

Evaluation and performance of integrated crop management in Chilli in Rainfed tracts of Prakasam district, Andhra Pradesh, India

Abstract:

Chilli is an important high value spice crop, its Integrated crop management is an important area for the welfare and livelihood security of farmers. Most of the farmers of Prakasam district of Andhra Pradesh are growing wide varieties and cultivars of chilli but so far the research findings on chilli integrated crop management were less aware. To know the yield potential of integrated crop management and its economic impact, evaluation on integrated crop management was conducted at Chandhaluru and Nallaguntla Guedm villages. The adopted package of practices was seed rate @1kg/ha, spacing 60x45cm, FYM 15t/ha, Urea, single super and muriate of potash 256:150:80 kg/acre. There was wide variation between integrated crop management and farmers practice in fruit yield and economic returns. The results on yield and economic returns indicated that chilli integrated crop management was found superior to farmers practice. Integrated crop management could obtain 124 fruits per plant and yield of 47.00q/ha, thrips incidence (24.3%), whitefly incidence (9.67 %) and fruit rot infestation (6.0%). Whereas, in farmers practice fruits obtained were 99 per plant and yield of 43.00q/ha, thrips incidence (44.67 %), whitefly incidence (28.33) and fruit rot (18 %) with a net income of Rs 220000/- and B:C ratio 1: 1.88 compared to farmers practice with a net income of Rs 113333/- with B:C ratio 1:1.36. The integrated crop management percent yield increased over farmers practices 8.5 per cent. It was concluded that integrated crop management could help to improve the economy of the farmers.

Key words: Chilli, cost benefit, Integrated crop management, net income, yield

INTRODUCTION:

“Chilli (*Capsicum annum* L.) belongs to the family Solanaceae and considered a very important high value spice crop of India. It is a self-pollinated crop which bears a pod like fruit and has a predominant position among the spices grown all over India. In India, chilli is

considered as an essential ingredient of diet for rich and poor families. Its fruits are used for its pungency spicy taste in diet and also a valuable foreign exchange earner” (Patel *et al.*,2001). “Dry red hot chilli powder is used as spice in curry, pickles, sauce, soups *etc.* Capsaicin extracted from chillies is used as an important ingredient in pain killers, balms and other homeopathic medicine. High pungency and attractive colour are the two important factors determining quality in chilli. In India, Andhra Pradesh is one of the important states for chilli cultivation. In Andhra Pradesh, it was grown in an area of 1.77 lakh ha with the production of 7.97 lakh ton by contributing to 19.86 % of area and 34.23 % of production of the country. However, the yield levels were lower Andhra Pradesh (4.58 t/ha)” (Geetha and Selvarani, 2017). “As the market price is much influenced by worldwide production and demand levels, the price fluctuation is high as compared to other crops. Rainfall being low in the state, the soil of the district is slightly saline, pH ranging from 6.5-7.9. The texture of the soil is mostly red soil. The district has a great potential for production of horticultural crops. Vegetable growing could help to increase the income of the farmers”. [11] Keeping the importance of chilli crop and its economic benefits, the study was conducted to find out green fruit yield/ha, Dry yield/ha, economic returns of the chilli

Materials and methods:

The present experiment was conducted at five farmers’ fields at Chandaluru and Nallaguntla gudem villages of Darsi and Dornala mandals during Rabi season of 2021 to 2022. ArkaMeghanaseeds were purchased from Indian Institute of Horticulture Research, Bangalore. The field was thoroughly ploughed, well decomposed farmyard manure was applied at the rate of 25t/ha and formed ridges and furrows. The seeds were sown in portraits during 2nd week of August and seedlings were transplanted on 3rd week of September 2021 to 2022. Krishi Vigyan Kendra recommended integrated crop management of chilli and local farmers practices were used for this study. The chilli seedlings were produced in shed net KVK, Darsi and distributed to the five identified farmers of Chandhaluru, Nallaguntla gudem and seedlings were transplanted at a spacing of 60 x 45 cm on one side of the ridges. The plot size was 50 cents and 1 acre area was cultivated for each demo. The recommended cultivation practices were followed as per the integrated crop management. Recommended dose of 30t of FYM, 500 kg neem cake and NPK 200:60:120 kg/ha was applied. Basal application of entire P. Whereas, N, K top dressing of 4 equal splits applied on 30, 60, 90 and 120 days after planting. Formula -4 were purchased and applied as foliar application during 45th, 75th and 90 days after transplanting. Soil

application of Neem cake @ 200 kg/acre at the time of last ploughing. “Yellow and blue sticky traps @ 30 numbers per acre were placed in different directions of the plot. Neem oil also purchased and distributed to the farmers to control the insect pest. Before conductance of the experiment, imparted trainings to the farmers on protray nursery raising, nursery management, transplanting of seedlings to the main field, application of growth regulators and harvesting methods etc. In addition to triconanol booster were also given for foliar spraying to increase the fruit set and quality (Mehraj *et al.*, 2014). The observation on plant height (cm), days to 50 per cent flowering(days), number of fruits per plant, average fruit weight (g), average fruit length (cm), yield per plant(g), estimated yield per ha (t/ha), net income (Rs.),B:C ratio and market preference were recorded”. [11] The data were analysed with appropriate statistical method was suggested by Panse and Sukhatme(1967).

