliser (N in form of urea)@50 g /plant	20 kg	Rs.5/ kg	100	100	100	200	200	700
Cost of plants	440 plants	Rs.10/- plant	4000	400				4400
Planting and replanting @ 100 plants per ld	5 ld	Rs.100 / ld	400	100				500
Weeding, soil working, etc.	15 ld per working	Rs.100 / ld	1500	1000	1000	1000	1000	5500
Irrigation @ 5 times / yr during dry months only (life saving irrigation)		Rs.150 per Irrign.	750	750	750	750	750	3750
Grand Total (Unit cost taking first 5 yrs of expenditure)			12350	2350	1850	1950	1950	20450
	round off		12400	2400	1900	2000	2000	20700
Unit cost per ha.								20700
Margin @10%			1240	240	190	200	200	2070
Bank loan @ 90%			11160	2160	1710	1800	1800	18630

Yield and income from Neem cultivation				Annexure II			
Year	Yield per tree (kg)	Yield per ha (kg)	Income (Rs.)				
6	5	2000	11000				
7	6	2400	13200				
8	10	4000	22000				
9	15	6000	33000				
10	20	8000	44000				

Techno - economic parameters	
Spacing of 5 m x 5 m has been adopted.	
The number of trees to be planted are 400 per hectare.	
Survival is considered at 90% with 10% casualty replacement.	
Life saving irrigation to be given during the first three years.	
Tree starts bearing fruits after about 5 years.	
A conservative yield of 5,6,10,15,20 kg per tree has been presumed from 6th year onwards.	
Yield stabilises in 10 th year.	
Sale price of seed has been considered at Rs.5.50/kg.	
Margin money has been assumed at 10% of the total financial outlay.	
Rate of interest on loan has been considered at 12%.	
Repayment period is 10 years with 5 years grace period.	

Financial Analysis

Particulars	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Capital cost	12,400	2,400	1,900	2,000	2000	-	-	-	-	-
Recurring cost		-	-	-	-	-	-	-	-	-
Total Expenditure	12,400	2,400	1900	2000	2000	-	-	-	-	-
Income		-	-	-	-	11000	13,200	22000	33000	44000
Net Income	-12400	-2400	-1900	-2000	-2000	11000	13200	22000	33000	44000

PWC at 15% **15984**

PWB at 15% **37167**

BCR **2.33** **:** **1**

IRR **30.48%**

ANNEXURE – 3

Pongamia – A Brief and its Economics

Distribution

Pongamia pinnata belongs to the family fabaceae (Papilionaceae). It is also called *Derris indica* & *Pongamia glabra*. It is a medium sized evergreen tree with a spreading crown and a short bole. The tree is planted for shade and is grown as ornamental tree. It is one of the few nitrogen fixing trees producing seeds containing 30-40% oil. The natural distribution is along coasts and river banks in lands and native to the Asian subcontinent. It is also cultivated along road sides, canal banks and open farm lands.

Ecology

Native to humid and subtropical environments, *Pongamia* thrives in areas having an annual rainfall ranging from 500 to 2500 mm, in its natural habitat, the maximum temperature ranges from 27 to 38°C and the minimum 1 to 16°C. Mature trees can withstand water logging and slight frost. This species grows to an elevation upto 1200 m.

Soil

Pongamia can grow on most soil types ranging from stony to sandy to clayey. It does not do well on dry sands. It is highly tolerant of salinity. It is common along waterways or seashores, with its roots in fresh or salt water. Highest growth rates are observed on well drained soils with assured moisture.

Commercial Uses:

Oil The seeds are largely exploited for extraction of a non-edible oil commercially known as 'Karanja oil' which is well organised for its medicinal properties. The yield of fruit varies from 9 to 90 kg per tree for different age trees. There is no systematic organized collection of seeds. Mixture seeds consist of 95% kernel and are reported to contain about 27.0% oil. The yield of oil is reported to be about 24 to 26.5% if mechanical expellers are used for the recovery of oil from the kernels, but it is only 18-22% from village crushers. The crude oil is yellow orange to brown in colour which deepens on standing. It has a bitter taste and disagreeable odour, thus it is not considered edible.

The oil is used as fuel for cooking and lamps. The oil is also used as a lubricant, water-paint binder, pesticide, and in soap making and tanning industries. The oil is known to have value in folk medicine for the treatment of rheumatism, as well as human and animal skin diseases. It is effective in enhancing the pigmentation of skin affected by leucoderma or scabies.

Wood With a calorific value of 4600 - 4800 kcal per kg, Pongamia is commonly used as fuel wood. Its wood is beautifully grained and medium to coarse textured. However, it is not durable, is susceptible to insect attack, and tends to split when sawn. Thus the wood is not considered a quality timber. The wood is used for cabinet making, cart wheels, posts, agricultural implements, tool handles and combs, etc.

