Productivity Potential and Profitability of oil Palm Cultivation (A Case Study of Krishna District, Andhra Pradesh)

INTRODUCTION
Agriculture is the backbone of Indian Economy and is central to all strategies of planned economic development in India. Oils and fats form an integral part of food, condiments, cosmetics, soaps and detergents, lubricants and laxatives besides having medicinal and therapeutic value. Thus these oilseed groups of crops occupy an important place in India’s agricultural economy. The domestic demand for vegetable oils and fats has been rising at the rate of about 4 percent per annum whereas domestic output has been rising at just around 2 percent per annum only. This demand-supply gap has forced the government to resort to large-scale imports of edible oils. The rising import bill on this account has caused great alarm to the government. The growth and stability of India’s food economy is, therefore, very much linked with the growth and stability of its economy. Among oilseeds, Oil Palm plays significant role in vegetable oils and fats form an integral part of food, condiments, cosmetics, soaps and detergents, lubricants and laxatives besides having medicinal and therapeutic value.

REVIEW OF CURRENT LITERATURE
Several studies have been made in the area of oil seed cultivation in India and abroad in general and palm oil cultivation in particular. Most of these studies are in the form of Committee Reports, Research Papers, Books, Journals, and Doctoral Theses.

Susenki Buddidarsana, Arif Rahmanullah, Muhammad Sofiyuddin (2013) in their study on ‘Economic Assessment of Oil Palm Production’ through the research found that oil palm plantations are attractive to investors. The growing worldwide interest in bio-fuel as an alternative for fossil fuels will increase demand for its feed stock and lead to the expansion of oil palm plantation. Also oil palm processing units are attractive segment for investment. Rethinam (2009) in his study on “Recent Advances in oil palm – A Global perspective,” felt that a ‘Three Pronged Strategy’ should be adopted in planning the research and development activities for the industry. He suggested measures like enhancing productivity, improving efficiency of ECO plantation, Capacity development and community development, crop insurance, strengthening the research infrastructure to satisfy the developmental need in order to meet the requirement of economically viable, environmentally sound and socially acceptable oil palm development. Noormahayu, Khalid and Elsadig (2009) in their study on “Financial Assessment of Oil Palm Cultivation on Peat land in Selangor, Malaysia” explores the social and economic basis of oil palm cultivation in Peat land. Also they found that oil Palm cultivation is a profitable investment so long as growth conditions, costs, selling price and interest rate do not fluctuate substantially. Venkata Kumar, Ramana Rao, Padmaiah, Hegde (2009) have conducted a study on productivity potentials and profitability of non-monetary, low-cost and cost-effective oilseeds production technologies. Rethinam (2008) founder of Society for Promotion of Oil Palm Research and Development discussed in detail the membership of the society, privileges of members, subscription details and palm research and development. He expressed that Society for Promotion of Oil Palm Research and Development (SOPOPRAD) was formed to discuss common issues and also to get to know financial issues, technology transfer, programs identified and solutions found out in the cultivation of oil palm. Chadha (2006) committee in their report on “progress and potential of oil palm in India” found that during last 15 years, the industry had seen several ups and downs in the rate of area expansion, yield potential, price fixation and establishment of processing facilities in the states. Ninar (1988) in his book “Edible oilseeds growth, area responses and prospects in India” made a comprehensive study of the production of oil seeds and a systematic in-depth analysis of factors influencing their supply.

METHODOLOGY
This paper explores the social and economic basis of oil palm cultivation in Krishna district in the state of Andhra Pradesh.
Pradesh. Data were obtained by conducting a questionnaire survey of 200 farmers who cultivate oil palm in the Krishna District of Andhra Pradesh. Financial viability of oil palm cultivation for farmers was assessed by calculating three financial indicators (NPV, BCR and IRR). Greater annual returns can be achieved over 20–25 years than over shorter periods, especially of less than 10 years.

The primary data was collected from 200 farmers who are cultivating oil palm, using survey type research with a cross-sectional design. The survey involved completing a questionnaire covering financial aspects of oil palm cultivation (Appendix 1) during a face-to-face interview with each farmer. The social backgrounds of the farmers and their attitudes to oil palm cultivation were explored by empirical analysis and cross tabulation of questionnaire data.

In this study the financial return of Oil Palm is estimated by considering the financial aspects like farmer’s income on Oil Palm and income on intercrop. This did not include any externalities. Financial performance is evaluated in terms of Net Present Value (NPV), Benefit-Cost Ratio (BCR) and Internal Rate of Return (IRR) over a period of 21 years. The costs of production taken into account are establishment cost, input cost and labour cost. Establishment costs are incurred during the first years of planting and include clearing and preparation of the land, cost of seedling and sowing. The input costs include fertilizer cost, cost of weedicides, pruning, mulching, harvesting, fencing etc. Labour cost incurred on fertilizing, pruning weeding mulching, harvesting, bunch loading etc.

