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DEMONSTRATION OF INTEGRATED CROP MANAGEMENT TECHNOLOGIES IN OIL PALM THROUGH FRONT LINE DEMONSTRATION IN BHADRADRI KOTHAGUDEM, TELANGANA, INDIA

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Abstract: Oil palm (*Elaeis guineensis* Jacq.) cultivation has expanded rapidly in recent years and is now the largest source of oils and fats in the world. Oil palm cultivation assumes significance for augmenting the indigenous availability of edible oil as it is the highest oil yielding perennial crop. With good planting material, irrigation and proper management, oil palm has the potential to produce 20-25 MT fresh fruit bunches (FFB) per hectare after attaining the age of 5 years. The effect of integrated crop management on yield and economics of oil palm through frontline demonstration at farmer's field of Bhadrai Kothagudem district, Telangana state during the year from 2018-19 to 2020-21. The demonstrated technologies were performed better in all years compare to farmer's practices. In the demonstrated plot, the average yield of three years was recorded 46.2 t/ha as compared to local practices 33.1 t/ha. The average percent increase in yield of the demonstrated plot was recorded 14.1 % during the three years of programs. The research practices gave higher average gross return (Rs. 206531/ha), net return (Rs. 148500/ha) with a higher B: C ratio (1:2.3) as compared to the framer's practices. By conduction front line demonstrations on farmer's field, there was a significant increase in the knowledge level of the farmer's and the majority of farmers showed a high level of satisfaction about ICM Technology in oil palm.

Keywords: Oil palm, ICM, Farmer practice, Yield, Economics

INTRODUCTION

The oil palm, *Elaeis guineenis* Jacq. is a monocotyledon of the order *Spadiciflotae*. It is from the Palmae family and the *Cocoineae* tribe. It originated in Africa, and its natural habitat is in the humid tropics, 158 on either side of the equator. Oil palm is a high yielding crop (more than 5 tonnes of oil per hectare per year) as compared to other oil yielding crops that are yielding around one tonne of oil per hectare. Oil palm tree produces edible palm-oil as well as palm kernel-oil. This oil palm is considered as golden palm due to its high yielding capacity. Oil palm produces 4 to 5 tonnes per ha of Crude Palm Oil (CPO) and 0.40 to 0.50 tonne per ha of Palm Kernel Oil (PKO) from 4th to 30th year of its productive life spam. Oil palm crop provides the excellent substitute of importing the oil. In India, oil palm is being cultivated in 13 states by covering about 3,15,000 hectares by 2017-18 under irrigated conditions. Potential states are Telangana, Andhra Pradesh, Gujarat, Karnataka, Tamil Nadu and Bihar[1].

There are ample opportunities for the development of oil palm in India which has

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diversified agro-climatic conditions and vast stretches of land with untapped underground water potential. The oil palm crop, though recently introduced in India, comes up well in many regions and 1.93 million ha. in 19 states could be brought under oil palm cultivation[2].

Poor crop management, imbalanced use of fertilizers, indiscriminate use of pesticides are major constraint, which leads to poor harvest. Thus, there is tremendous opportunity for increasing the productivity of oil palm by adopting improved production technologies. The poor crop management has led to increase in pest and disease incidence causing 50-60 per cent yield loss. The challenge is therefore to narrow the gap between the national average/ commercial yield and the yield potential, both through crop improvement and management[3]. Adoption of integrated crop management practices at proper time resulted better production as well as management of insect pest and diseases. Technology demonstration is the most effective way to show how a thing works, how to do the work, principles involved in an operation and to show the end results of the technology/ methodology adopted. The main objective of front line demonstrations is to demonstrate newly released crop production technologies and its management practices in the farmer's field under farming situations and at different agroclimatic regions[4 & 5]. Under this unique program, Krishi Vigyan Kendra, Bhadradri Kothagudem, has conducted the front line demonstrations (FLD's) on ICM in Oil palm in Thirty demonstration during 2018-19 and 2020- 21 in the jurisdiction of Krishi Vigyan Kendra. The present study has been undertaken to evaluate the difference between demonstrated technologies followed by the farmer's practices in Oil palm crop.

MATERIALS AND METHODS

The present study was carried out by the Krishi Vigyan Kendra, Bhadradri Kothagudem, (Telangana) in Kharif season in the ten farmer's field of Bhadradri Kothagudem district during 2018-19 and 2020-21. All 30 front line demonstrations in 12 ha areas were conducted in different villages with the active participation of farmers. Before conducting FLDs a list of farmers was prepared from group meetings and specific skill training was imparted to the selected farmers regarding a different aspect of cultivation[1]. The objective of FLD's was to transfer the integrated crop management technology to increase the productivity of Oil palm. Treatments included, technology refinement and farmer's practice. The technology refinement treatment was taken as recommended practice (demonstration) and conducted front line demonstration of plot size of 0.4 ha in ten locations at different farmers' fields during 2018-19 and 2020-21 in the both kharif and rabi season.

