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A COMPARATIVE STUDY OF INDIGENOUS AND EXOTIC OIL PALM VARIETIES IN ANDHRA PRADESH: OPPORTUNITIES AND CHALLENGES OF OIL PALM CULTIVATION

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ABSTRACT

This study investigates the agronomic performance, adaptability, economic viability, and associated challenges of indigenous and exotic oil palm varieties in Andhra Pradesh, India. Recognizing the global significance of the oil palm industry and its growing importance in the region, our research aims to provide valuable insights for sustainable cultivation practices. The comparative analysis includes growth parameters, yield potential, climate resilience, soil adaptation, and economic considerations. Through a carefully designed experimental setup, we assess the performance of selected varieties over time, considering environmental impacts, social considerations, and ethical aspects. The study concludes with recommendations for farmers, policymakers, and stakeholders, aiming to guide decision-making and contribute to the responsible development of the oil palm industry in Andhra Pradesh. comparative study of indigenous and exotic oil palm varieties in Andhra Pradesh can provide valuable insights into the opportunities and challenges of oil palm cultivation in the region. Such a study may encompass various aspects, including agronomic performance, yield potential, adaptability to local conditions, economic viability, and environmental impact.

Keywords: Oil Palm Cultivation, Indigenous Varieties Exotic Varieties, Agro Economic Performance

1. INTRODUCTION

India is a major producer of oilseeds but relies heavily on imports for edible oils due to high demand. In 2013, India produced 9 million tonnes of vegetable oil but consumed double that amount. Around 40% of the demand is met through imports, with palm oil accounting for 73% of these imports in 2009–10. To address this issue, there has been a push to expand oil palm farming. The Indian government

introduced palm oil cultivation in 1985-86 through the Technology Mission on Oil Seeds, leading to large-scale farming. The Oil Palm Development Programme (OPDP) was launched in 1991-92 under the Technology Mission on Oilseeds and Pulses, aiming to cultivate 80,000 hectares of oil palm. This initiative was extended during the IX Plan, adding another 80,000 hectares. Andhra Pradesh is the leading producer, contributing 85% of the country's production, followed by Kerala (10%) and Karnataka (2%). Other states like Orissa, Tamil Nadu, Goa, and Gujarat also contribute smaller amounts.

2. OIL PALM'S ROLE IN THE OILSEEDS SECTOR: PROSPECTS IN ANDHRA PRADESH

Looking at the performance of Andhra Pradesh's oil seed output from TE 1990-91 to TE 201415, it is clear that the production showed an increasing tendency up to TE 1995-96, and then a continuous sharp reduction in production is noticed up to TE 2003-04. Production had a variable trend from TE 2004-05 to TE 2014-15. During the first decade, from 1980-81 to 198990, no major growth was reported in the area under rice, whereas a considerable negative growth was recorded in the area under coarse cereals. The impact of poor growth in rice and coarse cereals reflected on the area under food grains. The reason for negative growth in rice and coarse grains may be related to the irregular nature of rain fall. During the same decade, both the area and production of oil seeds increased significantly.

From 1990-91 to 1999-2000, there was a minor rise in the area under rice, while there was a decrease in the area under coarse cereals. The impact of negative growth in rice and pulse regions is shown in negative substantial growth in food grain area from 2010-11 to 2014-15. There is a negative substantial increase in the area of oil seeds and a positive not significant increase in the area of oil palm. There has been no discernible increase in the yields of oil seeds, horticulture crops, or oil palm.

Comparing across the districts, the growth of area under Oil Palm is reported to be negative in East Godavari and S.P.S. Nellore, while positive growth is observed in five districts ranging from 1.03 percent in West Godavari to 1.38 percent in Visakhapatnam. On the other hand, all districts showed a positive increase in Oil Palm yield between the two Triennia (TE 2005-06 and TE 2014-15). Except in the East Godavari district, the share of land under oil palm increased dramatically between TE 2005-06 and TE 2014-15. The area and production of oil seeds in Andhra Pradesh declined from TE 2005-06 to TE 2014-15. All districts, with the exception of West Godavari, showed a considerable decline in Area under Oil Seeds in TE 2014-15, compared to TE 2005-06. However, with the exception of three districts (viz., Vizianagaram, West Godavari, and S.P.S. Nellore), the remaining districts reported lower output in TE 2014-15 than in TE 2005-06. There has been a significant rise in the area, production, and yield of oil palm in the state of Andhra Pradesh from TE 2005-06 to TE 2014-15. A similar pattern can be seen across the districts.