**OBJECTIVES**

The current research paper has broad research objective of studying financial aspects of oil palm cultivation with special reference to Krishna District. The specific objectives include the following:

- To estimate return of Oil Palm
- To evaluate the financial performance of Oil Palm

**ANALYSIS AND INTERPRETATION**

The yield depends on the maturity of the Oil Palm. It will normally starts from fourth year onwards so that the first fruits are borne in the fourth year. The yield of oil palm can be affected by many factors like age of Oil Palm, unusual periods of drought, prolonged heavy rain etc. The profit level is influenced by planting density, yield and market price. The market price of this crop fluctuates; the FFB price has recently been increasing. When the survey was conducted the average market price was Rs.5600 per Tonne.

Other data required for the calculations are discount rate and the project life (Number of years for discounting). In attaching values to the inputs and outputs, constant prices are assumed. The discounted sum of total revenue (also known as the present value of benefit) and the discounted sum of total cost (Present value of cost) are calculated annually over 21 years using an interest rate of 9%.

Applying the interest rate of 9% the discounted sum of total costs from discounted sum of total revenue NPV is obtained for Oil Palm cultivation at Rs.252047/-. By subtracting the present value of total costs from discounted sum of total revenue NPV is obtained for Oil Palm cultivation at Rs.44935/-. By calculating the ratio of these two values BCR of 1.17 is obtained. These values indicate that the overall profitability of the crop is low and to make oil palm cultivation an efficient investment either the price of Oil Palm Fresh Fruit Bunches have to be increased or the cost of cultivation has to be decreased.

The IRR obtained as 11.25 and it is only 2% more than the interest rate. Hence it is not much worthwhile investment.

**Sensitivity Analysis**

The financial indicators provide convenient indices for assessing financial performance, but the disadvantage is that all of them are static. In the real world factors that affect them vary. Particularly when these changes are in the pessimistic direction, the conclusions of the analysis in terms of viability of project will no longer hold. Therefore it is better to calculate the financial indicators using different values in order to explore how robust the financial performance of Oil Palm cultivation under changing market conditions. This process is known as sensitivity analysis and it enables to estimate the financial risks associated with such developments. The crucial factors that are likely to affect the financial indicators are as follows:

1. The market price of Oil Palm FFB, which effects the income derived from selling each year's crop.
2. The cost of material inputs and labour.
3. Different costs which are associated with sowing to harvesting.

The above fig. shows the pattern of annual cost and returns for Oil Palm production for 21 years and table no, gives a detailed cash flow. Costs are high in the first years because of establishment costs incurred in clearing, preparing the land and planting the Oil Palm plants. There is no revenue during the first three years because the Oil Palm trees starts producing Fresh Fruit Bunches from fourth year. In the fourth year also the revenue is negative due to low yield and high costs. But in the Oil Palm cultivation, even in the initial four years considerable revenue is obtained through the cultivation of intercrop. Revenue starts to climb steeply from fifth year and continues to increase annually until ninth year. In the following years, income begins to fluctuate but remains fairly stable until 19th year, after which it begins to decline due to the age of the (Over mature) trees.

This analysis involves evaluation of the financial indicators assuming defined percentage or absolute changes in the relevant inputs, considered. In this study the analysis is carried out by recalculating NPV>BCR and IRR for various assumed changes in the crucial factors listed above, for ex-
ample a 10 percent increase in some or the entire project costs. Comparing the resulting changes in the values of the financial indicators gives insights into how sensitive the project is to changes in each of the factors.

To examine the effect of risk factor over the cultivation of Oil Palm sensitivity analysis is used. In pessimistic direction the market revenue reduced by 10 percent, then the discounted total revenue declined from Rs.296982 to Rs.267285. But it did not change the discounted sum of cost Rs. 252047/- . Thus the net benefit of the farmer (NPV) is reduced from Rs. 44935/- to Rs. 15238/-. The Benefit Cost Ratio correspondingly reduced from 1.17 to 1.06 and IRR falls from 11.25 to 9.6 just nearer to the minimum required rate of return.

In the second direction the fertilizer, harvesting and labour costs increased by 10 percent , increases the discounted total cost from Rs.252047 to Rs.264497, reducing the NPV from Rs.44935 to Rs.32485/-. If all costs are increased by 10%, the discounted total cost raises from Rs. 252047/- to Rs. 277890/-. NPV, BCR and IRR fell to 19092, 1.06 and 9.09 from 44935, 1.17 and 11.25 respectively. Thus the financial indicators are more sensitive to a 10% reduction in the market price of Fresh Fruit Bunches than to the same proportionate increase in costs.