Fodder and feed Opinions vary on the usefulness of this species as a fodder. It is reported in some places that the leaves are eaten by cattle and readily consumed by goats. However, in many areas it is not commonly eaten by farm animals. Its fodder value is greatest in arid regions. The press cake, remaining when oil is extracted from the seeds, is used as a poultry feed.

Other uses Incorporation of leaves and the press cake into soils improve fertility. Dried leaves are used as an insect repellent in stored grains. The press cake, when applied to the soil, has pesticidal value, particularly against nematodes.

Pongamia is a drought resistant, nitrogen fixing leguminous tree. It is also salt tolerant and to some extent tolerant to slight frost. It is a good shade tree. The shade provided by this tree is said to have cooling effect and is good for health .

Pongamia is often planted in homesteads as a shade or ornamental tree and in avenue plantings along roadsides and canals. When planted as a shade or ornamental tree, branch pruning may be necessary to obtain a trunk of appropriate height. It is a preferred species for controlling soil erosion and binding sand dunes because of its dense network of lateral roots. Its root, bark, leaf, sap, and flower also have medicinal properties.

Silviculture / Cultivation practices

Seed Collection & Storage

Pongamia is easily established by direct seeding or by planting nursery-raised seedlings or stump cuttings of 1-2 cm root-collar diameter. Propagation by branch cuttings and root suckers is also possible. In peninsular India, the seeding season is April to June, and the seed yield per tree ranges from about 10 kg to more than 50 kg. There are 1500-1700 seeds per kg. The pods are dried in sun & seeds are extracted by thrashing the fruits. They remain viable for about a year when stored with the fruit shell un opened in air-tight containers / stored at 5 0 C.

Seed Germination

Generally seeds do not require any pre-treatment before sowing. But, soaking the seeds in hot water for 15 minutes improves germination percent & vigour. Seeds are sown in seed beds / poly pots / sand trays with the micro Pyle facing downwards. Seed germinates within two weeks of sowing. Seedlings attain a height of 25-30 cm in their first growing season. Transplanting to the field should occur at the beginning of the next rainy season when seedlings are 60 cm in height. Seedlings have large root systems. Soil should be retained around the roots during transplanting. Seedling survival and growth benefit from annual weed control for the first three years after transplanting. Pits of 30 cm³ are appropriate for planting in a plantation scale at a spacing of 3 M X 3 M

The spacing adopted in avenue plantings is about 8 m between plants. In block plantings, the spacing can range from 2 x 2 to 5 x 5 m. Pongam seedlings withstand shade very well and can be interplanted in existing tree stands. In nurseries and in the field the presence of root nodules on uninoculated pongamia seedlings are common.

Weeding

Two or three weeding are required per year for the first 3-4 years of sowing / planting.

Pests and diseases

Pongamia attracts many pests & diseases. There are about 30 species of insect pests recorded to cause damage to pongamia raised usually as avenue planting & strip plantations on marginal lands. They include gall inducers, leaf miners, foliage feeders, shoot bores, sap suckers, flower feeders and fruit seed borers. Of these, gall inducers and leaf miners, rank predominant position because of their destructive potential and ubiquitous occurrence.

UNIT COST of PONGAMIA CULTIVATION IN ONE HECTARE

ESPACEMENT:5M x 4M

WAGE RATE : Rs.150/MD

CASUALTY REPLACEMENT :20%

NO.OF TREES/HA.:500

SURVIVAL/HA.:400

Sr.	PARTICULARS						TOTAL
No.	OF WORKS	UNIT	1	2	3	4	
1	Site preparation	10 MD	1500				1500
2	Initial ploughing for 6 hrs.	Rs.270/hr	1620				1620
3	Intercropping	LS	2000				2000
4	Alignment & staking	5 MD	750				750
5	Digging of pits (45cm ³) and refilling of pits after mixing	13 MD 3 MD	1950	450			2400
	FYM, Fertiliser & insecticides (50 pits/MD & 150 pits/MD)						
6	Cost of FYM @2 Kg/pit	Rs.500/ton.	500				500
7	Cost of fertiliser @150 gm./plant	Rs.18/kg	1350	1350	1350	1350	5400
8	Cost of plants including transport (500, 100 nos.)	Rs.3/plant	1500	300			1800
9	Planting and replanting @ 100 plants per MD	5 & 1 MD	250	50			300
10	Weeding, soil working, application of fertiliser, etc.(3,2,1,1)	10 MD per working	1500	1000	500	500	3500
11	Plant protection measures	LS	200	200	200	200	800
12	SUB TOTAL	RS.	13120	3350	2050	2050	20570
13	CONTINGENCY 5 %	RS.	656	168	102	102	1028
14	GRAND TOTAL	RS.	13776	3518	2152	2152	21598