Technology refinement treatment included

1. Sanitation: Before on-set of monsoon, crown cleaning by means of removing the dead inflorescences, bunch stalks, aborted bunches etc. help in reducing the inoculums build up and harbouring of pathogen.
2. The Palm basins are to kept clean by regular weeding. For conserving the moisture and weed suppression in the basins, apply coconut husk or saw dust or paddy husk or cut leaves & male inflorescence of oil palm as mulching.
3. Application of 50-100 kg FYM or 100kg green manure per palm along with four equal split doses of fertilizers application starting from June/July at three month interval (1.2 kg of nitrogen, 600 g of phosphorus and 1.2 kg of potassium dose of fertilizer application). Application of five kg neem cake per palm. Broadcasting of the fertilizers around the clean-weeded basin, about 50 cm away from the palm base and incorporate into the soil with the help of fork. Supplementing of irrigation to the palms immediately after fertilizer application.
4. Application of 100 g of boron and 500 g of $MgSO_4$
5. Practicing of Ablation immediately after the appearance of inflorescences on the palms.
6. Digging and forking of the soil before

and after the monsoon will help in eliminating the various developmental stages of the beetle.

7. Avoiding of injuries on stems of palms as the wounds may serve as oviposition sites for the weevil. Fill all holes in the stem with cement
8. Setting up of attractant traps (mud pots) containing sugarcane molasses 2½ kg or toddy 2½ litres + acetic acid 5 ml + yeast 5 g + longitudinally split tender oil palm stem/logs of green petiole of leaves of 30 numbers in one acre to trap adult red palm weevils in large numbers[6,7,8,9 & 10].

The experiment was conducted with farmers practice in plot size of 0.4 ha each in 10 locations.

In the control plot, the same variety was planted with basal dose of DAP 50 kg/ha than top dressing of urea, spray of insecticides and fungicides at pest and disease appearance and maintained as farmers practice.

The data on yield were recorded from vegetative to crop harvest stage. The cost of cultivation, gross monetary return and benefit cost (B:C) ratio were calculated based on current market price. In addition to this, data on farmer practices were also collected from the equal area. The benefit cost (B:C) ratio was calculated based on gross return. The following formulae were used to calculate the parameters as suggested by [11].

1. Increase in yield = Yield from emo plot – Grain yield FP plot / Grain yield demo plot × 100.
2. Net Return = Gross Return – Cost of cultivation
3. Benefit / Cost Ratio = Net Return / Cost of Cultivation × 100.

RESULTS

The yield was higher in technology demonstration plot with 41.2 (t/ha), 45.8(t/ha), and 48.5 (t/ha) in 2018, 2019 and 2020 respectively, whereas lower yield was recorded in farmers practiced plots with 34.2 (t/ha), 36.7 (t/ha) and 38.7 (t/ha) in 2018, 2019 and 2020 respectively. The per cent of increase in technology demonstration plot when compared with the farmer's practiced plot was 11.3 and 13.8 and 14.5 in 2018, 2019 and 2019 respectively.

The net return was higher in technology demonstration plots with Rs. 138700/-, Rs. 142600/- and Rs. 148500/- in 2018, 2019 and 2020, respectively whereas net return was lower comparatively in farmers practiced plots with Rs. 128500/-, Rs. 132500/- and 136800 in 2018, 2019, 2020 respectively.

The benefit cost ratio (BC Ratio) was higher in technology demonstration plots with 2.2: 1, 2.3:1 and 2.3:1 in 2018, 2019 and 2020 respectively whereas benefit cost ratio (BC Ratio) was lower comparatively in farmers practiced plots with 1.8:1, 1.9:1 and 1.9:1 in 2018 2019 and 2020 respectively.

Table 1: Economic impact of experiment from 2018-19 to 2020-21

	2018-19		*2019-20*		*2020-21*	
	Farmer's practice	*Demo*	*Farmer's practice*	*Demo*	*Demo*	*Demo*
Yield (t/ha)	32.4	41.2	36.7	45.8	38.7	48.5
Per cent increase over farmers practice	-	11.3	-	13.8	-	14.5
Net Return (Rs.)	28500	38700	32500	42600	36800	48500
B:C ratio	1.8:1	2.2:1	1.9:1	2.3:1	1.9:1	2.3:1

CONCLUSION

The study concluded that the FLD programme is an effective tool for increasing the production and productivity of oil palm and changing the knowledge, attitude and skill of the farmers. This has not only resulted in socio-economic security but also helped in subsequently increase the income as well as the livelihood of the farming community. The per cent increment in yield of oil palm to the extent of 14.5 in demonstration over the farmers practice created greater awareness and motivated the other farmers to adopt the

improved package of practices of oil palm. This demonstration built the relationship and confidence between farmers and KVK scientists. Therefore, it concluded that the demonstrated plots experiment in preceding years can be recommend in wide scale to Bhadradri Kothagudem district.

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