Sensitivity analysis, showing how NPV, BCR and IRR vary with % change in absolute market price (Rs.5600/-.). Trend lines are fitted where linear relationship exists.

The above scatter charts illustrates the sensitivity of the financial indicators to the actual market selling price of Fresh Fruit Bunches in Rs.5600. For NPV, the relation-ships are linear .The intercept on the (negative) Y-axis corresponds to the total discounted cost of the project. Rs252047, which would be the project's NPV in the absence of income from sales.

<table>
<thead>
<tr>
<th>FINANCIAL INDICATOR</th>
<th>STANDARD</th>
<th>10% REDUCTION IN REVENUE</th>
<th>10% INCREASE IN ALL COSTS</th>
<th>10% INCREASE IN FERTILIZERS, HARVESTING AND LABOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPV(%)</td>
<td>44935</td>
<td>15238</td>
<td>19092</td>
<td>32485</td>
</tr>
<tr>
<td>BCR</td>
<td>1.17</td>
<td>1.06</td>
<td>1.06</td>
<td>1.12</td>
</tr>
<tr>
<td>IRR</td>
<td>11.25</td>
<td>9.6</td>
<td>9.09</td>
<td>10.62</td>
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</tbody>
</table>

FINDINGS
The financial assessments indicate that oil palm cultivation is not commercially viable and a profitable investment for farmers in Krishna District. In the standard scenario adopted as the basis for the calculations of financial indicators, the NPV is well above zero and the BCR of 1.17 implies a substantial return per unit cost which is low due to the high maintenance costs of oil palm plantation. The IRR of 11.25 is just above the current market interest rate, and indicates a low rate of return. The financial indicators are more sensitive to a 10% reduction in the market price of Fresh Fruit Bunches than to the same proportionate increase in costs. The financial indicators are more sensitive to the Market price of Fresh Fruit Bunches than the costs. So the market price should be fixed at least equivalent to the costs.

One of the main constraints on farming in Krishna district is the limited areas of land that individual farmers own, which means that most of them plant just one hectare. Given the income levels of many of the farmers interviewed, a particular drawback of oil palm cultivation would appear to be the extremely high establishment costs in the first year. This may be unattainable for some potential cultivators, especially when combined with the total lack of revenue during Years 1–3. Nonetheless, many do choose oil palm because it provides a slightly better income than fruit and vegetables.

On the other hand, even though farmers can get return in the form of intercrop in the non-revenue period, all the farmers are not investing on intercrops.

SUGGESTIONS
Thus, in order to enable cultivators to maximise their farming incomes, present work indicates a need for intervention by the government's Agricultural Department to set market prices in such a manner that they give return more than cost of cultivation for the farmers, and provide extension services to encourage intercropping.

Timely credit should be made available to the Oil Palm farmers through co-operatives and other financial institutions to enable them to use requisite inputs so as to increase production of oilseeds.

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Easy access to Institutional finance should be provided to Oil Palm cultivators in order to prevent them from going for non- institutional sources which levy heavy charges.

CONCLUSION
The sustainability of oil palm cultivation is the need of the
hour for both farmer as well as processor and finally to the country. For this purpose, integrated management practices need to be developed by using the latest low cost technologies which will give sustainability to the oil palm industry as a whole.

LIMITATIONS OF THE STUDY AND SCOPE FOR FUTURE RESEARCH

There are certain limitations to the study. This study is confined itself basically to oil palm growers and excluded other oil seed cultivators. It is also confined to selected area of Andhra Pradesh i.e. Krishna District. Personal prejudices and biases of respondent may act as hindrance to the study. Non-response error has occurred in research process because a few respondents refused to give the information regarding the questions in brief because of their unwillingness. To overcome these limitations cited above care has been taken to make the responses more objective and accurate.

Since Palm Oil has several advantages and health protecting effects, necessary steps could be taken to enhance its production and consumption. Further studies can be helpful to increase the production and thereby make large quantities of this non-conventional oil available for human consumption. The present study focused on the financial problems of oil palm growers in Krishna district of Andhra Pradesh. These problems vary from one area to another area. Hence it can be said that there is scope for further research in other areas where the oil palm is cultivated. The present study is confined to the problems of Oil Palm growers. To increase the potential of our country in the oil sector, it is necessary to identify and resolve the problems of other Oil Seed growers. Similar studies can also be conducted in this regard.

ANNEXURE:

CASHFLOW PER ACRE OF PLANTATION OF 57 OIL PALM TREES WITH INTEREST RATE OF 9%
REFERENCE


6. Dr.Chadha.K.L (2006), Progress and potential of oil palm in India, Department of Agriculture and corporation.