Yield and income per hectare

Year	Seed yield per tree (Kg.)	No. of Trees	Qty. seed (Kg)	Cost per kg.in Rs.	Total Income(Rs.)
5	3	500	1500	5	7500
6	3.5	500	1750	5	8750
7	4	500	2000	5	10000
8	4.5	500	2250	5	11250
9	5	500	2500	5	12500
10th year onwards	5.5	500	2750	5	13750

Economics of Pongamia cultivation in one Hectare of land

Years	1	2	3	4	5	6	7	8	9	10
Cost	13776	3518	2152	2152						
Benefits					7500	8750	10000	11250	12500	13750
Net Benefit	-13776	-3518	-2152	-2152	7500	8750	10000	11250	12500	13750

PWC@ 15% 10048.94

PWB@ 15% 21900.78

BCR 2.18

IRR 31.77%

Annexure 4

ToR for Rapid Assessment of Oil Palm Development Program in Karnataka

1. **Title:** 'Rapid Assessment of Oil Palm Development Program in Karnataka State'

2. **Background and the context:** In India, the annual demand for edible oil varies from 140 - 160 lakh tons, but domestic production of edible oil is 75 to 80 lakh tons only, the remaining 65 - 80 lakh tons of edible oil is being imported from other countries to bridge the gap between demand and supply. The Government is spending huge amount of money to a tune of Rs.40000 crores annually to meet the demand for edible oils. In this direction, in order to attain self-sufficiency in edible oil production, oil palm has gained importance. "The Govt of India is encouraging oil palm cultivation, as the productivity of edible oil per unit area is very high (4'-4.50 M.Ts per ha.) compared to any other edible oil seed crop (0.6 to 1.20 M.Ts per ha.). Oil Palm is native to South America and it is being cultivated extensively in Malaysia, Thailand, Indonesia and other South African countries. It has been introduced to India during 1960 and its commercial cultivation began during 1990 after several field trials in different agro-climatic condition, Oil Palm is performing well and the yield levels are comparable to the yield levels of Malaysia. Hence, the Govt. of India intends to increase the area under oil palm and increase the edible oil / palm oil production through this scheme.

Karnataka State is estimated to have a potential of 2.60 lakh ha for Oil Palm cultivation. About 14500 farmers have already cultivated Oil Palm in 16000 ha of area. About 5284 ha of this is at the bearing/yield stage;. The State is producing about 1000 tons of Fresh Fruit Bunches (FFBs) annually which yields about 1925 tons of Crude Palm Oil (CPO) worth approximately Rs.9.63 crores. State government intends to further expand the area under Oil Palm cultivation.

Under Oil Palm Program, farmers are provided input subsidy for purchase of fertilisers, planting material, Diesel Pump-set, Harvesting tools, Drip irrigation, Bore well, water harvesting structures, Intercrop and for INM & IPM. The farmers are also taken on study tour for training regarding oil palm cultivation. The responsibility of Area expansion, nursery raising, procurement of fruits and its processing has been entrusted to private entrepreneurs on regional basis. Currently there are five private entrepreneurs operating in the State. The unique feature of this program is the buy back arrangement. Purchase price of the farmer's produce known as Fresh Fruit Bunches are fixed at Government Level based on a scientific formula recommended by Directorate of Oil Palm Research (DOPR), Pedavegi, Andhra Pradesh after taking into consideration of farmers interest and the interest of the processors. The Govt. of Karnataka has also constituted a Price fixation committee, in which the oil palm farmers, oil palm processors are the members. The Price Fixation Committee meetings are conducted regularly *once in 4 months* to look into the problems being faced by the oil palm industry. However certain problems cropped up in the international market

for Palm Oil which resulted in unstable prices. Consequently, the buy-back arrangements *became* uneconomical and were rendered non-functional. Because of the uncertainty created, farmers incurred losses and some of them took the extreme step of uprooting the plantations and putting the land to alternate use. Indeed the international Palm Oil Price market *has a* serious adverse impact on the program.

3. Evaluation scope, purpose and Objectives: Oil Palm Development Program is being implemented under the Govt. of India program titled 'Integrated Scheme for Oil Seeds, Pulses, Oil Palm and Maize (ISOPOM) since 1990. Oil Palm cultivation and related activities are now planned to be taken up under Rastriya Krishi Vikas Yojane (RKVY) which was *introduced during 2011-12. The Govt., of India is in the process of starting a new program titled Oil Seeds and Oil Palm Mission by subsuming ISOPOM - OPDP and RKVY Promotion of Oil palm. The programs pertaining to Oil seeds are implemented by Agriculture Dept. and programs pertaining to oil palm are being implemented by Dept. of Horticulture.*