Results and Discussion:

The results revealed (Table 1) that among the integrated crop management and farmers practice of chilli cultivation, integrated crop management recorded the highest values in growth, yield and cost economics characters compared to farmers practice. Highest plant height of 174.33 cm was recorded in integrated crop management, whereas in farmers practice it was 149.67 cm. Days to first flowering and day to first harvest, integrated crop management recorded the earliest days taken for flowering (49.67) and days taken for first harvest (78.33), whereas longer days were observed for flowering (54 days) and days taken for first harvest (84 days) was noticed in farmers practice. The finding was in conformity with Singh (2017) that the performance of the technology demonstrated was found to be better than the farmer's practice under same environment. Regarding yield characters, integrated crop management observed the highest number of fruits per plant (124) whereas the farmers practice registered the lowest number of fruits per plant of 99.67. Similar trend was noticed for fruit length and fruit weight also. Integrated crop management recorded the highest fruit length (10.37cm) and fruit weight (6.27g). The local check noticed the lowest values in fruit length (9.22 cm) and fruit weight (4.77 g). This finding was in conformity with the report that chilli was significantly different from one cultivar to another in number of fruit Obidiebube *et al* (2012). Integrated crop management recorded the highest yield per ha of 47.00 q /ha which was higher than the other crop management practices, whereas the farmers practice registered the lowest yield of 43.00q/ha. The same trend was noticed in yield per plant also. Integrated crop management recorded the

highest yield per plant of 920g. Whereas, the farmers practice registered the lowest yield per plant of 710 g. Demonstrated variety recorded the higher yield than farmers practice in French bean and clusterbean (Muthuramu, 2015; Rajamanickam, 2019). The yield variations were occurred amongst the genotypes, varieties and hybrids under varying field conditions have been reported by Mishra *et al* (2017).

Economics:

The Integrated crop management of chilli (Table 2) could obtain a net return of Rs.220000/- with benefit cost ratio 1:1.88 whereas the farmers practice could obtain only Rs.113333 /- as net income with benefit cost ratio 1:1.36. The wide variation in net return and benefit cost ratio was due to variation in the yield.

Conclusion:

Chilli integrated crop management was found to be better than farmers practice. Days taken for flowering (49.67), number of fruits per plant (124), yield per ha of 47.00q /ha low incidence of thrips (24.3 %), white fly (9.67 %) and fruit rot (6.0%) when compared with farmers practice days taken for flowering (54), number of fruits per plant (99), yield per ha of 43.00 q /ha, thrips (44.67 %), white fly (28.33) and fruit rot (18 %). Integrated crop management performed well and increased yield of 8.5 per cent with good market preference over the farmers' practices. The chilli Integrated crop management of chilli could be considered as a promising and suitable for Prakasam district of Andhra Pradesh which will help in the economy upliftment of the farmers. Thus, the chilli Integrated crop management could be selected for mass communication and popularization at farmer's field for getting higher returns.

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Table1. Performance and Integrated crop management and farmers practice in chilli during *Kharif* season

Particulars	Integrated crop management							Farmers practice						
	2020-21	2021-22	2022-23	Mean	SD	t-value	p-value	2020-21	2021-22	2022-23	Mean	SD	t-value	p-value
Plant height (cm)	168	182	173	174.33	7.09	4.64	0.0030	135	167	147	149.67	16.17	12.63	0.0100
Branches per plant	23	22	19	21.33	2.08	2.35	0.0010	13	16	18	15.67	2.52	9.15	0.0200
Days to first flowering	48	51	50	49.67	1.53	2.54	0.0100	54	56	52	54.00	2.00	8.61	0.1000
Days to first harvest	76	81	78	78.33	2.52	6.41	0.0240	84	86	83	84.33	1.53	6.61	0.0000
Number of fruits per plant	112	132	128	124.00	10.58	11.26	0.0300	98	83	118	99.67	17.56	20.2	0.0000
Average fruit weight (g)	6.9	5.7	6.2	6.27	0.60	5.46	0.2100	4.1	5.4	4.8	4.77	0.65	12.63	0.0300
Fruit length(cm)	9.7	10.5	10.9	10.37	0.61	2.85	0.0010	8.9	9.3	9.4	9.20	0.26	3.67	0.0100
Fruit yield per plant(g)	980	870	910	920.00	55.68	8.03	0.0010	740	610	780	710.00	88.88	4.64	0.0100
Yield per hectare(q)	59	42	54	51.67	8.74	5.78	0.0100	41	39	43	41.00	2.00	5.41	0.0000
Percentage of thripsincidence(%)	31	24	18	24.33	6.51	9.65	0.0300	56	43	35	44.67	10.60	9.63	0.1500
Whitefly incidence percentage(%)	12	9	8	9.67	2.08	20.42	0.0100	33	24	28	28.33	4.51	8.63	0.0200
Fruit rot incidence percentage(%)	0	5	13	6.00	6.56	20.28	0.0010	0	17	38	18.33	19.04	5.44	0.0300

Table.2 Cost of cultivation and economics in Integrated crop management and farmers practice in chilli.

Particulars	Integrated crop management				Farmers practice			
	2020-21	2021-22	2022-23	Mean	2020-21	2021-22	2022-23	Mean
Yield per hectare	43	42	56	47.00	38	39	52	43.00
Cost of cultivation	230000.00	240000.00	280000.00	250000.00	290000.00	310000.00	350000.00	316666.67
Gross Returns	430000.00	420000.00	560000.00	470000.00	380000.00	390000.00	520000.00	430000.00
Net returns	200000.00	180000.00	280000.00	220000.00	90000.00	80000.00	170000.00	113333.33
B:C Ratio	1.87	1.75	2.00	1.88	1.31	1.26	1.49	1.36

UNDER PEER REVIEW