3. INDIGENOUS AND EXOTIC SEEDLING PLANTATION

During 2011-12, the Department of Agriculture and Cooperation (DAC) of the Government of India launched a special programme on Oil Palm Area Expansion (OPAE) in eight identified states including Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Maharashtra, Mizoram, Orissa, and Tamil Nadu with an allocation of Rs. 300 crores. A Mission on Oilseeds and Oil Palm is proposed to be started during the

XII Plan period (2012-13 to 2016-17) by combining the existing Integrated Scheme of Oilseeds, Pulses, Oil Palm, and Maize (ISOPOM), Central Sector Scheme on Tree Borne Oilseeds (TBOs), and Oil Palm Area Expansion (OPAE). To cover the intended area, vast amounts of oil palm planting material (sprouts) have to be imported under the earlier operations.

To meet the planting material requirements proposed in the Oil Palm Development Programme (OPDP), the Government of India established seed gardens to improve indigenous hybrid seed production and identified exotic sources for imports. Oil palm hybrid seed production in India has begun at the exclusive 'Oil Palm Seed Gardens' that have been established in various sections of the country throughout time. The first seed garden, constructed at Palode (near Trivandrum, Kerala) in 1982, began seed production with base material from OPIL, Thodupuzha (basic breeding materials supplied from Malaysia and Nigeria). Subsequently, , in order to promote the indigenous production of planting material, TMOP sponsored the creation of oil palm seed gardens throughout the country. As a result, five new seed gardens have been established: one at the Directorate of Oil Palm Research (DOPR, Pedavegi), two at State Departments of Horticulture (in Andhra Pradesh at Rajahmundry and in Karnataka at Taraka), one at Oil Palm India Limited at Thodupuzha (a joint venture of the Governments of India and Kerala State), and one in the private sector (M/s Navabharat Agro Products Limited).

Owing of the ambitious Oil Palm Area Expansion (OPAE) initiative announced by the Government of India, it has become imperative to supplement indigenous seed production by creating more seed gardens. Three more seed gardens were planted in 2012 at Kabini (Department of Horticulture, Government of Karnataka), Morampudi (Department of Horticulture, Government of Andhra Pradesh), and Taraka (Taraka-II) (Department of Horticulture, Government of Karnataka), with production expected to begin in 2020.

Oil palm, once planted, lasts a long time (providing economic yields for more than 30-35 years), therefore any difference (quality concerns or faults) in the planting material will have a major negative impact on its sustainability. Quality checks are necessary from seed processing (mesocarp removal or depericarping, physical anomalies, moisture content, etc.), heating treatment (designed for dormancy breaking), during and after germination, primary nursery, secondary nursery, and ultimately at the time of shipping.

Statement of the problem: While there may be existing studies on oil palm cultivation, there might be a gap in comprehensive comparative studies specifically focusing on both indigenous and exotic varieties in Andhra Pradesh. Especially insufficient economic analysis, incomplete stakeholder perspectives, Limited Focus on Sustainable Practices: Inadequate Exploration of Market Dynamics Limited Attention to Socioeconomic Factors: When conducting your research, it's essential to delve into these potential gaps and design of this study to address them, contributing valuable insights to the existing body of knowledge.

4. OBJECTIVES OF THIS STUDY

1) To compare the agronomic performance of indigenous and exotic oil palm varieties.
2) To analyze the economic viability of cultivating indigenous and exotic oil palm varieties.

3) To identify the challenges and opportunities associated with oil palm cultivation in Andhra Pradesh.

5. REVIEW OF LITERATURE

Olagunju (2008) investigates the economics of palm oil processing in Southwest Nigeria. He has concentrated on medium-to-large-scale processers. The research aims to identify existing rural holders' processing procedures, assess the profitability of palm oil processing firms, and determine the factors influencing the processors' net return.

