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Growing oil palm as strategy for environmental protection

Dr. IV Srinivasa Reddy and Dr. A Meena

Abstract
Oil palm is a perennial oilseed tree which can fix carbon continuously unlike the annual crops which have lesser duration to fix carbon and land be left fallow for some period. Moreover, increased cost of cultivation and more risk due to biotic and abiotic factors coupled with lesser labour availability are forcing the farmer to resort to perennial crops. Agriculture College, Aswaraopeta of Professor Jayashankar Telangana State Agriculture University, Telangana, is growing oil palm for Research and Demonstration to the farmers besides collaborating with the oil palm Factory and Nursery of T.S. Co-operative oil seeds Growers federation located adjacent/in the vicinity. The comparative study of oil palm growing in Aswaraopeta (Telangana) and Eluru (Andhra Pradesh) divisions revealed that location are not significantly differing as they are adjoining districts of Bhadradri Kothagudem of Telangana and West Godavari of Andhra Pradesh. Similarly, over the period of five years trends of oil palm production has been not significantly differing. Nevertheless, the yield from younger trees (five to eight years old) has been increasing significantly while that of older trees declining gradually necessitating cutting the old trees and grow new plantation in future. However, care should be taken to avoid deforestation and preserve biodiversity.

Keywords: oil palm, production, carbon fixation, environmental protection, % FFB

1. Introduction
Oil Palm (*Elaeis guinensis* Jacq.) is a native of Guinea Coast of West Africa. It belongs to family Palmae. Oil palm is commercially cultivated in Indonesia, Malaysia, Thailand, Nigeria, Colombia, India etc. Oil palm is the highest oil producer among perennial oil yielding crops. The oil palm cultivation in India is highly successful in West Godavari district in Andhra Pradesh and Bhadradri Kothagudem District in Telangana state. At all India level, Andhra Pradesh state ranks first in area expansion while Telangana ranks first in FFB (Fresh Fruit Bunch) and CPO (Crude Palm Oil) production per hectare. Andhra Pradesh and Telangana states together produce 96% of total production of FFB and CPO in India. Oil palm is a perennial oil seeds tree which can fix carbon continuously unlike the annual crops which have lesser duration to fix carbon and land will be left fallow for some period. Moreover, increased cost of cultivation and more risk due to biotic and abiotic factors coupled with lesser labour availability are forcing the farmers to resort to perennial crops. Estimates of emission by Germer and sauerborn (2007) [3] indicate that if tropical grass land is rehabilitated by oil palm plantations, carbon fixation in plantation biomass and soil organic matter not only neutralizes emission caused by grass land conversion, but also results in the net removal of about 135 Mg carbon dioxide per hectare from the atmosphere. Globally, carbon dioxide comprises about 57% of greenhouse gases and 17% of it arises from converting forest to other land uses. Hence it is essential not to deforest but for better land utilization by growing oil palm. The returns of palm biomass such as pruned fronds, empty fruit bunches and palm oil mill effluent to the agroeco system would increase the soil organic C by only 0.3 t ha-1 yr- (Shukla & Chandel, 2006) [4]. Oil palm also sequesters carbon from the atmosphere, which helps to reduce GHG. Results of studies conducted in Indonesia and revealed that a mature oil palm has a carbon density of 90 t ha-1 (Tomich *et al*. 2002; Casson *et al*. 2007) [1, 2]. Florencia B. Pulhin *et al.*, also conducted similar studies in Philippines and results revealed that a nine-year old oil palm plantation in the Philippines could sequester 6.1 t ha-1 yr-1 of carbon, with an estimated carbon density of 55 t ha-1. Present paper looks into the feasibility of growing oil palm.