Since, Govt. of India and Govt. of Karnataka intends *to expand Oil Palm Development activity through increased investment, time and effort, it is considered necessary to make a rapid assessment of the experience gained in Karnataka state in the last couple of years under RKVY - Promotion of Oil Palm. It is proposed to hire an independent external agency to conduct the assessment and to provide independent feedback.*

4. Evaluation questions: Following are the issues to be addressed by the rapid assessment:

- i. Assess the area under Oil Palm cultivation at present in Karnataka and assess the scope for further expansion.
- ii. Furnish the economics of Oil Palm cultivation in Karnataka based on real life situation and compare it with other tree based oil seed crops.
- iii. Assess the efficiency of Promotion of Oil Palm scheme implemented under RKVV by Horticulture Dept in the last two years,
- iv. Identify the risks in promoting Oil Palm, identify the promotional needs of farmers and entrepreneurs and recommend better ways and means to popularize Oil Palm Cultivation

in the State of Karnataka.

5. Evaluation methodology: Required data and information is to be collected from the secondary data available with Horticulture Department, interaction with private entrepreneurs engaged in Oil Palm production and marketing, holding focus group discussion with the participating farmers and some aspirants, personal interviews with key officials, and other key stakeholders. It is necessary to cover all the agro-ecological regions of the state during the study. Oil Palm is presently cultivated in 5 command areas in 22 districts and 4 other district (in non-command areas). Taluk should be taken as a unit for analysis. About 10 taluks in all, and a random sample of 100 farmers covering Palm Oil crops in different age groups from each taluk gathered in 2-3 focus groups is suggested as the ideal sample for the farmers. Actual sample *size* could be slightly modified by the consultant if it is justified. The number of other stakeholders to be interviewed should be kept to the minimum required.

6. **Qualifications of the consultants:** Consultants who intend to participate in the tender should be an organisation with a strong background in conducting high quality evaluation studies in the area of Agriculture/Horticulture and Natural Resources Management. They also should have a qualified economist and statistician to support the study.
7. **Method of selecting the consultant:** Consultant for the Rapid Assessment Study will be chosen by open competition. A request for Proposal (RFP) will be issued to the prospective external consultants. Each one of them will be given an opportunity to conceive the study according to their expertise and understanding and make a power point presentation in about 20 minutes to a team of senior officers in July, 2013. The proposal which is the best in methodology to adequately cover the objectives of the study and modest in terms of cost will be accepted and the contract will be awarded to the agency which makes such a proposal. Horticulture Department will provide the data of participating farmers taluk-wise and list of other entrepreneurs in the state. The prospective consultant should examine the details and participate in the tenders.
8. **Deliverables and time schedule:** Successful consultant should adhere to the following timelines and deliverables:
- a. Submission of Work Plan - within 30 days after signing MoU.
 - b. Field Data Collection - within one month after the work plan is approved
 - c. Draft report preparation - within one month of completing field data collection.
 - d. Final report submission - within one fortnight after the draft report is approved.
- Thus excluding the time taken for approvals in KEA, the successful consultant should complete the evaluation study in 3-4 months time.
9. **Expectations from the study:** Promotion of Oil Palm under RKVY is an important and futuristic scheme of Govt. of India and Govt. of Karnataka. The proposed study is expected to provide a depth analysis of the shortcomings of the scheme. More importantly, it should provide the necessary inputs in terms of policy changes that are required, modalities of implementing the scheme, adequacy and the scale of financing to be done and convergence possibilities etc., with a view to benefit the rural community to the maximum extent possible. The study should bring out the status and prospects of Oil Palm cultivation in the state. The economic benefit in promoting Oil Palm to the farmers as well as to the state should be brought out clearly.
10. **Cost and schedule of budget releases:** Cost of the study will be finalized based on the competitive bids received. Agreed cost will be paid in four installments as below:

40% will be released as advance on signing of the contract.
30% will be released after completing 50 % of field survey work. 20% will be released after the draft report is approved.

10% will be released after submitting the final report along with data etc.

11. **Appointment of Nodal officer:** Additional Director of Horticulture, Oil Palm Project will act as the nodal officer for this study. He will provide additional information if needed and clarify doubts if any. He will make arrangements for coordinating the field survey work.

12. **Ensuring Quality:** The evaluation report and its findings must demonstrate highest professional standards on par with national and international studies. Evaluation Authority will provide the complete oversight for the study. All technical aspects of the study are subject to their approval.

Chief Evaluation Officer
Karnataka Evaluation Authority
Bangalore - 560001

Approved
[Signature]

TRA-May-2013 **IRA- April-2014** **DRA- Aug-2014** **FNO- KEA 110 EVN 2012**

EXTERNAL EVALUATION REPORT NO: 3 OF 2014



**EVALUATION STUDY ON OIL PALM DEVELOPMENT
PROGRAMME IN KARNATAKA**