Rao (2009) focuses on the development of oil palm in Andre Pradesh in terms of production and productivity. The survey spans the districts of Andre Pradesh, from Nellore to Srikakulam. He has made efforts for oil palm growers, Science Department officials, businesses, and policymakers as golden palm under Indian conditions. He has proposed that the learning experience come from Malaysia and Indonesia. He came to the conclusion that farmers needed enough training and good technology implementation to cultivate oil palm.

Rethinam (2009) investigates recent achievements in oil palm from a global perspective. He has used a Three-Pronged Strategy to plan the industry's research and development efforts. The three tactics include a high-income approach to maximize land usage, a biomass utilization strategy to maximize non-oil biomass, and a value-added strategy to focus on high-value products such as oleo chemicals and phytonutrients. He proposed measures such as increasing productivity, improving the efficiency of ECO plantations, capacity development and community development, crop insurance, and strengthening the research infrastructure to meet the demand for economically viable, environmentally sound, and socially acceptable oil palm development.

Singh (2009) focuses on oil palm in India, with a particular emphasis on technological innovations, techniques of improving utilization efficiency, waste recycling and utilization, product diversification, and information on oil palm processing units in various Indian states. He mentions that Malaysia and Indonesia are the top producers and exporters of palm oil. Both account for more than 85 percent of global palm oil production. Potential states in India include Andhra Pradesh, Karnataka, and Tamil Nadu. He discovered that there has been significant progress in oil palm production, processing, and utilization around the world, including India.

Kochu Babu (2008) conducted comprehensive research on the initiation of oil palm research, the current setup of oil palm research, research achievements in crop improvement, crop production, crop protection, harvesting, and post-harvest technology, technology transfer, ongoing research programs, and future strategies for improving oil palm research in his study on oil palm Research in India: A National Perspective. He believes that the fact that oil palm is a perennial and completely new crop introduced under irrigated conditions in various agroclimatic areas necessitates rigorous planning and execution of appropriate research programs.

M. A. Elsadig (2009) investigated the social and economic basis of oil palm production in peat soil in their paper "Financial Assessment of Oil Palm Cultivation in Selangor, Malaysia." According to the findings of their investigation, chemical inputs are more essential than labor costs in determining financial output. So long as growth conditions, costs, and selling prices do not fluctuate much, oil palm production is lucrative.

Rajendra Prasad and colleagues (2010) estimate the impact of the WTO on oil seed output and productivity in Andhra Pradesh by predicting growth patterns and the extent of instability. The study found that growth performance of oil seed output was stronger before WTO than after WTO, although it was accompanied by a significant degree of unpredictability.

Madhusudhana Rao (2008) highlighted mandals for oil palm development programme and execution of Technology Mission on Oilseeds and Pulses (TMOP) in his essay on Oil palm development programme in Andhra Pradesh focused on oil palm Act. His identify is that Andre Pradesh was the first state to draft and publish an oil palm legislation in 1993, which provided regulation for oil palm cultivation, processing, and related things. He also stated that 227 mandals in 8 districts have been designated as factory zones for oil palm firms and processors. His conclusion is that with sufficient care, commercial growth of oil palm can be effective.

Noormahayu. M. N., Khalid. A.R. and Elsadig (2009) investigate the economics of oil palm cultivation on peatlands in Selangor, Malaysia. They are detailed analyses of the social and economic foundations of oil palm cultivation in the research region. They arrived at the CobbDouglass Production function model for oil palm financial output in terms of chemical input and manpower costs. Chemical inputs are more essential than labor costs in determining the level of financial output, according to the findings. Oil palm agriculture has been determined to be a beneficial investment as long as growth circumstances, costs, selling prices, and interest rates do not alter significantly.

Rethenam (2008), the oil palm was introduced as an ornamental palm in India throughout the nineteenth century. During the 1970s and 1980s, the crop was designated as a forest land plantation crop in Kerala and Little Andaman. Following that, the crop was grown by small, medium, and large farmers. During this time, the crop was grown in eleven Indian states. During that time, a substantial number of farmers switched from low-value labor-intensive crops to oil palm. He stated that the Society for the Promotion of Oil Palm Research and Development (SOPOPRAD) was established to discuss common challenges as well as to learn about technology transfer, programs identified, and solutions discovered in the industry.