2. Material & Methods
Agriculture College, Aswaraopeta of the Professor Jayashankar Telangana State Agriculture

University, Telangana, is growing oil palm for Research and Demonstration to the farmers besides collaborating with oil palm Factory and Nursery of T.S Co-operative oilseeds Growing Federation located adjacent/ in the vicinity. The area (hectares) of younger (five to eight years old) and trees (more than eight trees old) and their fresh fruit bunches (metric tonnes) were recorded and percentage were calculated which were analysed statistically in AGRISTAT programme. The data in MS excel is utilized for graphical representation.

3. Results & Discussion

Result given in table 1 were analysed statistically (presented in table 2) and the graphs pertaining to area (Fig 1) and FFB (Fresh Fruit Bunches) (Fig 2) were also included for understanding the trends in a better manner. The comparative study of oil palm growing in Aswaraopeta (Younger and older occupy 44.8 & 55.2 percent area and contribute to 25.0 & 75 percent FFB, respectively) and Eluru (21.5 & 78.6% FFB from 39.7 & 60.2% younger and older trees, respectively) divisions revealed no significant differences as they are of adjoining districts of Bhadradri Kothagudem of Telangana and West Godavari of Andhra Pradesh. Similarly, average percent areas (26.9,36.1,44.7 and 51.8 for younger and 73.1,63.9,55.2,53.2 and 48.2 for older trees) and %FFBs (13.2, 16.9, 24.1, 30.4 and 31.9 for younger and 76.8, 87.2, 83.1,75.9, 69.6 and 68.1 of older trees) over the period of five years did not differ significantly. Nevertheless, significant differences were observed with respect to the percent areas of young (42.6) and old (58.7) trees and their % FFBs (23.3 and 76.8, respectively). Co efficient of Variation (6.8 for area and 8.1 for FFBs) are low indicating the validity. Yield of younger trees has been increasing while that of older trees declining gradually necessitating cutting the old trees and growing new plantation in future.

Table 1: Percent Area (Hectares) and Production {Fresh fruit Bunches (metric tonnes)} of Oil palm

S. No.	Year	Percent Area (Ha)				Percent Production {Fresh Fruit Bunches (Metric tones)}			
		Aswaraopeta		Eluru		Aswaraopeta		Eluru	
		Younger	Older	Younger	Older	Younger	Older	Younger	Older
1	2015-16	27.94	72.06	25.89	74.11	12.37	87.63	13.93	86.67
2	2016-17	37.90	62.10	34.25	65.75	18.20	81.80	15.65	84.35
3	2017-18	48.98	51.02	40.43	59.37	27.46	72.54	20.68	79.32
4	2018-19	54.22	45.78	49.39	50.61	32.35	67.65	28.47	71.53
5	2019-20	54.81	45.19	48.74	51.26	34.75	65.25	28.97	71.03
	Mean	44.77	55.23	39.74	60.22	25.03	74.77	21.54	78.58

Table 2: Analyses of Variance of Percent A {Area (hectares)} and P[Production {Fresh Fruit Bunches (metric tonnes)}] of oil palm

S. No.	Source	Degrees of freedom	Sum of squares		Mean Sum of Squares		F Value		Significant (*)/Non significant (NS)	
			A	P	A	P	A	P	A	P
1	Locations	1	0.0	0.0	0.0	0.0	0.0	0.0	NS	NS
2	Years	4	0.0	0.1	0.0	0.0	0.0	0.0	NS	NS
3	Ages	1	1196.6	14308.0	1196.6	14308	72.2	1255.1	*	*
4	Interaction	4	1846.4	1084.5	461.6	271.1	27.9	23.8	*	*
5	Error	9	149.1	102.6	16.6	11.4				
6	Total	19	3192.1	15495.3						