6. METHODOLOGY

The current study is based on secondary data. Secondary data is gathered from numerous public and unpublished sources, as well as from state and district agriculture departments. The Department of Agriculture collects information on Palm Oil Areas under Indigenous and Exotic variations in each district.

7. DATA COLLECTION

7.1. OIL PALM AREA, PRODUCTION, AND PRODUCTIVITY - INDIGENOUS VS EXOTIC VARIETIES

Each household grows 6.03 acres of oil palm on average. Large farmers have the highest land allocation with 12.61 acres, while marginal farmers have the smallest allocation with 1.81 acres, all of which are dedicated to oil palm. The total output value of Fresh Fruit Bunch per acre is Rs. 64,262 and Rs. 3,90,585 per household. Surprisingly, there is no discernible difference between the recommended MSP and the actual price obtained.

Households allot an average of 4.90 acres per family for exotic varieties. Fresh Fruit Bunch production per acre averages 10.35 tonnes, producing an output value

of Rs. 67,280 per acre and Rs. 3,29,680 per household. Surprisingly, marginal and tiny farmers produce more per acre than the average farmer. Again, there is no discernible difference between the recommended and actual values obtained per acre. Households devote an average of 7.26 acres per household for the indigenous variety, with large farms having the greatest allocation at 13.67 acres. According to reports, the average yield per acre is 9.57 tonnes, resulting in an output value of Rs. 62,223 per acre and Rs. 4,51,490 per household. There is no obvious disparity between the recommended MSP and the actual pricing received, as there is with the exotic variety.

Area and Production Under Oil Palm - Variety-Wise

Farm Size	Area under oil palm (per hh) (Acres)	Area under 01 palm as % of NOA	No of plants per acre	No of bunches per plant	Production of FFB per acre (Tones)	Value of Output per (Rs)	Value of output per hh (Rs)	Recommended MSP (Rs per tonne)	Actual price obtained Rs per tone
Exotic variety									
Marginal	1.78	98.34	57	13	10.59	68865	122500	6500	6500
Small	3.68	92.69	57	13	10.61	68980	253500	6500	6500
Medium	5.89	73.54	55	13	9.80	63702	374969	6500	6500
Large	10.89	51.93	57	13	10.78	70072	763296	6500	6500
Total	4.90	56.25	56	13	10.35	67280	329680	6500	6500
Indigenous variety									
Marginal	1.86	100.00	57	13	10.38	67461	125794	6500	6500
Small	3.29	82.87	57	12	11.21	72845	222368	6500	6500
Medium	6.06	75.65	57	13	9.82	63827	386750	6500	6500
Large	13.67	65.19	57	13	9.29	60365	825297	6500	6500
Total	7.26	83.35	57	13	9.57	62223	451490	6500	6500
Aggregate									
Marginal	1.81	100.00	57	13	10.51	68294	123802	6500	6500
Small	3.52	88.73	57	13	10.53	65458	240915	6500	6500
Medium	5.97	74.70	57	13	9.81	63765	380859	6500	6500
Large	12.61	60.12	57	13	9.67	62874	806424	6500	6500
Total	6.03	69.25	57	13	9.89	64262	390585	6500	6500

7.2. PRODUCTIVITY DIFFERENCES BETWEEN EXOTIC AND INDIGENOUS OIL PALM VARIETIES:

Oil palm productivity is reported to be 7.73 tonnes per acre in the peak season and 2.19 tonnes per acre in the lean season. The productivity differential between the two seasons is around 252.78 percent. The production gap between seasons varied throughout the groups, ranging from 5.11 tonnes per acre for medium farmers to 5.86 tonnes per acre for small farmers.

According to reports, peak season oil palm productivity is 7.73 tonnes per acre and lean season productivity is 2.19 tonnes per acre. The difference in productivity between seasons is around 252.78 percent. The seasonal output gap ranged from 5.11 tonnes per acre for medium farmers to 5.86 tonnes per acre for small farmers.

The peak season productivity of indigenous oil palm was found to be 7.29 tonnes per acre, whereas the lean season productivity was 2.3 tonnes per acre. The production gap between seasons varied by category, ranging from 5.15 tonnes per acre for medium farmers to 5.88 tonnes per acre for small farmers. The average production gap between peak season and offseason is stated to be 231.71%. The table below contains all of the above information.

Productivity Difference in Palm During Peak and Lean Season (tonnes per acre)

Farm Size	Marginal	Small	Medium	Large	Total
Exotic variety					
Productivity in the peak season	7.91	8.36	7.44	8.74	8.08
Productivity in the lean season	2.68	2.25	2.36	2.04	2.27
Productivity difference in the two season	5.23	6.10	5.08	6.70	5.81
% difference from peak season	195.16	270.69	214.83	328.62	256.12
Indigenous variety					
Productivity in the peak season	7.92	8.59	7.51	7.06	7.29
Productivity in the lean season	2.46	2.71	2.36	2.23	2.30
Productivity difference in the two season	5.46	5.88	5.15	5.38	5.33
% difference	221.79	217.20	217.90	241.33	231.71
Aggregate					
Productivity in the peak season	8.02	8.21	7.47	7.71	7.73
Productivity in the lean season	2.62	2.35	2.36	1.98	2.19
Productivity difference in the two season	5.40	5.86	5.11	5.74	5.54
% difference	206.37	249.10	216.39	290.31	252.78

7.3. ECONOMIC ANALYSIS OF PRODUCTION COSTS AND RESOURCE UTILISATION - INDIGENOUS VS. EXOTIC VARIETIES

The economics of production cost and resource use of indigenous and exotic oil palm cultivars are detailed. Taking into account the production expenses of both types of Oil Palm, the total production is stated as 989 quintals per acre, resulting in a total income of Rs. 64,262. According to reports, the entire cost per acre is Rs.37,921. The net returns are reported to be Rs.26341 per acre after deducting entire costs from total revenue. In contrast, the net returns after deducting variable costs from total income are Rs.31,751.

Looking at individual varieties, the net returns from exotic varieties after deducting total cost from total revenue are Rs.27,640, while the net returns from

indigenous varieties are Rs.25,463. On the other hand, the net returns after deducting variable costs from total revenue are indicated to be Rs. 33,773 in the case of Exotic varieties and Rs. 30,385 in the case of Indigenous varieties. Though there is a small difference in net returns (Rs. 2,277) between the two kinds, farmers are attracted to Exotic variants of Oil Palm due to the attractiveness of a larger quantity of production in the case of the Exotic variety than the Indigenous variety.

Net Returns Per Acre from Oil Palm (Rs per acre)

Farm Size	Exotic variety	Indigenous variety	Total
Average Area Planted (acres)	490.01	725.6	1215.6
Preparatory tillage	(0.0)	(0.0)	(0.0)
Manure & FYM	4856 (12.25)	4388 (11.94)	4577 (12.07)
Major and minor nutrients	11825 (29.83)	10409 (28.32)	10980 (28.95)
Transplanting and gap filling	(0.0)	(0.0)	(0.0)
Irrigation charges	2751 (6.94)	3161 (8.60)	2996 (7.9)
Intercultural operations	(0.0)	(0.0)	(0.0)
Plant protection chemicals	954 (2.41)	1047 (2.85)	1010 (2.66)
Weeding and plant protection measures	313 (0.79)	279 (0.76)	293 (0.77)
Harvesting and collection	(0.0.)	(0.0)	(0.0)
Pruning	(0.0)	(0.0)	(0.0)
Grading, storage, transport, packing	188 (0.47)	193 (0.52)	191 (0.5)
Market/mandi fee etc.	(0.0)	(0.0)	(0.0)
Interest on Working Capital#	(0.0)	(0.0)	(0.0)
Variable labour cost	12620 (31.84)	12361 (33.63)	12466 (32.87)
Total Variable Cost	33507 (84.53)	31838 (86.61)	32511 (85.73)
Fixed cost including planting material, field preparation cost, supporting material and irrigation setup (Amortized over the lifetime)##	6134 (15.47)	4922 (13.39)	5410 (14.27)
Total Cost	39641 (100.0)	36760 (100.0)	37921 (100.0)
Total Revenue	67280	62223	64262
Total Revenue - Total Cost	27640	25463	26341
Total Revenue - Variable Cost	33773	30385	31751
Output produced per acre (quintals)	1035	957	989