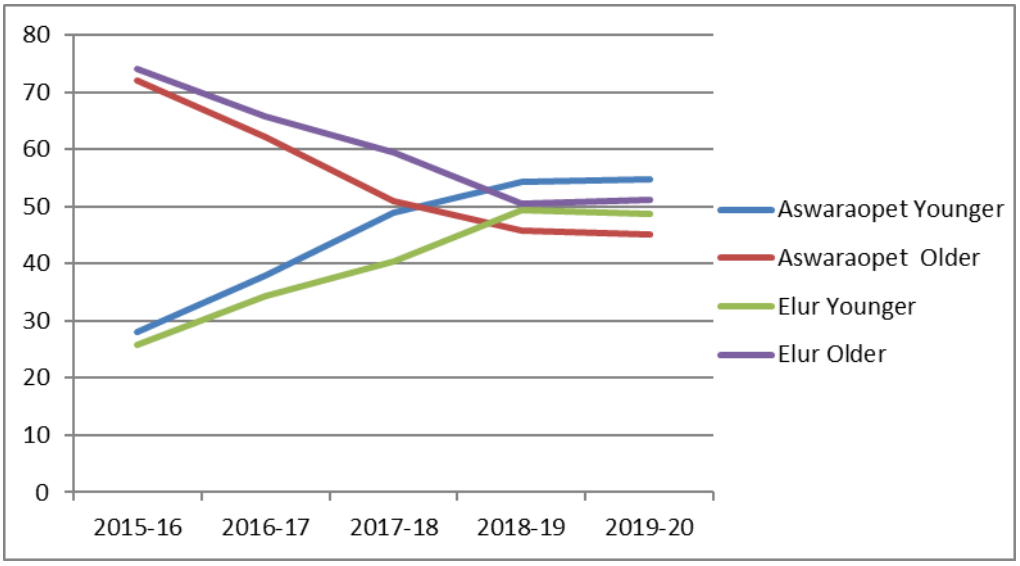

Fig 1: Oil palm production Areas (%) for the last five years in Aswaraopeta and Eluru divisions

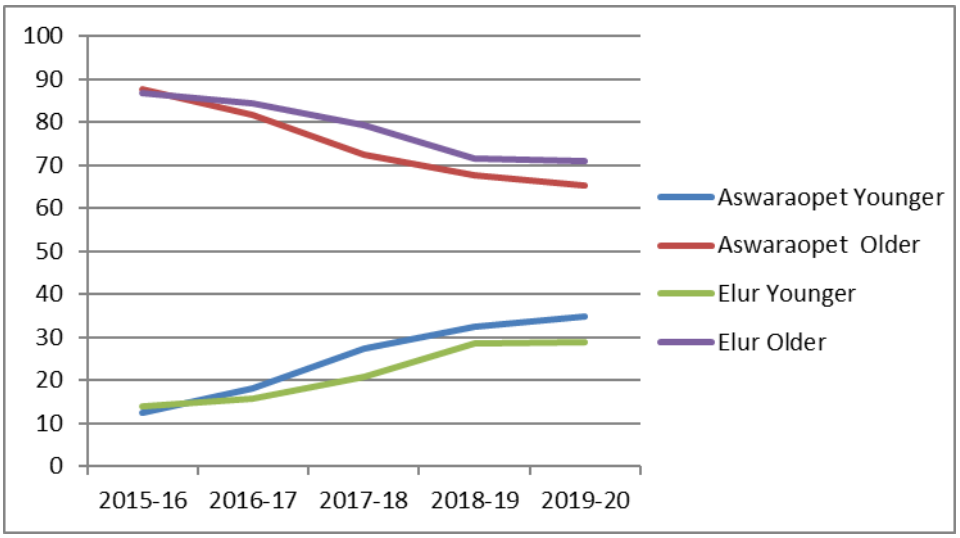

Fig 2: Fresh Fruit Bunches Production (%) for the last five years in Aswaraopeta and Eluru division

4. Conclusion

Present paper recommends oil palm growing for carbon sequestration. However, care should be taken to avoid deforestation and preserve biodiversity. Further research is recommended to enhance and validate the results of the study and employing statistical design could help provide more accurate computations for carbon sequestration and storage potential of oil palm plantations in the Telangana. The study's findings could help policy and decision makers craft climate change mitigation policies and programs in the India.

5. Acknowledgements

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