8. NET RETURNS ON INDIGENOUS VS. EXOTIC OIL PALM VARIETIES

8.1. EXOTIC VARIETY

Exotic variety yields 1035 quintals per acre. The per-acre production varied across categories, ranging from 980 quintals for medium farmers to 1078 quintals

for large farmers. Furthermore, the reported average total cost per acre is Rs. 39641. The overall costs per acre varied throughout the groups, ranging from Rs. 38,586 for large farmers to Rs. 42,174 for small farmers. The average net returns after deducting total costs from total revenue are reported to be Rs. 27,640, with net returns ranging from Rs.24,663 for medium farmers to Rs.31,487 for large farmers. On the other hand, net returns after deducting variable costs from total revenue ranged from Rs.30,646 for medium farmers to Rs.38,929 for large farmers. In addition, marginal and small farmers report higher labor expenses than medium and large producers.

8.2. INDIGENOUS VARIETY

The indigenous type of Oil Palm has a recorded output per acre of 957 quintals. Looking at different categories, the yield per acre ranged from 929 quintals for large farmers to 1121 quintals for small farmers. The overall cost per acre is stated to be Rs.36,760, with the cost varying by category, ranging from Rs.36,569 for wealthy farmers to Rs.38,990 for marginal farmers. Net returns are reported to be Rs. 25,463 after deducting entire costs from total revenue. Net profits ranged from Rs.23,796 for large farmers to Rs.30,407 for small farmers on average and across categories. The net returns after deducting variable costs from total revenue, on the other hand, accounted for Rs.30,385 and ranged from Rs.29,344 in the case of medium farmers to Rs.34,578 in the case of marginal farmers. Medium farmers reported higher labor expenditures per acre than other farmer groups.

Net Returns Per Acre from Oil Palm – Exotic Variety (per acre)

Farm Size	Marglnal	Small	Mediutn	Laroe	Total
Average Area Planted (acres)	46.25	102.90	188.36	152.50	490.01
Preparatory tillage	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Manure & FYM	4512	5898	4868	4242	4856
	(11.30)	(23.26)	(19.30)	(16.09)	(12.25)
Major and minor nutrients	11668	14113	11757	10412	11825
	(29.22)	(33.47)	(30.12)	(26.98)	(29.83)
Transplanting and gap filling	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Irrigation charges	2638	2876	2893	2524	2751
	(6.61)	(6.82)	(7.41)	(6.54)	(6.94)
Intercultural operations	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Plant protectjon chemicals	1131	1039	952	844	954
	(2.83)	(2.47)	(2.44)	(2.19)	(2.41)
Weeding and plant protection measures	403	344	311	268	313
	(1.01)	(0.82)	(0.80)	(0.70)	(0.79)
Harvesting and collection	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Pruning	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Grading, storage, transport, packing	192	187	177	200	188
	(0.48)	(0.44)	(0.45)	(0.52)	(0.47)
Market/mandi fee etc.	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Interest on Working Capital#	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Variable labour cost	13227	13255	12098	12652	12620
	(33.13)	(31.43)	(30.99)	(32.79)	(31.84)
Total Variable Cost	33771	37715	33056	31143	33507
	(84,58)	(89.43)	(84.67)	(80.71)	(84.53)

Fixed cost including planting material, field preparation cost, supporting material and irrigation setup (Amortized over the lifetime)##	**6158 (15.42)**	**4458 (10.57)**	**5983 (15.33)**	**7442 (19.29)**	**6134 (15.47)**
Total cost	39928 (100.0)	42174 (100.0)	39040 (100.0)	38586 (100.0)	39641 (100.0)
Total Revenue	68865	68980	63702	70072	67280
Total Revenue - Total Cost	28936	26805	24663	31487	27640
Total Revenue - Variable Cost	35094	31264	30646	38929	33773
Output produced per acre (quintals)	1059	1061	980	1078	1035

Net Returns Per Acre from Oil Palm – Indigenous Variety (per acre)

Farm Size	**Marginal**	**Small**	**Medium**	**Large**	**Total**
Average Area Planted (acres)	31.70	62.50	193.90	437.50	725.60
Preparatory tlllage	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Manure &FYM	4593 (11.78)	5224 (14.05)	4884 (13.31)	4033 (11.03)	4388 (11.94)
	-	-	-	-	-
Major and minor nutrients	11920 (30.57)	14014 (37.68)	11669 (31.81)	9226 (25.23)	10409 (28.32)
Transplanting arld gap hlling	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
lrrigation charges	2650 (6.80)	2456 (6.60)	3662 (9.98)	3077 (8.41)	3161 (8.60)
lnter cultural operations	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Plant protection chemicals	1050 (2.69)	1053 (2.83)	989 (2.69)	1072 (2.93)	1047 (2.85)
Weeding and plant protection	386 (0.99)	347 (0.93)	304 (0.83)	250 (0.68)	279 (0.76)
Harvesting and collection	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Pruning	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Grading, storage, transport, packing	183 (0.47)	184 (0.49)	192 (0.52)	195 (0.53)	193 (0.52)
Market/mandi fee etc.	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
lnterest on Working Capital#	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)

Variable labour cost	**12099 (31.03)**	**12.261 (32.97)**	**12782 (34.84)**	**12208 (33.38)**	**12361 (33.63)**
Total Variable Cost	32882 (84.34)	35538 (95.55)	34483 (93.99)	30061 (82.21)	31838 (86.61)
Fixed Cost including planting material, field preparation cost, supporting material and irrigation setup including that of gestation period (Amortized over the lifetime)##	6107 (15.66)	1654 (4.45)	2203 (6.01)	6507 (17.79)	4922 (13.39)
Total Cost	38990 (100.0)	37193 (100.0)	36686 (100.0)	36569 (100.0)	36760 (100.0)
Total Revenue	67461	67600	63827	60365	62223

Total Revenue - Total Cost	28471	30407	27141	23796	25463
Total Revenue - Variable Cost	34578	32062	29344	30303	3038.5
Output produced per acre (quintals)	1038	1121	982	929	957

9. CONCLUSION

It can be observed that there is not much variation in cost of cultivation and net returns between Indigenous and Exotic varieties of Oil Palm. But a marginal variation in production is observed. The farmers have inclined to grow Exotic variety than Indigenous varieties, because of higher production in Exotic varieties than 72 Indigenous varieties. To popularise the Indigenous varieties of Oil Palm the following points may be adopted in future cultivation.

10. FINDINGS

1) **Cost Efficiency:** The study might reveal the cost efficiency of indigenous versus exotic oil palm cultivation, highlighting which method incurs lower initial setup and ongoing operational costs.
2) **Yield Discrepancy:** Findings could show the yield differences between indigenous and exotic varieties, indicating which one produces higher-quality oil or higher quantities per hectare.
3) **Market Viability:** Understanding the market dynamics could reveal which type of oil palm (indigenous or exotic) aligns better with market demands, pricing, and potential profitability.
4) **Environmental Impact:** The study might uncover the environmental implications of both cultivation methods, including soil health, biodiversity, and water usage, providing insights into sustainability.
5) **Government Policies and Incentives:** Analysis might highlight the influence of government policies, subsidies, or incentives on the economic feasibility and growth of oil palm cultivation.

11. SUGGESTIONS AND RECOMMENDATIONS

1) **Optimal Cultivation Methods:** Based on findings, there could be suggestions for integrating certain aspects of both indigenous and exotic cultivation methods to maximize yield and minimize costs.
2) **Market Strategy:** Recommendations might include strategies for farmers or stakeholders to align their cultivation methods with market demands and price fluctuations.
3) **Environmental Sustainability:** The study might propose methods to minimize the environmental impact of oil palm cultivation, suggesting best practices for sustainability.
4) **Policy Recommendations:** Suggestions might be provided for policymakers on incentivizing more sustainable and economically viable practices in oil palm cultivation.
5) **Research and Development:** Recommendations might focus on further research to enhance indigenous varieties or develop hybrid varieties that combine the strengths of both indigenous and exotic types.

1) The improved seed technology must be introduced to popularize the Indigenous varieties for dewing higher production to compete with the production of Exotic varieties. 3. Full subsidy must be provided for all inputs of Indigenous varieties until the varieties are popularized.
2) The New Modern Harvesting Machinery must be provided to all the farmers at subsidized rates.
3) Since all the farmers are not fully aware of the varieties, the extension staff of the department of Horticulture should conduct special training programmes in the villages at frequent intervals to make the farmers thoroughly acquainted with the varieties.

CONFLICT OF INTERESTS

None.

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